SCHOOL OF PUBLIC HEALTH, COLLEGE OF HEALTH SCIENCES, UNIVERSITY OF GHANA, LEGON

CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN IN THE SHAI-OSUDOKU AND NINGO PRAMPRAM DISTRICTS, GHANA

BY

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DECLARATION

I hereby declare that this thesis is the product of my original independent research conducted in Greater Accra Region under the supervision of Professor Richard Adanu, Dr. Richmond Aryeetey and Dr. Amos Laar. I affirm that this work has neither been published nor submitted in whole or in part to any institution for any academic award. All references made to other researchers' works have been duly acknowledged.

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ABSTRACT

INTRODUCTION: The intended and continued use of contraceptives is critical for attaining individual reproductive health goals and the prevention of unintended births that may be subject to induced abortions. Women who eventually overcome barriers and adopt a contraceptive method, encounter challenges that result in discontinuation, switching, or method failure. The occurrence of discontinuation for reasons other than the desire to conceive or switching to less effective methods, places women at an increased risk of unintended pregnancies. Identifying the period within which any form of discontinuation or switching is likely to occur and the reasons influencing these, will facilitate the identification of opportunities for providing a more accurate guide to users and encourage the delivery of context–appropriate support to users of family planning services.

OBJECTIVE: This study sought to identify the occurrence of contraceptive discontinuation and switching among women in the Shai-Osudoku and Ningo Prampram districts, Ghana.

METHODS: Individual in-depth interviews with 20 women reporting for reproductive and child health care services at the district Hospital were undertaken. This was complimented by a retrospective survey of 1,114 women using a structured questionnaire that incorporated the contraceptive calendar to collect reproductive histories. Cox regression and life table analysis was used to estimate discontinuation or switching.

RESULTS: All method discontinuation for any reason at 12, 24 and 36 months after starting use were 4%, 18% and 38% respectively. This study identifies increasing age, number of children, use of contraceptives between births, after childbearing and receiving counselling on methods were associated with the reduced risk of

contraceptive discontinuation at all times of follow up. A change in marital status and was associated with increased contraceptive discontinuation. At 12 months of use 10% of women discontinued because they are afraid of side effects of contraceptives, this increases to 37% at 24 months of use. Women who expressed fear of side effects of contraceptives had a 60% increase in the hazard of discontinuation at all times of follow up [HR=1.60 95% CI (1.17, 2.20)] whilst women who experienced side effects had a 50% increase in the hazard of discontinuation [HR=1.34; 95% CI (1.04, 1.75)] compared to women who discontinued for any other reason implying dissatisfaction with the method. A reduced need for contraceptives was associated with a 57% increase in the hazard of discontinuation at all times of follow up [HR=1.57; 95% CI (1.22, 2.01)]. Discontinuation of the pill was significantly increased compared to users of the male condom [HR=2.35, 95% CI (1.40, 3.97)] and compared to all other methods [HR=1.68; 95% CI (1.26, 2.25)]. Approximately 39% of switching occurred within the next month of use. Increasing number of children and counselling on methods were associated with a reduction in the hazard of discontinuation. The choice of switching to modern method was associated with an increased hazard at all times of follow up and the male condom was the preferred method for 20% of all switchers. Overall, 3.4% of pregnancies were identified as unintended, with the emergency contraceptive identified as the method with the most failures recorded.

CONCLUSION: A reduced need for contraceptives, fear of side effects and the experience of side effects carry an increased risk of discontinuation compared to all other reasons. The strength of the influence that fears of side effects play in method selection, discontinuation and choice of method switched to where switching occurs, is a critical but amenable element if allocated the necessary attention.

DEDICATION

To CJ and Kay

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LIST OF ABBREVIATIONS

DHS	Demographic and health survey
FP	Family planning
GDHS	Ghana Demographic and health survey
GFPCIP	Ghana Family Planning Cost Implementation Plan
MDG	Millennium development goals
SDG	Sustainable development goals
GHS	Ghana health service
GMHS	Ghana maternal health survey
ICDP	International Conference on Population and Development
LAPM	Longer acting more permanent methods
LAM	Lactational amenorrhea method
LNG-IUD	Levonogestrel releasing Intrauterine Device
Cu-IUD	Copper bearing Intrauterine Device
ECP	Emergency contraceptive pills
IUD	Intra-uterine device
HR	Hazard Ratio
CI	Confidence interval
CIP	Cost implementation plan
LAM	Lactational Amenorrhea
PAC	Post-abortion care
SAM	Short acting methods
STD	Sexually transmitted disease
STI	Sexually transmitted infection
UKAid	UK Aid direct

DALYS	Disability adjusted life years
UNDP	United nations development programme
UNFPA	United nations population fund
WHO	World health organization

DEFINITION OF TERMS

Unintended pregnancy: occurs when a woman who wants to postpone conception for at least two years or did not want to become pregnant at the time falls pregnant.

Fertility intentions: refers to an individual's desire to delay childbearing for two years or to conceive within the next two (2) years.

Contraceptive discontinuation: refers to the proportion of married women who have used a method of contraception in the past but are not currently using any method.

Contraceptive Switching: refers to current use of a different contraceptive method than what was used in the previous month.

Resumed use: Discontinuation that is followed by the resumption of use at a period later than 3 months post discontinuation is classified as resumed use.

Health concerns: health concerns were health related issues of importance and concern to participants but not eliciting of fear.

Reduced need: Women conveyed this reduced need either as infrequent sex, no sex, marital dissolution/separation and not being able to conceive (amenorrhea/menopause).

Disability adjusted life years: A measure of the burden of disease from mortality and morbidity which combine the years of life lived with disability and years lost due to premature death from a given health condition.

LAPM: longer acting more permanent methods of contraception, which protect the user from unwanted pregnancy for a longer duration ranging eg. Implant, female sterilization, IUDs.

Pill: Birth control pills are a kind of medication containing a hormone(s) that women can take daily to prevent pregnancy. This hormone works by keeping a woman's ovaries from releasing eggs.

Male Condom: Latex sheaths or coverings that fit over an erect penis

Female Condom: Sheaths, or linings, that fit loosely inside a woman's vagina, made of thin, transparent, soft plastic film

Injectables: an injection with progestin, which makes the mucus of the cervix impenetrable to sperm cells and also stops ovulation in most women. Injected into the muscle every 2 or 3 months, depending on product

IUD: a small, T-shaped device made of copper (Copper IUD) or flexible plastic (LNG-IUD) inserted into a woman's uterus.

Implants: Several sub-dermal implants consisting of polymer capsules or rods that deliver a progestin provide highly effective, long-acting contraception. Four types of progestin have been used in implants to date: Levonorgestrel, Etonogestrel, Nestorone, and Nomegestrol acetate.

Lactational Amenorrhea (LAM): is a method that offers physiological protection against pregnancy evolving from exclusive breastfeeding that ultimately delays the return of fertility and menstruation. Temporary contraception for new mothers whose monthly bleeding has not returned; requires exclusive breastfeeding day and night of an infant less than 6 months old

Male Sterilization: Vasectomy: a surgical procedure blocking the vas deferens.

Female Sterilization: Blocking of the Fallopian tubes, so that sperm and egg cannot meet.

Withdrawal: Man withdraws his penis from his partner's vagina, and ejaculates outside the vagina, keeping semen away from her external genitalia

Periodic Abstinence: Calendar-based methods: monitoring fertile days in menstrual cycle; symptom-based methods: monitoring cervical mucous and body temperature

Emergency Contraception: Progestin-only pills taken to prevent pregnancy up to 5 days after unprotected sex

CHAPTER ONE

1.0 INTRODUCTION

Improving access to reproductive health services is a priority action for countries worldwide aimed at reducing maternal mortality (United Nations, 2017a; Scoggins & Bremner, 2017). The safe motherhood initiative, launched in 1987, identified family planning as a key strategy among others needed to reduce maternal mortality, especially in developing countries. The 1994 International Conference on Population and Development (ICPD), re-echoed the importance of family planning and highlighted "the basic right of all couples and individuals to decide freely and responsibly the number, timing, and spacing of their children, and to have the information and means to do so..." (United Nations, 2014).

Subsequent global actions such as the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) have advocated for universal access to sexual and reproductive health services, including family planning. All these initiatives seek to enable individuals to exercise control over their fertility and eliminate maternal mortality and morbidity (United Nations; WHO, UNICEF, UNFPA, World Bank Group, & United Nations Population Division, 2015; Scoggins & Bremner, 2017; United Nations, 2017a, 2017b).

Studies of fertility regulation have shown that the use of a contraceptive method, is the main means by which women achieve their fertility goals (Campbell , Sahin-Hodoglugil , & Potts 2006; Lule, Singh, & Chowdhury, 2007) . Globally, about 57% of sexually active women use modern methods of contraception; another 6% use traditional methods. In sub-Saharan Africa, the proportion of sexually active women

using modern methods is less at 24% whilst, traditional method use is 5% (Population Reference Bureau, 2013).

Despite improvements in increasing access to a range of family planning services to meet varying and changing needs, an estimated 225 million women in developing countries who wish to space or limit childbearing are still unable to do so (Singh, Darroch, Ashford, & Vlassoff, 2010; Singh & Darroch, 2012; Hindin, McGough, & Adanu, 2013; World Health Organization, 2013). Multiple barriers to contraceptive use among women have been identified. These include myths and misperceptions, method-related issues (including the experience of side effects or health concerns), cultural and religious beliefs, partner influence, limited access to family planning options, suboptimal family planning service delivery and an underestimated risk of becoming pregnant (Campbell et al., 2006; Darroch, Sedgh, & Ball, 2011; Alaii, Nanda, & Njeru, 2012; Hindin et al., 2013; Sedgh & Hussain, 2014).

Among women who eventually overcome these barriers and successfully adopt a contraceptive method, incorrect or inconsistent use usually manifesting as discontinuation by abandonment of use, switching, or method failure has been observed (Bradley , Schwandt , & Khan 2009; Curtis , Evens , & Sambisa 2011; Ali , Cleland , & Shah 2012; Modey, Aryeetey, & Adanu, 2014; Castle & Askew, 2015). These events of inconsistent use occur primarily due to dissatisfaction with the method and have been found to also occur among women who do not intend to become pregnant (Ghana Statistical Service , Ghana Health Service, & ICF Macro International, 2009; Modey et al., 2014).

Women who discontinue use of their contraceptive method for reasons other than the desire to conceive or who choose to switch to less effective methods, are at an increased risk of unintended pregnancies (Ali et al., 2012). Uunintended pregnancies precipitate more psychological and physical health challenges, including an increased risk of induced abortions that may be unsafe, poor health, and adverse economic and social outcomes (Geelhoed, Nayembil, Asare, Van Leeuwen, & Van Roosmalen, 2002; Lule et al., 2007; Sedgh 2010; Singh, Sedgh, & Hussain, 2010).

1.1 Fertility, Contraceptive use, Discontinuation and Switching in Ghana

Ghana's total fertility rate (4.2 births per woman) estimated by the DHS 2014 survey is an increase from the previous estimate of 4.0 in 2008 (Ghana Statistical Service et al., 2009; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). These estimates from the DHS 2014 further identify unplanned births at 31% (inclusive of mistimed 24% and unwanted 7%), a situation that fuels high fertility levels. Evidently, the total fertility rate (TFR), is 17% higher than it would have been, if unwanted births had been avoided (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

The increase in the TFR reported has intriguingly been accompanied by an increase in contraceptive prevalence (CPR) from 19% in 2008, to 27% in 2014. This increase however was not correspondingly attained by all regions (Ghana Statistical Service et al., 2009; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). The Greater Accra region that previously reported the highest contraceptive prevalence of 33% in 2008 showed a reduced prevalence of 29% in 2014 (Ghana Statistical Service, Noguchi Memorial Institue for Medical Research, & ORC Macro,

2004; Ghana Statistical Service et al., 2009; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015), a finding that implies some level of discontinued use among women within the Greater Accra region.

Although the proportion of women who indicate 'ever use' of contraceptive methods in Ghana has increased, there has been less continuity of use (Ghana Statistical Service et al., 2004; Ghana Statistical Service, 2009; Ghana Health Service, 2018). The Shai-Osudoku and Ningo Prampram districts within the Greater Accra Region, in their annual reports have shown a gradual increase in family planning adoption since 2013 (Ghana Health Service, 2014; Ghana Health Service, 2018). Nonetheless, although adoption is increasing, steady reductions in continuing users have been recorded from 2013-2016 by as much as 53% in Shai Osudoku to 28% in Ningo Prampram (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

In the 2014 Ghana Demographic and Health Survey reported, a contraceptive discontinuation rate of 24.7% at 12 months of use was estimated. The survey further highlights that only 4.5% of discontinuations occurred because of desire to become pregnant in the 12 months preceding the survey (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Furthermore, method-specific discontinuation highlighted variations in discontinuation by method type. It indicates the male condom as the method with the highest discontinuation observed (35%) (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

1.2 Conceptual framework

Contraceptive discontinuation is a dynamic process often initiated by the adoption of a contraceptive method. When an individual adopts a method, he/she is expected to maintain its use until the need for contraception is mitigated after which the individual ceases use. The ultimate adoption and use of a method of contraceptive is a process influenced by multiple factors that directly or indirectly guide the decision to use contraception (Vaughan, Trussell, Kost, Singh, & Jones, 2008; Ali & Cleland, 2010b). These factors play a critical role in determining adherence, discontinuation or switching and/or failure.

The framework, that has guided this study therefore, suggests that reproductive, demographic characteristics, health service delivery factors and other behavioural barriers act to motivate the adoption and continued use of a method of family planning (Figure 1, page 8). Existing evidence suggests that factors such as age, educational level, employment status, wealth index/economic status, place of residence, intention for use (spacing/limiting) family size, number of living children have been found to be associated with discontinued use (Blanc , Curtis , & Croft 2002; Steele & Curtis, 2003; Ali & Cleland, 2010b, 2010a; Curtis et al., 2011). Others, such as marital status and method type, have been identified to be more strongly related to continuity of use (Vaughan et al., 2008; Ali & Cleland, 2010b).

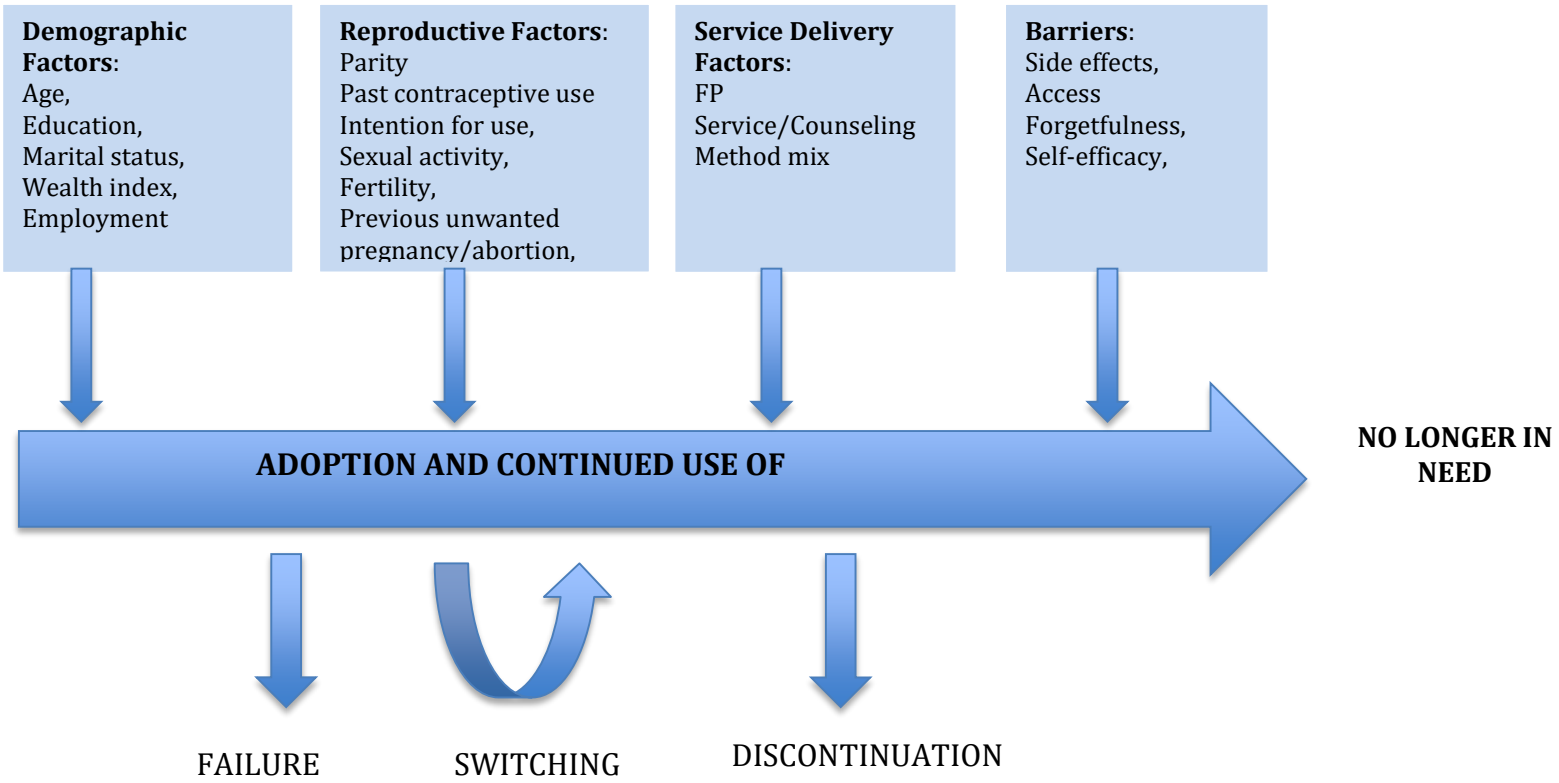
The framework identifies four expected outcomes following the adoption of a contraceptive method:(i) discontinuation of the method; (ii) switching to alternate methods; (iii) contraceptive method failure resulting in unintended pregnancy or (iv) sustained use of the method until the individual no longer has a need for contraception

(figure1, page 8). The framework proposes that an individual motivated to adopt and continue with their chosen method, will do so consistently, or discontinue its use once there is no more need, to achieve their ideal family size or reproductive goals (Curtis and Blanc, 2001). Discontinuation occurs either because of challenges in persisting with the method's use, or because the individual no longer has need for contraception and intends to become pregnant (Curtis et al., 2011; Castle & Askew, 2015). Switching methods is also acknowledged as a process that may either occur immediately or after a period of time. Switching is however measured within three months of cessation of a methods use. This is the generally defined period within which an individual is said to have switched methods (Ali et al., 2012).

Discontinuations are nonetheless not all negative events, particularly for some forms of method related discontinuations and switching (Castle & Askew, 2015) This is particularly so for situations where one ceases use of a chosen method due to a reduced need or no longer has need for contraceptives because of a desire to conceive. Other discontinuations may occur because of a challenge with using the method, but rather than remain exposed to unintended pregnancy, opts for another method in place of the initial method. In such situations discontinuation or switching is a positive event that occurs for the purposes of attaining reproductive goals or improving the contraceptive experience and keeps risk of exposure to unintended pregnancy to the minimum.

Method failure is identified as the individual becoming pregnant whilst they were using the contraceptive method. The occurrence of method failure is generally expected to be followed by a pregnancy that is mistimed or unwanted and is generally

estimated by the proportions of reported unintended pregnancies that occurred following discontinuation.



Adapted from Curtis and Blanc, 1996, Curtis and Blanc, 2001. & Ali and Cleland, 2010, Ali, Cleland and Shah, 2012.

Figure 1 Conceptual framework for analysis of contraceptive use dynamics

1.3 Problem Statement

The reproductive consequence of contraceptive discontinuation is an increased risk in accidental/unwanted pregnancies. An estimated 33million of such pregnancies occur globally with 5%-20% of these pregnancies ending in miscarriages, stillbirths or abortions (Ali et al., 2012; Castle & Askew, 2015; Jain & Winfrey, 2017). In developing countries, approximately half of all unintended pregnancies are terminated and most terminations carried out under unsafe conditions placing women at an increased risk of maternal morbidity or deaths (Haddad & Nour, 2009; Sedgh 2010; Sedgh & Hussain, 2014). Children born from unwanted pregnancies that are carried to term, are also faced with an increased risk of developmental delays and psychosocial challenges (Leite & Gupta 2007; Scoggins & Bremner, 2017).

Factors that hinder use of contraception whilst still in need, can encourage discontinuation, or switching to alternate methods that may either be less effective or used incorrectly. The increased exposure of women to unintended pregnancy after discontinuation or poor switching increases unwanted fertility (Bradley et al., 2009; Barden-O'Fallon, Speizer, Cálix, & Rodriguez, 2011; Ali et al., 2012). The continued use of contraceptives is therefore critical for the prevention of unwanted, mistimed or unintended births that are more subject to induced abortions (Curtis et al., 2011).

An anticipated 17% of unwanted births in Ghana could be avoided if women had their contraceptive needs met (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). This decrease could potentially minimize the consequences of unsafe abortion which is a leading cause of maternal mortality in Ghana (Ghana Health Service, 2007, 2009). Unfortunately, knowledge on the reasons for

discontinuation of contraceptives are limited and particularly for discontinuations assessed under the broad categorization of 'method-related' issues which include experience of side effects and health concerns (Castle & Askew, 2015).

Perceptions and experiences of side effects have been identified as a challenge to not only to initiation but continued use of safe and effective family planning among women in Ghana (Hindin et al., 2013; Staveteig, 2016). Existing evidence is limited in the ability to distinguish between experienced side effects and feared of side effects and ascertain how much these side effects contribute to discontinuations (Curtis & Blanc 1997; Khan , Mishra, Arnold, & Abderrahim, 2007; Ghana Statistical Service, 2009; Hindin et al., 2013; Ali , Park , & Ngo 2014; Jain & Winfrey, 2017). Previous studies which have explored side effects independently in Ghana, did not report the specific contribution to discontinuation in terms of proportion (Hindin et al., 2013; Staveteig, Mallick, & Winter, 2015). Thus, there is limited knowledge of the influence of barriers to the continuous use of effective contraceptives particularly among women in Ghana.

Available evidence in Ghana currently shows that of the estimated 25% of women discontinuing use within the first 12 months, less than 5% are due to a desire to conceive (Ghana Health Service, 2015). Within the Greater Accra region where contraceptive prevalence has declined, the Shai-Osudoku and Ningo Prampram districts have exhibited declining levels of continuing use of contraceptives following the adoption of methods (Ghana Health Service, 2018). The reasons why contraceptive discontinuation was occurring, the factors that increase the possibility of discontinuations and potential solutions to the specific issues that expose women

and their children to the health, social and economic risks associated with unintended pregnancies remain incomplete.

1.4 Justification

Effective fertility regulation can improve maternal health beyond simply reducing the proportion of births that are unwanted. Contraceptive use directly affects the number of maternal deaths, by reducing the number of times a woman is exposed to pregnancy, its risks and risks of induced abortions (ORC Macro, 2005). Evidence from Family planning 2020 data on Ghana, shows that total contraceptive use in 2017, prevented 388, 000 unintended pregnancies, averted 124,000 unsafe abortions and prevented 800 additional maternal deaths that would have occurred if contraceptives were not being used (UKaid, Bill & Melinda gates foundation, UNFPA, USAID, & United nations Foundation, 2018).

Overcoming identified barriers and reasons for non-use or discontinuation in developing regions is as important to increase family planning adoption, reduce discontinuations and minimize the consequences of unintended pregnancy by as much as 59% (Darroch et al., 2011; Sedgh & Hussain, 2014). From the DHS 2014 survey, the observed increase in total fertility insinuated a departure from the progress previously made towards fertility reduction. Although more recently, a reduction in TFR is observed, the accompanying reduction in continuing use of contraceptives is worrying. The observed reduction in fertility alongside reducing continued use of contraceptives denotes that although women are not persisting with contraceptive use, they are still exercising some control over fertility.

The knowledge that access to effective contraception is a key intervention to prevent unintended pregnancies and moderate the need for unsafe abortion raises concern over this occurrence (Coeytaux, Bingham, & Langer, 2011). With unsafe abortions estimated to account for 11% of maternal deaths in Ghana (Sedgh 2010), it is important to identify the spate of occurrence of discontinuation, reasons for its occurrence and the factors fueling intended non-use. Gathering this information will provide insight into contraceptive use dynamics and will assist in understanding the nature and significance of obstacles that individuals must surmount to exercise some form of control over their fertility and provide assistance where critical.

The Shai-Osudoku and Ningo Prampram districts were thus chosen for this study due to the observed discontinuation reported. The two districts were additionally, selected for the study because both districts are jointly monitored as district surveillance sites. This monitoring therefore makes available routine information on vital events (births, migration, deaths), and particularly socio-demographic indicators such as wealth status that would otherwise have needed to be collected and constructed (Ghana Health Service, 2014; Dodowa Health Research Center, 2014).

Identifying the period within which any form of discontinuation or switching is likely to occur will further facilitate the identification of opportunities for providing more accurate guidance to users and encourage the delivery of context–appropriate support to users of services that will address the specific anxieties related to discontinuation (Halpern, Lopez, Grimes, Stockton, & Gallo, 2013). The provision of a more tailored service could enhance uptake, minimize discontinuation while still in need, and consequently assist all women to achieve their reproductive health goals and reduce

unintended pregnancies and unmet need. This will ultimately contribute to improved maternal health outcomes, infant and child well-being overall (Darroch et al., 2011; Sedgh & Hussain, 2014; Castle & Askew, 2015).

1.5 Main Objective

To identify the frequency, reasons, and consequences of contraceptive discontinuation and switching among women in the Shai-Osudoku and Ningo Prampram districts of the Greater Accra Region of Ghana.

1.6 Specific objectives

1. To identify factors associated with discontinuation and switching among women of reproductive age in the Shai-Osudoku and Ningo Prampram district.
2. To explore user-reported reasons for discontinuation of contraceptives among women of reproductive age in the Shai-Osudoku and Ningo Prampram district.
3. To estimate method-specific and cause-specific discontinuation rates among women of reproductive age in the Shai-Osudoku and Ningo Prampram district.
4. To determine unintended pregnancies among women of reproductive age in the Shai-Osudoku and Ningo Prampram district.

1.7 Hypotheses

The study's primary hypothesis is derived from the findings of the DHS 2014 report that identified highest discontinuation among women who report use of the condom. The hypothesis proposed is thus:

H_o: There is no difference between discontinuation observed among women who use condoms compared to other methods.

Additionally explored were three hypotheses for the objectives of the study:

H_1: *Contraceptive discontinuation occurs equally among the different socio-demographic groups of Ghanaian women.*

H_2: *Contraceptive discontinuation does not occur for reasons other than the desire to become pregnant.*

H_3: *There is no difference in discontinuation observed among women by contraceptive method type.*

CHAPTER TWO

2.0 LITERATURE REVIEW

Introduction

This section presents the relevant literature in relation to the stated objectives of this study. It presents information family planning and contraceptive use on a global, regional and country level. It further provides detail of contraceptive use behavior: discontinuation switching and method failure, identifies existing gaps in literature and provides an assessment of the methods used in studying these events of interest. The information presented was from a literature search of online databases PubMed, Medline, Science direct and Google scholar. The search was done using search terms: maternal health, family planning, contraceptives, contraceptive use, contraceptive behavior, contraceptive dynamics, discontinuation, switching, method failure, unintended pregnancy and side effects. The search was expanded to include reports from demographic and health survey resource Measure DHS as well as published reports from the INDEPTH-Network HDSS, Ghana Health service and dissertation databases. Identified articles were screened for relevance.

2.1 Maternal Health – Global Interventions and Strategies

For decades, global interventions and strategies to reduce maternal deaths and disability have been proposed and implemented at various levels (Campbell, Sahin-Hodoglugil, & Potts, 2006). These interventions include family planning, access to reproductive services, antenatal care, postpartum care and access to safe abortions. Maternal health, as a result, has gradually been identified and positioned as a priority area in local and international policy frameworks and interventions (Cleland et al., 2006).

In 1987 the UNFPA, WHO and World Bank raised awareness about maternal mortality by jointly launching the safe motherhood initiative in Nairobi. The 1994 International Conference on Population and Development (ICPD), re-echoed the importance of family planning and highlighted “the basic right of all couples and individuals to decide freely and responsibly the number, timing, and spacing of their children, and to have the information and means to do so...” (United Nations, 2014).

The importance of the challenges faced in respect of maternal mortality was again underscored in 2000 when the International Community met to decide on the Millennium Development Goals (MDGs). One of which, the MDG 5, was specially focused on improving maternal health and set a target of reducing maternal mortality levels by three-fourths. In acknowledging the connection between maternal and reproductive health, an additional target of ensuring universal access to reproductive-health services was added to the MDG 5 (Coeytaux et al., 2011).

Further actions such as the Global Strategy for Women's and Children's Health and more recently the Sustainable Development Goals (2016–2030) and Family Planning 2020 summit (FP2020), sought to galvanize the momentum of progress and advocate for improving women’s health globally to eliminate preventable maternal deaths (United Nations; Say et al., 2014; Alkema et al., 2016).

An examination of progresses in reducing maternal mortality worldwide shows a reduction in annual maternal deaths worldwide from 385 000 in 1990 to about 216 000 in 2008 (Hogan et al., 2010; WHO et al., 2015). Although this provides evidence of progress in minimizing the threat of maternal deaths and disability, it reechoes the

potential benefits of directing efforts towards investing in the health of women globally and highlight need to devote resources to interventions that focus on safeguarding the lives and health of women everywhere (Sachs, 2012; World Health Organization, UNICEF, & United Nations Fund for Population Activities, 2012).

Current progress in improving data quality and its availability by countries have contributed to the availability of estimates of potential challenges and country's progress (WHO et al., 2015). Many have employed the use of civil registration systems, national and household surveys, censuses and specialized studies over the past decade (WHO et al., 2015). Additional tools such as the ImpactNow family planning cost implementation plan (CIP) costing tools assist country institution to understand cost and economic/health benefits associated with implementing the activities outlined on their roadmaps for family planning (Health Policy Project, USAID., & Marie Stopes International, 2014; USAID & Health Policy Project, 2015).

Demographic and health surveys (DHS) of men women and men in developing countries have also enriched available information by collecting extensive data on outcomes relating to sexual and reproductive health. Although access and outcomes appear improved in some cases, varying levels of inequalities were reported (UNFPA, 2017). The evidence indicates that, developing regions contribute the greatest to global maternal deaths with sub Saharan Africa equally contributing a greater burden of 66% (201 000) to maternal death in 2015 (WHO et al., 2015). Despite progress realized over time, there still exists a great need to amplify the advances towards the attainment of the MDG5 and facilitate the attainment of the Sustainable Development Goal 3: Ensure healthy lives and promote well-being for all at all ages, and which has

as its first target to reduce the global maternal mortality ratio to less than 70 per 100,000 by 2030 (WHO et al., 2015).

2.2 Family Planning and Contraceptive Use

Global access to contraceptive use has improved particularly in Asia and Latin America. Regionally however, this improvement has been slow to achieve in sub Saharan Africa where it is estimated at 28.5% (World Health Organisation, 2018). The use of modern methods of contraception is reported as 57.4% globally whilst Latin America and Asia report more than 70% (United Nations, 2017c). These improvements in access to contraceptive use have primarily stemmed from the interplay of health and social interventions to remove barriers and increase access (Campbell et al., 2006; Prata, 2009; United Nations, 2017a, 2017c). Particularly in Asia, interventions that have focused on investing in girl child education in Bangladesh for example, have delayed marriage and subsequently first pregnancy and fertility levels (World Bank, 2011; Sheikh & Loney, 2018).

Moreover, access has been improved by the provision of a range of reproductive health services tailored to suit different audiences. These include the use of public and private facilities, female extension and community based workers (Cleland et al., 2006). These have ensured the provision of quality, affordable and acceptable contraceptive services to women in need. The improved access is additionally attributable to the shift in preferences for smaller family sizes particularly in Latin America (United Nations, 2017b). This shift is evident in the method preferences of women i.e. the use of longer acting and more effective methods (Darroch & Singh, 2013). Evidently, women in Latin America, report the use of female sterilization as

their preferred method for limiting family sizes to achieve their fertility goals (Darroch, 2013; Darroch & Singh, 2013).

These improvement in contraceptive use highlight the critical role of improved socioeconomic conditions in tandem with greater family planning program effort (Lapham & Mauldin, 1985; Mwaikambo, Speizer, Schurmann, Morgan, & Fikree, 2011). Over time, the desire for a smaller family, and the ability for one to exert some control over the time and space intervals between births have greatly increased (Bongaarts & Westoff, 2000; Cleland & Ali, 2004; Castle & Askew, 2015). The use of modern contraceptives or natural techniques to limit or space pregnancies emerges as one of the various components of family planning services to assist couples achieve this.

Contraceptive use has multiple health and social benefits for both mother and baby. At international and local levels, improving access to safe and effective family planning services is identified as a cost-effective public health intervention for averting unwanted pregnancies, unsafe abortions, maternal and foetal deaths and disability resulting from complications of pregnancy or abortion (Levine et al., 2006; Khan et al., 2007; Lule et al., 2007; Singh, Sedgh, et al., 2010; Sedgh & Hussain, 2014). Expanding access to contraceptive options for women who wish to space or limit births has the potential benefit of reducing the number of unintended pregnancies occurring annually (Asamoah, Agardh, & Östergren, 2013). This ultimately has the potential to minimize mortality or disability resulting from pregnancy, labour or childbirth and consequently improve maternal and newborn health outcomes.

Contraceptive use helps to reduce the number of times a woman is exposed to pregnancy and the risks associated with each pregnancy (Cleland et al., 2006; United Nations Population Fund & PATH, 2006). Couples and individuals are now better positioned to preventing pregnancies too early in life, or occurring too late. This is particularly critical as pregnancies that occur later in the reproductive years have been identified to carry a higher risk of complications such as hemorrhage and hypertension (Lule et al., 2007; Say et al., 2014).

In a report by the WHO Technical Consultation group on birth spacing, a recommended interval of 24 months has been put forth (World Health Organisation, 2007). This was because of the potential of what is identified as 'residual risks' associated with shorter intervals. The supplementary benefits of a wider spacing interval lie in its contribution to longer periods of breastfeeding. This extended period can lead to a reduction in child malnutrition and retarded growth while helping couples achieve a desired family size where all can be cared for appropriately (Jain, 1989; Cleland et al., 2006; Jain & Winfrey, 2017; Scoggins & Bremner, 2017). It is also expected that this would help women avoid births at intervals associated with the highest risk of poor maternal, perinatal, neonatal, and infant health outcomes in general (World Health Organisation, 2007).

Improving access to safe and effective family planning services is thus identified as a cost-effective public health intervention for improving maternal and child health (Campbell et al., 2006; Levine et al., 2006; Khan et al., 2007; Lule et al., 2007; Singh, Darroch, et al., 2010; Singh, Sedgh, et al., 2010).

Local family planning programmes have provided access to family planning and reproductive health care services through local institutions in line with the regional commitments made towards global goals (United Nations, 2017b). While public/government sources have been the main providers in many countries, the private medical sector and associated social marketing programs have gained recognition as important sources also (Khan et al., 2007; Riley et al., 2018).

The findings of a contraceptive market survey in Ethiopia, Nigeria and the Democratic republic of Congo confirms the potential of the private sector in providing contraceptives through increased availability of multiple options c, lowered price and expanding method mix (Riley et al., 2018). They however indicate in the quest to improve on choices for achieving the SDGs and FP2020 goal, there is the need to regulate the private sector through partnerships to avoid a skewed method mix within countries owing to the wider availability of short acting methods through private source particularly pharmacies and drug shops.

In Ghana, the Family Health Division of the Ghana Health Service, provides reproductive and child health services through its three units: Reproductive and Child health, Nutrition and Health Promotion units. The Reproductive and Child Health division has as parts of its components family planning and the provision of information and counselling on human sexuality, responsible parenthood, pre-conceptual care and sexual health. Currently, the Ghana Family Planning Costed Implementation Plan, 2016–2020 (GFPCIP) that was developed in alignment with key sectoral goals, guides the programme of operation.

The GFPCIP has two operational objectives to be attained by 2020. The first, to increase the modern contraceptive prevalence rate (CPR) amongst currently married women from the current 22.2% to 29.7% by 2020 (33% all methods CPR in 2020). The second, to increase the CPR amongst unmarried sexually active women from the current modern CPR of 31.7% to 40% by 2020 (50% all methods CPR in 2020) (Government of Ghana, 2015). The GFPCIP outlines six strategic priorities intended to facilitate the attainment of its goal of increasing the number of Ghanaian women currently using modern contraception by 400,000 in 2020(Government of Ghana, 2015). These six priority areas are:

1. Demand creation
2. Service delivery
3. Contraceptive security
4. Policy and enabling environment
5. Financing
6. Stewardship, management and accountability

The areas are intended to be addressed through a number of prioritised activities that require financial/resource allocation for its implementation (Government of Ghana, 2015). The GHCIP therefore noting that not all activities are strategic priority activities, estimates cost for only a portion of the total CIP costs per year to facilitate planning and successful execution of the strategy.

Available tools form the ImpactNow Health Policy Project provide evidence that investments in family planning in Ghana aimed at achieving the anticipated GFPCIP goals can avert approximately 2.3 million unintended pregnancies, an excess of 800,000 abortions, 5,000 maternal deaths (USAID & Health Policy Project, 2015). It

also shows the capacity to prevent up to 30,000 child deaths all between 2016-2020. Additionally, the intervention will avert expenditures of almost $115 million USD on maternal and infant healthcare costs in the 5year period.

2.2.1 Types of contraceptive methods

The contraceptive options available are categorized into two groups. These are modern methods inclusive of the pill, condom, IUD, diaphragm, female sterilization, lactational amenorrhea (LAM); and traditional methods inclusive of periodic abstinence, withdrawal and other folk methods to meet the varying needs of individuals (World Health Organization, 2013).

A further classification of modern methods of contraception exists where methods are regrouped into two categories: longer acting more permanent methods (LAPM) by their nature inclusive of the IUD, implant, female sterilization and vasectomy (male sterilization) and short-acting methods which include the pill, condom and injectables (Peterson & Curtis, 2005; Jacobstein, 2007).

2.2.1.1 Modern Methods

2.2.1.1.1 Combined Oral Contraceptives

Combined oral contraceptives (COC) are pills that contain relatively low doses of the hormones progestin and estrogen. These hormones are naturally produced in a woman's body and work primarily by inhibiting ovulation. They can be started once one is reasonably certain that they are not pregnant. For breastfeeding women the COC can be started at six (6) months after birth if fully breastfeeding. The effectiveness of the COC is relative to use: it is 92% effective as observed with

typical use but less than 1 pregnancy per 100 women when no mistakes are made in pill taking (World Health Organization Department of Reproductive Health and Research (WHO/RHR) and Johns Hopkins Bloomberg School of Public Health/Centre for Communication Programs (CCP), 2011).

Aside from preventing pregnancy, COCs have health benefits associated with their use. They have been found to protect against endometrial and ovarian cancer and this protection continues for as long as fifteen (15) years after the user has stopped use. It also protects one from ovarian cysts, pelvic inflammatory disease and iron deficiency anemia (World Health Organization Department of Reproductive Health and Research (WHO/RHR) and Johns Hopkins Bloomberg School of Public Health/Centre for Communication Programs (CCP), 2011). The pill is also known to reduce menstrual bleeding problems, cramps, ovulation pain and symptoms of polycystic ovarian syndrome and endometriosis. Unfortunately pills are unable to provide the user protection against sexually transmitted infections. Fertility is expected to return immediately following the cessation of use (World Health Organization, Johns Hopkins Bloomberg School of Public Health, & United States Agency for International Development 2018).

2.2.1.1.2 Progestin only Pill

Progestin only pills are pills that contain low doses of progestin hormone that is similar to naturally produced progesterone. Progestin only pills (POPs) are also commonly called ‘mini-pill’ as they do not contain estrogen. They are however suitable for use throughout breastfeeding and can be taken as early as six (6) weeks after birth. POPs function primarily by thickening cervical mucus, which serves to

prevent the sperm from meeting the egg, or prevent ovulation from occurring. Effectiveness is estimated at 99% with common use. When the mini pill is taken regularly at the same time everyday, effective use is expected to further increase (World Health Organization et al., 2018).

2.2.1.1.3 Injectable Contraceptives - Progestin only Injectables

Depot medroxyprogesterne acetate (DMPA) and Norethisterone enanthate (NET-EN) contain a progestin similar to progesterone that is naturally produced. The DMPA is more commonly known as Depo, Depo-Provera, Petogen, 'the shot' or 'the injection'(World Health Organization Department of Reproductive Health and Research (WHO/RHR) and Johns Hopkins Bloomberg School of Public Health/Centre for Communication Programs (CCP), 2011). Injectables are given by intramuscular injection and function primarily by preventing the release of eggs from the ovaries. Effectiveness is 97% (3 pregnancies per 100 women) with typical use and increases with consistent timely use. DMPA helps protect against endometrial cancer and uterine fibroids. It also reduces the risk of sickle cell crises among women with sickle cell anemia (SCA). A delayed return to fertility is reported for the injectable, with fertility normally returning at four (4) months following cessation of use for DMPA and one (1) month for NET-EN (World Health Organization et al., 2018). These methods are however unable to protect one from STIs.

2.2.1.1.4 Implants

Implants are small flexible rods containing progestin that is similar to naturally produced hormone progesterone. The implants are placed just under the skin of the individuals upper arm. They are inserted via a minor surgical procedure to place

implants on the individual's upper arm. They are various types of implants defined by their period of effectiveness: Jadelle (2 rods inserted, effective for 5 years); Implanon (1 rod, effective for 3 years); Norplant (6 capsules, effective for at least 5 years). They function by primarily thickening the cervical mucus and preventing ovulation. Within the first year of use less than 1 pregnancy per 100 is expected. Expulsion of the implant is rare but can occur usually within the first 4 months following insertion. The implant has also been found to help protect against symptomatic pelvic inflammatory disease and may help protect one from iron deficiency anemia.

2.2.1.1.5 Intra-Uterine Devices - Copper Bearing Intrauterine device (Cu-IUD)

The copper-bearing intrauterine device (IUD) is a small flexible plastic frame that either has a wire or copper sleeves. It is inserted into a woman's uterus and works primarily by causing a chemical change that damages sperm and eggs prior to them meeting. It remains one of the most effective methods of contraception with less than 1 per 100 women over the first year of use and 2 per 100 after 10 years of use (World Health Organization et al., 2018). Fertility is expected to return immediately after IUD use is discontinued. The IUD does however carry a rare risk of perforation of the uterus wall. This may occur either by the IUD itself or of the instrument used in insertion. In the rare event that the woman happens to become pregnant with the IUD in place, miscarriage, preterm birth or infection may also occur. The Copper IUD is also effective for use as an emergency contraceptive within 5 days of unprotected intercourse. It can however still be inserted after five (5) days on condition that the date of insertion is within 5 days post-ovulation (World Health Organisation, 2015b, 2015a)

2.2.1.1.6 Lenovergestrel Intrauterine device (LNG-IUS)

The LNG-IUS is a small T-shaped plastic device inserted into the uterus that releases daily doses of Levonegestrel. It functions by thickening the cervical mucous to prevent the sperm and egg from meeting. Its effectiveness is estimated at less than 1 pregnancy per 100. Commonly reported are reductions in menstrual flow over time with some women experiencing no menstrual bleeding. IUDs do not offer protection from STIs/STD (World Health Organisation, 2015a, 2018).

2.2.1.1.7 Female sterilization

This is a permanent, lifelong method for individuals who do not want any more children. It is commonly called tubal ligation, bi-tubal ligation (BTL), minilap or 'tying the tubes'. It is undertaken by a trained provider who via one of two surgical approaches: mini laparotomy or laparoscopy (World Health Organization et al., 2018). Female sterilization prevents pregnancy because the fallopian tubes are blocked or cut hence eggs that are released from the ovaries cannot move down to meet sperm. This procedure is among the most effective methods of contraception but carries a small risk of failure resulting in less than 1 in 100 pregnancies a year. This risk is dependent upon how the tubes are blocked as cutting and tying the tubes is the most effective technique. Female sterilization has been found to protect against pelvic inflammatory disease.

2.2.1.1.8 Vasectomy

Vasectomy is a lifelong permanent form of contraception for men who do not intend to have any more children. It is performed by surgical procedure to block the tubes carrying sperm to the penis (vas deferens). This blockage may be done by cutting,

tying or cauterization. The functioning of vasectomy is primarily a result of blocking the vas deferens. This keeps sperm out of semen produced. Although the individual ejaculates semen, it does not contain sperm and thus cannot cause pregnancy (World Health Organization et al., 2018)

2.2.1.1.9 Condoms - Male condoms

The male condom is a sheath that fits over a man's erect penis mostly made of thin latex rubber. A few are produced from polyurethane and are commonly identified as non-latex condoms. The condom functions by forming a barrier that keeps sperm out of the vagina thereby preventing a pregnancy. The added benefit of the condom is that by acting as a barrier, it also keeps all other infections that may be present in semen or the vagina from infecting the other partner. The condom's effectiveness is 85% within the first year of typical use. This increases to 98% within the first year for consistent use. There is no associated delayed return to fertility with condom use (World Health Organization et al., 2018).

2.2.1.1.10 Condoms- Female Condom

The female condom is also a sheath that fits into a woman's vagina. It is mostly made of thin soft plastic. Some female condoms are made of latex and others of nitrile. The condom functions by forming a barrier that keeps sperm out of the vagina thereby preventing a pregnancy. The added benefit of the condom is that by acting as a barrier, it also keeps all other infections that may be present in semen or the vagina from infection the other partner.

2.2.1.1.11 Lactational Amenorrhea

Lactational amenorhea (LAM) is a temporary family planning method which functions based upon the natural effect of breastfeeding on fertility. The methods however has three key requisites: the mother must be fully breastfeeding the baby; the mother's monthly bleeding must not have returned at the time of using the method; and the baby must be less than six (6) month old (World Health Organization Department of Reproductive Health and Research (WHO/RHR) and Johns Hopkins Bloomberg School of Public Health/Centre for Communication Programs (CCP), 2011). The health benefits of LAM lies in its innate encouragement of the best breastfeeding patterns and the associated health benefits for the mother and baby.

2.2.2 Traditional Methods

2.2.2.1 Fertility awareness methods: Periodic abstinence/ Ryhthm

The use of fertility awareness methods (FAM) specifically relies on the knowledge of ones fertile period and menstrual cycle. It is commonly called periodic abstinence or natural family planning. For women adopting this method, they simply avoid unprotected intercourse on certain days of the cycle where risk of pregnancy is highest (Sinai, Lundgren, Arévalo, & Jennings, 2006). There are different ways of using the FAM: calendar based methods and symptoms based methods. Calendar based methods like periodic abstinence/rhythm require one to keep track of the days of the menstrual cycle to identify the start and end of the fertile period. These include the standard days method and calendar rhythm method. Symptoms based methods depend upon the billings approach and rely on observing the signs of fertility i.e. cervical secretions, basal body temperature. Effectiveness is 75% with typical use and

91%-99% with consistent use. The use of FAM does not delay fertility in any way. However it does not protect against STIs.

2.2.2.2 Withdrawal

Withdrawal is one of the least effective methods of contraception and relies on the ability of the man to withdraw his penis from the vagina for ejaculation to occur outside the vagina. It functions by keeping sperm out of the vagina. It is commonly known as 'coitus interruptus' or pulling out. The effectiveness of this method observed with typical use is 73% within the first year of use and this has the potential to be as high as 96% with consistent use. Withdrawal does not have any effect on delaying fertility and it also does not offer any protection from STIs.

2.3 Contraceptive Behaviour (The Dynamics of Contraceptive Use)

An individual's contraceptive use is characterized by multiple events such as adoption (the decision to begin using a contraceptive method), adherence/continued use or discontinuation (cessation of use of a contraceptive method), switching (the changing from one method to another), and misuse (interrupted, omitted or mistimed use of a contraceptive method) (Curtis & Blanc 1997). This method misuse, is at times classified as method failure, which is defined as episodes of contraceptive use that ended because respondents indicated that they stopped use because they got pregnant (Curtis & Blanc 1997).

2.3.1 Contraceptive Use

The stated goal of family planning 'to assist couples and individuals of reproductive age to achieve their reproductive goals and improve their general reproductive health'

in Ghana is realised through a number of policies. These policies were developed as part of population management and national development outlined in the Shared Growth and Development Agenda II: 2014-2017 (NDPC 2014). The policies include the National Population Policy, the Reproductive Health Service Policy and Standard, the 2000 Adolescent Reproductive Health Policy and the Reproductive Health Commodity Security Strategy (2011-2016) (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

Ghana's family planning programme seeks to provide information, education, and counselling to all individuals to enable them to make a free and responsible decision to start childbearing and space the children they choose to have. It also seeks to provide affordable contraceptive services in addition to making available a full range of proven safe and effective methods. The final objective of the Ghana family planning program is to provide information to all on how to manage sexually transmitted diseases or infections (STDs or STIs), including RTIs, HIV and AIDS.

In Ghana contraceptive use among married women is estimated at 22% for modern methods and 5% for traditional methods in 2014 (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015) an increase for modern methods compared to the estimate of 17% in 2008 but a reduction in traditional method use from 7% in 2008 to 5% in 2014 (Ghana Statistical Service, Ghana Health Service, & ICF Macro, 2009; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Contraceptive use among Ghanaian women has shown variation with age.

Lower contraceptive prevalence has generally been reported among the youngest (19%) and the oldest (18%) group of women. The explanation for this being that younger women are in the early stages of family building and require contraceptive less as pregnancy is desired. On the other hand, many of the oldest women are no longer fecund and do not require protection from pregnancy (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). The commonly used methods are the injectable (8.2%), implant (7.4%), the pill (4.3%) and periodic abstinence/rhythm (4.2%). Among sexually active unmarried women also, 31% use modern methods and 7.8% use of traditional methods was reported. Commonly used methods were the injectable (7.5%) the condom, (5.9%), implant (5.9%) and pill (4.9%).

Among women who adopt a contraceptive, four possible outcomes in relation to contraceptive use are expected: (i) discontinuation of the method; (ii) switching to alternate methods; (iii) contraceptive failure or (iv) sustained use of the method until the individual no longer has a need for contraception. Despite the essential contribution of the use of the various contraceptive options to reducing unwanted fertility and moderating maternal mortality and disability, differences exist in contraceptive use for a variety of reasons (Ali et al., 2012; Castle & Askew, 2015).

2.3.1.1 Method Preferences/ Method Mix

2.3.1.1.1 Traditional Methods of Family Planning

The contraceptive method mix has been identified to continuously evolve, with contraceptive preferences exhibiting variation by being skewed more towards one kind of method over another based on the availability and preferences (Leite & Gupta,

2007). Globally, as many as 20% of married women of reproductive age in some settings report currently using the traditional method periodic abstinence. This is sometimes also classified as fertility awareness based method. A number of deterrents to use of this method of family planning exist for potential users. Principal among these is that accurate knowledge of the menstrual cycle, and the period identified as 'safe' varies for most women (Sinai et al., 2006).

Similarly, findings show that among Ghanaian women, there has been a slight faltering in knowledge of the fertile period compared to previous advances in the earlier surveys (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). The evidence indicates that accurate knowledge of the fertile period even among women who use periodic abstinence has reduced from 70% to 54%. Among non-users of the method, it has reduced from 39% to 36% (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

Another notable deterrent to the use of this method to regulate fertility is the challenge of spurring support and corporation between partners (Sinai et al., 2006). Partner support is evidently an important determinant of correct and consistent use of these methods. Issues such as husband's satisfaction with the method emerged as one of the foremost reasons for method failure, challenges with compliance and potentially fuel method discontinuation or switching (Sinai et al., 2006).

2.3.1.1.2 Modern method mix

The diversity of country contexts highlights variations in method preferences among women. Assessing contraceptive method use in general reveals the predominant use

of female methods (United Nations, 2015; Khalifa, Abdelaziz, & Sakr, 2017). Globally, by types of modern methods, short acting methods such as the condoms and pills emerge dominant in Africa and European countries whilst the longer acting more permanent methods such as IUDs implants are popular in Asia and North America. The injectable emerges dominant in East and South Africa (United Nations, 2015; Khalifa et al., 2017).

Method preferences have been increasingly recognized as influenced by one or more factors within countries. In Brazil for example the general low use of hormonal method and preference for sterilization highlight the contribution of one or more factors identified as: cultural practices and beliefs, health services and methods available or fears and skepticism about contraceptive methods and their mode of functioning (D'Antonal, ChelekisI, D'AntonaI, & SiqueiraI, 2009).

In further assessment to identify the contribution of these contextual influences to method mix, uncertainty about method function and physiological effects of contraceptive on the body particularly in relation to fears about infertility resulting from method use are commonly raised. Similarly, Riley et al. (2018) reported the influence of method availability on method mix in Nigeria and the Democratic Republic of Congo (DRC). They identified that the preference for short acting methods and low utilization of LAPMs was a result of social franchising programs that increased access and availability of pills and condoms over LAPM which could only be sold but not inserted by providers as they had not been trained to do so (Riley et al., 2018).

In an earlier comparative analysis Cleland and colleagues (2006) identified variations in method preferences by user characteristics also. The preference for condoms was identified among 13 out of 18 sub-Saharan African countries from 1993-2001. In Kenya and South Africa however although condom use was also dominantly reported, dual use of pills and other non-barrier methods were also reported (Cleland et al., 2006). As suggested by Sinai et al. (2006) difficulties in getting partner support for the use of some methods results in the preference of one over another or incorrect use that could result in unintended pregnancy (Sinai et al., 2006). Findings from Kenya and South Africa provide support to this position by identifying the use of pills in addition to condom use because of anticipated difficulties in consistent use of the male condom by the partner (Cleland et al., 2006).

Opposition to use emerges in various forms, some report refusal to adopt hormonal methods with potential menstrual irregularities or discontinue methods that are associated with such occurrences. Further in-depth inquisition to these events highlight on accusatory inferences of infidelity in the event of missed periods or references to infection (Cleland et al., 2006).

2.3.2 Non-use of Contraceptives

Earlier findings from the DHS 2008 showed that knowledge of contraceptives was nearly universal among Ghanaian women. Among women who were not using contraceptives however, the most commonly reported reason for non-use and in some case an intention to not use contraceptive in future was the experience of side effects and health concerns (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). This was cited by 26% of women. Alongside other reasons such

as health concerns (8%), a desire for more children (8%) and menopause/hysterectomy (7%).

Studies based upon surveys of married women of reproductive age for reasons for unmet need found that poor knowledge about contraception was most common particularly in sub-Saharan Africa (Sedgh, Henshaw, Singh, Åhman, & Shah, 2007; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). More recently, the findings show that lack of knowledge about contraception has declined substantially as a reason for nonuse, and that knowledge of multiple methods is yet to improve (Khan et al., 2007). Health concerns and experience of side effects associated with modern contraceptive methods are also frequently reported.

2.3.2.1 Reasons for non-use

The available literature on barriers to contraceptive use identifies a myriad of obstacles to contraceptive use among women. Commonly reported are misinformation concerning methods, limited method choice, decision-making restrictions at health facilities, fear of side effects, health concerns particularly about cancer, and in some instances provider biases for contraceptive options (Serfaty, 1992; Campbell et al., 2006; Sedgh & Hussain, 2014).

Hearsay about side effects and misinformation were common reasons for non-use in Ghanaian women in the study conducted by Hindin et al (2013). Such heresay included beliefs based on distortions of the medical eligibility criteria that is employed by health workers in their selection of the most appropriate method (World Health Organisation, 2015b). The formed belief that blood tests were required for

clinicians to recommend the best method for an individual woman thereby implying that contraception was best gotten from the health center consequently detered others from seeking options for short acting method perhaps, from drug stores and pharmacy points (Hindin et al., 2013).

It is also documented that health providers by their action and beliefs may pose barriers to effective use of contraceptives among women (Campbell et al., 2006). Evidence from Ghana, supported this assertions by highlighting minimum-age and marital status restrictions that were enforced on clients reporting for family planning and contraceptive services. Although they indicated that these restrictions were imposed in a bid to prevent promiscuity and future infertility that they feared could result from method use, their actions highlighted poor knowledge and lack of consideration for the user's desires (Stanback & Twum-Baah, 2001).

The knowledge levels of service providers have also been raised as an issue that may hinder use of effective contraceptive methods. Evidence supporting this has been identified particularly among injectable users in Ghana and Kenya where poor knowledge of acceptable use of injectables during periods of postpartum amenorrhea emerged; and India where less than half (41%) of service providers had knowledge of emergency contraceptives (Stanback, Qureshi, Sekadde-Kigondu, Gonzalez, & Nutley, 1999; Stanback & Twum-Baah, 2001; Tripathi, Rathore, & Sachdeva, 2003). These findings recognize a critical need to enhance provider knowledge of contraceptives and their mechanisms of use. This is critical for the accurate counseling and selection of appropriate methods of contraceptives to suit individual needs.

2.4 Increasing Access and Acceptability of Methods

In addition to providing services via health facilities, improving access to contraceptive options and commodities, commercial outlets such as pharmacies, shops, and occasional social settings such as bazaars constitute the second most frequent way of providing services to the public (Cleland et al., 2006). In many developing countries, social marketing of condoms is nearly universal and have been identified as particularly suited for clients that prefer anonymity in access. A majority of clients who opt for short acting methods: male condom and pills, indicate commercial sources as their source of supply. In Ghana, the predominant source of supply of contraceptives has been pharmacies or drug shops (Cleland et al., 2006). The DHS 2014 survey confirms this finding it reports that 33% of users indicate that they obtain their methods from the private medical sector. The commonly utilised private sources are chemical or drug stores (22%) and pharmacies (7%) (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

The provision of contraceptive services via outreach and community-based provision has been established as useful in rural communities with limited access (Phillips, Greene, & Jackson, 1999). These community-based schemes have gained creditability through the use of local staff or volunteers that speak the language and are aware of customs and cultural practices of their clients and the communities (Phillips et al., 1999; Cleland et al., 2006).

Although increasing the proportion of individuals who adopt a contraceptive method and continue to use it consistently is critical to reducing adverse maternal and foetal outcomes, an alternate school of thought suggests that successfully boosting

adherence at the individual level has only shown small measurable effect that is difficult to sustain given the limited resources available (Blanc et al., 2002). Follow up studies lend support to this position by recognising that increases in contraceptive prevalence, have not always resulted in reduced levels of fertility (Dasgupta , Zaba , & Crampin 2015; Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). This has led some to question if the contraceptive prevalence rate is the best indicator of successful family planning programmes in all settings (Dasgupta et al., 2015).

A probable measure of programme success put forth may be the number of continuing users and unintended pregnancies reported. The proposed focus of programmes therefore, is to anticipate discontinuation of contraceptives by method type and user groups and assess switching to a more effective method in cases where discontinuation is identified to occur for reasons other than the intention to become pregnant (World Health Ogranisation, 2012).

2.5 Contraceptive Discontinuation

Contraceptive use generally evolves from an individual's decision to satisfy an unmet need. This unmet need is measured by the percentage of currently married sexually active women wishing either to delay future childbearing for at least two years or to stop further childbearing, but are not using any family planning method (Khan et al., 2007). The recent DHS 2014 estimates an unmet need among Ghanaian women of 30%. It further identifies among this unmet need, 17% of women that indicate a need for spacing and 13% that identify a need for limiting births (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

It is increasingly recognised that the decision to discontinue use of a contraceptive method may be based upon the individuals need at that particular point in time and is equally subject to change with time (Blanc et al., 2002; Youssef 2005; Lule et al., 2007; Ali & Cleland, 2010b).

The use of a contraceptive method for spacing or limiting purposes is however, an event characterized by multiple occurrences following the initiation of use. Contraceptive discontinuation may occur when an individual using a method stops even though a need still persists (Ali et al., 2012; Ali et al., 2014). Several studies that utilise large country DHS data have been conducted to understand contraceptive discontinuation (Scoggins & Bremner, 2017). Jain & Winfrey (2017) in their review of 34 DHS surveys identified high levels of discontinuation particularly among women with unmet need in sub Saharan African countries. Their estimation of 50% discontinuation implies that as many as 49 million women with unmet needs could stop using contraceptives (Jain & Winfrey, 2017).

Ali et al (2012) estimated discontinuation at 12 months of use in countries with available DHS surveys from 2006 to range from 17% in Zimbabwe to 54% in Paraguay. For sub-Saharan African countries discontinuation ranged from 17% in Zimbabwe to 45% in Morocco. A follow up review by Ali, Park and Ngo (2014) found that at 12 months, 13% of users discontinue IUD methods and 9% of these women indicate some form of method related reason for discontinuation. They also reported that 12% of women who discontinue use of their contraceptives become pregnant at three months following discontinuation, whilst about 25% of then remain at risk of pregnancy from non-use of contraceptives (Ali et al., 2014).

It has been estimated that about 33% of unintended births recorded in 36 developing countries that had DHS information available by 2014 were contributed by women who had discontinued use (Jain & Winfrey, 2017). Only 3% of women indicated the reason for discontinuation as the desire to become pregnant (Jain & Winfrey, 2017). Women who fall pregnant after discontinuation of a contraceptive despite not wanting to become pregnant are more likely to resort to abortions that may be unsafe when they experience an unintended pregnancy. Maternal morbidity is a much more common consequence of unsafe abortion than mortality (Grimes et al., 2006). With abortions identified as one of the leading causes of maternal mortality in Ghana, preventing unwanted pregnancies becomes an important step in achieving these reproductive health targets (Ghana Health Service, 2007, 2009).

2.6 Determinants of contraceptive use/discontinuation

2.6.1 Reasons for discontinuation

The availability of contraceptive use histories or data collected by the demographic and health survey (DHS) have been hailed as an opportunity to study contraceptive discontinuation in a more comprehensive manner (Ali et al., 2012). A large number of studies on contraceptive use discontinuation have used DHS data due to its population based approach that provides a representative sample of women to be studied (Khan et al., 2007; Bradley et al., 2009; Ali & Cleland 2010c). The availability of this information has facilitated the generation of knowledge on discontinuation and enhanced the level of analysis performed in these studies.

The identification of several factors that are associated with and influence contraceptive use and discontinuation have highlighted upon background factors such

as age, educational level, employment status, wealth index, place of residence, intention for use i.e. spacing or limiting family size, number of living children, decision-making concerning contraceptive use, and regular media exposure to be associated with discontinued use (Steele & Curtis, 2003; Blanc, Tsui, Croft, & Trevitt, 2009; Ali & Cleland, 2010b, 2010a; Curtis et al., 2011; World Health Ogranisation, 2012). Other factors such as the intention for use i.e. spacing or limiting family size, age, number of living children, marital status, method type, have been found to exhibit a more consistent relationship to continuity of use. These factors by their influence reduce discontinuation.

Additional studies of multi-country health surveys have identified obstacles to contraceptive use and adherence across regions (Ali et al., 2012; Sedgh & Hussain, 2014). Issues such as fear of side effects, health concerns, limited method choice, myths and misinformation, constraints on women's decision-making and service delivery issues such as provider biases towards methods have been identified across developing countries (Campbell et al., 2006; Ali et al., 2012; Hindin et al., 2013; Nettey et al., 2015).

2.6.2 Correct /Consistent use

Recent findings from a longitudinal study in a DSS area in Northern Malawi to assess adherence to injectables in a setting where the injectable is the most commonly used method identified that only half of injectable users received their reinjection on time and only 15% indicated continued use at 12 months of use (Dasgupta et al., 2015). Nonetheless factors, such as reservations about the method itself, lack of partner

cooperation, and the woman's beliefs about her fertility may attenuate the effect of this knowledge and engender inconsistent use or discontinuation (Sinai et al., 2006).

2.6.3 Socio-demographic factors

2.6.3.1 Age

Earlier reviews of existing country data identify background factors and their relationship with discontinuation by users. Findings from a DHS study on contraceptive discontinuation in Zimbabwe suggested that discontinuation of contraceptives decreases with increasing age and desire to limit family size (Sambisa, 1996). Older women who have attained their ideal family size are thus less inclined to discontinue use as much as younger women due their increased motivation to not have more children. Blanc et al (2009) in their study identify higher discontinuation and failure among younger sexually active women (15-19 years).

Follow on studies have clarified this relationship and have generally identified that in most developing countries, women above 25 years of age are less likely to discontinue than women younger than 25 years (Laguna, Po, Perez, & Kanter, 2000; Blanc et al., 2009; Ali & Cleland, 2010b, 2010a; Curtis et al., 2011).

2.6.3.2 Employment

Curtis & Blanc, (1997) in their review identified that women who have been in employment in the past year are less likely to discontinue use compared to those who had remained unemployed. Castle and Askew (2015) supported this position in their review of multi-country DHS survey and add that the woman's desire to maintain employment influences her decision to discontinue and face an unintended pregnancy

or otherwise (Castle & Askew, 2015). Recent evidence from Ghana however contradict this by stressing that motherhood is viewed as a socially valued and primary role in a woman's life. This they identified had the potential to counter the perceived strain of combining work with children among working women. They further clarify that economically productive women, are viewed as the most capable of being able to provide and cater for a child than unemployed women (Waterhouse, Hill, & Hinde, 2016). A finding that would imply that Ghanaian women who are employed may discontinue and have children because they feel they are ready and capable to cater for them.

2.6.3.3 Education

Unlike developed countries where contraceptive use shows some level of increments with increasing level of education, earlier studies in developing countries showed an inconsistent trend (Khan et al., 2007; Vaughan et al., 2008; Yideta, Mekonen, Seifu, & Shine, 2017). Recent evidence for the women's health survey in Ghana however provided evidence of increasing contraceptive use with increasing level of education among women in Accra (Adanu et al., 2009). Cleland and Ali (1995), in an analysis of pill discontinuation in six developing countries from DHS phase1, showed that uneducated women in Ecuador, Egypt and Thailand discontinued pill use more than women with primary education. In other countries the trend differed, and uneducated women in Indonesia discontinued less (Cleland and Ali, 1995).

Subsequent comparative studies using multi-country DHS data have been able to clarify this relation and identify that the odds of discontinuation reduces with increasing education of the woman (Blanc et al, 2009). Additional analyses of survey

data support this relationship and specify that the higher the level of education of a woman, the less likely she is to discontinue use of her chosen method (Ali & Cleland, 2010b). More recently, results of a community based RCT in southern Ethiopia to identify factors influencing implant discontinuation supportive of this position (Tadesse et al., 2017). The level of education attained by women is likely to influence contraception primarily through its effect on women's preference for smaller family size, desire to be gainfully employed and attain a higher socioeconomic status (Youssef 2005). This has also been supported by findings among Ghanaian women that show lowering levels of fertility with increasing education (Asamoah et al., 2013)

2.6.3.4 Media Exposure

It is recognized that women's exposure to the mass media can have significant influence on contraceptive method choice (Leite & Gupta, 2007). Further insight on the role of mass media was gotten from a study in Ethiopia, where it was discovered that watching television was associated with higher discontinuation among women with televisions in their home (Bekele, Gebremariam, & Tura, 2015). These high discontinuations they suggested could be the result of exposure to contraceptive messages on air that may increase their awareness of alternative contraceptive options.

Unfortunately switching was not assessed in the study and as such the possible use of another contraceptive in the month or months following discontinuation is purely speculative. Although some suggestions regarding the media to address discontinuation have been proposed (Blanc, Croft & Trevitt, 2009). It is identified

however, that the contribution of mass media to reducing discontinuation would be contingent messages that are well designed and carefully implemented to avoid the misinterpretation and mixed messages that it would seek to have corrected (Castle & Askew, 2015).

2.6.3.5 Marital Status

A change in marital status has been identified to be positively associated with discontinuation (Curtis & Blanc, 1997). Women who experience a change from married to single or divorced have been found to abandon use of the contraceptive method particularly due to a reduced need for contraception. The influence of marital status on discontinuation is however variable as among individual who marry, the desire to become pregnant is higher (Curtis & Blanc, 1997).

Changes in marital status have also been associated with method failure in Columbia and Zimbabwe which may be either a result of increased exposure to sexual intercourse following marriage or that marriage was a result of premarital contraceptive failure (Ali et al., 2012). It is also noted in some developing country settings, that the desire for grandchildren by the family generates some form of disapproval of contraceptive use after marriage. Qualitative evidence from Ethiopia revealed situations in which husbands were compelled by their families to discontinue use of birth control by wives so childbearing could begin after marriage (Bekele et al., 2015).

Previous studies of contraceptive use focused more on married women of reproductive age primarily as a result of its cultural acceptability for discussing issues

relating to contraceptives (Laguna et al., 2000). More recently the inclusion of sexually active women in the interest of understanding reproductive health experiences of all women provides an opportunity to perform analysis on all women at risk of unwanted pregnancy regardless of marriage in settings where this is equally acceptable (Leite & Gupta, 2007). Evidence from Southwest Ethiopia for instance shows reduced discontinuation among single women compared to married women (Yideta et al., 2017). This they express is a result of single women exhibiting more cautiousness in preventing unwanted pregnancies.

2.6.4 Reproductive Factors

2.6.4.1 Parity

The number of living children a woman has is identified as the strongest predictor of discontinued use (Ali & Cleland, 1995). Results from Curtis et al (2011) analysis of six developing countries with DHS data available for 1999-2008 found that among women with two children or less, the odds of discontinued use increased for all countries except Zimbabwe (Curtis et al., 2011). This increased discontinuation has been identified to originate from a lowered motivation to avoid pregnancy that manifest as ambivalent fertility intentions among women (Speizer, 2006).

In women with more children the tendency to discontinue use is relatively lower (Curtis et al., 2011). Though identified as acting in tandem with an individual's reproductive goals and ideal family size, Bekele et al (2015) in a recent study in Ethiopia identify that discontinuation is reduced with increasing family size i.e. number of children the reasons for discontinuation can possibly attributed to increased pressure on limited family resources.

2.6.4.2 Fertility intentions

Among individuals who adopt a contraceptive method, their intended purpose for its use has been found to influence continued use of the chosen method (Curtis et al., 2011). For individuals who are strongly motivated to delay or prevent pregnancy, discontinuation is less and the likelihood of switching to other methods than abandoning use altogether is higher. The fertility intentions of a user have been suggested to not only direct discontinuation, but also influence the ability of a user to tolerate side effects (Tolley & Nare, 2001).

The desire for another child was identified as one of the strongest predictors of discontinued use by Ali and Cleland (1995) in their six country comparative analysis of contraceptive discontinuation (Ali & Cleland, 1995). In support of their previous findings, Cleland and Ali in a subsequent study of 19 developing countries in 2003 found discontinuation was higher among spacers than limiters (Ali & Cleland, 2010b). Curtis et al (2011) also in support of these findings further proposed that, it may be the intensity of motivation to avoid pregnancy that influences the decision to use contraception and affects subsequent discontinuation or switching behavior (Curtis et al., 2011).

2.6.4.3 Desire to limit childbearing

In Ghana, the desire to limit childbearing increases with increasing number of living children (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Regional differences are also observed, with women in Greater Accra region showing a greater desire to not have more children than women from other regions. Among women with no children in the Greater Accra region, 16.6% do not desire any

children and this gradually increases to 64.4% among women with four (4) children (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

Evidence from developing country settings further highlight that the strength of contraceptive use intentions are an even better predictor, particularly among women who want to limit births. The realization that women who do not wish to have another child remain more strongly urged to maintain method use is apparent. Among women who indicate a desire for a child in the next two years (spacing) the occurrence of that birth at an earlier time than planned still renders it wanted even though it may have been mistimed (Lynn M Van Lith, Yahner, & Bakamjianc, 2013). Women who wish to limit birth thus adhere to method use for as long as the need for contraceptives is and contributes more strongly to fertility reduction than spacers.

2.6.4.4 Desire for pregnancy

Only 6% of couples stop use of their contraceptive method within the first year of use because of the desire for pregnancy (Ali et al., 2012). This is a similar finding to the recent evidence from Ghana on discontinuation estimated at 6% due to desire for pregnancy within 12 months of use (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Findings from a DHS analysis in Brazil show even lower discontinuation (3.7%) because of the desire to become pregnant (Leite & Gupta 2007). Although in the multi-country survey by Ali & Cleland (2012), this estimate rises to 17% in the second year of use and to 23% by the third year. Couples and individuals generally rarely discontinue use for this reason.

2.6.4.5 Ambivalence towards pregnancy

Additionally, for women who intend to space or delay a pregnancy, an ambivalent fertility intention; where women express that they would not find it problematic if they became pregnant without deliberately intending to has been identified. Some women who may have an unmet need might also be less strongly motivated to avoid pregnancy (Casterline, Perez, & Biddlecom, 1997; Stash, 1999; Casterline, Sathar, & ul Haque, 2001). These women have been identified to have ambivalent feelings towards a pregnancy and as such waver between wanting a pregnancy or not. As evidence from Ghana, Burkina Faso and Kenya show, such women are less motivated to adhere to method use (Curtis et al., 2011). Identifying the strength of these ambivalent intentions may further explain variations in discontinuations observed. It is increasingly identified that women having unmet need might be less strongly motivated to avoid pregnancy due to ambivalence about pregnancy (Curtis et al., 2011). Recent evidence from the 2014 Ghana DHS shows that only 42% of mothers under 20 have planned pregnancies.

2.6.4.6 Abortions

Any procedure for terminating a pregnancy that is carried out by persons who lack the necessary skills, or in an environment that does not conform to minimum medical standards, or both is classified as an unsafe abortion (Aahman E & I., 2004). Previous estimates of the incidence of abortions indicate that half of all unintended pregnancies in developing regions are terminated (Sedgh & Hussain, 2014). More recent estimates provided from the 2017 Maternal Health Survey however identify a lower proportion pregnancies (10%) ending in abortions (Ghana Statistical Service , Ghana Health Service, & ICF., 2018).

Nonetheless, the knowledge that at least half of all abortions are carried out in unsafe conditions that predispose women to further risk of morbidity or mortality warrants concern (Haddad & Nour, 2009; Scoggins & Bremner, 2017). Rominiski & Lori in their review of existing literature on abortion in Ghana ascertain that this is particularly distressing because complications of abortions contribute to maternal mortality and morbidity (Rominski & Lori, 2014).

Westhoff and Bongaarts (2000) argued that the desire for smaller family sizes in areas with low contraceptive prevalence inherently results in increases in the number of abortions to regulate unintended pregnancies. Settings where desired family sizes are larger are anticipated to have less abortions occurring (Bongaarts & Westoff, 2000). Within the Ghanaian setting, attitudes towards abortion are not completely favourable. Abortion is generally stigmatized in the Ghanaian society. However there exists some level of acceptability under conditions where economic hardship in raising the child present or the woman is young and not in union (Sedgh 2010).

The recent Maternal Health Survey in Ghana estimates that approximately 26% of women in the Greater Accra region have previously had an abortion. Assessing knowledge of abortion yielded an estimate of 75% of women who have never had an abortion but know what an abortion is (Ghana Statistical Service et al., 2018). Among these women who have never had an abortion but know what it is, 25% indicate that they would be able to get an abortion and 57% say they know where to get an abortion. An examination of the types of abortions women resort to, highlighted the use of non-medical methods of abortion by 27% of women who have ever had an abortion. Among the remaining women who used medical methods,

dilation and curettage (D&C) or dilation and extraction (D&E) was used by 24% of women (Ghana Statistical Service et al., 2018).

Studies among women who have had abortions have identified low contraceptive prevalence and poor method use, as primary contributors to unwanted or unintended pregnancies (Upadhyay, Brown, Sokoloff, & Raine, 2012). Upadhyay (2012) in a study of abortion and repeat unintended pregnancy among American women found that compared to women who had never had a terminated pregnancy, those who had a previous termination had higher rates of contraceptive discontinuation.

Literature suggests that counseling on contraceptive use is offered as part of post abortion care (PAC) can assist with increasing contraceptive adoption among women who have had a terminated pregnancy (Nobili, Piergrossi, Brusati, & Moja, 2007; Opoku, 2012). Contraceptive counseling as part of PAC is largely useful because women who undergo abortion may have unique characteristics that make them an at risk group for repeat unintended pregnancies than other groups of women (Upadhyay et al., 2012).

These unique characteristics were explored by Nobili et al. (2007) in a randomized controlled trial (RCT) to assess whether a patient-centered contraceptive counseling intervention would result in improved use of contraception in women who undergo a termination. Their findings indicated that receiving family planning counseling as part of post abortion care services can increase use of contraception (Nobili et al., 2007). Additionally, they suggested that contraceptive counselling would be more effective when the woman's contraceptive agenda, feelings and expectations regarding

contraception as well as the context are explored. Their assumption is that when these unique issues are better appreciated, it is possible to understand the reason for the discontinued use or failure that may have occurred leading to the pregnancy and its termination and suggest acceptable ways to prevent future occurrence (Nobili et al., 2007).

2.6.4.7 Delayed return of fertility

Additionally cited is the delayed return to fertility which is experienced by some former contraceptive users (World Health Organization, 2007). This occurrence have been identified to inhibit use among some women (Barnhart & Schreiber, 2009) and was similarly found to be responsible for nonuse among younger women in the Greater Accra region (Hindin et al., 2013). Similar finding were observed among users of the intrauterine systems LNG-IUS where participant reported high discontinuations attributed to amenorrhea, which they indicated as unwanted.

2.6.4.8 Reduced Need

Discontinuation of a contraceptive method because one identifies 'no further need' for contraception was earlier acknowledge as the least common reason cited for discontinuation observed from multi-country surveys (Ali et al., 2012). In follow up country analysis however, Sedgh and Hussain (2014) from their review of 51 country DHS data from 2006; of which Ghana was included, identified that reduced need for contraceptives encompassing: infrequent sex or no sexual activity was a main reason for discontinuation among 34% Latin American and Caribbean women, 31% of Asian women and 19% of Africa women (Sedgh & Hussain, 2014). Among African women, this reason was estimated as 16% in East Africa and 15% in West Africa. By method

used however, it was more likely to be cited by condom users as a result of cessation of sexual activity.

2.6.5 Service delivery factors

2.6.5.1 Method Type/Method choice

The decision to choose a contraceptive method inherently considers the likelihood of sustained use and compliance (Barden-O'Fallon & Speizer, 2011). Steele & Curtis (2003) in their analysis of the 1997 Indonesian demographic and health survey data to identified the impact of method choice on discontinuation highlighted on the intrinsic ability of methods to relate to discontinuation and switching (Steele & Curtis, 2003). Their findings implied that the ease of discontinuation of the method therefore plays a contributing role to an individual's decision to use the method.

In support of their discovery, further studies have provided evidence to suggests that discontinuation rates are generally higher for shorter acting methods such as the condom, pills and injectables because they do not require any active user or provider action to stop (Steele & Curtis, 2003; Bradley et al., 2009). This has been identified as active and passive discotninaution respectively (Barden-O'Fallon & Speizer, 2011). Any user that does not wish to persist with the method simply has to miss the next dose or supply for discontinuation to occur.

Method choice consequently depends on several factors: the perceived acceptability of the method to the potential user, the tolerability for sustained use and required levels of compliance with the method in comparison to alternative methods available (Che, Cleland, & Ali, 2004; Ali & Cleland, 2010b; Sedgh 2010). Longer acting more

permanent methods such as the intrauterine device (IUD) and implants usually record lower discontinuations than the shorter acting methods i.e. pills and condoms (Bradley et al., 2009; Staveteig et al., 2015; Yideta et al., 2017). In a review of 60 demographic health surveys, Ali et al (2012) similarly identify low proportion of IUD users (13%) discontinuing within 12 months of use compared to users of the other methods i.e. pills condoms, injectables, periodic abstinence and withdrawal which ranged between 40%-50% (Ali et al., 2012). The situation in Ghana is not different as the highest discontinuations was reported for users of the condom (35%) and the least discontinuation (6.9%) for users of the implant (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

Population based studies typically report that side effects and health concerns are the main reasons for discontinuing hormonal methods and IUDs and method inconveniences in addition to partner's disapproval are the main reasons for discontinuing condom use. However among traditional method users, contraceptive failure and desire for a more effective method are the main reasons for discontinuing traditional methods (Ali et al., 2012; World Health Ogranisation, 2012; Castle & Askew, 2015). Greater probabilities of switching are thus expected from traditional methods than the other modern methods.

2.6.5.2 Side Effects and health concerns

Clinical side effects have been reported for a number of contraceptive methods. These have been observed predominantly under randomized trial conditions (World Health Organization, 2007; World Health Organisation, 2015a). Commonly reported are nausea, headaches and breast tenderness among some users, irregular or absent

periods, heavier menstrual periods and increased cramping (World Health Organization, 2007). A review of contraceptive histories from multiple countries suggests that discontinuations due to side effects however vary by method with more experienced side effects reported for the hormonal methods (pills, implant, and injectable) than other forms of contraception (Ali et al., 2012; Sedgh & Hussain, 2014) Similar reasons driving method discontinuation have been observed in Ghana for users of hormonal method. Approximately 21% of discontinuation due to experienced side effects was identified among pill users, 39% among injectable users and 55% among implant users (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

There is clinical evidence to support the occurrence of physical side effects of some of the hormonal methods of contraception (World Health Organization et al., 2018). Modern methods of contraception by their action alter hormone levels to achieve one or more of three possible options to prevent pregnancy. Multiple studies and surveys identify concerns about health and side effects as the most common reasons cited by women. These reasons however are usually cited for the oral contraceptives, injectable, implants and IUDs. A household survey of implant clients in Egypt showed that clients who experienced side effects of implant had an increased discontinuation (Aziz, El-Gazzar, & Elgibaly, 2018).

Additionally reported however are side effects experienced by individuals with allergies or sensitivities to latex condoms among condom users (Slater, 1994; World Health Organization et al., 2018). To prevent discontinuation and encourage consistent use of barrier protection non latex male condoms made of polyurethane

film or synthetic elastomers were developed (Gallo, Grimes, & Schulz, 2003). Gallo et al (2003) in a RCT to assess effectiveness and discontinuation identifies that female polyurethane condom users reported fewer genital irritations but for males there was equal reporting of genital irritations.

Discontinuation was not significantly different between the groups, but clinical failure and breakage were reported more among polyurethane condoms than latex condoms. This failure and breakage is noted among other reviews of available evidence on non-latex condoms (Frezieres & Walsh, 2000; Gallo et al., 2003; Steiner, Dominik, Rountree, Nanda, & Dorflinger, 2003). The reviews all conclude however that the use of non-latex condoms among individuals with latex allergies provides a better alternative to the nonuse of contraceptives.

It has been suggested that women who cite side effects and or health concerns associated with methods, may do so based on either personal experience or that of other women they know (Hindin et al., 2013; Sedgh & Hussain, 2014). Others may simply have peculiar perceptions of contraceptive methods or concerns that may be based on misinformation.

Biney (2011) in her study of contraceptive knowledge and induced abortions in Ghana, identified that among women who had experienced an abortion, previous nonuse of contraceptives stemmed from fears of side effects that they had heard about or warnings about side effects from friends. It is important to note however, that some of these reasons may equally be based on an accurate appraisal of side effects and health risks (Sedgh & Hussain, 2014). All these women nonetheless, have a genuine

need for appropriate information regarding contraceptives options available to make an informed choice.

Analysis of contraceptive discontinuation using DHS data often lumps side effects and health concerns together and is unable to discriminate between actual experience of side effects and fear of side effects or health concerns. The separation of these two factors may be critical to identifying the independent contribution of experienced side effects or the fear of side effects on discontinuation. This information will be more useful to service providers as fears can be dispelled with appropriate interventions that are separate from those used in managing experienced side effects.

Menstrual side effects have been identified as playing key roles in the discontinuation of hormonal contraceptive methods (Tolley, Loza, Kafafi, & Cummings, 2005). These side effects usually manifest as changes in the duration, volume, regularity or levels of pain associated with menstruation (Tolley et al., 2005). The implant and the injectable can cause period of light bleeding that may be prolonged, or temporary amenorrhea among users. The injectable also can cause users to miss periods. Among women who identify menstruation as an essential occurrence for well-being, these menstrual disturbances are more likely to result in the discontinuation of the method. In Mali, the social consequences of being caught experiencing side effects such as menstrual irregularities or disruption results in the accusation of witchcraft or immoral behaviors (Castle, 2003).

Examining the relative contribution of individual menstrual side effects have been challenging particularly owing to the contradictory nature of some of the findings

among hormonal methods, and at times for the same method under observation. In a study of menstrual irregularity in Egypt, IUD users reported prolonged periods and heavier bleeding. Some implant users reported increased periods with heavier bleeding, whilst other implant users reported decreased bleeding, and the rest reporting that the periods had stopped completely. This has led some to conclude that menstrual disturbances though likely to influence discontinuation, may do so alongside other personal factors (Tolley et al., 2005).

Even among women who cite health concerns or fears of side effects as reasons for nonuse of contraceptives, these concerns may be a result of one out of three possibilities: first, personal experience from using a method; secondly, an inaccurate attribution of bodily changes to the contraceptive method or thirdly, hearsay. Though the veracity of these concerns may be unverified, these perceptions about contraceptive can be powerful barriers to their use even among women in dire need of contraceptives (Westhoff et al., 2007; Ali et al., 2012). Among women who even overcome these concerns and adopt a method, these mixed feelings further have the potential to foster inconsistent use that may result in discontinuation and unintended pregnancy and impact on the perceived effectiveness of the method.

2.6.5.3 Myth and Misinformation

Hearsay about side effects and misinformation are common reasons for non-use in younger women (Gilliam, Warden, Goldstein, & Tapia, 2004; Hindin et al., 2013). Women have been found to have different views and opinions of contraceptives that inhibit use and discourage adherence (Diamond-Smith, Campbell, & Madan, 2012; Hindin et al., 2013). Although these views may not all be from personal experience,

they impact on decision-making and influence adoption and adherence to use. The impact of myths and misperceptions extends from health concerns to fears of side effects (Castle, 2003; Ankomah, Anyanti, & Oladosu, 2011; Endriyas, Eshete, Mekonnen, Misganaw, & Shiferaw, 2018).

Among women who cite breast-feeding or postpartum amenorrhea as their reason for nonuse of modern methods for instance, many assume they are protected from pregnancy during this period by the mere initiation of use (Darroch, Sedgh & Ball, 2011). Others express a concern about potentially adverse effects of contraceptive methods on the production or content of breast milk while they breastfeed their children.

In a community based study of implant discontinuation in southern Ethiopia, the contribution of rumors to method discontinuation was measured (Tadesse et al., 2017). The authors found that 14% of discontinuation identified was attributable to rumors. Although the veracity of these rumors was not verified, their influence on discontinuation for users was significant. Similar findings noted among women highlight fears of reproductive consequences of hormonal methods particularly on infertility and unexplained amenorrhea (Castle, 2003; Gilliam et al., 2004). These studies also identified sources of misperceptions as non-health individuals whose contributions to knowledge about side effects appear so highly valued that they are capable of influencing discontinuation among users of methods.

2.6.5.4 Services provided

The world health organization has clearly defined and reviewed eligibility criteria for adopting a contraceptive method and the decision making tool for family planning providers and clients (World Health Organization et al., 2018). This was developed with the intention of selecting the most appropriate and safe option for any woman who wishes to delay or prevent pregnancy. It has been reported however that in interpreting the requirements for method use, some women are subjected to unnecessary procedures, generally stipulated as a prerequisite for being provided the method (Campbell et al., 2006).

These actions by providers may deter many potential users from initiating method use. The availability of services and supplies for adoption and persistent use thus influences discontinuation. In a follow up study of female contraceptive respondents of the DHS 2014 survey in Ghana, Staveteig et al (2015) identified that discontinuation was less likely to have occurred among individuals who live in settings where contraceptive methods are always available (Staveteig et al., 2015).

The importance of strong family planning programmes, adequate counseling and good follow up services has been emphasized as critical for continued use of contraceptives(Ali et al., 2012). The attitudes of providers and the experience of the user during that interaction with the provider has the ability to influence discontinuation (Tolley et al., 2005). They identified that counseling significantly predicted discontinuation of the implant among women who experienced menstrual side effects (Tolley et al., 2005). In an earlier qualitative study conducted in Senegal, implant users report that providers did not provide them with comprehensive

information regarding menstrual side effects that could occur while using the method (Tolley and Nare, 2001). The users recall they were simply given the reassurance to not worry while they were using the method.

Tolley et al also found in their follow up study that less than half of women initiating use of a contraceptive method indicated that they had received information about their method prior to its use (Tolley et al., 2005). This may create a situation where the occurrence of any side effect can become a cause for concern among users. In support of this counseling oversight, Lilt, Yahner & Bakamjian (2013) in a more recent review of challenges to contraceptives use in sub-Saharan Africa also found that users had not been informed about potential side effects of their method prior to initiating use. This varied by methods use at 54% for pill users, 45% of injectable users, 29% of IUD users, and 25% of implant users reported that they were not informed about potential side effects or other problems associated with their method (Van Lith, Yahner, & Bakamjian, 2013).

Similarly a community-based study in southern Ethiopia identified a positive association between receiving counseling on methods prior to their use and less discontinuation of the implant (Tadesse et al., 2017). Evidence from narratives in Egypt supported this position by highlighting the influence of non-health individuals in contributing to discontinuation among who had received inadequate counseling and experienced side effects (Aziz et al., 2018). This underscores the contribution that receiving information particularly prior to method use can prepare users to anticipate and manage side effects better as opposed to the unpreparedness that results in more discontinuation.

2.7 Switching

Method switching occurs when a user stops use of one method and initiates use of another (different) method (Curtis & Blanc 1997; Ali et al., 2012; Ali et al., 2014). Studies conducted on method switching identify that a considerable amount of women resume use of contraceptives following a period of time after discontinuation (Bradley et al., 2009; Ali et al., 2012). This occurrence, they infer to be the justification that discontinuation did not occur because of a desire to become pregnant but rather because of some form of method related reason. Switching was also observed more towards modern methods than traditional methods. A finding that concurs with results from other developing country settings (Ali & Cleland, 2010b). Switching though regarded, as a better option to abandonment while a need for contraceptives still exists can also be negative. This is particularly so when Switching occurs from one method to another less effective method as such situations, reduce the demographic impact (Leite & Gupta 2007).

Interestingly, the three month period within which switching is expected to occur has been also been shown to place women at an increased risk of an unintended pregnancy. Ali and Cleland (2012) in their DHS review estimated that between 12%-73% of women who have not switched methods by the third month of discontinuation were still at risk of unintended pregnancy, and an estimated 12%-20% had experienced and unintended pregnancy by three months (Ali et al., 2012). Following these insights, some studies have restricted method switching to an event that occurs within the next month of discontinuation of a method to minimize the potential risk of unintended pregnancy that arises from a longer period before switching (Barden-

O'Fallon & Speizer, 2011; Hameed et al., 2015; Barden-O'Fallon, Speizer, Calhoun, & Corroon, 2018).

There is therefore a need to identify the occurrence of prompt switching among women in the Ghanaian setting and identify factors influencing this to understand how it can be harnessed. This will provide insight into strategies to encourage others to adopt similar reproductive practices to minimize the threat of unwanted fertility.

2.7.1 Method choice following switching

Among women who switch from modern contraceptive methods, the method opted for have predominantly been another modern reversible method (Scoggins & Bremner, 2017). Ali Park and Ngo in their recent review of 14 country DHS data found that approximately 10% of all switching is to the male condom. The decision to switch has been observed as some indication that problems with previous modern methods that may mostly be hormonal, drive the decision to switch. Similar findings in support of this increased influence of hormonal methods on discontinuation have been documented (Ali & Cleland, 1995; Ali et al., 2012; Barden-O'Fallon et al., 2018). They also found that among women who switch methods after three months following discontinuation, the estimate in sub-Saharan Africa ranged from 28% in Tanzania to 61% in Morocco for modern reversible methods (Ali et al., 2012).

Other non-DHS studies have also identified switching generally to short acting modern methods (33%) and traditional methods (19%) in Pakistan for instance (Hameed et al., 2015). Evident from all findings is the lowered levels of switching to permanent methods (Sterilization) among sub-Saharan African countries ranging from

0.1% in Zimbabwe to 0.9% in Malawi. Their findings reinforce the earlier position of Cleland et al (2006) elaborating that sterilization was underutilized in Africa due to the preference for spacing than limiting (Cleland et al., 2006). The estimates of switching to traditional methods from the multi-country review however also showed lower with estimates ranging from 2% in Malawi to 4.8% in Kenya (Ali et al., 2012).

2.8 Determinants of method switching

A number of background factors are identified as predictors of method switching: parity, education and fertility intentions (Ali et al., 2014; Hameed et al., 2015). These studies supported evidence from panel studies in Honduras that identified switching to be associated with number of living children a woman has, with women that have more than four children more likely to switch to another modern reversible method than remain unprotected from unintended pregnancy. Similarly more switching is expected to occur among women who were more educated compared to the uneducated women, and those indicating an intention to limit births rather than space, also more likely to switch method ((Barden-O'Fallon & Speizer, 2011).

Barden-O'Fallon & Speizer (2011) in their analysis also identified that the experience of side effects of contraceptive method influenced switching. Interestingly, they also discovered that for women who had discussed switching with another person preferably a partner or health worker, switching was reported among all women and discontinuation among 85% of them. Seeking counsel about the symptoms experienced and possible ways to manage them thus potentially enhances switching. This service, if provided to all women who present with side effects has the potential

to encourage switching rather than extended periods of exposure to discontinuation that could arise if not managed.

Similarly, switching to alternative methods of contraception following the use of LAM is also expected and identified as influenced by the very nature of the method (Van der Wijden, Kleijnen, & Van den Berk, 2003). The use of LAM, which offers physiological protection against pregnancy preferred through the execution of exclusive breastfeeding for six months ultimately, delays the return of fertility and menstruation for the period of its use. This disposition to switch has been identified by a study conducted by Khella et al (2004) in Egypt assessing alternate contraceptive method use by 2,610 lactating mothers. Their findings indicated that at least 70% of breastfeeding mothers reported use of modern contraceptives specifically the IUD (25%) as the preferred method (Khella, Fahim, Issa, Sokal, & Gadalla, 2004). Some studies also show that many women prefer not to use hormonal methods either during the postpartum period or because they have concerns about estrogen-containing methods and decreased milk volume particularly among breast-feeding women (Darroch, Sedgh & Ball, 2011).

An evolving category of switching identified by Jain and Winfrey (2017) is switching failure. This they suggest is an event that indicates that the method switched to may also be unsuitable to the individual's needs. They further indicated that the user may not have received adequate information about switching to another method or that the required services for the other method may not have been available. These switching failures, accounted for about 16% of unintended recent births. The ultimate reduction of method-specific discontinuation for other reasons requires the availability of

quality information and encouragement about the possibility of switching to another method in the event that the user finds the original method unsuitable (Jain & Winfrey, 2017).

2.9 Unintended pregnancy and Method failure

Unintended pregnancies occur to women either due to non-use of contraceptives, or because of contraceptive failure which arises due to inherent failure rates of methods or a result of incorrect and inconsistent use of the method (Cleland & Ali, 2004). This obstetric impact of unintended pregnancies is noticeable in its contribution to maternal death and disease burden among women in low and middle-income countries because of the hazards of illegal and unsafe abortion and inadequate access to effective maternal health services. Additionally, unintended pregnancies in low- and middle-income countries that are carried to term present an avoidable financial burden on family budgets, and more often end with poorer nurture and education outcomes (Cleland & Ali, 2004).

Method failure is measured by the number of pregnancies reported as unintended or mistimed following method use. Although some level of failure is expected from contraceptive use, failure that stems from incorrect or inconsistent use also contributes to this estimation of method failure. Earlier review of country data had shown that method failure ranged from 13% in Kenya to 23% in Kazakhstan (Curtis et al., 2011). Ali et al (2012) in their analysis find that failure rates are highest for users of Periodic abstinence (17%) and withdrawal (15%) in the first 12 months of use (Ali et al., 2012). Pill and condom users have also reported (6%-8%) failure rates and injectable users report about 1% (Scoggins & Bremner, 2017).

Factors identified to be associated with method failure from DHS analytical studies have been method type, age and intention for use (Curtis et al., 2011; Ali et al., 2012). Findings show that although failure is dependent upon the method type, factors such as age and intention for use which may contribute to inconsistent use have been associated with more failures reported among younger women and women who intend to space births.

A challenge to accurate estimation of method failure is the reporting of pregnancies occurring alongside method use as unintended/mistimed or unwanted (Curtis et al., 2011). Ali and Cleland (2004) in an analysis of national surveys conducted in 1990-2000 that were available for 19 developing countries estimated 15% occurrence of unintended pregnancies. The finding that women are more prone to identifying births that occur after what would appear to be method failure as wanted and planned has emerged in numerous studies and inherently contributes to low method failure reported (Cleland & Ali, 2004; Curtis et al., 2011). This has led to the suggestion that women may have an ambivalent pregnancy intention that they do not disclose. This ambivalence towards pregnancy inherently contributes to method discontinuation and failures (Curtis et al., 2011; Curtis, 2012).

Additionally worth noting, is that in cultures where providing positive responses are more of the norm, dissatisfaction with the method may not be articulated as such by the user (Castle & Askew, 2015; Scoggins & Bremner, 2017). In their report, they identify that users under such condition provide positive responses to surveys rather than indicate dissatisfaction with the method as the real reason for discontinuation.

Jain and Winfrey (2017) in pursuit of documenting the challenge of underreporting of unintended births following contraceptive use or discontinuation in their analysis reclassified and identified all unintended births reported based on their occurrence following method use and discontinuation or following non-use of contraceptives. They reported that 67% of unintended births were contributed by women not using contraceptive methods, and 33% were contributed by women that had discontinued their contraceptive method in some month prior to pregnancy (Jain & Winfrey, 2017). They further identified inconsistencies in the reasons given for discontinuation and the reported intended status of the pregnancy.

What is missing from these studies, is an alternate means of measuring unintended pregnancies that would be devoid of individual's biases in underreporting or identifying pregnancies that are mistimed as unintended. This is a critical factor for the accurate estimation of unwanted fertility levels to identify individual needs and potential challenges with methods for which interventions could be designed.

2.10 Interventions for reducing contraceptive discontinuation

2.10.1 Service delivery

In an assessment of the impact of quality of care on a reduction of fertility, Jain (1989) argued that improving the quality of family planning services even when provided for a small number of acceptors, would not only contribute to increased contraceptive prevalence but had the potential to improve continued use of contraceptives among these acceptors (Jain, 1989). Although evidence to support the theoretical link between the quality of services and contraceptive discontinuation is still gradually being unearthed, there is growing interest in the relationship between

contraceptive discontinuation and quality of family planning services (Steele & Curtis, 2003).

Evidence from Honduras on the determinants of contraceptive discontinuation showed that women who had more contact with family planning providers discontinued use of their contraceptives less. Interestingly, they also discovered that women who had discussed the side effects experienced with another person preferably a partner or health worker all switched as opposed to discontinuing use which was reported among 85% of women who discussed side effects (Barden-O'Fallon & Speizer, 2011).

This position has drawn attention to the continuing measurement of family planning programme success by indicators that are focused on fertility and population growth rather than improved reproductive health and individual rights with indicators such as quality of care received, client provider interaction and service delivery (Dasgupta, Weinberger, Bellows, & Brown, 2017). Improving upon the quality of information and counseling provided to women on side effects has been proposed to reduce discontinuations and method failure that results from poor use (Curtis 2012). There is a need to explore the role of the service environment, services delivered social networks and individual motivational factors in facilitating the reduction of levels of discontinuation while in need, emphasized the low levels of understanding of their contribution to discontinuation and failure.

General interventions to reduce discontinuation have focused on the provision of revised counseling techniques, group motivation; structured, peer, or multi-

component counseling and reminders systems for next dose appointments versus routine services. The results have however been mixed with some improved on-time injections among the intervention groups at 12 months assessments (Madlon-Kay, 1996; Kirby, 2008), whilst others have not (Halpern, Grimes, Lopez, & Gallo, 2006) . The growing utilization of mobile phone technology in expanding access to health care services has been observed (Free et al., 2010; Smith et al., 2017). This approach to healthcare delivery stems from the recognition of the growing number of mobile phone users globally (Källander et al., 2013).

The growing reach of mobile phones particularly provides opportunities for mobile technology to contribute to health services delivery, particularly to clients in low- and middle-income countries where access is a challenge. This delivery of health service and interventions by mobile phone has been dubbed ‘mHealth’. Mhealth is delivered through the use of mobile electronic devices (MEDs) for example mobile phones and personal digital assistants (PDAs) (Free et al., 2010). Though initially introduced for acute and chronic disease management and for health promotion interventions devised to improve medication adherence, appointment attendance via reminders or promote some specified behaviour change (Free et al., 2013), mhealth interventions have been translated to suit functionality in diverse fields of health.

The use of mHealth in family planning and contraceptive use interventions have primarily been targeted towards supporting the uptake of methods and reduce discontinuation by providing reminders. Additional interventions for reducing discontinuation are designed to provide support via mobile phone services for clients experiencing side-effects (Smith, Gold, Ngo, Sumpter, & Free, 2014). Mobile phone

technology provides multiple functions (text message, voice message, video and applications) that can be utilized based upon the desired outcome.

Recently, results from a randomized controlled trial in Ghana showed an increase in reproductive health knowledge among women through the use of text messaging (Rokicki, Cohen, Salomon, & Fink, 2017). An advantage of this technology is that the intervention still has the ability to maintain an interactive two-way communication process. Interventions delivered by mobile phone to improve contraceptive use are identified to offer an alternative particularly in instances where privacy is essential.

2.10.2 Access to Mass Media

Exposure to mass media in the form of television (TV), radio, newspapers is identified as a useful tool for disseminating information regarding contraceptive use. Media exposure has generally been identified as higher among men (13%) than women (5%) in Ghana (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Respondents living in the greater Accra region are identified to have greater media exposure compared to other regions. Background characteristics identified to be positively associated with media exposure in Ghana are education and economic status (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Participants that are more educated and in the higher wealth quintiles are more exposed to these media sources.

Improving adoption and continued use of contraceptive methods requires addressing a range of barriers. Reports on contraceptive use commonly say that women have unmet need because they lack access to supplies and services, but that is only one of

the many reasons women report for not using contraceptives. In-depth inquisitions to identify why they do not use or intend to use contraceptives can identify concerns about their health or the side effects of methods of fertility particularly the belief that they are not likely to become pregnant.

2.10.3 Components of Care

Recent findings suggest reducing contraceptive discontinuation for reasons other than no more need may require simultaneous efforts to improve service delivery structures and ultimately quality of care received by potential users. (Jain & Winfrey, 2017). The is a need to focus greater attention to issues such as counseling to certify that users receive their chosen method and are informed on correct and consistent use as much as possible.

Both quantitative and qualitative approaches to assessing the effectiveness of counseling provided as part of routine services indicate client dissatisfaction as an important factor. The quality of care received by potential users becomes key to expanding contraceptive use and reducing unintended births. This may contribute to minimizing contraceptive discontinuation, unmet need and unintended fertility at the very initiation point (Jain & Winfrey, 2017). Evidence from a case control study in Ethiopia (Diguna Fango District) suggests that women who receive counselling or have a follow-up appointment scheduled, are more likely to discontinuation less than women who do not receive such care (Tadesse et al., 2017)

Identifying what information is essential during counseling by different users may be challenging. Drawing on lessons from developing country settings, Dehlendorf et al

(2014) proposed a framework that uses two approaches to communication that builds on what women place value upon in the relationship with their provider (Dehlendorf, Krajewski, & Borrero, 2014). The first: a relational oriented communication intended to build on the relationship between provider and client. The second: task oriented communication which seeks to provide adequate evidenced based counseling about the side effects, encourages women to be concerned about the potential for side effects that are not associated with the methods and anticipate barriers to consistent use among others (Dehlendorf et al., 2014).

In summary, establishing a relationship for effective health communication would require an interaction that takes into account both the medical issues involved in method use as well as context specific issues that may be intensely personal, including perceptions and attitudes to side effects, and fertility desires (Dehlendorf et al., 2014).

2.11 Methods of Assessing Contraceptive Discontinuation:

Previous works on contraceptive use dynamics have sought to identify factors that influence discontinuation. These have primarily been analytical and comparative studies of country DHS data (Parr, 2003; Steele & Curtis, 2003; Khan et al., 2007; Ali & Cleland, 2010b, 2010a; Ali et al., 2012). These studies identified socio-demographic factors such as age, education, employment, wealth index, place of residence, intention for use i.e. spacing or limiting family size, number of living children and decision-making to be associated with discontinued use (Blanc et al., 2002; Steele & Curtis, 2003; Ali & Cleland, 2010a; Curtis et al., 2011; World Health Ogranisation, 2012).

Due to the complex nature of discontinuation and the varying effect of the factors identified to influence events in various settings, these studies highlight upon the dual nature and variations in intensity of some factors on discontinued use, switching or method failure. Other approaches to studying discontinuation have been used however, these include some purely qualitative studies (Castle, 2003; Biney, 2011; Burke & Ambasa-Shisanya, 2011), a combination of qualitative and quantitative approaches (Tolley et al., 2005; Bekele et al., 2015; Aziz et al., 2018), randomized control trials (Nobili et al., 2007), case control studies (Tadesse et al., 2017) and longitudinal studies (Moreau, Bouyer, Bajos, Rodriguez, & Trussell, 2008; Dasgupta et al., 2015). The combination of qualitative and quantitative approach however, provides a structure to discuss both findings from the perspective of an integrated analysis (Guetterman, Fetters, & Creswell, 2015).

Qualitative methodology predominantly employ a phenomenological approach to studying discontinuation, switching and failure/unintended pregnancies (Castle, 2003; Biney, 2011). Qualitative approaches from phenomenological perspectives focus on understanding the lived experiences of women who have essentially subsisted the event of interest (Creswell, Hanson, Clark Plano, & Morales, 2007). Such data may draw on narrative inquiry to tell the story of the phenomenon under study. Researcher reflexivity is an important factor in ensuring rigour and validity in qualitative study. By taking into account the personal beliefs, values, social and cultural forces that shape the interpretation of data (Creswell & Miller, 2000; Cypress, 2017). Threats to validity of qualitative studies are similarly minimised by setting criteria for analysis. These are identified standards and rules that decisions and judgements of qualitative data will be based upon (Cypress, 2017).

Central to the methodology employed in many quantitative studies of contraceptive use dynamics is the use of the retrospective data from the contraceptive history calendar of the DHS that captures episodes of events that may have occurred in the years preceding the survey among women in the sample (Steele & Curtis, 2003; Khan et al., 2007; Leite & Gupta 2007; Ali & Cleland, 2010a; Curtis et al., 2011). The additional availability of background data of respondents collected during individual interviews allows for analysis of multiple events by background factors.

Even though the DHS calendar collects as much comprehensive information about a woman's use in the preceding five years, there are likely to be some biases associated with the collected data due to its self-reported nature (Castle & Askew, 2015). Particularly noteworthy is the declaration of events such as 'method failure' as a desire to conceive among women who do not wish to be viewed as declaring a pregnancy as unwanted for cultural or social reasons (Curtis et al., 2011). Another limitation of the calendar is that only one reason for discontinuation may be captured at a time. This eliminates real experiences where multiple reasons culminate in the discontinuation of a contraceptive method and provides an estimate based on what the participant considers to be the most important reason at the time (Castle & Askew, 2015). Although prospective cohort study approaches have been utilised (Moreau et al., 2008; Dasgupta et al., 2015) the introduction of biases as participants are aware that they are being followed up have been speculated to influence their behaviour and consequently affect whether discontinuation occurs or not.

Survival analysis of calendar data provides an avenue to examine the relationship between survival to an event of interest and one or more predictors in the available

data (Fox & Weisberg, 2011). Kaplan Meier curves permit the estimation of survival over time, even in the presence of varying observation times or drop-outs. The Logrank test is used in examining the null hypothesis to confirm that there is indeed no difference in the probability of an event between the groups at any point in time. This analysis further approximates the number of events observed, to number expected (Bland & Altman, 2004). This provides an estimate to determine if there is no significant difference between the groups under study

The Cox proportional-hazards model is the most common tool for studying the dependency of survival time on one or more predictor variables (Fox & Weisberg, 2011). This approach to analysis is best suited for instances when the rate at which the event of interest varies over time. The model is essentially a robust regression technique commonly used in medical statistics for investigating the association between the time to event or 'survival time' of patients/participants and one or more predictor variables (Cox, 1972). It provides an estimating of the effect of the covariate on 'survival' or 'failure' depending on the outcome of interest.

An important assumption of the proportional hazard model is that the ratio of the hazards among the groups under study must be constant over time (i.e. study period).

$$\frac{h_{o(t)}}{h_{1(t)}} = \text{constant}$$

Where h_1(t) is the hazard in the exposed group at time t and h_0(t) is the hazard in the unexposed group at time t.

This assumption may be tested either graphically or statistically(Schoenfeld, 1982; Kirkwood & Sterne, 2003). Methods for examining the proportional hazards assumption include:

- Nelson Aalen Estimate of cumulative hazard function: this produces a slope of the cumulative hazard against time. The hazard assumption is met if the graphs of the cumulative hazard are parallel to each other.
- Examination of the Kaplan Meier curves: assumption is met if the graphs of the covariates run parallel to each other.
- Schoenfield residuals: interpreted using the chi^2 value estimated.

In identifying the factors associated with contraceptive discontinuation in the surveillance area (Shai-Osudoku and Ningo Prampram districts), this study adopts a retrospective approach of utilising the contraceptive calendar to identify episodes of use, discontinuation, switching and failure among a cohort of women selected in the district of interest. This study seeks to identify not only factors that may influence discontinuation, but also the specific details and contribution of which methods, side effects-experienced or feared, ultimately compel the individual to discontinue use, upon which interventions to improve adherence may be built. The use of an initial in-depth individual inquiry provides an opportunity to explore women's perspectives of these issues, and further reduces the constraints encountered in the use of closed ended questionnaires.

2.11.1 Demographic Surveillance Sites

Demographic surveillance as defined by the WHO is the process of defining risk and corresponding dynamics in rates of birth, deaths, and migration within a population

over time (Baiden, Hodgson, & Binka, 2006). Demographic surveillance sites generally are geographically defined populations under continuous monitoring, which produce timely data on all events such as births, deaths, and migrations (INDEPTH Network). Demographic surveillance systems work by monitoring individuals, households and residential units in a well-defined geographic area, known as a demographic surveillance area (DSA).

Surveillance within sites typically begin with an initial census. This is intended to capture details of each individual resident in the target area. Additional information on individual's background such as age, sex and marital status, household composition, religion, ethnicity, educational levels, employment status, household wealth and access to facilities such as water and sanitation are included in the data collected at this stage. Regular subsequent rounds of data collection are undertaken at intervals to record and monitor changes to any of these details in the defined. These update rounds record other key events such as marriage, divorce, pregnancy, births and changes in employment are included in the data collected at this stage (INDEPTH Network; Bos Eduard, 2002).

DSS sites were initially instituted or created for the implementation of an intervention. On completion of the intervention, they are subsequently converted into DSS's (Baiden et al., 2006). It has been proposed that DSS sites by their nature provide access to large volumes of data that have the capacity to help fill the data void in maternal and neonatal health, cause-specific mortalities, and non-communicable diseases (Baiden et al., 2006). In Ghana three DSS have been established: the Dodowa HDSS in Greater Accra region, Kintampo HDSS in Brong Ahafo and

Navrongo in the Northern region (Baiden et al., 2006; Dosoo et al., 2012; Gyapong et al., 2013; INDEPTH Network, n.d). The three sites are members of the INDEPTH Network of health and demographic systems that seek to strengthen research capacity and data management in low and middle-income countries.

The DSS established in Matlab, Bangladesh in 1963 is the best-known oldest and largest surveillance system (Bhatia, Mosley, Faruque, & Chakraborty, 1980; Baiden et al., 2006). Matlab made major contributions to health development by providing a reliable means of collecting robust information on the health problems facing communities (INDEPTH Network). Though initially set up as a family planning and health services project, the Matlab project is highlighted as one of the unique opportunities to study contraceptive adoption, discontinuation, challenges in method use and corresponding influences on fertility over time within a fixed population (Bhatia et al., 1980).

Data gathered from DSS's have also been utilized in other research in developing country settings such as non-communicable disease in Filabavi (Viet Nam), and HIV/STIs (sexually transmitted infections) in Rakai (Uganda), insecticide-treated nets in Navrongo, Farafeni (Gambia), Ifakara (United Republic of Tanzania), Kisimu (Kenya), and Oubritenga (Burkina Faso) pneumococcal vaccines in Basse (Gambia) (Baiden et al., 2006). The use of a health and demographic surveillance site (HDSS) in Ghana, the Dodowa Health Research Centre surveillance area for this work therefore provides the study with additional data on the vital events for participants in the study. The study thus benefits from the updated monitoring of the population by utilising a revised and current sampling frame.

CHAPTER THREE

3.0 METHODS

3.1 Study Design

This study was designed as a retrospective cohort study and in-depth interviews.

A qualitative study was undertaken initially to understand and identify key elements influencing contraceptive use and estimate rates of discontinuation. This component assessed key perceptions of barriers and experiences of contraceptive use and non-use among women. It utilised a sample of women reporting for Reproductive or Child Care services (RCH) care at the Shai-Osudoku district hospital, Findings from the qualitative inquiry were then used to revise the a survey tool designed to quantify method-specific discontinuation or switching.

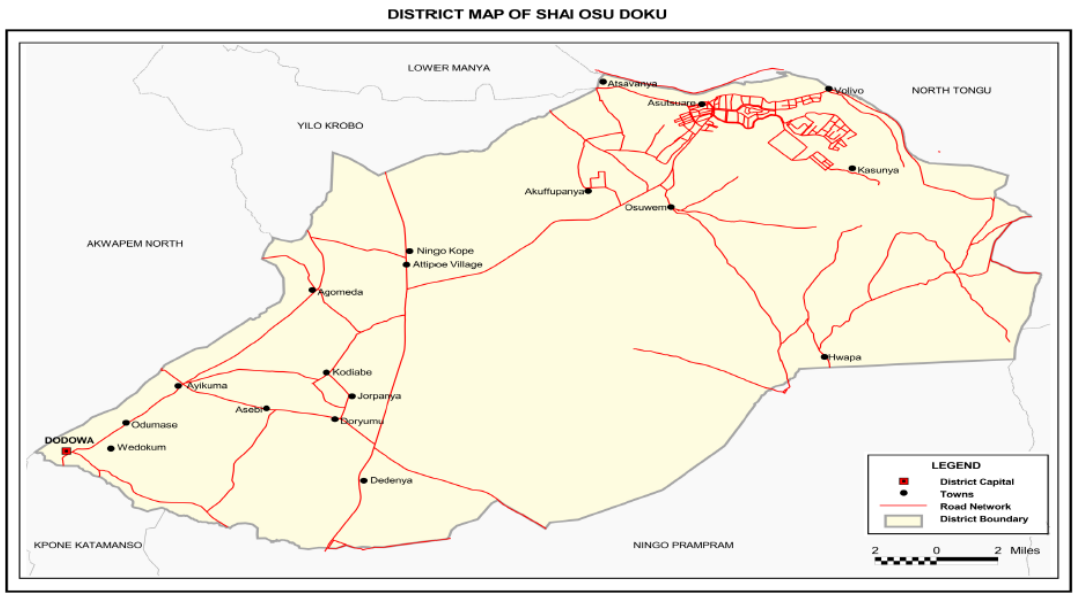
3.2 Study Location

The study is situated in the Shai-Osudoku and Ningo Prampram districts in the Greater Accra region. The two districts are local government administrative units in Greater Accra that jointly form a district surveillance area (DSA) monitored by the Dodowa Health District Surveillance System (DHDSS) since 2005 (Ghana Health Service, 2014; Dodowa Health Research Center, 2014). As both districts are jointly monitored by the DHDSS, the routine monitoring provides updated information on vital events (births, migration, deaths), health indicators, and demographic and economic indicators such as age, education, ethnicity and wealth status from which this study builds upon (Ghana Health Service, 2014; Dodowa Health Research Center, 2014).

The DSA is made up of four sub districts namely: Dodowa, Osudoku, Ningo and Prampram. It is also divided into seven (7) area councils which are Ayikuma (AY), Asutuare (AS), Dodowa (DD), Dawa (DW), Ningo (NI), Osuwem (OS) and Prampram (PR) of which 376 communities are present (Dodowa Health Research Center, 2009). The Shai-Osudoku district is divided into 2 administrative Sub-districts namely the Dodowa (Shai) Sub-district and the Osudoku Sub-district. The district has four (4) area councils (Dodowa, Ayikuma, Asutuare, and Osuwem) (Ghana Health Service, 2014).

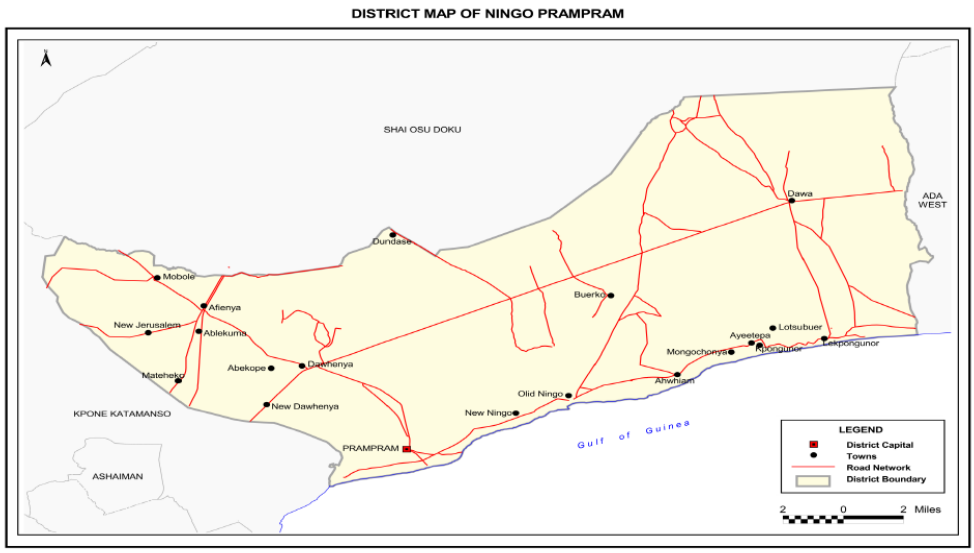
Figure 2 Map of Ghana showing study districts
Source: Ghana Statistical Service, GIS

The Shai Osudoku district has One-hundred and sixty-seven (167) communities. The district population size as of 2014 was 58,885 inhabitants (Ghana Health Service, 2014). The District has a Total Fertility Rate of 3.0 with a total number of 1,222 births in the twelve (12) months preceding the census (Ghana Statistical Service, 2014b) Approximately 52% of the population are females. Among this proportion of females, women aged 15-49 years make up form 28.2% of the population. About 8,904 reside in the Dodowa Sub-district and 5,229 in Osudoku Sub-district. There are sixteen (16) health facilities including a district hospital at Dodowa, the district capital. (Ghana Health Service, 2014).



Source: Ghana Statistical Service, GIS

Figure 3 District map of Shai-Osudoku



Source: Ghana Statistical Service, GIS

Figure 4 District map of Ningo Prampram

The population of Ningo Prampram is about 70,923. Males constitute 47% and females, 53% (Ghana Statistical Service, 2014a). The district has three area councils namely: Prampram, Ningo and Dawa (Dodowa Health Research Center, 2009). The District has a Total Fertility Rate of 2.8 with a total of 1,558 births recorded in the twelve (12) months preceding the census (Ghana Statistical Service, 2014a).

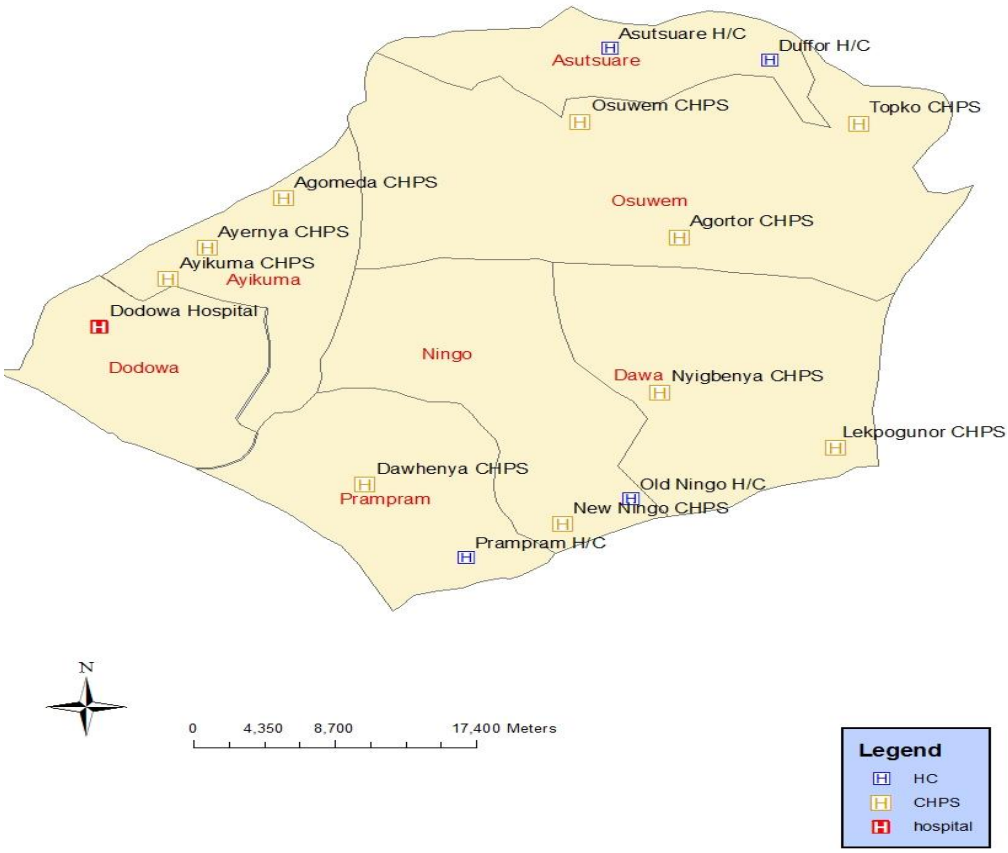


Figure 5 Map of district surveillance area (DSA)
Source: Dodowa Health Research Centre, GIS

3.3 Sample for Qualitative study

A total of 20 women participated in the exploratory study. This was based on the suggest minimum number of respondents required for qualitative research inquiry (Marshall, Cardon, Poddar, & Fontenot, 2013; Ritchie, Lewis, Nicholls, & Ormston, 2013). Five (5) in-depth interviews were conducted within each user category, as follows: women who have stopped using an FP method, women who have switched methods, women who became pregnant while using, and women who have never used any family planning method.

3.3.1 Inclusion Criteria

Women selected for participation in the in-depth interviews were:

- Married women of reproductive age (15-49years) who resided in the district.
- Women who have ever used any contraceptive method in the past five years.
- Women who have never used a contraceptive method

3.3.2 Data collection approach

A total of 20 participants were conveniently sampled from women reporting for maternal and/or reproductive health services at the district hospital. These women were attending child welfare clinics, family planning clinics, or gynecological appointments. This approach allowed recruitment of women into one of three categories for analysis. First, women who were pregnant or became pregnant while they were using their method were classified as contraceptive failure. Second, women who discontinued due to reduced need (i.e. wanted to become pregnant) or discontinued while still in need (experienced side effect) – are classified as discontinued users. Finally women who changed methods were classified as contraceptive switchers.

3.4 Sample for Quantitative study

Sample size as estimated using command *stpower cox* in STATA version 13 under the assumptions for sample size, power, and effect size for cohort study using the Cox proportional hazards model [*stpower cox, hratio(#) failprob(#)*] based on the DHS 2014 data. The assumptions used are as follows:

Alpha = 0.05 (two sided)

Power= 0.8 (80%)

Ha: Contraceptive discontinuation occurs less among users of other methods compared to users of the condom

hratio= Hazard Ratio of 0.7, based on ratio of discontinuation in exposed (0.24) to discontinuation in the unexposed (0.35) user groups

Pr(fail)= Probability of failure event (discontinuation)= 0.24: based on 23.6% discontinuation of all methods*(All methods excluding the condom)

Estimated sample size required was 1,029

Pre-empting household/individual non-response at an oversampling estimate of 8%, (0.08x1029) + 1029= 1111.3. This yielded a minimum of **1,112** Participants rounding up to the nearest whole number.

3.4.1 Inclusion Criteria

Married women of reproductive age (15-49years) who reside in communities in the surveillance area and have used contraceptives within the previous five years (January 2013 to Jan 2018).

3.4.2 Data collection approach

The sampling was done from a list of eligible women within the demographic surveillance area. The DSS area councils have population sizes as follows: Dodowa (18,097), Ayikuma (16,199), Dawa (20,749), Ningo (12,987), Asutuare (13,544) and Prampam (43,879). Dodowa, Asutuare, and Prampam were selected for the study.

The DSS database was used as the sampling frame for this study. First random numbers were assigned to each individual ID. The random numbers were sorted by area, community and household ID. The resulting list was then ordered in excel. A

formula based on expected proportions per area was applied, and the required number of women was selected. The sample selected was proportionate to population size per selected area. This produced an expected sample per area of 649 for Prampram, 275 for Dodowa and 190 for Asutuare. A total of 3,000 participants were sampled from the database using simple random sampling technique. Eligible women were selected based on inclusion criteria for possible participation in the study.

3.4.3 Participant selection

3.4.3.1 Multiple participants

In the instance where more than one eligible participant was selected from a household, the available women in the household at the time of the interview were requested to participate in a ballot for one woman to be selected for participation.

3.4.3.2 Replacement protocol

Selected participants who were not available at time of interview were replaced by selecting the next identified eligible woman on the numbered list from the community visited. This replacement was only done when selected participant was not available after three visits to the household.

3.5 Data Collection instruments

In-depth individual interviews for the initial qualitative study were conducted with women identified to have discontinued, switched or experienced contraceptive failure using a screening tool (Appendix 4). Data collection for the quantitative component utilized a household survey tool (Appendix 5) and a contraceptive history calendar (Appendix 6) to collect reproductive history over the preceding five years (Jan 2013-

Dec 2017). The survey was conducted using electronic data capture for each participant household. Software used was ODK collect Version 14.

3.6 Types of data collected

The in-depth interviews were administered following administration of the participant consent and study information (Appendix 1&2) for all women older than 18 years and (Appendix 3&4) for women under 18. The IDIs were conducted using an interview guide (Appendix 7). This gathered information about women's experiences with contraceptive methods and their reasons for discontinuation or sustained use. Interviews were also conducted with women who have never used any contraceptive method. The purpose was to learn about specific reasons for non-use that may be peculiar to the study context.

Specific issues probed using the tool (Appendix 7) included reasons for use or non-use, reasons for discontinuation or switching, side effects (experienced or feared), types of side effects (weight gain, nausea, palpitations, changes to menstrual cycle, stomach cramps) and other health concerns. Additional issues that emerged from individual interviews included reasons for nonuse among non-users; counseling received and content of counseling i.e. information about side effects. The survey tool was revised to reflect this and capture the issues for users.

The quantitative study participants were administered the survey tool (Appendix 5) to collect background information such as social, demographic, and reproductive information after consent had been sought. Data collection using the calendar (Appendix 6) collected information in four (4) categories:

Event: Column 1 collected information on episodes of contraceptive use, discontinuation, switching or method failures and reproductive history (pregnancies, births, miscarriages, abortions).

Reason: Column 2 collected information on reasons for discontinuation, switching, or failure, where reported among women who indicated discontinuation of use of a contraceptive method.

Side effect: Column 3 collected information on which side effects were experienced or what side effect was feared, if this was the reason indicated in column 2.

Marital Status: column 4 recorded information on marital status and was intended to capture any change in marital status over the observation period.

This analysis restricts the estimation of method switching from a period of three months following discontinuation as commonly performed in other studies to the next month after discontinuation. This approach factors in the potential exposure of women to the risk of an unintended pregnancy during the period where one remains at risk but is not using a contraceptive. This is informed by results indicating a fifth of women experience unintended pregnancy by three months from previous estimates from multi-country studies (Ali et al., 2012). Following these insights, this study draws lessons from other works that have also restricted method switching to an event that occurs within the next month of discontinuation of a method to minimize the potential risk (Barden-O'Fallon et al., 2018).

3.7 Pre-data Collection Activity

3.7.1 Training and Pretesting

Field staff were trained over a two day period. Training involved an introduction to the study's aim and specific objectives, family planning concepts and descriptions of the types of contraceptive methods under study. Field staff were provided with visual aids from the WHO 2018 Global Handbook for family planning providers (World Health Organization et al., 2018), to assist with the communication of the various types of methods being investigated for enhanced identification and understanding during interviews.

Translation the concepts of the interview guide were done into local languages: Dangme, Ga, and Twi. These translations were tested among field staff for uniformity and consensus in understanding. Key terms such as 'family planning' and the names of the contraceptive methods were used in their English form as pretesting highlighted easier understanding and identification with the English form than translated descriptions. Translated guides were also tested on independent field staff of the Dodowa health research centre for clarity of understanding. Pretesting was done in a non-selected community within the district surveillance area.

3.8 Ethical consideration

Ethical clearance was obtained from the Ghana Health Service Ethics review committee (GHS-ERC 08/02/17) (Appendix 8) and the Dodowa Health Research Centre Institutional Review Board (DHRCIRB/02/01/17) (Appendix 9) and the College of Health Sciences Ethical and Protocol review committee (CHS-Et/M.5-P4.9/2015-2016) (Appendix 10).

Information about the study

- Participants were screened using a screening tool (Appendix 4) and given initial information concerning the study, objectives, purpose and anticipated outcomes prior to seeking consent.
- Participants recruited for the individual in-depth interviews were informed that the interview was going to be audio recorded and transcribed for analysis.

Informed consent

- Informed consent was obtained from all participants after the study objectives and details of information required from them was communicated and explained. Participants who were illiterate and unable to provide signatures to the consent were provided with stamp pads to thumbprint their consent. Participants under 18 years of age were provided with a child assent form (Appendix 3) after a parent or guardian had consented to their participation in the study.
- Participants who were under 18 years of age were interviewed after a guardian provided consent and the participant had assented to the interview. Such participant were interviewed after the parent/guardian had left the area to ensure confidentiality.

Confidentiality

- Participants who could provide their individual consent were interviewed at their homes when there was no other person present to assure them of confidentiality or at their workplaces (shops) to prevent inconvenience to daily schedules.

- Participants were also given unique IDs, which were used at all times in references to them to maintain anonymity and confidentiality.
- Data on individuals in the district surveillance area from the Dodowa health research centre as well as the data from the survey were saved and stored on a password protected computer and backed up on an encrypted external hard drive.

Voluntariness

- Participants were informed that their participation was voluntary. They were not paid for their participation and were informed of this prior to initiation of the data collection before they decided to participate.

Interference with daily schedule/Convenience to participants

- Consenting participants with conflicting schedules at the time of selection had their interviews scheduled to be conducted at a convenient time that did not interfere with their reason for visiting the facility/other schedules i.e: women reporting for child welfare clinics that consent to participate had their interviews scheduled to take place after they have completed the activities required for the welfare clinic that day.

Gender Sensitivity in disclosure

- All individual in-depth interviews were conducted by female interviewers. In the interest of minimising any potential discomfort that may have be experienced by participants in disclosing information that may be personal and private to a member of the opposite sex.

3.9 Data Collection

Data for the qualitative study was collected over a period of August 2016 to September 2016. Data for the quantitative component was collected over a period of December 2017-April 2018. A total of 1,462 interviews were conducted with women. All interviews were conducted in the preferred language of the respondents; these were Dagme, Twi and English. Interviews lasted between 45minutes to one hour.

3.10 Quality control

Translation of interview guides and survey questions were tested on independent research officers from the Dodowa health research centre to check for consistency and accuracy in meanings.

Age variables, were cross-referenced against date of birth variables to check for accuracy of responses recorded. The ranges of responses were also compared with age eligibility criteria of 15-49 years to identify outliers. Method use within the past five years, which acts as the main inclusion criteria, was cross referenced against participant qualification for full interview to tally numbers for accuracy. Contraceptive method options were matched against participants that indicated ever use of any method to validate that any method use had occurred. For participants that were currently using contraceptives, was matched to responses of ever use of that method to check for accuracy of response.

3.11 Data Management

All qualitative interviews were audio-recorded. Audio records were transcribed verbatim using Microsoft Word files, translated into English and checked for

completeness and clarity. Data coding, indexing and categorization under themes were done by one person (primary investigator).

Data from the quantitative survey was uploaded after the successful completion of an interview. This minimized errors in data entry from paper-based approaches of data collection. Data from quantitative study due to electronic capture was saved as Excel comma separated values format (.CSV). This data was then imported into STATA version13 and cleaned by running summaries of totals for categories such as number of observations, reviewing range of values such as age to identify outliers and performing crosstabs to identify incomplete entries.

Age variables such as participant age and child's age were used in conjunction with date of birth values to estimate and correct for age at time of interview. Participants who did not know their date of birth were assigned default estimates based on DSS practice of the 15th date of the middle of the year (June) of their expected age year i.e 15/06/YY. Participants who knew their ages but did not know their date of birth accurately had their date of birth calculated backwards from this estimate provided to ensure that date of birth and age was captured for all participants.

Frequencies and cross tabulations were also adopted as a method for data cleaning. Distribution per variable category was compared to the expected estimated numbers and used to assess and identify inconsistencies in the data by crosschecking frequencies or estimates recorded. This form of comparison was employed for variables pertaining to information of ever use of family planning methods for

example i.e: responses to ever use of contraceptives were cross referenced to responses to past use of specific methods for improved accuracy in responses.

Data storage and protection protocol

No transfer of identifiable participant information was made. Participant information was kept secure on a password protected computer. The password was known only to the primary investigator. The de-identified data will be made available for further analysis.

3.11.1 Independent variables

Independent variables under study included demographic variables: current age (at the time of the survey), level of education, employment, number of living children, wealth index, marital status, fertility intention, history of terminated pregnancy, ever pregnant, ever given birth, counselling and ANC attendance.

3.11.2 Dependent Variables

Respondents were divided into two categories of contraceptive use status: discontinued use and switching. A sub-category of discontinued users i.e. abandoned and resumed users assessed proportions of users who discontinued completely and those that resumed use at a later point in the observation period.

3.11.3 Definition of Variables

The key variables in addition to other family planning and reproductive health concepts used in this study are briefly defined. The standard DHS definitions of most concepts were retained.

Discontinuation: Contraceptive discontinuation is the cessation of use of a contraceptive method by a user at any point within the observation period.

Abandonment: Discontinuation that is not followed by the resumption of use at a period later than 3 months post discontinuation is classified as abandonment.

Switching: method switching in this study is the change from one contraceptive method to another contraceptive method (different from the previous method) within the next month of use.

Unintended pregnancy (Method failure): Method failure is captured by this study as the identification of a pregnancy that is reported to have occurred alongside the participant's use of a contraceptive method i.e. in the next month following method use, but not reported as "wanted to become pregnant". This study therefore presumes that all such pregnancies recorded were unintended.

3.12 Qualitative data analysis

Qualitative data collected from individual in-depth interviews were manually analysed. The transcripts were read repeatedly, to identify recurring issues/reasons as indicated by participants for the events being studied. These events were: switching, unintended pregnancy/method failure, discontinuation or non-use. This review of transcripts and interpretation of findings was undertaken by the primary investigator only.

Criteria were determined for categories to be used in developing themes prior to data analysis. These themes were created based on the study objective of exploring user reported reasons for discontinuation. Some themes were theoretically derived from available literature and were set a priori e.g. method type and side effects. Other themes that emerged from the data were side effects experienced, side effects feared, physical side effect (pain and weakness) and menstrual side effects.

Themes that emerged from the transcripts were noted. Quotes from transcripts were coded and grouped under the themes that they represented. These quotes were used to substantiate findings from the quantitative that sought to quantify the qualitative results in an integrated analysis.

3.13 Quantitative Data analysis

Data imported into STATA were assessed for inconsistencies, outliers and missing values using frequencies. This was performed on variables: current age, child's age, ever had a live birth, parity, level of education, ever use of contraceptives. Ever use of contraceptive options was measured by 'yes' or 'no' responses to ever use of any of the contraceptive methods under study (pill, IUD, condom, injectable, implant, male condom, female condom, periodic abstinence, withdrawal, foam/jelly, LAM or emergency contraceptives), current method choice, previous method, method use in the past five years and participant qualification for full interview.

Parity was checked against responses to 'have you ever given birth?' Participants with affirmative responses to '*ever given birth?'* were expected to have at least one positive response to details of 'what is *the age of your first child'*. Participants with

parity higher than one (1) were checked against responses to child number that tally with reported parity. Ever use of modern method lactational ammenorhea (LAM) was cross checked against responses to birth dates of children born. This was performed for improved accuracy of recollection of month and year of use of LAM.

Univariate analysis was initially carried out to identify frequencies, means and distribution of contraceptive user type (never user, current user, discontinued user and switched user). Distribution of individual factors (demographic, social, reproductive and barriers) and user types relative to reference population/ reasons for discontinuation were also assessed and presented to describe participants.

To describe the population under study, frequencies, proportions and means were performed for independent variables (age, employment, employed for the past two years, ever attended school, highest level of education completed, ever been pregnant, ever given birth, history of terminated pregnancy, fertility intentions, ANC attendance, number of children, ever use of contraceptives, timing of use, received contraceptive counselling, told about side effects of the methods).

Using age as a continuous variable, the mean, standard deviation, minimum, maximum and number of participants were determined. For all other categorical variables, data presented were frequencies, percentages and proportions of participants.

Descriptive statistics of data were summarized into background tables showing distribution by the user categories of interest (current users, discontinued users and

switched users). Participants were first described by their socio-demographic information: age, level of education, employment, marital status parity and wealth. Within analysis of socio-demographic information, standard deviation for age as a continuous variable was estimated. A second description of reproductive characteristics was performed to define participants by pregnancy status, ANC attendance, timing of contraceptives, received counseling, told about side effects. The final description provides information on reason for discontinuation and methods switching from.

Independent sample t-tests was also used to compare mean age among women who discontinued, switched or abandoned use. Kaplan meier curves were used to estimate failure probabilities of the covariates under study and discontinuation or switching. Bivariate analysis also involved the use of the Chi-squared test to identify associations between socio-demographic, reproductive and health service factors under study (i.e. marital status, level of education, employment status, age, parity wealth, abortion history, fertility preferences, time of use of contraceptives, counselling and knowledge of side effects) and the outcomes of interest (discontinued use and switching). The Kaplan Meier failure curves and log rank test statistic was also used to test for equality of survival by background and reproductive factors and discontinuation or switching. In all statistical analysis that was performed, a p-value of 0.05 was used to determine statistical significance.

To determine the relationship between discontinuation and switching with background factors, Cox proportional hazard models (Hazard Ratios) were used to estimate the hazard of discontinuation and the hazard of switching. Crude hazards were derived and the strength of their influence on the hazard of discontinuation using

hazard ratios (HR) and their 95% confidence intervals (CI) was used for comparisons of their effect on discontinued use and switching.

To examine the contribution of method type on discontinued use or switching, hazard ratios and their 95% confidence intervals (CI) were used for comparisons to determine effect of discontinuation or switching by the contraceptive method ever used. The Log-Rank test was used to determine whether differences identified in survival between groups was statistically significant.

Data were prepared for survival analysis by creating a time variable for which the event of interest was measured against. The events of interest are discontinuation (cessation of use of contraceptives), method use (use of any contraceptive method), nonuse (No Method/not using), switching (change in contraceptive method used in the previous month) or failure (pregnancy reported in the next month following method use) were captured on a month by month basis.

The time variable was thus generated in months and subsequently covered 60 months for the 5-year period of January 2013 – January 2018. This time variable was created in two forms – start date and end time. The start date variable start2 was created to identify the month and year within which the event of interest (contraceptive use) begun. This variable was thus generated for all 1,114 women. The end time variable was created to identify the month and year when one stops using the method (No method/not using) occurs. This variable was generated for only the 542 women who discontinued their contraceptive method.

A switching variable was created to identify when one stops using one method and begins to use an alternate contraceptive method. This variable was generated for only the 438 women who switched from one contraceptive method to another in the next month of use. A one month estimation was used as the defined period of switching in this study. This underestimates switching by 5 participants who were identified to have switched after 3 months.

A further classification of discontinued use identified two categories of discontinued women. The first includes women who discontinue use and resumed use after a period of time following discontinuation (resumed users), and the second, that consists of women who discontinue use completely (abandon) and never resume throughout the observation period. Four additional time dependent variables were created to aid with the analysis. Variables created were end time, exit time, follow up time and change in marital status.

Data were set to survival time data using STATA command *stset* and analysis of the data was performed using *st* commands. The analysis is episode-based, with an episode defined as a period of uninterrupted use. It is noted that not all episodes of use may have ended at the time of the survey, and that a woman may contribute more than one episode during this period. Life table methods were used to calculate conditional probabilities of discontinuing a method. This was also done for reasons for discontinuation provided. Probabilities were computed for 12, 24 and 36 month intervals to assess likelihood of continuation after using a method for a period of time.

At the multivariate level, Cox proportional hazard models (Hazard Ratios) were used to estimate the hazard of discontinuation while controlling for all other background, reproductive and service delivery factors. Multiple decrement life tables were also used to assess cause specific and method specific discontinuation rates at 12, 24 and 36 months intervals by reasons provided. Parametric assumptions of the Cox proportional hazards model were evaluated using the Schoenfield residuals, which produced p-value of 0.82. The assumption was again examined through the visual inspection of the Kaplan Meier curves (Appendix 8).

Method failure was assessed in this study by pregnancies occurring alongside method use/ in the month following method use. Such pregnancies identified were classified as “unintended” by this study. Pregnancy for which the user reports that they became pregnant while using the method were identified as pregnancies due to method failure. Pregnancies that were reported as “wanted to become pregnant” were excluded and categorized as discontinuations due to reduced need. This study summed the total pregnancies identified through reclassification and by response to estimate method failure.

Contraceptive method variables were created to cover method use over the 60 month period (5 years). These variables assume a binary outcome of the method or all other methods i.e. for pill 0 represents all other methods used whilst 1 represents only pill used. This method variables were created for eleven of the thirteen contraceptive methods studied. Female and male sterilization were not created owing to the permanent nature of the method

CHAPTER FOUR

4.0 RESULTS

This section presents the results of the screening tool and household survey conducted with 1,462 women, complemented by the results of individual interviews with 20 women.

4.1 Characteristics of women screened for the study

Of the total number of 1,462 women screened, a majority of women (79.5%) had used at least one method of contraception, while 76.1% (1,114) met the eligibility criteria for the study and had used a contraceptive method in the preceding 5 years. The ages of respondents included in the study ranged 17-49 years. The average age of women was 28. 7±0.2 (Table 4.1).

Women interviewed were all usual residents of the Shai-Osudoku and Ningo Prampram districts. Almost all the women (99.46%) have lived in the study area for at least one year. Few women (7.8%) have no formal education. Most participants were predominantly educated to middle/JHS level (51%), or were employed (71.72%). whilst 26.3% belonged to the 'richer' wealth quintile (Table 4.1).

4.2 Characteristics of women discontinuing use

Socio-demographic Characteristics

Table 4.1 presents the results of log rank and t-test analysis of background characteristics of women included in the study and the occurrence of discontinuation. Results highlight significant differences were identified between the mean ages of women who discontinued and those who did not ($p<0.001$) (Table 4.1). Women who

had discontinued use were about 3 years older (30.62 ±0.37) than those who did not (27.31 ±0.27). In terms of age, discontinuation was observed at 21.7% for women 25-29years and at 21.2% for women age 30-34 years. Discontinuation was estimated at 34.4% among women who were married or co-habiting, 47.2% among women educated up to middle/JHS level and 75.9% for employed women. Women who belong to the richer wealth quintile discontinuation was 28.4%. Also 29.1% discontinuation was estimated for women who had no children (Table 4.1).

Table 4.1: Socio-demographic characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts and association with discontinuation (N=1,114)

Socio-Demographic Characteristics	Ever Used (%)	User Type				p-value[1]
		Not Discontinued (%)		Discontinued (%)		
Age (Mean)	**28.67 ±0.22**	**27.31 ±0.27**		**30.62 ±0.37**		**<0.001**
Age groups						
15-19	108(9.69)	80	(12.18)	28	(6.13)	
20-24	284(25.49)	191	(29.07)	93	(20.35)	
25-29	265(23.79)	168	(25.57)	97	(21.23)	
30-34	207(18.58)	108	(16.44)	99	(21.66)	**<0.001**
35-39	149(13.38)	72	(10.96)	77	(16.85)	
40-44	57(5.12)	21	(3.2)	36	(7.88)	
45-49	44(3.95)	17	(2.59)	27	(5.91)	
Marital Status						
Single	380(34.11)	28	(4.26)	14	(3.06)	
Married/cohabiting	307(27.56)	223	(33.94)	157	(34.35)	**0.021**
In relation/ not cohabiting	381(34.2)	164	(24.96)	143	(31.29)	
Separated/widowed	46(4.13)	246	(37.44)	135	(29.54)	
Change in Marital Status						
No	871(78.19)	534	(81.28)	345	(75.49)	**0.020**
Yes	243(21.81)	123	(18.72)	112	(24.51)	
Ever attended School						
No	87(7.81)	41	(6.24)	46	(10.07)	**0.019**
Yes	1027(92.19)	616	(93.76)	411	(89.93)	
Education						
None	87(7.81)	40	(6.99)	47	(8.67)	
Primary	209(18.76)	106	(18.53)	103	(19.00)	
Middle/JHS	527(47.31)	271	(47.38)	256	(47.23)	0.107
Secondary/SHS	249(22.35)	129	(22.55)	120	(22.14)	
Higher	42(3.77)	26	(4.55)	16	(2.95)	
Wealth Index						
Poorest	105(9.46)	65	(9.92)	40	(8.79)	
Poorer	214(19.28)	129	(19.69)	85	(18.68)	
Poor	257(23.15)	152	(23.21)	105	(23.08)	0.752
Richer	292(26.31)	163	(24.89)	129	(28.35)	
Richest	242(21.8)	146	(22.29)	96	(21.1)	
Number of living children						
None	448(40.22)	315	(47.95)	133	(29.1)	
1	218(19.57)	130	(19.79)	88	(19.26)	**<0.001**
2	163(14.63)	77	(11.72)	86	(18.82)	
3	147(13.2)	60	(9.13)	87	(19.04)	
4	83(7.45)	42	(6.39)	41	(8.97)	
5+	55(4.94)	315	(47.95)	133	(29.1)	
Current employment status						
Not working	347(31.15)	237	(36.07)	110	(24.07)	**<0.001**
Working	767(68.85)	420	(63.93)	347	(75.93)	
TOTALS	**1,114**	**657**	(58.98)	**457**	(41.02)	

[1] P-values are results from log rank test of equality of survival (Kaplan Meier curves shown in appendix 8)

4.3 Characteristics associated with discontinuation at bivariate level

Women who discontinued use differed significantly from those who did not by age, change in marital status, marital status, number of living children and employment status ($p<0.05$) (Table 4.1).

Reproductive Characteristics

An estimated 79.4% of discontinuation was observed among women who have had previous pregnancies; or who had given birth before (89.01%). Among women who had ever been pregnant, 80.2% discontinuation was found among those who had never had a terminated pregnancy, and those who had received antenatal care for their most recent pregnancy (81.97%). A little less than 40% of women who reported use of family planning methods after childbearing discontinued (39.82%) (Table 4.3). Additionally, 26.3% of discontinuation was found among women who did intend to become pregnant within the next two (2) years. Approximately 41.8% of women who received counseling prior to the initiation of method use discontinued. About 22.3% of women who had knowledge about side effects of the contraceptives also discontinued (Table 4.3).

Table 4.2: Reproductive Characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts, Ghana and association with discontinuation (N=1,114)

Reproductive Information	Ever Used(%)	User Type: Not Discontinued (%)		Discontinued (%)		p-value[1]
Ever Pregnant						
No	331(29.71)	237	(36.07)	94	(20.57)	**<0.001**
Yes	783(70.29)	420	(63.93)	363	(79.43)	
Ever given birth*						
No	121(15.37)	81	(19.15)	40	(10.99)	**0.002**
Yes	666(84.63)	342	(80.85)	324	(89.01)	
History of terminated pregnancy						
No	594(75.57)	302	(71.56)	292	(80.22)	0.005
Yes	192(24.43)	120	(28.44)	72	(19.78)	
Fertility Intentions						
Wants another child in 2yrs	853(76.57)	516	(78.54)	337	(73.74)	0.063
Does not want a child in 2yrs	261(23.43)	141	(21.46)	120	(26.26)	
ANC attendance						
No	152(20.27)	88	(22.28)	64	(18.03)	0.148
Yes	598(79.73)	307	(77.72)	291	(81.97)	
Timing of FP use						
Before Childbearing	507(45.51)	327	(49.77)	180	(39.39)	**<0.001**
After childbearing	446(40.04)	264	(40.18)	182	(39.82)	
In-between children	161(14.45)	66	(10.05)	95	(20.79)	
Received Counselling on contraceptives						
No	530(47.58)	264	(40.18)	266	(58.21)	**<0.001**
Yes	584(52.42)	393	(59.82)	191	(41.79)	
Told about Side Effects						
No (Ref)	794(71.27)	439	(66.82)	355	(77.68)	**<0.001**
Yes	320(28.73)	218	(33.18)	102	(22.32)	

**Responses limited to 783 women who provided answers to question.
[1] P-values are results from log rank test of equality of survival (Kaplan Meier curves shown in appendix 8)

4.3 Reproductive Characteristics associated with discontinuation

Women who discontinued use differed significantly from those who did not by past pregnancy status, ever given birth, history of terminated pregnancy, timing of use of contraceptives receiving counseling on methods and being told about side effects of contraceptive methods (P<0.05) (Table 4.2).

Contraceptive use and method mix

Current use of contraceptives at the time of the survey was reported by 60.1% of women. The three most commonly used methods were the implant (20.8%) male condom (20.5%) and pill (18.2%)(Table 4.3).

Table 4. 3: Methods currently used among women in the Shai-Osudoku and Ningo Prampram districts, Ghana (n=670)

Current Method	n	(%)
Implants	139	(20.75)
Male Condom	137	(20.45)
Pill	122	(18.21)
Injections	109	(16.27)
Periodic Abstinence/Rhythm	64	(9.55)
Withdrawal	56	(8.36)
Other*	26	(3.88)
Female Sterilization	7	(1.04)
LAM/exclusive breastfeeding	6	(0.9)
IUD	4	(0.6)
TOTAL	670	

*Other includes foam/jelly, emergency contraception and combination of methods

Bivariate analysis reported relationships between discontinuation and background factors. In general, the hazard of a woman discontinuing use reduced by 0.02 for each yearly increase in age [HR= 0.98, 95% CI (0.97, 0.99)] (Table 4.4). Additionally, in adjusted analysis, age in 5-year groups, marital status, number of living children and employment status was significantly associated with reductions in the hazard of discontinuation (Table 4.4) when controlling for, education, marital status, wealth and employment status (Table 4.4). Change in marital status and education however, were significantly associated with increasing hazards of discontinuation (Table 4.4).

Table 4. 4: Hazard of discontinuation by background characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts (N=1,114)

Background Characteristic	Hazard Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Age	**0.98**	**0.97**	**0.99**			
Age groups						
15-19 (Ref)						
20-24	**0.65**	**0.42**	**0.99**	0.74	0.48	1.15
25-29	**0.41**	**0.27**	**0.62**	**0.52**	**0.33**	**0.83**
30-34	**0.31**	**0.20**	**0.48**	**0.47**	**0.29**	**0.77**
35-39	**0.32**	**0.20**	**0.50**	**0.50**	**0.30**	**0.82**
40-44	**0.25**	**0.15**	**0.41**	**0.39**	**0.22**	**0.69**
45-49	**0.22**	**0.13**	**0.38**	**0.40**	**0.22**	**0.74**
Marital Status						
Single						
Married/cohabiting	**0.78**	**0.62**	**0.97**	0.77	0.58	1.02
In relation but not cohabiting	**0.73**	**0.58**	**0.92**	**0.75**	**0.59**	**0.97**
Separated/widowed	0.68	0.43	1.06	**0.51**	**0.31**	**0.85**
Change in Marital Status						
No						
Yes	**1.70**	**1.37**	**2.10**	**1.92**	**1.47**	**2.51**
Education						
None (Ref)						
Primary	1.06	0.74	1.51	0.95	0.65	1.38
Middle/JHS	1.16	0.84	1.60	0.84	0.59	1.19
Secondary/SHS	**1.66**	**1.16**	**2.38**	0.98	0.66	1.47
Higher	1.00	0.55	1.83	0.78	0.42	1.46
Wealth Index						
Poorest (Ref)						
Poorer	1.01	0.70	1.48	1.14	0.77	1.68
Poor	0.94	0.65	1.35	1.03	0.71	1.50
Richer	0.98	0.68	1.39	1.02	0.71	1.48
Richest	0.71	0.49	1.03	0.78	0.53	1.15
Number of living children						
None (Ref)						
1	0.83	0.63	1.08	0.94	0.69	1.27
2	**0.60**	**0.46**	**0.79**	0.74	0.53	1.02
3	**0.55**	**0.42**	**0.72**	0.75	0.54	1.05
4	**0.41**	**0.29**	**0.59**	**0.53**	**0.35**	**0.80**
5+	**0.34**	**0.22**	**0.54**	**0.49**	**0.30**	**0.83**
Current employment status						
Not working (Ref)						
Working	**0.60**	**0.49**	**0.75**	0.99	0.77	1.28

Women 25 years and older had a reduced hazard of discontinuation compared to younger women 15-19 years old [HR=0.52; 95% CI (0.33, 0.83)]. Women aged 30-34years had a reduced hazard of discontinuation [HR=0.47; 95% CI (0.29, 0.77)] compared to the youngest age group (15-19years). A reduced hazard of discontinuation was also identified among women aged 35-39 years compared to

women 15-19years [HR=0.50; 95% CI (0.30, 0.82)]. Women 40-44 years had a reduced hazard of [HR=0.39; 95% CI (0.22, 0.69)]. Among women in the oldest age group (44-49 years) the hazard of discontinuation was reduced compared to women age 15-19years [HR=0.40; 95% CI (0.22, 0.74)] (Table 4.4).

Women in a relationship though not living together with their partners had a 25% reduced hazard of discontinuation [HR=0.75 95% CI (0.59, 0.97)] compared to single women. Interestingly, women who were separated/widowed also had a 49% reduction in the hazard of discontinuation compared to single women [HR=0.51; 95% CI (0.31, 0.85)] (Table 5). A general change in marital status was identified to have a 92% increase in the hazard of discontinuation compared to women who did not experience any change in marital status [HR=1.92 95% CI (1.47, 2.51)] (Table 4.4).

Compared to women with no children a gradual reduced hazard of discontinuation was observed by increasing number of living children although not statistically significant for all categories. Women with four children had a 47%% reduction in the hazard of discontinuation [HR=0.53, 95% CI (0.35, 0.80)]. Similarly women with more than four children had a 51% reduction in the hazard of discontinuation [HR=0.49; 95% CI (0.30; 0.83)] (Table 4.4).

Reproductive Factors

Reproductive characteristics associated with discontinuation were timing of use of contraceptives (use of contraceptives before or after childbearing) and receiving counseling. These were identified to be associated with a reduction in the hazard of discontinuation compared to their respective reference groups at all times of follow up

(Table 4.5). The hazard of discontinuation was reduced for women who indicated use of contraceptive after childbearing compared to women who used it before childbearing begun [HR=0.53; 95% CI (0.400, 0.694)]. Similarly for women who used contraceptive in-between children, the hazard of discontinuation was reduced by 56% [HR=0.44; 95% CI (0.325, 0.604)].

Table 4.5: Hazard of discontinuation by reproductive characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts, Ghana (N=1,114)

Reproductive/ Service delivery factors	Hazard Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Ever Pregnant						
No (Ref)						
Yes	**0.66**	**0.52**	**0.83**	0.23	0.03	1.69
Ever given birth						
No (Ref)						
Yes	0.48	0.34	0.67	**(omitted)***		
History of terminated pregnancy						
No (Ref)						
Yes	1.15	0.88	1.48	1.07	0.81	1.41
Fertility Intentions						
Does not want a child in 2yrs(Ref)						
Wants another child in 2yrs	**1.26**	**1.02**	**1.55**	1.17	0.92	1.49
ANC attendance						
No (Ref)						
Yes	1.16	0.88	1.52	1.14	0.86	1.50
Timing of FP use						
Before Childbearing (Ref)						
After childbearing	**0.51**	**0.41**	**0.64**	**0.53**	**0.40**	**0.69**
In-between children	**0.46**	**0.35**	**0.59**	**0.44**	**0.33**	**0.60**
Received Counselling on contraceptives						
No (Ref)						
Yes	**0.55**	**0.44**	**0.66**	**0.72**	**0.56**	**0.93**
Told about Side Effects						
No (Ref)						
Yes	**0.58**	**0.467**	**0.73**	0.77	0.58	1.04

**Ever given birth omitted due to collinearity*

The role of timing of use of family planning in relation to childbearing was identified in qualitative evidence also. This was expressed in narratives as the reduced need for contraceptives after marriage when childbearing is expected:

> *"I started using it (contraceptives) before children. I did the five year contraceptive to protect myself for that time. I wanted to get married before I started giving birth." (Mother of two, 24yrs)*

Service Delivery factors

Among women who received some counseling on their method, a 28% reduction in the hazard of discontinuation was estimated compared to women who did not receive any counseling [HR=0.72 95% CI (0.56, 0.93)] (Table 4.5). This finding was also substantiated by the findings from the qualitative interviews:

> "*…they lectured me about the implant, I was told it is fine but sometimes it takes time to adjust to it as if it does not agree with you. When I tried it, even though it took some time I have realized it is fine now*".
> (Mother of four, 34yrs)

Compared to women who were not told about side effects of contraceptives, women who had been informed about side effects had a reduced hazard of discontinuation at all times of follow up [HR=0.58; 95% CI (0.47, 0.73)] (Table 4.5).

Factors associated with discontinuation from narratives

Although no significant association was identified when controlling for change in marital status, number of children, education and wealth (Table 4.4), the reduced discontinuation of contraceptives by employed women was disclosed in qualitative inquiry. This was expressed by an understanding of the importance of family planning to assist with wider spacing intervals for career advancement:

"I am using it for protection. I gave birth premature so I did it to protect myself. I was going to learn a trade and I didn't want any distraction so I decided to protect myself.
(Mother of two, 24yrs)
"...it will help me to be able to finish learning my trade before I get pregnant again and it will also help me to space them as well."
(Mother of two, 27yrs)

The narratives also highlighted the reduced discontinuations among women engaged in employment that required more time commitment. Such women indicated a need to use and adhere to contraceptives to prevent mistimed pregnancy as a way to keep their jobs. This reduction was particularly pronounced among women who had children, with reason being that so they could earn more to take care of the current children in their household.

"...Maybe you are working and you're so busy to the extent that you don't even have time to stay home and take care of your children, and if you don't have money too it will worry you." (Mother of four, 34yrs)

4.5 Reasons for Discontinuation

Table 4.6 presents the results of the frequency distribution of reported causes of discontinuation among women in the study. The most common reason for discontinuation reported was the reduced need for contraceptives (32.39%). The next commonly reported reason was the experience of side effects (25.60%). Any other reason implying dissatisfaction with the method (24.73%) and the fear of side effects (12.91%) were also frequently reported (Table 4.6).

Table 4. 6: Reasons for discontinuation by women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Reasons	**n**	**(%)**
Reduced need*	148	(32.39)
Experienced side effects	117	(25.6)
All other reasons**	113	(24.73)
Fear of side effects	59	(12.91)
Health concerns	12	(2.63)
Got pregnant	8	(1.75)
Total	**457**	(100)

*Includes women who report no sexual activity, desire pregnancy, are separated, and are unable to get pregnant/menopausal.
**All other reasons: includes all reasons implying dissatisfaction with the method (access, cost, want more efficient method, inconvenience of use)

The probability of discontinuation at 12, 24 and 36 months of use highlights the strength of the fear of side effects on discontinuation. At 12 months of use 10% of women discontinue because they are afraid of side effects of contraceptives. This increased to 37% at 24 months of use. Approximately 69% of users would discontinue due to a reduced need after 36 months of use (Table 4.7).

Table 4.7: Probability of discontinuation at 12, 24 and 36 months of use (all methods)

Cause	No. Begin	Deaths/ Discontinue	Lost	Cumulative Probability	95% CI	
All other reasons						
Interval 0-12	152	9	11	0.061	0.032	0.115
12 - 24	132	20	10	0.209	0.150	0.287
24 - 36	102	27	3	0.422	0.342	0.511
Got pregnant						
Interval 0-12	18	0	8	0.000	0.000	0.000
12 - 24	10	4	2	0.444	0.196	0.796
24 - 36	4	2	0	0.722	0.409	0.956
Fear of side effects						
Interval 0-12	59	6	0	**0.102**	0.047	0.212
12 - 24	53	16	0	**0.373**	0.264	0.509
24 - 36	37	12	0	0.576	0.455	0.703
Health concerns						
Interval 0-12	14	1	0	0.071	0.010	0.409
12 - 24	13	2	0	0.214	0.075	0.528
24 - 36	11	3	1	0.439	0.226	0.729
Experienced side effects						
Interval 0-12	125	6	1	0.048	0.022	0.104
12 - 24	118	23	3	0.236	0.171	0.322
24 - 36	92	27	2	0.463	0.379	0.556
Reduced need						
Interval 0 - 12	153	15	2	0.099	0.061	0.158
12 - 24	136	41	0	0.370	0.299	0.453
24 - 36	95	48	1	**0.690**	0.616	0.762

Assessing the hazard of discontinuation by reason provided shows that compared to women who discontinued for any other reason implying dissatisfaction with the method, women who express a fear of side effects of contraceptives had a 60% increase in the hazard of discontinuation at all times of follow up [HR=1.60 95% CI (1.17, 2.20)]. (Table 4.8)

Women who indicate the experience of side effects had a 34% increase in the hazard of discontinuation [HR=1.50; 95% CI (1.07, 2.09)] compared to women who discontinued for any other reason implying dissatisfaction with the method. For

women who report a reduce need for contraceptives, the hazard of discontinuation is 57% higher than women who discontinue for any other reason implying dissatisfaction with the method (Table 4.8).

Table 4.8: Hazards associated with identified cause of discontinuation among women in the Shai-Osudoku and Ningo Prampram districts, Ghana

Reasons	Hazard Ratio	95% Confidence Interval	
All other reasons (Ref) **			
Got pregnant	1.32	0.65	2.72
Fear of side effects	**1.60**	**1.17**	**2.20**
Health concerns	1.31	0.72	2.38
Experienced side effects	**1.34**	**1.04**	**1.74**
Reduced need*	**1.57**	**1.22**	**2.01**

*Includes women who report no sexual activity, desire pregnancy, are separated and are unable to get pregnant/menopausal.
**All other reasons: includes all reasons implying dissatisfaction with the method (access, cost, want more efficient method, inconvenience of use)

4.6 Method Specific Discontinuation

The total percentage of women who discontinued for all methods at 12, 24 and 36 months after starting use shows that within 12 months of use of any method, 4% of women discontinue use. For women who continue to use their methods up to 24 months, this estimate increases to 18% and further to 38% among women who continue to use their method beyond 24 and 36 months (Table 4.9).

Table 4. 9: Method specific discontinuation probabilities at 12, 24 and 36 months for all causes among women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Methods	Interval	Begin total	Deaths/ Disc	Cum. Failure	95% Confidence interval	
All Methods						
	0-12	1114	37	0.04	0.03	0.05
	12 - 24	807	106	0.18	0.15	0.21
	24 - 36	549	119	0.38	0.34	0.41
Pill						
	0-12	272	14	0.06	0.04	0.10
	12 - 24	181	37	0.27	0.21	0.34
	24 - 36	119	31	0.48	0.40	0.56
Condom						
	0-12	252	6	0.03	0.01	0.06
	12 - 24	164	22	0.18	0.13	0.25
	24 - 36	98	24	0.42	0.33	0.52
IUD						
	0-12	11	0	0.00	.	.
	12 - 24	10	1	0.11	0.02	0.57
	24 - 36	7	1	0.24	0.06	0.67
Injectable						
	0-12	312	5	0.02	0.01	0.04
	12 - 24	258	30	0.14	0.10	0.19
	24 - 36	193	43	0.34	0.28	0.41
Implant						
	0-12	213	1	0.01	0.00	0.04
	12 - 24	184	5	0.04	0.02	0.08
	24 - 36	139	17	0.17	0.12	0.25
Rhythm/PA						
	0-12	102	0	0.00	.	.
	12 - 24	78	10	0.14	0.08	0.25
	24 - 36	53	8	0.28	0.19	0.41
Withdraw						
	0-12	109	5	0.05	0.02	0.12
	12 - 24	87	8	0.15	0.09	0.25
	24 - 36	52	17	0.47	0.35	0.60

Results from the Cox regression also showed a significantly reduced hazard of discontinuation for users of the implant at all times of follow up [HR=0.69; 95% CI (0.53, 0.90)] compared to other methods of contraception (Table 4.10).

Table 4. 10; Hazard of Discontinuation by specific methods among women in the Shai-Osudoku and Ningo Prampram Districts, Ghana

Method	Hazard	95% Confidence Interval	
Pill	0.96	0.78	1.17
Condom	0.81	0.64	1.04
IUD	0.83	0.31	2.25
Implant	**0.69**	**0.53**	**0.90**
LAM	1.04	0.67	1.64
Injectable	0.89	0.74	1.08
Periodic Abstinence/Rhythm	0.81	0.58	1.12
Withdrawal	0.92	0.67	1.25
Others	1.07	0.75	1.52

An analysis of the hazard of discontinuation of specific contraceptive methods compared to other method users highlighted the variations in method specific discontinuation. Users of the pill had the highest hazard of discontinuation compared to users of all other methods at all times of follow up [HR=1.68, 95% CI (1.26, 2.25) (Table 4.11).

Table 4. 11: Hazard of discontinuation of specific contraceptive methods compared to all other contraceptive methods among women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Contraceptive Method	Hazard Ratio	[95% Confidence Interval]	
All other methods (Ref)			
Pill	**1.68**	**1.26**	**2.25**
All other methods (Ref)			
Injectable	1.33	0.04	1.74
All other methods (Ref)			
IUD	0.76	0.24	2.38
All other methods (Ref)			
Condom	**0.57**	**0.37**	**0.92**
All other methods (Ref)			
Withdrawal	0.37	0.18	0.75
All other methods (Ref)			
Implant	**0.35**	**0.23**	**0.54**
All other methods (Ref)			
LAM	0.36	0.11	1.12
All other methods (Ref)			
Periodic Abstinence	**0.18**	**0.08**	**0.44**

Users of the male condom had a reduced hazard of discontinuation by 43% at all times of follow up compared to users of other methods [HR=0.57, 95% CI (0.37, 0.92)]. Implant users however had the greatest reduction in the hazard of discontinuation at all times of follow up compared to users of all other methods [HR=0.35, 95% CI (0.23, 0.54) except for LAM (Table 4.11).

A Log rank test of equality of survival between users of the male condom compared to all other contraceptive methods produced a chi-squared value of 0.017. The log rank test clearly rejects the null hypothesis that the survival experiences of condom users are the same as those of all other contraceptive methods ($p<0.05$).

4.6.1 Discontinuation of other methods compared to the condom

Table 4.12 presents the assessment of method specific discontinuation by comparing individual methods to the male condom. The hazard of discontinuation for the pill was significantly increased at all times of follow up compared to users of the male condom [HR=2.35, 95% CI (1.40, 3.97)]. The hazard of discontinuing the injectable was significantly the increased by 82% at all times of follow up [HR=1.82 (CI 1.10, 2.99)] compared to users of the male condom. Comparing the hazards of discontinuation of the male condom to the two traditional methods (Periodic abstinence and withdrawal) produced a general reduced hazard of discontinuation (Table 4.12). A significant reduction by 70% in the hazard of discontinuation for periodic abstinence users at all times of follow up was identified [HR=0.30, 95% CI (0.11, 0.81)].

Table 4. 12: Hazard of discontinuing specific contraceptive methods compared to the male condom among women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Contraceptive Method	Hazard Ratio	[95% Confidence Interval]	
Modern Methods			
Male Condom (Ref)			
Pill	**2.35**	**1.397**	**3.969**
Male Condom (Ref)			
Injectable	**1.82**	**1.103**	**2.987**
Male Condom (Ref)			
IUD	1.49	0.439	5.113
Male Condom (Ref)			
LAM	0.62	0.183	2.105
Male Condom (Ref)			
Implant	**0.52**	**0.285**	**0.968**
Traditional methods			
Male Condom (Ref)			
Withdrawal	0.62	0.27	1.404
Male Condom (Ref)			
Periodic Abstinence	**0.30**	**0.109**	**0.809**

4.6.2 Probability of discontinuation by methods

4.6.2.1 Pill

The probability of discontinuation of the pill at 12 months of use is highest among users who have a reduced need (15%). At 24 months of use the probability of discontinuation is highest for pill users who experienced side effects. The probability of discontinuation of the pill is highest at 36 months for women who have fears of side effects and health concern (67% respectively).

4.6.2.2 Condom

The probability of discontinuing the condom is highest at 12 months of use for women who have fear of side effects (20%). At 24 months of use, 48% of condom users will discontinue due to a reduced need for contraceptives. At 36months of use also, 78% of women discontinue for the same reason of reduced need (Table 4.13).

4.6.2.3 Implant

The implant records one of the lowest 12-month discontinuation rates. Approximately 4% of implant users discontinue within 12 months of use due to the experience of side effects. At 24 months of use 17% of user discontinue because of a fear of side effects. This increases to 38% for women who indicate any other reason implying dissatisfaction with the implant (Table 4.13).

4.6.2.4 Injectable

The injectable also reports a low 12-month discontinuation rate. The experience of side effects is the main cause of injectable discontinuation at 12 months of use (4%). At 24 months of use approximately 50% of injectable users discontinued because they got pregnant on the method. At 36 months of use 56% discontinuation is observed due to a reduced need for contraceptives (Table 4.13).

Table 4.13: Probability of discontinuing by duration of specific contraceptive methods by reason at 12, 24 and 36 months

Methods	Months of use	Reason for discontinuation					
		All others	Got pregnant	Fear of Side effects	Health concerns	Experienced Side effects	Reduced need
Pill							
	12	0.13	-	0.00	-	0.06	**0.15**
	24	0.35	0.20	0.33	0.33	**0.42**	0.39
	36	0.52	0.60	**0.67**	**0.67**	0.64	0.66
Condom	12	0.00	0.00	**0.20**	0.00	0.00	0.10
	24	0.03	0.40	0.00	0.00	0.33	**0.48**
	36	0.31	1.00	0.00	0.00	0.00	**0.78**
Implant	12	-	0.00	-	-	**0.04**	0.00
	24	0.00	0.00	**0.17**	0.00	0.12	0.10
	36	**0.38**	0.00	0.33	0.17	0.34	0.30
Injectable	12	0.02	0.00	0.00	0.00	**0.04**	0.03
	24	0.20	0.50	**0.26**	0.25	0.16	0.20
	36	0.42	-	0.35	0.50	0.39	**0.58**
Rhythm/PA	12	0.08	**0.50**	0.00	0.00	0.00	**0.50**
	24	0.05	**1.00**	0.00	0.00	0.00	**0.63**
	36	0.40	-	0.00	0.00	0.33	
Withdraw	12	0.16	**0.33**	0.00	0.00	0.00	0.21
	24	0.45	**1.00**	0.00	0.00	0.00	0.33
	36	0.62	-	0.00	0.00	0.50	**0.89**

4.6.2.5 Rhythm/Periodic Abstinence

Discontinuation of the traditional method – rhythm/periodic abstinence is reported at 50% due to a reduced need or a method failure within the first 12 months of use (Table 4.13). At 24 months of use it is observed that users of the rhythm method stop use because they got pregnant (Table 4.13).

4.6.2.6 Withdrawal

Withdrawal users indicate getting pregnant whilst using the method as reason for discontinuation at 12 months of use (33%). For women who used this method up to 24 months, discontinuation is observed again due to the method failure (women getting pregnant) whilst using the method and for those who persist with its use, a reduced need at 36 months (89%) (Table 4.13).

4.7 Types of Discontinuation: Abandonment and Resumed use

In addition to identifying the occurrence of any discontinuation, this study further determines two types of discontinuation occurring among women who have discontinued a contraceptive method. The first being the complete discontinuation by abandonment (32%) and the second being the resumption of use of contraceptive methods at a later point by users who discontinued (68.1%) (Table 4.14).

Table 4. 14: Association of socio-demographic characteristics of women in the Shai-Osudoku and Ningo Prampram districts, Ghana by type of discontinuation exhibited (Abandonment and Resumption of use) (n=457)

Socio-Demographic Characteristics	Discontinue (%)	User Type Discontinued (abandoned use) (%)		Discontinued (Resumed use)(%)		p-value[1]
Age (Mean)	**30.62 ±0.33**	**29.62 ±0.43**		**28.30±0.26**		0.004
Age groups						
15-19	28(6.13)	4	(2.74)	24	(7.72)	
20-24	93(20.35)	20	(13.7)	73	(23.47)	
25-29	97(21.23)	32	(21.92)	65	(20.9)	
30-34	99(21.66)	34	(23.29)	65	(20.9)	**<0.001**
35-34	77(16.85)	22	(15.07)	55	(17.68)	
40-44	36(7.88)	22	(15.07)	14	(4.5)	
45-49	27(5.91)	12	(8.22)	15	(4.82)	
Marital Status						
Single	157(34.35)	38	(26.03)	119	(38.26)	
Married/cohabiting	143(31.29)	58	(39.73)	85	(27.33)	**0.024**
In relation but not cohabiting	135(29.54)	42	(28.77)	93	(29.9)	
Separated/widowed	22(4.81)	8	(5.48)	14	(4.5)	
Change in Marital status						
No	345(75.49)	98	(67.12)	247	(79.42)	
Yes	112(24.51)	48	(32.88)	64	(20.58)	
Ever attended School						
No	46(10.07)	16	(10.96)	30	(9.65)	0.664
Yes	411(89.93)	130	(89.04)	281	(90.35)	
Education						
None	46(10.07)	16	(10.96)	30	(9.65)	
Primary	90(19.69)	33	(22.6)	57	(18.33)	
Middle/JHS	213(46.61)	68	(46.58)	145	(46.62)	0.662
Secondary/SHS	94(20.57)	25	(17.12)	69	(22.19)	
Higher	14(3.06)	4	(2.74)	10	(3.22)	
Wealth Index*						
Poorest	40(8.79)	14	(9.59)	26	(8.41)	
Poorer	85(18.68)	27	(18.49)	58	(18.77)	
Poor	105(23.08)	29	(19.86)	76	(24.6)	0.741
Richer	129(28.35)	41	(28.08)	88	(28.48)	
Richest	96(21.1)	35	(23.97)	61	(19.74)	
Number of living children						
None	133(29.1)	30	(20.55)	103	(33.12)	
1	88(19.26)	25	(17.12)	63	(20.26)	**0.042**
2	86(18.82)	31	(21.23)	55	(17.68)	
3	87(19.04)	34	(23.29)	53	(17.04)	
4	41(8.97)	18	(12.33)	23	(7.4)	
More than four	22(4.81)	8	(5.48)	14	(4.5)	
Current employment status						
Not working (Ref)	110(24.07)	17	(11.64)	93	(29.9)	**<0.001**
Working	347(75.93)	129	(88.36)	218	(70.1)	
TOTAL	**457**	**146**	**(31.95)**	**311**	**(68.05)**	

*Number of participants with wealth index data reduced to 455 based on 2 participants with no wealth index data available at the time of the survey.

[1] P-values are results from log rank test (Kaplan Meier curves shown in appendix 8)

4.7.1 Socio-demographic characteristics of Abandoned and Resumed users

On average, women who abandoned use of contraceptive were identified to be significantly older (29.62 ±0.43**)** than those who resumed use later (28.30 ±0.26) (p,0.004) Table 4.14). Assessing distribution by age shows that 23.3% of women abandoning use were aged 30-34yrs (Table 4.14). Approximately 39.7% of these women who abandoned use were married, had not experienced any change in marital status (67.12%), richer (28.08%), had three children (23.29%) and were employed (88.36%) (Table 4.14). Resumed users represented the age group 25-29 years (23.47%). An estimated 38.3% of resumed users were single (38.26%), had no children (33.12%) and were employed (70.10%) (Table 4.14).

4.7.2 Reproductive characteristics of Abandoned and Resumed users

By reproductive characteristics, 83.6% of abandonment was observed by women who had ever been pregnant. About 95% of abandoned users had ever given birth (95.1%) and received ANC (85%) for their most recent pregnancy. Women who used their method after childbearing constituted 45.2% of abandonment assessed. Additionally, 71% of women indicating a desire to have another child in the next 2 years abandoned use. A little over half of abandonment was seen among women who received counseling on their contraceptive methods (52.7%). However, more than 60% of women who were not told about potential side effects of their methods were identified to have abandoned use (66.4%) (Table 4.15).

4.7.3 Factors associated with Abandonment

Significant differences were identified between users who abandoned methods and those that resumed use. Women showed significant differences by age in 5-year

groups, marital status, number of living children, employment status were identified by background characteristics ($p<0.05$) (Table 4.14). Additionally by reproductive and service delivery factors, differences by ever given birth, history of terminated pregnancy, timing of use of family planning and being told about side effects prior to method use were noted ($p<0.05$) (Table 4.15).

Table 4.15: Association of reproductive characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts, Ghana, with type of discontinuation exhibited (Abandonment and resumption of use) (n=457)

Reproductive Information	Discontinued(%)	User Type Discontinued (abandoned use) (%)		Discontinued (Resumed use)(%)		p-value[1]
Ever Pregnant						
No	94(20.57)	24	(16.44)	70	(22.51)	0.134
Yes	363(79.43)	122	(83.56)	241	(77.49)	
Ever given birth*						
No	40(10.99)	6	(4.92)	34	(14.05)	**0.009**
Yes	324(89.01)	116	(95.08)	208	(85.95)	
History of terminated pregnancy**						
No (Ref)	292(80.22)	106	(86.89)	186	(76.86)	**0.023**
Yes	72(19.78)	16	(13.11)	56	(23.14)	
Fertility Intentions						
Wants another child in 2yrs	337(73.74)	103	(70.55)	234	(75.24)	0.288
Does not want a child in 2yrs	120(26.26)	43	(29.45)	77	(24.76)	
ANC attendance						
No	64(18.03)	18	(15)	46	(19.57)	0.289
Yes	291(81.97)	102	(85)	189	(80.43)	
Timing of FP use						
Before Childbearing	180(39.39)	44	(30.14)	136	(43.73)	**0.021**
After childbearing	182(39.82)	66	(45.21)	116	(37.3)	
In-between children	95(20.79)	36	(24.66)	59	(18.97)	
Received Counselling on contraceptives						
No (Ref)	266(58.21)	69	(47.26)	197	(63.34)	**0.001**
Yes	191(41.79)	77	(52.74)	114	(36.66)	
Told about Side Effects						
No (Ref)	355(77.68)	97	(66.44)	258	(82.96)	**<0.001**
Yes	102(22.32)	49	(33.56)	53	(17.04)	

[1] Kaplan Meier curves shown in appendix 8

Bivariate analysis highlights upon the relationship observed between abandonment, change in marital status, number of living children and wealth index. When controlling for other background variables, abandonment was significantly associated with change in marital status and employment (Table 4.16). Women experiencing a change in their relationship status had more than three times the hazard of

abandonment compared to women who did not experience such change [HR=3.58; 95% CI (2.26, 5.66)] (Table 4.16). Similarly, employed women had more than two times the hazard of abandonment compared to unemployed women at all times of follow up [HR=2.29; 95% CI (1.30, 4.02)] (Table 4.16).

Table 4. 16; Hazard of discontinuation (abandonment) by background characteristics of women sampled from the Shai-Osudoku and Ningo Prampram districts Ghana

Background Characteristic	Hazard Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Age	**0.95**	**0.937**	**0.960**			
Age groups						
15-19 (Ref)						
20-24	1.15	0.516	2.575	0.81	0.266	2.486
25-29	0.91	0.414	2.017	0.72	0.238	2.189
30-34	0.76	0.343	1.675	0.54	0.173	1.717
35-34	0.74	0.332	1.667	0.48	0.146	1.560
40-44	0.76	0.328	1.777	0.69	0.205	2.302
45-49	0.58	0.238	1.428	0.70	0.196	2.483
Education						
None (Ref)						
Primary	1.04	0.658	1.643	1.23	0.648	2.340
Middle/JHS	0.99	0.654	1.501	0.92	0.505	1.672
Secondary/SHS	1.50	0.937	2.386	1.22	0.602	2.488
Higher	0.59	0.229	1.538	0.85	0.270	2.651
Marital Status						
Single (Ref)						
Married/cohabiting	1.22	0.810	1.842	0.84	0.497	1.410
In relation but not cohabiting	0.89	0.575	1.386	0.81	0.510	1.301
Separated/widowed	0.95	0.441	2.033	0.56	0.232	1.347
Change in marital status						
No (Ref)						
Yes	**2.68**	**1.898**	**3.792**	**3.58**	**2.266**	**5.663**
Wealth Index						
Poorest (Ref)						
Poorer	0.77	0.485	1.224	1.12	0.570	2.191
Poor	0.68	0.432	1.063	0.90	0.466	1.751
Richer	0.65	0.421	1.014	0.97	0.514	1.820
Richest	**0.54**	**0.346**	**0.855**	0.78	0.404	1.515
Number of living children						
None (Ref)						
1	1.16	0.789	1.693	0.91	0.502	1.644
2	0.88	0.598	1.288	0.81	0.444	1.460
3	0.82	0.561	1.208	0.88	0.485	1.586
4	0.64	0.396	1.025	0.61	0.305	1.227
More than four	**0.42**	**0.218**	**0.807**	0.52	0.215	1.251
Current employment status						
Not working (Ref)						
Working	0.79	0.573	1.084	**2.29**	**1.300**	**4.017**

4.7.3 Factors associated with abandonment in adjusted analysis

In adjusted analysis, controlling for previous pregnancy, history of terminated pregnancy, fertility intentions and being told about side effects, women who used contraceptives after childbearing were found to have a 32% reduction in the hazard of discontinuation compared to women who used contraceptive before childbearing [HR=0.68 CI (0.514, 0.909)] while women who used contraceptives in-between children had the hazard of discontinuation reduced by 53% compared to women who used contraceptive before childbearing [HR=0.47 CI (0.327, 0.677)] (Table 4.17).

Table 4. 17: Hazard of Discontinuation (Abandonment) by reproductive characteristcs of women sampled from the Shai-Osudoku and Ningo Prampram districs Ghana.

Reproductive Information	Hazard Risk Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Ever Pregnant						
No (Ref)						
Yes	0.97	0.68	1.38	**(omitted)**		
Ever given birth						
No (Ref)						
Yes	0.65	0.40	1.07	1.42	0.70	2.90
History of terminated pregnancy						
No (Ref)						
Yes	0.97	0.68	139	0.93	0.63	1.37
Fertility Intentions						
Does not want a child in 2yrs(Ref)						
Wants another child in 2yrs	**1.52**	**1.17**	**2.00**	1.35	0.99	1.84
ANC attendance						
No (Ref)						
Yes	**1.50**	**1.02**	**2.21**	1.37	0.92	2.05
Timing of FP use						
Before Childbearing (Ref)						
After childbearing	**0.68**	**0.51**	**0.91**	**0.59**	**0.40**	**0.86**
In-between children	**0.47**	**0.33**	**0.68**	**0.39**	**0.25**	**0.60**
Received Counselling on contraceptives						
No (Ref)						
Yes	**0.59**	**0.46**	**0.77**	**0.61**	**0.43**	**0.87**
Told about Side Effects						
No (Ref)						
Yes	0.76	0.5	1.00	1.13	0.77	1.67

**Ever pregnant omitted due to collinearity*

The predisposing effect of a desire to have another child in the next two (2) years was intensified in adjusted analysis though not attaining statistical significance in

association with abandonment when controlling for other reproductive factors. The narratives however highlighted on the influence of intention to delay the next pregnancy for an opportunity to care for the youngest child.

> *"...I am waiting for this one (baby) to grow so that I can come and do it (family planning), and be able to take care of them till a certain level, then I will stop it and give birth to a fourth one*
> *(Mother of one, 30yrs)*

4.7.4 Reasons for Abandonment

Among women who abandoned use of contraceptive, the major reason for discontinuation was the reduced need for contraceptives (36.99%). The experience of side effects (27.4%), all other reasons implying dissatisfaction with the method and the fear of side effects (13.01%) were the frequently reported reasons for discontinuation (Table 4.18).

Table 4. 18: Reported reasons for Abandonment of contraceptives

Reasons for abandonment	n	(%)
Reduced need*	54	36.99
Experienced side effects	40	27.4
All other reasons**	25	17.12
Fear of side effects	19	13.01
Health concerns	8	5.48
Total	**146**	

*Includes women who report no sexual activity, desire pregnancy, are separated and are unable to get pregnant/menopausal.
**All other reasons: includes all reasons implying dissatisfaction with the method (access, cost, want more efficient method, inconvenience of use)

Experienced Side effects

Assessing the relationship between reasons given shows that compared to women who abandon methods for any other reason that implied dissatisfaction with the method, women who experienced side effects have an increase in the hazard of

abandoning use completely at all times of follow up [HR=1.92 95% CI (1.163, 3.163)] (Table 4.19). Evidence of this dissatisfaction emerged in qualitative interviews with women who indicated discontinuations because they had experienced side effects earlier and did no longer want to experience it as a result of method use.

> *"... I stopped because I didn't want any side effect again then I got pregnant" (Mother of One, 34yrs)*

Table 4. 19: Hazard associated with reported reasons for Abandonment by women sampled from the Shai-Osudoku and Ningo Prampram districts

Reasons for Abandonment of use	HR	95% Confidence Interval	
All other reasons (Ref)			
Fear of side effects	**1.97**	**1.083**	**3.570**
Health concerns	**2.42**	**1.092**	**5.373**
Experienced side effects	**1.92**	**1.163**	**3.163**
Reduced need	**3.38**	**2.094**	**5.446**

*Includes women who report no sexual activity, desire pregnancy, are separated and are unable to get pregnant/menopausal.

**Any other reason: includes all reasons implying dissatisfaction with the method

Hazard associated with reasons for abandonment

The hazard of abandonment of use was increased for all reasons reported compared to women who abandoned for other reasons implying dissatisfaction with the method. Women had an increased hazard of abandonment due to fears about side effects of the method [HR=1.97; 95% CI (1.083, 3.570)]. In similar manner, women who express health concerns with their method use also have an increase in the hazard of abandonment compared to women who abandon for other reason implying dissatisfaction with the method [HR=2.42; 95% CI (1.092, 5.373)]. Women who actually experienced side effects also had an increase in the hazard of abandonment

compared to women who report other reasons for being dissatisfied with the method [HR=1.92; 95% CI (1.163, 3.163)] (Table 4.19).

A reduced need for contraception was seen to have an increase in the hazard of abandonment compared to women who abandon methods for any other reason that implied dissatisfaction with the method [HR=3.38; 95% CI (2.094, 5.446)] (Table 16). This reduced need was particularly reinforced by women in relation to relationship status:

> "*you can only have a child when you have a man in your life. When you don't have a man what will you do?.….If I have a husband I would have done it to protect myself. Because I don't have that is the reason why I said I would not do it."* (Mother of two, 31yrs)

4.8 Method Switching

4.8.1 Characteristics of women who switched methods

Table 4.20 presents the socio-demographic characteristics of 439 (39.41%) women who switched contraceptive methods at least once and their association with method switching. Women that switched between methods were relatively older (30.54±7.79) then those who did not switch (27.46±7.12) ($p<0.001$) (Table 4.20). About a fifth of switching was observed among women aged 30-34 years (21.92%) whilst less than a tenth was noted among older women aged 40-45years (5.48%). More than half of women who switched had completed middle/JHS level education (52.43%), and by parity, a similar proportion of switching was observed for women with one (1) child (27.36%) as women with three (3) children (27.36%). Additionally, women that were employed represented over 70% of switching (76.48) (Table 4.20).

Table 4. 20: Socio-demographic characteristics of sampled women in the Shai-Osudoku and Ningo Prampram districts Ghana and association with switching

Socio-Demographic Characteristics	User Type				
	Ever Used (%)	Not Switched (%)		Switched (%)	p-value
Age (Mean)	**30.62±0.37**	**27.45±0.27**		**30.54±0.37**	**<0.001**
Age groups					
15-19	108(9.69)	80	(11.85)	28	(6.38)	
20-24	284(25.49)	196	(29.04)	88	(20.05)	
25-29	265(23.79)	171	(25.33)	94	(21.41)	
30-34	207(18.58)	110	(16.3)	97	(22.1)	**<0.001**
35-39	149(13.38)	76	(11.26)	73	(16.63)	
40-44	57(5.12)	22	(3.26)	35	(7.97)	
45-49	44(3.95)	20	(2.96)	24	(5.47)	
Marital Status						
Single						
Married/cohabiting	380(34.11)	226	(33.48)	154	(35.08)	**0.004**
In relation but not cohabiting	307(27.56)	168	(24.89)	139	(31.66)	
Separated/widowed	381(34.2)	257	(38.07)	124	(28.25)	
Change in Marital Status						
No	879(78.9)	545	(80.74)	334	(76.08)	
Yes	235(21.1)	130	(19.26)	105	(23.92)	0.063
Wealth Index*						
Poorest (Ref)	105(9.46)	65	(9.64)	40	(9.17)	
Poorer	214(19.28)	135	(20.03)	79	(18.12)	
Poor	257(23.15)	159	(23.59)	98	(22.48)	0.745
Richer	292(26.31)	168	(24.93)	124	(28.44)	
Richest	242(21.8)	147	(21.81)	95	(21.79)	
Ever attended School						
No	87(7.81)	40	(5.93)	47	(10.71)	**0.004**
Yes	1027(92.19)	635	(94.07)	392	(89.29)	
Education (level completed)						
None						
Primary	87(7.81)	40	(5.93)	47	(10.71)	
Middle/JHS	209(18.76)	124	(18.37)	85	(19.36)	
Secondary/SHS	527(47.31)	321	(47.56)	206	(46.92)	**0.030**
Higher	249(22.35)	162	(24)	87	(19.82)	
Yes	42(3.77)	28	(4.15)	14	(3.19)	
Number of living children						
None	448(40.22)	317	(46.96)	131	(29.84)	
1	218(19.57)	134	(19.85)	84	(19.13)	
2	163(14.63)	84	(12.44)	79	(18)	**<0.001**
3	147(13.2)	63	(9.33)	84	(19.13)	
4	83(7.45)	43	(6.37)	40	(9.11)	
5+	55(4.94)	34	(5.04)	21	(4.78)	
Current employment status						
Not working	347(31.15)	243	(36)	104	(23.69)	**<0.001**
Working	767(68.85)	432	(64)	335	(76.31)	

*Wealth index is provided for 1,110 participants, 4 women did not have wealth information available at the time of the survey.

By reproductive characteristics, about 80.6% of switching was identified among women who had never had an abortion. An estimated 73.3% of switchers indicated that they wanted a pregnancy in the next two (2) years, had begun using contraception after childbearing (39.50%) and were currently using a modern method of

contraception (69.61%). Also, 78% of women who were not told about side effects indicated that they had switched methods (Table 4.21).

Table 4. 21: Reproductive characteristics of sampled women from the Shai-Osudoku and Ningo Prampram districts, Ghana and association with switching (N=1114)

Reproductive Information	Ever Used(%)	User Type				p-value[1]
		Not Switched(%)		Switched (%)		
Ever Pregnant						
No	329(29.53)	238	(35.21)	93	(21.23)	**<0.001**
Yes	785(70.47)	438	(64.79)	345	(78.77)	
Ever given birth						
No	121(15.37)	82	(18.59)	39	(11.27)	**0.005**
Yes	666(84.63)	359	(81.41)	307	(88.73)	
History of terminated pregnancy						
No (Ref)	594(75.57)	315	(71.59)	279	(80.64)	**0.003**
Yes	192(24.43)	125	(28.41)	67	(19.36)	
Fertility Intentions						
Wants another child in 2yrs	853(76.57)	532	(78.70)	321	(73.29)	**0.037**
Does not want a child in 2yrs	261(23.43)	144	(21.30)	117	(26.71)	
ANC attendance						
No	152(20.27)	87	(21.07)	65	(19.29)	0.547
Yes	598(79.73)	326	(78.93)	272	(80.71)	
Timing of FP use						
Before Childbearing	507(45.51)	335	(49.56)	172	(39.27)	
After childbearing	446(40.04)	273	(40.38)	173	(39.50)	**<0.001**
In-between children	161(14.45)	68	(10.06)	93	(21.23)	
Current contraceptive method type						
Traditional method	120(18.60)	89	(16.39)	31	(30.39)	**<0.001**
Modern method	525(81.40)	454	(83.61)	71	(69.61	
Received Counselling on contraceptives						
No	530(47.58)	274	(40.53)	256	(58.45)	**<0.001**
Yes	584(52.42)	402	(59.47)	182	(41.55)	
Told about Side Effects						
No	794(71.27)	452	(66.86)	342	(78.08)	**<0.001**
Yes	320(28.73)	224	(33.14)	96	(21.92)	

[1] P-values are results from log rank test (Kaplan Meier curves shown in appendix 8)

4.8.2 Characteristics associated with Switching at the bivariate level

Significant associations were identified between contraceptive switching and age groups, education, number of living children, employment, watching television and reading the newspapers (P<0.05) (Table 4.20). By reproductive and service delivery factors, switching was associated with ever pregnant status, ever given birth, having a

history of terminated pregnancy, fertility intentions, timing of use of contraceptive, counseling and being told about side effects of the methods ($p<0.05$) (Table 4.21).

Bivariate analysis of method switching against socio-demographic characteristics highlighted the protective effect of increasing parity on switching. A gradual reduction in the hazard of switching was observed for women with four children [HR=0.67, 95% CI (0.457, 0.986)] and women with more than four children [HR=0.49; 95% CI (0.299, 0.801)] at all times of follow up (Table 4.22) compared to women with no children.

Table 4. 22: Hazard risk of switching by selected background characteristics of women sampled from the Shai-Osudoku and Ningo Prampram districts Ghana

Background Characteristic	**Hazard** Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Age (Mean)	**0.97**	**0.96**	**0.99**			
Age groups						
15-19 (Ref)						
20-24	0.85	0.54	1.33	0.77	0.47	1.25
25-29	0.73	0.46	1.15	0.75	0.46	1.24
30-34	**0.51**	**0.32**	**0.80**	0.60	0.35	1.03
35-34	**0.55**	**0.35**	**0.88**	0.67	0.38	1.16
40-44	**0.55**	**0.32**	**0.95**	0.69	0.36	1.32
45-49	**0.42**	**0.23**	**0.75**	0.51	0.26	1.01
Education (level completed)						
None						
Primary (Ref)	0.80	0.55	1.17	0.72	0.48	1.09
Middle/JHS	0.96	0.69	1.34	0.72	0.50	1.05
Secondary/SHS	1.12	0.78	1.63	0.76	0.48	1.18
Higher	1.39	0.76	2.55	0.83	0.43	1.61
Marital status						
Single						
Married/cohabiting	1.07	0.85	1.36	0.86	0.63	1.16
In relation but not cohabiting	0.88	0.70	1.12	0.76	0.58	1.00
Separated/widowed	1.24	0.79	1.95	0.62	0.36	1.05
Change in Marital Status						
No						
Yes	0.96	0.76	1.21	0.99	0.75	1.31
Wealth Index						
Poorest (Ref)						
Poorer	0.84	0.56	1.24	0.87	0.57	1.33
Poor	0.95	0.65	1.39	1.01	0.67	1.52
Richer	1.01	0.70	1.47	1.01	0.68	1.50
Richest	0.92	0.63	1.36	0.93	0.61	1.40
Number of living children						
1 (Ref)						
2	0.80	0.59	1.09	**0.69**	**0.50**	**0.95**
3	0.77	0.57	1.05	**0.63**	**0.44**	**0.90**
4	**0.67**	**0.46**	**0.99**	**0.63**	**0.44**	**0.92**
5+	**0.49**	**0.30**	**0.80**	**0.54**	**0.34**	**0.86**
Current employment status						
Not working (Ref)						
Working	0.87	0.70	1.09	1.07	0.81	1.40

4.8.2 Factors associated with Switching in adjusted analysis

Adjusted analysis that controlled for age, education, wealth, number of living children, and employment status emphasizes the protective relationship between switching and increasing number of children (Table 4.22). Analysis shows that the hazard of switching was significantly reduced by 31% for women with two children

compared to women with only one child [HR=0.69; 95% CI (0.50; 0.95)]. The hazard was further reduced by 37% for women with three children compared to those with one child [HR=0.63, 95% CI (0.44; 0.90)]. Women with four children also had a 46% reduction in the hazard of switching [HR=0.63, 95% CI (0.44; 0.92)]. And finally for women with more than four children, the hard was further reduced by 64% compared to women with one child at all times of follow up [HR=0.54, 95% CI (0.34; 0.86)] (Table 4.22).

Table 4. 23: Hazard of switching by reproductive characteristics of women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Reproductive Information	**Hazard** Ratio	[95% Confidence Interval]		Adjusted Hazard Ratio	[95% Confidence Interval]	
Ever Pregnant						
No (Ref)						
Yes	**0.66**	**0.52**	**0.85**	**omitted**		
Ever given birth						
No (Ref)						
Yes	**0.41**	**0.29**	**0.58**	0.19	0.07	0.53
History of terminated pregnancy						
No (Ref)						
Yes	1.14	0.87	1.48	0.66	0.35	1.23
Fertility Intentions						
Does not want a child in 2yrs(Ref)						
Wants another child in 2yrs	1.13	0.91	1.40	0.99	0.52	1.88
Timing of FP use						
Before Childbearing (Ref)						
After childbearing	**0.79**	**0.64**	**0.98**	1.20	0.59	2.43
In-between children	**0.63**	**0.49**	**0.81**	0.79	0.34	1.83
Current contraceptive method type						
Traditional method (Ref)						
Modern method	**1.56**	**1.03**	**2.36**	**2.78**	**1.49**	**5.20**
Received Counselling on contraceptives						
No (Ref)						
Yes	0.89	0.74	1.08	**0.48**	**0.25**	**0.92**
Told about Side Effects						
No (Ref)						
Yes	0.93	0.74	1.17	1.02	0.47	2.23

In analysis that controlled for past pregnancy status, birth history, history of terminated pregnancy, fertility intentions, timing of use of contraceptives, current use of contraceptives, counseling and being told about side effects, a significant increase

in the hazard of switching among users of modern methods [HR=2.78, 95% CI (1.49, 5.20)] compared to traditional method users at all times of follow up.

Women who reported that they had received some counseling on contraceptives prior to use however reported a reduced hazard of switching methods compared to women who had not received such counseling when controlling for past pregnancy status, birth history, history of terminated pregnancy, fertility intentions, timing of use of contraceptives, counseling and knowledge of side effects [HR=0.48, 95% CI (0.25, 0.92)] (Table 4.23).

Even though the desire for another child in the next 2 years was not significantly associated with switching when controlling for other factors (Table 4.23), qualitative evidence showed its assisting influence on switching methods among participants who desired pregnancy in the near future in narratives. Among such participants, their intention to switch was conveyed as a decision to switch to another method that was relatively easier to discontinue and become pregnant when they so wished.

> *… …I was on the 5year method, and later changed it to 3 months because I wanted to give birth. I was almost done with my apprenticeship, and they said the 3 month is easy to stop and have a baby when you are ready…"*
>
> *(Mother of two, wanting 6, 24yrs)*

4.8.3 Method Specific Switching

Methods frequently switched from by contraceptive switchers

Table 4.24 presents the results of the analysis of contraceptive switching from the male condom specifically to any other contraceptive method among women in the sample. The injectable, LAM and the implant were the three methods with

significantly reduced hazards of switching at all times of follow up. The injectable had a 53% reduced hazard of switching compared to users of the male condom [HR=0.47, 95% CI (0.35, 0.64)]. Lactational amenorrhea also records a 53% reduced hazard compared to the male condom [HR=0.47, 95% CI (0.27, 0.80)]. Finally, the implant records the most reduced hazard of discontinuation by 57% compared to male condom [HR=0.43, 95% CI (0.30, 0.64)] (Table 4.24).

Table 4. 24: Hazard of switching from specific contraceptive methods compared to the male condom among women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Contraceptive Method	Hazard Ratio	[95% Confidence Interval]	
MODERN METHODS			
Male Condom (Ref)			
Pill	0.82	0.59	1.12
Male Condom (Ref)			
Injectable	**0.47**	**0.35**	**0.64**
Male Condom (Ref)			
LAM	**0.47**	**0.27**	**0.80**
Male Condom (Ref)			
Implant	**0.43**	**0.30**	**0.64**
Male Condom (Ref)			
IUD	0.38	0.12	1.24
TRADITIONAL METHODS			
Male condom (Ref)			
Withdrawal	0.69	0.46	1.03
Male Condom (Ref)			
Periodic Abstinence	0.50	0.33	0.77

The results of analysis of contraceptive switching from specific methods to other methods among women in the sample are presented in table 4.25. The condom emerges as the method with the highest hazard of switching compared to all other methods at all times of follow up [HR=1.82; 95% CI (1.41, 2.35)] (Table 4.24).

Table 4. 25: Hazard of switching from specific contraceptive methods compared to all other contraceptive methods among women sampled from the Shai-Osudoku and Ningo Prampram districts, Ghana

Contraceptive Method	Hazard Ratio	[95% Confidence Interval]	
All other methods (Ref)			
Pill	1.43	1.15	1.78
All other methods (Ref)			
Condom	**1.82**	**1.41**	**2.35**
All other methods (Ref)			
Implant	0.79	0.60	1.04
All other methods (Ref)			
Injectable	**0.76**	**0.62**	**0.92**
All other methods (Ref)			
IUD	0.90	0.33	2.40
All other methods (Ref)			
LAM	0.78	0.50	1.21
All other methods (Ref)			
Periodic Abstinence	0.85	0.62	1.18
All other methods (Ref)			
Withdrawal	1.16	0.85	1.59

4.8.4 Current Method Mix by contraceptive switchers

The results of a frequency analysis of the current method mix being used by women who have ever switched contraceptive methods at least once and are currently using are presented in Table 4.26. Out of the total number of 438 women who indicate ever switching of contraceptive methods, women preferred the male condom (20%), the implant (17%) and the pill or injectable (14% each) (Table 4.26).

Table 4. 26: Methods currently used by switched users [n=110 (25.5% of all switchers)]

Method	n	%
Pill	14	(12.73)
Injections	14	(12.73)
Implants	17	(15.45)
Male Condom	22	(20.00)
Female Sterilization	1	(0.91)
Periodic Abstinence/Rhythm	16	(14.55)
Withdrawal	15	(13.64)
LAM/exclusive breastfeeding	3	(2.73)
Other	8	(7.27)
TOTAL	110	

Narratives provided more insight on switching among women who exhibited a reduced motivation to prevent pregnancy. Particularly noteworthy was the preference for a less effective method when the motivation the prevent pregnancy was lowered.

> *… …I was on the 5year method, and later changed it to 3 months because I wanted to give birth. I was almost done with my apprenticeship, and they said the 3 month is easy to stop and have a baby when you are ready…"*
> *(Mother of two, wanting 6, 24yrs)*

Side effects also emerged as an influence for switching in narratives. In the few instances where women were curious about other contraceptive options available, the discontinuation of one method to try other methods that intrigued them was spurred on by the experience of side effects from the earlier method. Advice from health professionals was not sought in such events.

> *"...it was my own decision. I didn't need to ask anyone. I hate injections that's why I went in for the five year contraceptive."* (Mother of three, 27yrs)

Narratives however suggested that once the ideal number of children desired is achieved the decision to limit births is reached and participants would prefer to switch to a permanent method completely.

> *"...I will be using the implant, I will not change it again. If I stop using the implant then it means I would not give birth again. That is my mind now".*
> (Mother of four, 34yrs)

4.9 Method failure

A total of 8 (1.79%) cases of method failures were recorded as reported reason for discontinuation 'got pregnant while using method' among the sample. Analysis of events in the subsequent month following method use identified a total of 27

additional pregnancies that occurred but were not reported by participants as intended to become pregnant. These additional identified pregnancies increase the overall number of unintended pregnancies to 35 (3.14%). Pregnancies occurring that were identified by the respondent as 'stopped to become pregnant' were not included as such pregnancies are identified as intended.

4.9.1 Attitudes towards classifying mistimed pregnancies as unwanted

An inherent inclination to identify pregnancies that occurred alongside or in the next month of method use as intended was identified. Narratives highlighted on the proclivity to identify such pregnancies as intended rather than not among women. This may account for the underreporting of pregnancies that occurred in the subsequent months of method use as unintended. Participants indicated in narratives that when one falls pregnant the only available option is to have the child. The option of terminating the pregnancy was not acceptable and as such the only way to prevent that is to use contraception to control births.

> *"I am doing the family planning to prevent unwanted pregnancy, because if you get pregnant the only choice is to give birth and because I do not want any unwanted pregnancy that is why I am doing the family planning.*
> *(Mother of four, 34yrs)*

Women mainly considered having a pregnancy terminated (if it is not wanted at the time) to be a thing only wicked people do. Narratives conveyed this position women held of accepting pregnancy as well as their perception of the type of person that would consider a termination:

> *"if you get pregnant, then you have to have the baby be cause otherwise what will you do…? You cannot have an abortion, if you do that then you are a wicked person." (Mother of three, 28yrs)*

> *"For me all I know is family planning. I told myself I will never abort so if am not ready I will not get pregnant I will do family planning."*
> *(Mother of two, desiring six, 24yrs)*

Evident from the findings is that it is a natural inclination for these women to identify the pregnancy as wanted and not mistimed. An account that may bias estimates of unintended pregnancy and the reporting of method failure as such. This was expressed as an acceptance of pregnancy and denial of the unwanted of mistimed nature of it:

> *"....if you get pregnant then you must have the baby. It is not everyone who can have a child so you must say you want it because if you abort it will be that you are killing a person so family planning is good for that.*"
> *(Mother of two, 26yrs)*

Also highlighted, was a potential contribution to method failure through incorrect instruction on method use by the service provider. This was generally expressed as their incorrect use of contraceptive methods (particularly the pill), because they not properly instructed on how to take it:

> "*I bought the pills I was taking from the drugstore, it was a good drugstore. I was told to take it anytime I meet with my husband and become exposed to getting pregnant....I even remember taking the pills afterwards that evening thinking it would be ok. That was when the pills failed me and I got pregnant. I don't trust it again*" (Mother of three, 26yrs)

4.9.2 Methods with reported failure

A frequency distribution of the method with reported failure highlights on users of emergency contraceptives having the highest unintended pregnancies (25.93%)

possibly a result of poor use as suggested in narratives. High levels of failure were also reported among users of traditional methods: rhythm/periodic abstinence (18.52%) and withdrawal (22.22%). The least method failure reported was among users of the pill (7.41%) (Table 4.27).

Table 4. 27: Frequently reported methods with associated failure (unintended pregnancy) among women in the Shai-Osudoku and Ningo Prampram districts, Ghana

Method used	n	(%)
Pill	1	(3.7)
Injectable	2	(7.41)
Implant	2	(7.41)
Male condom	2	(7.41)
Rhythm / Periodic abstinence	5	(18.52)
Withdrawal	6	(22.22)
LAM	2	(7.41)
Emergency contraceptives	7	(25.93)

4.10 Intention to use contraceptive in future & preferred future method

Of the total number of women sampled for the interview, 48.47% (540) intend to use contraceptives at some point in future. Out of these, 39.04% (171) were women who had switched methods at least once and 58.06% (389) were women who were currently using (Table 4.28).

Table 4. 28: Preferred future methods by women who indicate intention to use contraceptives in the Shai-Osudoku and Ningo Prampram districts, Ghana (n=540)

Preferred Future Method	n	(%)
Implants	170	(31.48)
Injectables	126	(23.33)
Pill	82	(15.19)
Male Condom	40	(7.41)
Rhythm/Calendar	35	(6.48)
Withdrawal	31	(5.74)
Other	23	(4.26)
Female Sterilization	11	(2.04)
IUD	9	(1.67)
Emergency contraceptive	8	(1.48)
Female condom	2	(0.37)
LAM	2	(0.37)
Male Sterilization	1	(0.19)
TOTAL	**540**	

The preferred future methods were the implants (31.48%), the injectables (23.33%) and the pill (15.19%) The least preferred methods were male sterilization (0.19%) and LAM (0.37%) (Table 4.28). The preference for reversible methods was also revealed in qualitative inquiry:

> *"It's nothing but going to cut myself for them to insert it and coming back to remove it is difficult. I prefer the injectable. For the three months you can decide to stop on your own anytime and get pregnant."* (Mother of two, 24yrs)

> "*I used the pill. I think the pill is good because at that moment I could not have gone to the hospital to do it so I decided to use the pill."* (Mother of one, 34yrs)

4.10.1 Attitudes toward permanent methods

Narratives highlighted on perceptions towards permanent methods among this sample of women. A general aversion to permanent methods of contraceptives was revealed. For participants the idea of sterilization was met with disapproval with the exception

of instances when participants felt they had achieved their ideal family size or attained personal (marriage goals) or were certain that they did no longer wish to conceive at any future time. These were expressed as fears of an inability to bear children at any point in future that they may desire:

> "*I don't want to try that one. What if I want to have another child later on in life?"* (Mother of three, 30yrs)

A general inclination towards the intention to space births rather than limit was exhibited among women. However, even among those who appeared to have attained the ideal number of children, the methods opted for were rarely permanent in nature.

> *"I didn't want to give birth again, I am ok with what I have (number of children), that is reason why I did the family planning implant…*
>
> (Mother of three, 30yrs)

In accepting that the union or marriage was primarily for childbearing some report that, a mutual agreement to not have another child would be the only motivation to opt for a permanent method.

> "*I will not mind doing that one (female sterilization). If he marries me and decides that after this one we do not have to have another then I will consider it otherwise the answer is no"* (Mother of three, 24yrs)

4.10.2 Attitude towards LAM

Lactational amenorrhea (LAM) was also found to not be a popular choice of contraceptive with only 27% of women considering use of LAM as a method of contraception (results not shown). Among these 209 (31.24%) identify this choice to use LAM because they find it safe to use/ does not interfere with body and 53 (7.92%) indicate their choice because they intend to practice exclusive breastfeeding

(Table 25). The remaining 809 (72.62%) of women did not indicate any future consideration of LAM for contraception. This was predominantly because 79.06% of them felt that it was unreliable as a contraceptive method. Narratives reinforce this impression highlighting issues reported failure among previous users and difficulty in its use.

> "*I was doing it (exclusive breastfeeding) for my baby to grow well, but not for family planning. My friend did it and got pregnant so I will not try it. You can easily get pregnant then what will you do?... and you already have a new baby too. It is too unreliable*" (Mother of one, 27yrs)

Few women who indicated that would not be considering LAM indicated difficulty in its use as a reason (4.70%). Difficulty had emerged in qualitative inquiry as an exhibition of a desire to be weaned by the child at an earlier time than the prescribed six month interval. Many women acknowledge introducing solids earlier than advised.

> *"...I was told it was good for the baby so I started doing it but the baby was not getting satisfied, it became very difficult, she was always hungry for more so I started to feed her other foods so she will not be hungry*"
> (Mother of one, 28yrs)

4.11 Sources of knowledge of side effects: Misinformation

Misinformation was also an identified issue directing the nonuse of a contraceptive method. Many types of misinformation were identified and in one particular extreme, the death of a contraceptive user was wrongly attributed to method use.

> "*…They said her friend died at Volta and they said it was the family planning that killed her. So I asked her how they knew it was the family planning that killed her. According to her, she wanted them to eject it (IUD) but they couldn't find it in her body till she died. So that is why she died*"
> (Mother of three, 27yrs)

This misinformation was also observed with LAM users in qualitative inquiry where users wrongly attributed method failure to mean the method was ineffective rather than inconsistent or incorrect use:

> "*They say once you are breastfeeding the baby for six months, you cannot get pregnant. But when I tried it I became pregnant with my second child. It does not work for everybody. "* (Mother of two, 32yrs)

Some indication that not all hearsay and misinformation regarding contraceptives is adhered to was discovered in narratives. A positive finding suggesting that not all women were receptive to these misinformation and could be open to correction.

> "*It is better to use family planning if you are not ready to become pregnant. Yes they say it doesn't go with some people's blood but you have to try it and see for yourself…. … it would be better than listening to them."*
> *(Mother of two, 26yrs,)*

4.12 Other Factors

Although not assessed during the survey, additional factors influencing contraceptive use status were discovered through the qualitative inquiry, these included amenorrhea as a factor influencing nonuse of contraceptives and attitudes toward permanent methods of contraceptives. Additionally discovered is an aversion for abortions, an inclination to accept pregnancy as wanted even when it occurs alongside method use and personal traits that may influence discontinuations.

4.12.1 Amenorrhea (Association of fertility with Menstruation)

When probed to inquire if they were aware that compliance with method use was key for contraceptive to offer optimum protection from unintended pregnancy, participants were unaware and associated fertility with the presence of menstruation

thereby inferring that the absence of the monthly flow was an assurance that they would not get pregnant after intercourse.

> *"Hmm I didn't know ooo…..before I realised I was pregnant but because I was on the method my menses ceased so I didn't know I could get pregnant. I didn't even know I was pregnant, I found out when I went for a checkup.*
> *(Mother of five, 32yrs, tri-monthly injectable)*

A sub-fecundity was also identified among non users of contraceptive methods as reason for non use of the methods. Women in the interview generally expressed this as a delayed return to fertility:

> "*I've heard of family planning methods before but I've never used some …..After my first child it took almost three years before I had my second and almost one year and half before my third…my menses came as usual but I just didn't get pregnant until those times it wasn't any family planning."*
> (Mother of three, 24yrs)

4.12.2 Health Concerns

Narratives highlighted on general health concerns women expressed in relation to the prolonged use of contraceptives.

> "*I used to take the pills, it was very good I remember taking it for a long time, but I had to stop after awhile. It never worried me but I have heard other women chat and be talking about it, and you know they say that taking it for too long is not good for you* " (Mother of one, 31yrs)

> *"I used to take pills after my son was born but I stopped after about two years because it is not good to continue taking them for too long."*
> (Mother of two, 28yrs)

4.12.3 Personal traits influencing method use

Some participants indicated personal characteristics such as forgetfulness and inconsistent use as challenges to adhering to correct use of the methods. This resulted in method failure from the incorrect use

> *"...for the pill, I was supposed to take too I forgot so it failed me. As for the pills I don't want to even go there again. It is too hard to use".*
> (Mother of four, 34yrs)

> *"I first tried the IUD, switched to pills and it failed me because I didn't really take it well. " (Mother of four, 30yrs)*

4.12.4 Counselling on method use

Women in qualitative inquiry indicate that their low knowledge on method use particularly in relation to follow up visits for reinjection among injectable users contributed to method failures.

> *"When I did the first one (injection), my card got missing so I couldn't go for a renewal. I didn't know it was critical to not miss it and then I got pregnant. That is the reason why I had my 5th born because the 4 was ok for me""*
> *(Mother of five, 32 years)*

CHAPTER FIVE

5.0 DISCUSSION

This section discusses the key findings in relation to contraceptive discontinuation and switching among the women studied in the Shai-Osudoku and Ningo Prampram districts of the Greater Accra Region. The discussion is organized under the following main topics:

- Discontinuation and associated factors
- Method switching and factors associated with switching
- Types of discontinuation: Abandonment and its associated factors
- Predictors of method discontinuation and switching
- Method specific and cause-specific discontinuation
- Unintended pregnancies (method failure)
- Strength and limitations of the study

5.1 Discontinuation and associated factors

The estimated 4% discontinuation at 12 months of use among women in the sample studied is lower compared to the 25% reported in the 2014 Ghana DHS (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). The influence of the method mix in the study setting is a plausible explanation for the lower estimates of discontinuation compared to the national estimate. Whereas nationally, the most utilized contraceptive method is the injectable, within the study the implant was the more popular method used (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). Taking into cognizance the lower discontinuation that characterizes the implant, the lower discontinuation observed in the study area is not unexpected.

The key reason for discontinuation among this sample, fear of side effects presents opportunities for improvement based on user profiles. The association of all method discontinuations at 12 and 24 months of use with the fear of side effects rather than the experience of it again buttresses the strong influence that these perceived fears have on discontinuation among users. Similar findings of increased discontinuation among women who have fears concerning the use of particularly modern contraceptives from district level studies in Ethiopia reinforce this observed influence on contraceptive behavior (Bekele et al., 2015; Tadesse et al., 2017).

Narratives also pointed to the fact that women hear about side effects from other social sources, supporting evidence from Mali identifying informal sources of knowledge on side effects (Campbell et al., 2006). These sources may be unverified and may be misinformation. Current available interventions to reduce discontinuation generally evolve from an improved client provider relationship and counseling to reduce biases and minimize the effects of misinformation (Dehlendorf et al., 2014; Jain & Winfrey, 2017). There is a need to inform women of the possible effects of their current methods to minimize their gullibility when unsubstantiated information is presented to them.

This study's finding of a significantly higher rate of discontinuation at 24 and 36 months of use due to a reduced need for contraceptives was not unexpected, due to the relatively lower proportion of nulliparous women in the study population. Considering the national median birth spacing interval of 39 months (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015) it is plausible that there is a reduced need for contraception as women either approached or reached

their preferred birth interval. Women may become more prone to discontinuation to conceive on reaching this goal.

The estimated rate of discontinuation at 12 months of use reported in this study though lower than rates observed in other African countries, occurs for similar reasons i.e. reduced need and a fear of side effects (Castle, 2003; D'Antonal et al., 2009; Ankomah et al., 2011; Castle & Askew, 2015; Bekele et al., 2015; Tadesse et al., 2017; Alvergne, Stevens, & Gurmu, 2017; Barden-O'Fallon et al., 2018). The inclination of women to discontinue use of a method due to the fear of side effects alone supersedes their intention to prevent unintended pregnancies. This finding is critical, in considering interventions tailored towards reducing unintended births.

5.2 Method Switching and factors associated with switching

Multiple studies of contraceptive discontinuation and switching have assessed method switching at a 3 months cut-off (Cleland & Ali, 2004; Blanc et al., 2009; Bradley et al., 2009; Curtis et al., 2011; Ali et al., 2012). This practice has predominantly been because most women who choose to switch to another method do so within 3 months or are pregnant by that time (Ali et al., 2012). However, findings from this present study present a different perspective to switching. All women, who switched between methods, were identified to have done so immediately i.e. within the following month of use. This method of assessing switching is not limited to this study; it has also been previously used by Curtis and Blanc (1997), Hameed et al (2015) and more recently by Bardon O'fallon et al. (2018).

The behavior of switching to another method immediately in no less than 4 out of every 10 women following dissatisfaction with the initial method in this sample may be as a result of women becoming increasingly aware of their exposure to the risk of unintended pregnancy at periods where they remain unprotected by contraceptives. The increased knowledge and awareness of contraceptives among Ghanaian women has been supported by the 2014 demographic and health survey (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

This study's estimate of method switching within one month of stopping use produced relatively higher estimates than the projected estimate of (14%) for sub-Saharan African countries which uses the window of switching within three months of use (Ali et al. 2012). At country level however, this estimate for switching is similar to that provided for Zimbabwe by Ali et al. which also showed more switching to modern methods over traditional methods (2012). The assessment of switching within a month of use in this study underestimates switching by 5 users identified to have switched at no earlier than 3 months. Narratives emphasized an increasing awareness among women of the increased exposure to unintended pregnancy during the period where one ceases use of contraceptives - an apparent appreciation for the use of contraceptives for preventing unintended pregnancy.

There is potential to encourage discontinuing users who present for method removals or discontinuations to begin to consider alternative methods immediately as part of discontinuation counseling. This presents an opportunity to draw their attention to possible options to switch to within the next month rather than at a delayed point with increased exposure to risk of unwanted fertility.

5.3 Types of discontinuation: Abandonment and its associated factors

This study identified two types of discontinuation among the sample of women. Among women who discontinued use of their contraceptives, approximately 3 out of every 10 women abandoned use of contraceptives completely. The remaining women were identified to have resume use at a period later than three months following discontinuation.

Women who experienced a change in marital status were observed to have almost four-fold increase in abandonment. Socio-cultural influences could be responsible for this occurrence particularly if considerations are made by age and parity of women. Married women are thus more likely to discontinue use of their method at the start of childbearing and this discontinuation can be observed as complete abandonment of contraceptives until the desired number of children have been attained. Evidence from Mali support this cultural opposition to method use by the family in view of the expectation of grandchildren as proof of fertility (Castle & Askew, 2015).

Among women who were employed, abandonment was observed to be greater than unemployed women. It is plausible that the social and cultural value of commencing childbearing when married, off age, or economically capable supersedes any other inhibitor among Ghanaian women. This increased abandonment may also be because they are engaged in a form of employment or work schedule that does not make additional demands or compete for attention in the presence of pregnancy. This finding supports evidence that childbearing may in fact be assisting women in attaining their social status as mothers that occupy economic positions, which make them capable of catering for children (Waterhouse et al.2016).

Participant reported reasons for abandonment was largely due to a reduced need (37%), experience of side effects (27%) and other reasons that imply dissatisfaction with the method (17%) and fears of side effects (13%) for contraceptives. The identification of other reasons for abandonment indicates challenges in managing side effects or identifying appropriate options for switching. This study found that women had an increased risk of abandonment due to both the fear of side effects and the experience of side effects compared to all other reasons for discontinuation.

5.4 Predictors of method discontinuation and switching

5.4.1 Age

The reducing risk of contraceptive discontinuation with increasing age groups places emphasis on contextual issues relating to childbearing and age in our Ghanaian setting. As voluntary childlessness is not a common occurrence in Ghana, more women indicate a desire to bear children as they approach their reproductive years (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). This finding actually confirms evidence from the DHS 2014, by showing that younger women who were found to be predominantly nulliparous would be more likely to discontinue and begin childbearing as they desire (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

As women attain ages 25 and beyond they become less at risk of discontinuation possibly because they may already have had at least one child, or attained their ideal family size. Discontinuation among women 25 years and above is therefore less than among younger women who discontinue more to become pregnant. Although no significant associations were observed by age, abandoned users were relatively older

women. A conceivable reason for older age groups abandoning contraceptive methods more is menopause, which eliminates the need for contraception. This finding is supported by results from the DHS 2014 that identifies the occurrence of menopause in 1 out of every 10 women in the age group 30-49 years (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

5.4.2 Number of Children

The reduced hazard of discontinuation observed among women who had three (3) children compared to women who had none highlights potential ambivalent pregnancy desires among women with no children (Castle & Askew, 2015). Women with no children may be more likely to discontinue their contraceptive method to conceive. Such women may desire the recognition of being able to bear and cater for children as identified by Waterhouse et al (2017). Although the association did not reach the required level of significance in this study, the reduced hazard of discontinuation observed by ever pregnant status and ever given birth is evident in the associated reduced discontinuation by number of living children a women who has been pregnant or had a live birth has at that point.

The identification of a gradual reduction in the hazard of discontinuation with increasing number of living children supports Ali and Cleland's foremost position that the number of children a woman had strongly decrees the occurrence of discontinuation (Ali & Cleland, 1995). As contraceptive use generally increases with increasing number of living children, an inherent adherence to the methods may occur by gradual reductions in the hazard of discontinuation especially when the woman has three children.

Similar findings have been reported in Ethiopia where increments in family size was identified to contribute to less discontinuation among women (Bekele et al., 2015). These reinforce the fact women are more committed to maintaining method use on attaining their ideal family size. It is important to identify such women and provide support for them to maintain method use by equipping them with information about possible side effects, how these can be managed and when to seek assistance to dispel any negative connotations to their experiences while on the method that may compel them to discontinue.

Women in this study were less inclined to switch between methods as they had more children. This may have been because they wished to prevent poor switching that could result in method failure and an unintended pregnancy in addition to what they already have. Evident from the qualitative interviews is that women have limited options to childbirth when they fall pregnant. The avoidance of this may be the reason why switching is reduced among women with more children as opposed to those with no children that are culturally expected to have a child. The reduced switching observed may also be indicative of a challenge with available options.

Drawing insight from qualitative interviews, women who have had a previous undesirable experience with a method that they have tried in the past and would normally have switched to would rather not switch to spare themselves the previous experience. This raises possible limitations of options for methods available to the users. Narratives supported the influence of desired number of children on discontinuations by elaborating on the role of user intentions. These intentions either encourage continuing use of current methods, or switching to more or less effective

contraceptives particularly with reference to their ideal family size at that point in the reproductive life.

This study findings support the acknowledged position that the number of children a woman has influences the contraceptive practices of switching; and this inclination to switch may adapt depending on life situations (Bradley et al., 2009; Mansour, Gemzell-Danielsson, Inki, & Jensen, 2011). The ability to achieve individual reproductive health goals and ideal family sizes depends on the current situation that a woman is faced with. Women who have children and would want to limit births are more inclined to switch between methods to maintain protection from an unintended pregnancy (Castle & Askew, 2015). On the other hand women who do not yet have children may be more inclined to switch between methods they perceive to be less risky so they can conceive when they wish to (Castle, 2003).

Among participants who desired pregnancy in the near future their intention to discontinue use was followed by a switch to another method that was relatively easier to discontinue and less effective. This finding is similar to that reported among Brazilian women (Leite & Gupta 2007). The decision to opt for long acting reversible methods is consequently considered when the ideal number of children desired is achieved. Once the decision to limit births is arrived at, there is a preference to switch to permanent or longer acting contraceptives. This finding is also supported by earlier results from Matlab, Bangladesh and recent findings from Brazil (Bhatia et al., 1980; D'Antonal et al., 2009). Identifying user profiles by preferred versus ideal number of children and fertility intentions may be a more useful approach to encouraging method switching as opposed to discontinuation.

5.4.3 Marital Status and Changes in status

Among married women who exhibit an increased discontinuation, child bearing is a culturally expected event and contraceptive use practically regarded as unnecessary (Castle, 2003; Castle & Askew, 2015; Bekele et al., 2015). Evidence from individual interviews in Ethiopia for instance, revealed cultural expectations of pregnancy and childbearing by the couple soon after marriage (Bekele et al., 2015). There is also evidence that the social pressure on newly married women to conceive as a proof of their fertility may make the use of contraception early in marriage socially unacceptable (Castle & Askew, 2015). The cultural and social expectation of the arrival of grandchildren by the family is a potential influence of method discontinuation.

This study's finding of a positive association between contraceptive discontinuation and change in marital status further buttresses the fact that discontinuation occurs when there is a desire for child bearing; which is the case both for increasing age from adolescence into adulthood or from single to married, which are both associated with social expectations of childbirth (Garenne, 2008; Weeks, Getis, Hill, Agyei-Mensah, & Rain, 2010; Yideta et al., 2017). The finding also supports recent comparative reviews of country data available that suggest discontinuation is reduced among women older than 25years (Laguna et al., 2000; Blanc et al., 2009; Ali & Cleland, 2010b, 2010a; Curtis et al., 2011).

A factor supporting this position of increased discontinuation after a status change that emerged from the narratives was that among single women, contraceptives were used to prevent pregnancy prior to marriage and could be discontinued to begin

childbearing at the accepted time. This finding is supported by the review by Garenne (2008) that women have fewer births out of wedlock.

The results of this study also support the initial position by Curtis and Blanc (1997) that a change in marital status is positively associated with method discontinuation. It is essential to provide counseling services to women that can be identified to be in a relationship or may soon be getting married in anticipation of discontinuation. Such women should be supported and encouraged to seek assistance for proper discontinuation i.e. if method requires removal, and equally encouraged resume method use once their reproductive goals are attained as part of creating a supportive client provider relationship. Service providers should consequently expect method discontinuation among married women. These women however, can be provided with the necessary information to make an informed choice once they have had children and are ready to space or limit.

The reduced discontinuation identified among women in relationships but not cohabiting is at best be explained by contextual factors. First of all, women not formally married will less likely discontinue use of contraception and experience an out of union birth due to cultural and moral apprehensions (Garenne, 2008). This avoidance of out of wedlock births is a key element that may influence continuing use among women in relationships. It supports findings from Yideta et al. (2017) that single women would be more cautious in preventing unwanted pregnancies.

Therefore, women in non-formal unions that are identified as such may be encouraged to persist with their method until there is no longer a need to do so. Such

women could be provided with information on how to manage side effects and when to seek assistance as well as given options for switching in the event of unacceptable challenges with their current method.

5.4.4 Timing of Contraceptive use

Women indicating use of contraceptives between births discontinued their contraceptive methods less probably due to their desire to maintain their acceptable birth interval. This adherence may inhibit discontinuation particularly compared to women who use contraceptive before childbearing and who are more inclined to discontinue when they are ready to conceive. Evidence emerging from the qualitative narratives was the importance of using contraceptive at time points in relation to preparedness for childbearing. Participants clearly identified the primary drive for their use of contraceptives as being able to exert some form of control over their births with reference to starting a family, limiting and spacing births at their convenience.

The narratives also elaborated use of contraception as a means of being better positioned to cater for themselves and the family by managing current employment, daily schedules and routines. This position was buttressed with the possibility of their daily routines being threatened by morning sickness challenges that could occur from unplanned pregnancy by evidence from Honduras (Barden-O'Fallon & Speizer, 2011).

5.4.5 Counselling

Findings of this study supports evidence of positive impacts of counseling on contraceptive discontinuation (D'Antonal et al., 2009; Endriyas et al., 2018). Based on the 2014 DHS, about 67% of contraceptive method adopters had been informed about side effects with 72% of them having been informed about other methods to use in the event of challenges (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). It is plausible that these women being cautioned about the effects and action of their methods, were able to anticipate challenges and manage them appropriately to encourage sustained use as opposed to discontinued use. These women demonstrate a greater level of commitment possibly in the face of challenges with the method. Such participants have a greater tolerance for side effects and are prepared to wait out the effects to continue with method use.

This finding is supported by evidence from Ethiopia and Egypt that highlight the encouraging role of factual information received during counseling on continuation as opposed to misinformation which discouraged persistent use (Tolley et al., 2005; Endriyas et al., 2018). Women who did not receive any of this counseling may have reacted to challenges in method use by discontinuing either due to their unpreparedness or low knowledge on what to do in the event of such challenges.

It is of utmost essence that all women who receive information on contraceptives also receive counseling on the possible side effects of the methods chosen and alternate methods that they can switch to incase they experience side effects. Again, these counseling sessions can be tailored to suit women's preference to space children, delay childbirth or not want any more children.

5.4.6 Reasons for discontinuation

5.4.6.1 Reduced need

In contrast to the findings from Ali and Cleland (2012) this study found that women who indicated a reduced need for contraceptives discontinued their contraceptive methods more. This finding is however a positive event for Ghanaian family planning programmes, as it supports the programmatic position of providing individual with information, education, and counseling to enable them to freely and responsibly decide when to begin having children and provide them with the means to space or limit births as they wish (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). The reduced need among such women therefore implies that there is no more a risk of unwanted or unintended pregnancy at that point in their reproductive life.

This finding is thus indicative of programme successes as these women were provided with the opportunity to achieve their goal through the use of contraceptives until there was no longer a need to do so. It is however essential, that providers do not become complacent in their efforts to guide all women to this point where they achieve their reproductive goals. More efforts will actually be required to achieve that goal.

5.4.6.2 Fear of Side effects

In this study, side effects were assessed from two perspectives, perceived side effects that women feared and side effects actually experienced by the user. What is notable among women who have fears of side effects, is the role of a friend/relative in relaying information about a negative experience of a side effect to another(Endriyas et al., 2018). These side effect may either have been experienced or simply be relayed

information. Although some of the women studied experienced these symptoms themselves, and for which they developed a fear of re-experiencing it, for others it was hearsay or some informal conversation or 'girl talk' among small groups of women at gatherings.

The individual interviews highlighted upon multiple side effects known by women-notable among those occurring were weight issues, menstrual disruption and irregularity, infertility, cardiac issues, dizziness, tiredness and waist pain. Although the information sources for these side effects, were health facility/workers (midwives), other non-health worker sources like close friends, relatives, and colleagues at work places were reported as having strong influences.

Similar findings have been documented through narratives by Gilliam et al (2004) among Latina women aged 18-26 years. They found that fears of side effects based on circumstantial evidence from non-health professionals were deeply regarded and influenced discontinuation among the young women (Gilliam et al., 2004). Unfortunately, the increased discontinuation for women who are afraid of side effects is noted in many settings (Castle, 2003; Ali et al., 2012; Hindin et al., 2013; Bekele et al., 2015; Castle & Askew, 2015; Yideta et al., 2017; Tadesse et al., 2017; Endriyas et al., 2018). This study therefore also recognizes this a key area that must be addressed to minimize avoidable discontinuations in the presence of unmet need.

Surprisingly, the proportion of women identifying a fear of side effects at their reason for discontinuation is lower (12.2%) among this sample than the estimate provided by the DHS 2014 survey (22%) (Ghana Statistical Service, Ghana Health Service, & ICF

International, 2015). It is important to note however, that this lowered estimate may be because the DHS does not distinguish between perceived side effects and the actual experienced side effects. It is also plausible that the DHS estimate may be higher owing to the merged reporting of side effects and health concerns.

The finding from this study however underscores the fact that women who have not actually experienced side effects could be so strongly motivated to discontinue use of their method because of this fear. This presents a possible avenue for reinforced intervention to dispel misinformation by providing users with accurate details. Similar findings have been identified in Brazil and Ethiopia, where women had particularly formed the notion that the use of contraceptive after a period of time would result in infertility and challenges in conceiving (D'AntonaI et al., 2009; Bekele et al., 2015). In support of these fears associated with contraceptive use, Castle and Askew (2015) note that in settings where status is measured by fertility, women may prefer to use condoms to avoid the risk of becoming sterile following method use (Castle, 2003; Castle & Askew, 2015).

Furthermore, the findings support evidence by Van Lith, Yahner & Bakanjiam (2013) which showed that the fear of side effects inhibited method use even among women who were motivated to limit births (Van Lith, Yahner, & Bakamjian, 2013). In this study also, fears were the result of actual experiences of side effects such as headache, menstrual irregularities and loss of appetite shortly after initiating modern methods as well as based on information from other women.

Moreover, it is possible that even among those who had experienced side effects of one method, would translate those fears to new methods. What is of utmost essence from this study however, is that the intensity of these fears were convincing enough to elicit a method discontinuation even in the face of exposure to unintended pregnancy.

5.4.6.3 Experienced side effects

The actual experience of side effects was also observed to result in an increased discontinuation among the women studied. This provides support to the growing body of evidence that women who experience side effects are more strongly compelled to cease method use than persist with it (Bhatia et al., 1980; Khan, 2001; Leite & Gupta 2007; D'Antonal et al., 2009; Singh, Sedgh, et al., 2010; Barden-O'Fallon et al., 2011; Castle & Askew, 2015; Tadesse et al., 2017).

Evidence from the literature suggests that side effects such as vaginal dryness and prolonged periods of bleeding associated with some injectable use identified by users as worrisome, and inconvenient particularly by impacting upon social and sexual relations influence high discontinuation among users (Castle, 2003; Campbell et al., 2006). The experience of such unpleasant side effects could instigate negative perceptions of contraceptive use that may result in discontinuation despite the risk of unintended pregnancy if not managed properly.

Substantiation from narratives highlighting fatigue as a side effect that results in the woman's reduced productivity and discontinuation supports previous findings from Honduras where discontinuation and switching was higher among women who experienced such domestic as well as social disruptions (Barden-O'Fallon & Speizer,

2011). The role of counseling in the management of these side effects is particularly emphasized in the study's qualitative findings, that women who were informed of symptoms early on, were not surprised or alarmed when they experienced side effects. Such participants state that they did not and do not intend to report any symptoms or request a removal until they are ready to discontinue method.

Women who experience side effects of contraceptive methods must thus be provided with support services for the management of these side effects until there is a need for the discontinuation of the method. Alternative methods for such women to switch to should also be provided to prevent social and domestic disruptions as well as encourage these women to maintain protection from unintended pregnancy.

5.4.7 Other identified reasons for discontinuation

This study identified poor adherence to method use particularly in the absence of menstruation among women. The finding that women were unaware about fertility status in the absence of menstruation supports the results of the 2014 DHS that indicates a reducing knowledge of the ovulatory cycle among Ghanaian women (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015). This misconceived absence of menstruation to mean infertility could lead to poor use of methods and result in increased failures and unintended pregnancies. Since reduced menstruation and amenorrhea has been reported and associated with the use of some hormonal methods, it is important that this is addressed during counseling to reduce unfavorable attitudes towards method use (World Health Organisation, 2015a).

Misinformation was also an identified factor leading to the abandonment of a contraceptive method. As indicated by other studies some of these perceptions were fueled by unverified information and not from personal experience (Ankomah et al., 2011; Hindin et al., 2013; Sedgh & Hussain, 2014; Endriyas et al., 2018). Among some women, method choice was influenced by this information they had heard about the method particularly regarding side effects. These findings are similar to findings from an Ethiopian qualitative study where the preferred method was influenced by what participants had heard about concerning the contraceptive method (Endriyas et al., 2018)

Although interviews in this study revealed that some of this information was from users that had actually experienced the issues from previous methods (particularly the implant and injectable) conveyed to other women, this information when relayed, formed strong impressions in women on adherence or discontinued use.

5.5 Method specific and Cause-specific discontinuation rates

5.5.1 Pill

This study found that users of the pill had the highest discontinuation compared to users of the condom and all other methods at all times of follow up. Assessing by time intervals however highlights that some pill users discontinue due to a reduced need at 12 months of use. As pill discontinuation can be executed passively, it is plausible, that pill users may have opted for that method because of the relatively shorter period of protection from pregnancy that they required (Bradley et al., 2009). Considering that, the pill is classified as a short acting method and as thus advised for users who may require short-term protection from unintended pregnancy, its

discontinuation after a short period may be indicative of no more need. This finding is similar to Westhoff et al. (2007) and suggests that although side effect may play a key role in discontinuation within the first 12months, some discontinuation observed may be unrelated to side effects at that point time.

Discontinuation though increased at 24 months of use, is attributed to the experience of side effects and interestingly at 36 months of use, the fear of side effects and health concerns rather than a reduced need for contraceptives emerged as the dominant reasons for discontinuation of the pill. It is possible that as identified in the qualitative inquiry, that after extended periods of use of the pill, women may be concerned about the effect of prolonged periods of method use and may also harbor fears about physiological effects. This could influence them to discontinue use in the presence of unmet need and even when there is an absence of actually experiencing these effects. The strength of the fear of experiencing side effects for hormonal methods is consequently a potential gap that may require a multifaceted approach to addressing these biases to maintain current use particularly in the presence of the risk of unintended pregnancy.

5.5.2 Male Condom

Users of the male condom had a reduced hazard of discontinuation by 43% at all times of follow up compared to users of other methods. This result is at variance with findings from the DHS 2014 that found highest discontinuation for condoms. This result among the population of women studied may be a result of the increased apprehension of side effects of hormonal methods among women and limited acceptable alternatives. Users of the male condom therefore discontinue less because

the male condom is the most tolerable contraceptive available to them. This apprehension concerning the experience of side effects of hormonal methods has been reported to influence the preference for condoms among Malian women (Castle, 2003).

Condom discontinuation at 12, 24 months of use was due to the experience of side effects. Although rarely reported as a reason for discontinuation in other studies, these possible side effects could be resulting from latex allergies among the women or their partners, which is a possible documented risk of latex condoms among individuals with latex allergies (World Health Organization, Johns Hopkins Bloomberg School of Public Health, & United States Agency for International Development 2018). The inclusion of these potential events as part of counseling for condom users should be a priority action particularly as the condom is the second most commonly used method among women in the Shai-Osudoku and Ningo Prampram districts.

The preference for the use of the male condoms may be a result of the absence of hormonal side effects as identified by Castle (2003) among Malian women. This preference, she identified, stems from an apprehension to use hormonal methods due to fears about its reproductive consequences (Castle, 2003). The provision of non-latex condoms for users in this current study who wish to persist with the method should be available, to encourage a switch to an equally acceptable method in the event of such side effects experienced. These alternative condoms could also be part of social marketing campaigns to encourage users to persist with method use.

5.5.3 Implant

Implant users however had the greatest reduction in the hazard of discontinuation at all times of follow up compared to users of all other methods. Life table analysis shows that even at 12 months of use, very few (2%) of discontinuations happen because users experienced side effects. A proportion relatively lower than the estimated 10%-13% for Egypt (Aziz, El-Gazzar, & Elgibaly, 2018; Tolley, Loza, Kafafi, & Cummings, 2005).

This low discontinuation may be a result of more women using the implant receiving adequate counseling about what to expect on the method before its use. At 24 months of use a larger proportion of users discontinued because they were afraid of side effects and not because they experienced them. At 36 months of use however, 38% of implant users discontinued for other reasons implying dissatisfaction with the method.

It is possible that among women who survive method use to the 36 month, a general anxiety/displeasure with the method is responsible for the inclination to discontinuation for any other reason that presents. Other studies have also identified an increased discontinuation due to side effects experienced among implant users (Aziz et al., 2018). A further indication that women may be plagued by side effects for some time leading up to the actual discontinuation for any other reason.

5.5.4 Injectable

Although no significant risks were identified by hazards, the injectable and the two traditional methods: withdrawal and Rhythm/periodic abstinence were also assessed. Approximately 4% of injectable users discontinue at 12 months of use because they

experienced side effects of the method. However, fear of side effects was the reason for more discontinuations (26%) at 24 months. This finding supports results of other studies in developing countries that identified fears of side effects and the experience of side effects as reasons for discontinuation of the injectable (Leite & Gupta 2007; Sedgh & Hussain, 2014; Castle & Askew, 2015).

In light of evidence to support the potential experience of menstrual side effects of injectable contraceptives users of the injectable must be fully informed of these potential events and educated on how to manage them particularly when they are expected events associated with the use of injectable contraceptives (World Health Organisation, 2018).

5.5.5 Traditional methods: Withdrawal & Rhythm/ Periodic abstinence

This study found that users of the withdrawal and periodic abstinence methods generally indicated a reduced need as the reason for discontinuation of the method at 12 months of use. Not surprisingly however, owing to the lower effectiveness associated with the use of traditional methods, at 24 months of use half of periodic abstinence users and about a third of withdrawal users experienced method failure and were pregnant on the method (World Health Organization et al., 2018). By 24 months of use, all users of periodic abstinence methods had experienced a method failure. It may be possible that considering the reduced knowledge of the ovulatory cycle and fertility among all women, that users of these methods are not properly educated on the correct use of the methods and may be failing to perfect its use as time elapses (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015).

This is particularly important as it is anticipated to be able to achieve a 75% effectiveness with typical use (World Health Organization et al., 2018) and is thus a better alternative to nonuse of any form of contraceptives. The identification of method failure among withdrawal users who persist with use up to 24 months is equally worrying. Users of both traditional methods must be educated on the availability of emergency contraceptives as an alternative in the event of unprotected intercourse on fertile days when pregnancy is not intended.

5.5.6 Choice of methods among current and switched users

The decision for choosing one method over another in this study was influenced by details such as ease of supply for condoms and pills, and mode of use and process of initiation for methods such as the IUD, implant and injectable. Previous studies have identified a preference for methods with minimal associated side effects among women in Accra (Anaman & Okai, 2016). In this study, among women who switched methods, the popular choice switched to was the male condom. This finding supports other studies suggesting the decision to switch may have been a result of problems with previous hormonal modern methods and found more switching to the male condom (Ali & Cleland, 1995; Ali et al., 2012; Barden-O'Fallon et al., 2018).

Others generally found more switching to short acting methods such as pill (37%, injectable (21%) IUD (14%) and condoms (13%) (Barden-O'Fallon & Speizer, 2011). It is plausible that the experience of side effects limits method choices particularly among women who intend to switch. The need to provide a variety of methods to women intending to switch is therefore crucial to encourage this event. Others decide on method choice based on ease of discontinuation. This supports the position of

active and passive discontinuation in choice of contraceptive methods (Barden-O'Fallon & Speizer, 2011). For some women, however, qualitative findings suggest that hearsay about side effects influenced their choice of method. A finding similarly identified in earlier studies (Castle, 2003; Castle & Askew 2015; Bekele et al. 2015; Aziz et al. 2018).

Qualitative findings also underscored some factors influencing method choice for rhythm/periodic abstinence, LAM and permanent methods as contraceptive options for these women. Many women indicated awareness of the use of the calendar to estimate fertile days and aid in spacing of births. Among women who had opted for this method, the choice was influenced by a fear of side effects of the hormonal methods; particularly difficulty conceiving after using modern methods of contraception. Partner opposition and difficulties with compliance to methods was raised among both traditional method users. This has been documented as a primary challenge to the effective use of the methods (Castle & Askew, 2015). The concerning discontinuation of these methods among this sample at 36 months of use due to the occurrence of unintended pregnancies supports these studies (Ali et al., 2012; Castle & Askew, 2015).

The reduction in the proportion of women who have accurate knowledge of fertility and the ovulatory cycle in the 2014 DHS (Ghana Statistical Service, Ghana Health Service, & ICF International, 2015) is a situation that warrants increased awareness creation among women. This could possibly account for the higher numbers of method failure among users of traditional methods (periodic abstinence and withdrawal). Among users of emergency contraceptives, it may be possible that

incorrect use of the method may have been responsible for the occurring pregnancy. This has implications for proper counseling to be provided to users of emergency contraception because the pregnancy risk for emergency contraceptive users is related to the cycle day of intercourse (Glasier et al., 2011). An opportunity for increased knowledge of all methods, their function and correct usage is needed to address these gaps and mitigate their effect.

Among women who used the calendar method adherence was simplified when their husbands worked in industries that demanded that they travel or be away from home regularly. Also noteworthy was difficulty of use of the rhythm/periodic abstinence among women with unstable menstrual cycles and inaccurate knowledge of the method's use. Users who indicate traditional methods, as their choice of contraceptive should be informed of potential difficulty in maintaining spousal compliance in its use. Women should also be advised on the essential natures of partner commitment for effective use of the methods. It is important however to also offer the users of traditional methods alternative options such as condoms and emergency contraceptives in the event that incorrect use or a method failure is experienced to prevent unintended fertility.

Lactational amenorrhea method (LAM) was also found not to be a popular choice of contraceptive during the qualitative inquiry. Many women expressed a low understanding of the use of exclusive breastfeeding as a contraceptive method. Women reported non-exclusive breastfeeding practices before 6 months yet, they expected protection from LAM just because they were still breastfeeding. The tendency for women to engage in sub-optimal exclusive breastfeeding due to early

weaning of babies is well documented in the study area (Mogre., Dery., & Gaa., 2016). The failure of the LAM due to non-compliance to EBF often resulted in women forming negative impressions about the effectiveness of LAM as a contraceptive (79.1%), and communicated this to friends and family. Recent findings among Ghanaian lactating mothers by Mogre et al.(2016) uncovered that although many women are aware of the practice of exclusive breastfeeding the execution of it may be suboptimal (Mogre. et al., 2016). Particularly noteworthy and similar to the Shai-Osudoku and Ningo Prampram setting, was that mothers misunderstood the signs of readiness to wean and as such gave other foods.

5.5.7 Preference for permanent Methods of contraception

The findings of this study emphasize the contextual variations in method preferences by country. Commonly identified for sub-Saharan African countries is the preference for shorter acting methods particularly the injectable (Castle & Askew, 2015). Women in this study exhibited similarly low preference for permanent methods of contraception. For participants the idea of female sterilization was greatly disapproved of except under specific circumstances. These included participants' feeling of having achieved their ideal family size, attained personal (marriage) goals or were certain that they no longer wish to conceive in the future time -a position that most women had difficulty coming to terms with.

The use of permanent methods was mostly regarded more as a final resort rather than a possible alternative to switch to. This finding is supported by Cleland et al (2006) who recognize that in African countries, permanent methods are not particularly favored because of the contextual preference for birth spacing rather than an intention

to limit the size of one's family (Cleland et al., 2006). The results of an analysis of DHs surveys for countries with available data from 2006 identified this low patronage of sterilization among users (Ali et al (2012). The authors estimated between 0.1% in Zimbabwe to 0.9% in Malawi of switching to sterilization in sub-Saharan African countries with some countries such as Ethiopia reporting no switching at all to sterilization.

For women that did not perceive the use of permanent method as abominable, it was of concern in relation to partner ideals also. Particularly noteworthy is the mutual agreement to not have another child as the only motivation to opt for a permanent method.

5.6 Unintended Pregnancy (Method failure)

In line with the position suggesting that women are less inclined to identify pregnancies that occur as a result of incorrect or inconsistent method use as unwanted or unintended (Curtis et al., 2011), this study sought to identify all pregnancies that occurred alongside method use (especially those not reported as a result of method failure). Approximately 8(1.76%) method failures were identified using the standard approach of response to discontinuation. An additional 27 (2.72%) pregnancies classified as unintended pregnancies were identified among the women sampled. The proportion of unintended pregnancies identified by the reclassification thus increases by 27 (2.42%) and is estimated at 35 (3.14%). This estimation of unintended pregnancies in this study population is much lower than (4.2%-19.5%) reported by Ali et al (2012).

This study's estimate is however within range for the estimates reported for neighboring Benin that recorded 2% (Curtis et al., 2011; Jain & Winfrey, 2017). This estimate of unintended pregnancy may also be lower because users identified all other pregnancies that occurred in the month following method use as intended. This finding supports studies that showed an increased inclination to identify births or pregnancies that occur after what would appear to be method failure as wanted (Cleland & Ali, 2004; Curtis et al., 2011).

Opinions expressed by respondents about abortion were generally prohibitive. Participants reiterated strongly that when one falls pregnant the only available option is to have the child and never consider terminating the pregnancy. In an extreme position expressed, women considered having a pregnancy terminated (if it is not wanted at the time) to be "something only done by wicked people". Women who experienced an unintended pregnancy are thus more inclined to report it as wanted or even planned rather than identify it as mistimed. This finding is supported by Speizer (2006) who reports that ambivalent fertility desires among women contribute to the identification of unintended pregnancies as intended rather than unwanted. This inevitably biases the results of the contraceptive history calendar with underreported method failures. Similar finding have been identified in Kenya, Dominican Republic, Bangladesh, Khazakstan, Phillippines and Zimbabwe and their contribution to the rates of discontinuation and failures highlighted (Curtis et al., 2011).

The negative attitudes towards pregnancy termination even when unwanted or unintended may be reinforced by the latent ambivalence toward pregnancy among this population. This ambivalence may either be an inherent quality of these women,

or may develop in response to an unintended pregnancy because the thought of an abortion is prohibitively unacceptable. The observed pregnancy ambivalence among this sample of women may contribute to method discontinuation as well as failures. There is evidence that women who face challenges with method use may rationalize the experience of unintended pregnancies as "not completely negative events" (Curtis et al., 2011; Curtis, 2012).

Such users are subsequently more willing to accept pregnancies following method failure as a welcome event and identify them as wanted or intended thereby biasing the estimates by underreporting unintended pregnancies. Provision of services intended to meet the need and demand for contraceptives requires careful consideration of the complexity of factors that influence discontinuation, switching or inconsistent use of methods. Successful provision of sexual and reproductive health care must factor in cultural expectations and interpretations surrounding fertility among women of different relationship status.

5.7 Strengths of the study

1. This study estimates contraceptive switching within one month of discontinuation of a method and allowed a discovery of shorter switching intervals. This would otherwise have been overlooked if method switching was assessed after a 3 month period.

2. This study was able to minimize the expected biases due to participants' reluctance to classify a pregnancy as unwanted whilst using a method to escape the culturally imposed guilt of calling a pregnancy unwanted. Thus, pregnancies

were classified as unintended in this study if it occurred within the next month of method use when respondents had not indicated a desire to conceive. Examiner 1 says not a strength

3. This study contributes to the knowledge of side effects on contraceptive discontinuation as a result of side effects in Ghana by distinguishing between fears of side effects and experienced side effects as reasons for discontinuation. Beyond the estimates provided on the independent contribution of these two factors to discontinuation, is the discovery that fears of side effects actually confers a higher hazard of discontinuation compared to all other reasons for discontinuations reported.

4. This study's use of a district surveillance area with a defined regularly monitored population provided updated health and social indicators. In studying contraceptive discontinuation and its influencing factors among this population, this study provides an uncommon opportunity to test known interventions within the same populace and observing changes over a period of time.- futuristic by examiner 1

5.7.2 Limitations of the study

Three main issues must be taken into consideration in interpreting the results of this study:

1. This study relies on individual retrospective reports of contraceptive use, pregnancies and periods of nonuse, switching or otherwise which is subject to recall bias (Hassan, 2006; Gordis, 2009). Nevertheless, the method of data collection used

in this study does not attenuate the quality of data gathered beyond that inherent in other studies that have employed similar monthly calendar approach to data collection.

2. The gathering of data on method use at a monthly interval basis by the contraceptive calendar was intended to provide an estimate of the period of use rather than a focus on accuracy of times used which is not severely limited by this method of reporting. The monthly use reporting may likely have poorly captured missed doses or sub-optimal use of methods within the same month leading to an overestimated report of use. However, the 5 year period of recall using the contraceptive calendar makes it practically impossible to obtain such detailed information from respondents. Thus, conclusions drawn based on this data remains valid.

3. Although discontinuation may be the result of multiple factors, this study in utilizing the contraceptive history calendar permitted the reporting of only one main reason per event. The reported reason is assumed to be the dominant cause of discontinuation or switching among users. This is intended to inform programme implementation.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The evidence gathered from this study in relation to the conceptual framework proposed for the analysis of discontinuation suggests that the action to discontinue stems from an interaction of critical factors: age of women, number of children, marital status, timing of use and counseling received as protective factors whilst changes in marital status, act as predisposing factors. Although fertility intentions play an important role in discontinuation of contraceptives, discontinuations were predominantly driven by fears of physiological changes in response to the contraceptive method, counseling received and the experience of side effects of chosen methods. The decision to discontinue use of contraceptives is thus a result of how these factors act to influence women's choices.

Evident from the qualitative findings is that for women who even experience side effects, when the desire to space or not have more children is strong, they switch between methods. Such women exhibit a stronger intent to adhere to method use and find alternatives in the face of challenges to prevent unintended pregnancy. Such strongly motivated women may have benefited from counseling on options and may have identified a suitable alternative to the current method as opposed to remaining at risk of unintended pregnancies.

For method switchers, the decision to opt for alternative methods to maintain protection from unintended pregnancy appeared to be a result of how strongly motivated they are to prevent or delay pregnancy and the acceptability of

contraceptive options available to them at that particular point. Four out of every ten women were observed to switch to another contraceptive option rather than do nothing and remain at risk of unintended pregnancy within a month of discontinuation.

In support of potential experiences of side effects or fears of side effects of hormonal methods, the most common methods discontinued compared to all other method was the pill and the preferred method switched to was the male condom. This finding among the women is indicative of a preference for a non-hormonal method of contraception or of limited options that users who harbor these fears or have experienced side effects have available to them. The higher proportions of condom discontinuations observed due to reduced need implies that although women may opt for this method when they decide to switch from initial methods, their reliance on the condom is short lived.

Misinformation regarding contraceptive use was varied in its content, and not limited to side effects and health concerns. In addition, incorrect use of contraceptives as a result of incorrect information led to method failure (unintended pregnancies) in some instances. Sources of misinformation varied in scope and may require a multifaceted approach to minimize their interference.

6.2 Recommendation

This study proposes a number of recommendations based on the profile of contraceptive discontinuers, switchers, methods and services.

1. It is crucial that as part of the commitment to increasing family planning commodities, a wide range of contraceptive options are made available to users at service points as part of the commitment to increasing family planning commodities. This would provide 'new' users who are dissatisfied with the method to have alternative contraceptive methods to switch to and avoid unwelcome pregnancies.

2. The Ghana Health Service Implant task shifting policy of training community health nurses (CHNs) to insert and remove implants should include as part of its training, counseling about method switching and alternative options for women. Their contact with users who have decided to discontinue the implant presents an opportunity to reinforce or provide additional information to users that can encourage a switch within the next month as opposed to remaining at risk.

3. The commitment to improved counseling and customer care outlined in the Ministry of Health and Ghana Health Service Ghana family planning cost implementation plan 2016-2020 should consider the exploration of additional strategies such as extended or follow up counseling for users scheduled to occur after users advance past the first 12 months of use of the pill. This strategy may potentially help to curb the influence of fears of side effects that arises at 36 months of use of the pills. Further research to monitor and assess the effect of scheduled counseling among pill user on fears of side effects may provide more insight.

4. The various forms of misinformation must be corrected by providing all clients and potential clients with unbiased information about method types,

options available and eligibility for their use. Women must be well informed to make decisions about methods, anticipate challenges, be equipped to manage side effects and seek assistance when required or switch to alternative methods for which they are aware of how to correctly use to prevent method failures.

5. The result that by 24 months of use of periodic abstinence, all users became pregnant is an undesirable opportunity for additional unintended pregnancies. The identification that most users of this method choose to use it as opposed to other modern methods for which they harbor fears is a gap that must be addressed by providing access to the option of emergency contraception for the unlikely event that they become exposed to unintended pregnancy resulting from method failure.

6. The identification of some side effects among condom users indicates a possible occurrence of latex allergies among women or their partners. The inclusion of non-latex condoms as part of expanding contraceptive options should be considered for users who present with such problems as an alternative method. This may encourage sustained use among such individuals. Education on these rare but possible side effects should also be given to potential users of the male condom.

7. Future research examining the role of male partners in contraceptive discontinuation and switching can inform implementation of strategies aimed at encouraging continued use.

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APPENDICES

APPENDIX 1

INFORMATION SHEET

CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN OF REPRODUCTIVE AGE IN THE SHAI-OSUDOKU AND NINGO PRAMPRAM DISTRICTS, GHANA

Background of the Study

This study intends to identify factors associated with contraceptive discontinuation among women of reproductive age in the Shai-Osudoku district of Ghana. Specifically it seeks to identify the rate of occurrence of contraceptive discontinuation and the reasons that women of reproductive age in the Shai-Osudoku District of Ghana attribute to it. This study is important because when women discontinue their contraceptive for reasons unrelated to the desire to conceive, they are then placed at an increased risk of exposure to unintended pregnancy which may be more subject to induce abortion and other poor health behaviors and associated health challenges.

Introduction

My name is Emefa Modey and I am a PhD student from the Department of population, family and reproductive health at the University of Ghana, School of Public Health. I can be contacted on telephone number is 054-7000-950 and by email at emmodey@hotmail.com.

Nature of Research

I am conducting a research study entitled *Contraceptive discontinuation and switching among women of reproductive age in the Shai-Osudoku and Ningo Prampram districts, Ghana*. I am asking you to take part in this research study because I am trying to learn more about what happens after a woman begins using a contraceptive (Family planning/Birth control) method. We would like to better understand what makes a woman stop using her chosen method altogether or switch to another method and how often/when this is most likely to happen.

Duration/What is Involved

If you agree to be in this study you will be required to give consent in writing by signing or thumb printing a consent form. After you have given your consent to participate you will begin with the interview that consists of a number of questions from a questionnaire. You will be asked to provide information about yourself, your reproductive/birth history and past/current contraceptive use by answering questions from a survey questionnaire.

The interview may take between 40-70mins to complete.

Potential Risks

There are no direct associated health risks with your participation in this study. However due to the personal nature of some of the issues to be explored you may have to recant some experiences that may be emotional or difficult and may result in emotional upset.

Benefits
There will be no direct benefit to you. Your participation in this study will nonetheless result helping us understand better the issues that influence women to stop or switch contraceptive methods. This may result in better service provision and attention to specific issues that may eliminate barriers to contraceptive use and minimize the consequences of unintended discontinuation. This will help in enhancing the family planning and contraceptive use experience for users of the services available.

Costs
There will be no monetary cost to you to be involved in this study.

Compensation
You will not be given any monetary compensation for your participation in this study.

Confidentiality
All of your records about this research study will be kept locked up so no one else can see them. Your real name and other identifiable information will be coded and you will be given a study ID.

Audio/Image capture (For IDI Paticipants)
If you agree to participate, the interview that we will conduct will be audio recorded for it to be transcribed and translated into English where required. This audio recording will only be available to myself and the transcription is to enable me to analyse the information you provide appropriately. The audio will be destroyed once it is transcribed. Only the transcribed document will be used for analysis. No images of yourself, your home or this interview as it is ongoing will be taken.

Voluntary Participation/Withdrawal
If you do not wish to participate in this study, you are at liberty to state so. Please do bear in mind that your participation in this study is entirely your decision and you will not be coerced into doing so. Additionally if you change your mind later on and wish to stop, you can do so without suffering any consequence.

Outcome and Feedback
The information gathered from your interview will be analysed to find out what barriers exist to the successful utilization of family planning and contraceptive use. This will also be used to identify contraceptive discontinuation, why it occurs and facilitate in the formulation of possible ways of preventing unplanned discontinuations with the aim of ultimately reducing the negative consequences. These findings will be reported upon in my thesis work to be submitted to the School of Graduate Studies, University of Ghana.

Appropriate Alternative Procedures and Treatment
If you have a question later that you did not think of during our interview, please feel free to contact myself (Emefa Modey, 0547000950) or ask me the next time we meet.

Funding Information
This study is being done as part of my research work for the award of a Doctor of Philosophy degree in Public Health (PhD Public Health) and is being self-funded.

Persons to Contact: If you have a question later that you did not think of now, please feel free to contact any of the following for further clarification

Emefa Modey (PhD Student, PI)
Department of Population Family and Reproductive Health, School of Public Health
University of Ghana-Legon on Tel: 054-7000950, emmodey@hotmail.com

Fidelis Anumu
(College of Health Sciences Ethical and protocol review committee administrator) on 0302-665-103/0244-061-270 email:eprc@chs.edu.gh.

Hannah Frimpong
(Ghana Health Service - Ethics Review Committee) on Tel: 0507-041223 and email at hannahfrimpong@ghsmail.org

Irene Hornam Tsey
(Dodowa Health Research Centre- Institutional Review Board) on Tel: 0501-336188 and email at irenetsey@dhrc-irb.org

APPENDIX 2

WOMEN' S CONSENT FORM

CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN OF REPRODUCTIVE AGE IN THE SHAI-OSUDOKU AND NINGO PRAMPRAM DISTRICT, GHANA

A. PARTICIPANT STATEMENT AND SIGNATURE

I certify that I voluntarily agree to answer the survey questions. I have read the information or the information regarding the purpose of the survey has been explained to me. I understand that there may be some emotional discomfort in recanting some personal experiences and also that I may have to share personal information with the researcher. I have also been made aware of the potential benefits of sharing of my experience to facilitate in understanding how to better assist other women who may be facing challenges with contraceptive use and in situations that can be remedied. I have had the opportunity to ask questions about it and any question I have asked has been answered to my satisfaction.

I consent voluntarily to participate as a subject in this study and understand that I have the right to withdraw from the study at any time without in any way it affecting my further medical care.

_____Signature or thumbprint of Participant
(Thumbprint for those who cannot read and write)
Date

_____Signature or thumbprint of Parent/Guardian/Legally Authorized Representative (For participants under 18yrs)
Date.

B. DECLARATION BY WITNESS

I declare that I was present while the benefits, risks and procedures were read to the participant. All questions were answered and all concerns by the participant were addressed. The participant has agreed to take part in the research.

_____Signature of witness (For participants unable to read the form themselves).
Date

C. INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been provided with the information pertaining to the study. The participant has been given ample time to read and learn about the study. All questions and issues requiring clarifications raised by the participant have been answered and addressed.

_____Signature of person who sought consent
Date

APPENDIX 3

CHILD ASSENT FORM
CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN OF REPROCUDTIVE AGE IN THE SHAI-OSUDOKU AND NINGO PRAMPRAM DISTRICTS, GHANA

Introduction
My name is Emefa Modey and I am from the University of Ghana, School of Public Health. I am conducting a research study entitled Contraceptive discontinuation among women in the Shai-Osudoku district of Ghana as part of my PhD studies. I am asking you to take part in this research study because I am trying to learn more about what happens after a woman begins using a contraceptive (Family planning/Birth control) method. We would like to better understand what makes a woman stop using her chosen method altogether or switch to another method and how often/when this is most likely to happen.

General Information
If you agree to be in this study, you will be asked to provide information about yourself, your reproductive/birth history and past/current contraceptive use by answering questions from a survey. The survey will only commence once you have had the information regarding the study read to you and your issues of concern and questions have been addressed satisfactorily.

Possible Benefits
There will be no direct benefit to you. Your participation in this study will result helping us understand better the issues that influence women to stop or switch contraceptive methods. This is intended to assist us in understanding how to make services better suited to the various needs of women.

Possible Risks and Discomforts
However, there are no associated health risks to you from participation in this study. You may however be asked certain questions that may require personal information from you. In the even that you feel that the questions are too personal you have every right to draw my attention to your discomfort.

Voluntary Participation and Right to Leave the Research
You can stop participating at any time if you feel uncomfortable and do not wish to proceed further with the study. The decision is entirely yours.
Confidentiality
Your information will be kept confidential. You will be given a participant ID so your name will not be disclosed. No one will be able to know how you responded to the questions and your information will be anonymous.

Additional Information
You may ask me any further questions about this study to clarify issues that may be of particular concern to you.

Your rights as a Participant

Please talk about this study with your parents before you decide whether or not to participate. I will also ask permission from your parents before you are enrolled into the study. Even if your parents/guardians say "yes" you can still decide not to participate.

Contact Information

This research has been reviewed and approved by the Ghana Health Services Ethics Review Committee and the College of Health Sciences Ethical and Protocol Review Committee. If you have any questions about your rights as a research participant you can contact Fidelis Anumu at the ECRB Office between the hours of 8am-5pm through the landline (233) 0302-665103/4 or email at :provost@chs.edu.gh or Hannah Frimpong at GHS-ERC on 0507-041223, email: hannahfrimpong@ghsmail.org, or Irene Honam Tsey at DHRC-IRB on 0501-336188

Child Assent

This assent form which describes the benefits, risks and procedures for the research titled *Contraceptive Discontinuation and switching among women of reproductive age in the Shai-Osudoku district of Ghana* has been read and or explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I consent voluntarily to participate as a subject in this study and understand that I have the right to withdraw from the study at any time without in any way it affecting my further medical care.

Participant ID:…… Researcher's Name:……..

Signature/Thumbprint…….. Researcher's Signature:……
Date: …… Date: ……..

APPENDIX 4

SCREENING TOOL

	YES	QUESTION		NO	
If Yes move to #2		1	Have you ever used a method of family planning?		If NO recruit as never user
If YES recruit move to #3		2	Were you using a method two years ago (as of Jan 2015)?		N/A [end]
If YES move to #4		3	Are you still using a family planning method?		If NO move to #6
If YES move to #5		4	Is the method you currently use the same one you were using in the past?		If NO recruit as Switched user [end]
If YES recruit as switch		5	Have you tried using a different method after it?		N/A
If YES move to #6		6	Did you have a baby in the last 2 years?		If no recruit as abandoned user [end]
If YES recruit as failure		7	Were you using your method when you became pregnant?		N/A
If answer to any of the above is YES, include participant in qualitative study [Select category option] Administer consent, and include participant in study					

APPENDIX 5

CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN OF REPRODUCTIVE AGE IN THE SHAI-OSUDOKU AND NINGO PRAMPRAM DISTRICT (WOMEN'S QUESTIONNAIRE)

BACKGROUND INFORMATION

I would like to ask you a few questions about yourself:

#No.	QUESTIONS	CODING	SKIP TO
	How old were you at your last birthday?	Age in completed years __ __	
	In what month and year were you born? COMPARE AND CORRECT #1	MONTH ___ ___ Don't know month 99 YEAR ___ ___ Don't know year 9999	
	Have you ever attended school?	YES……1 NO……0	….#4 ….#6
	What is the highest level of school you attended?	PRIMARY……1 MIDDLE/JHS……2 SECONDARY/SHS….3 HIGHER……4	
	What is the highest level you completed?	PRIMARY……1 MIDDLE/JHS……2 SECONDARY/SHS….3 HIGHER……4	
	Are you able to read written English?	YES……1 NO……0	
	Do you read the newspaper? If YES, How often?	YES……1 NO……0 EVERY DAY……1 ONCE A WEEK……2 NOT AT ALL……3 OCASSIONALLY……4	
	Do you watch television? How often?	YES……1 NO……0 EVERY DAY……1 AT LEAST ONCE A WEEK……2 NOT AT ALL……3	
	Do you have a mobile phone?	YES……1 NO……0	
	Are you currently working/employed?	YES……1 NO……0	
	Were you working/employed two years ago?	YES……1 NO……0	
	Where do you currently live? (Name of Place/town)		
	Have you been living at your current place of residence for up to a year?	YES……1 NO……0	

	How long have you been living at your current place of residence (Compare and Correct #12)	YEARS ___ ___ MONTHS _____ _____	
	Where were you living before? (If less than a year)		
	In the last two years have you been away from your home for more than a month?	YES……1 NO……..0	
	How long were you away for?	MONTHS ___ ___ YEARS ___ ___	

REPRODUCTION

Now I would like to ask you about your birth history

	Have you ever been pregnant?	YES……1 NO……..0	If no ➔#10
	Have you ever had a live birth?	YES……1 NO……..0	If no ➔#10
	Did you have a baby in the last two years?	YES……1 NO……..0	
	How many children have you had?	1……1 2……2 3……3 4……4 More than 4……5	
	How many are boys?	1……1 2……2 3……3 4……4 More than 4……5	
	How many are girls?	1……1 2……2 3……3 4……4 More than 4……5	
	Do you have any sons or daughters you gave birth to who are living with you?	YES……1 NO……..0	
	How many live with you?		
	Do you have children who are not living with you?	YES……1 NO……..0	
	Do you live with any children that do not belong to you?	YES……1 NO……..0	

	Are you pregnant now?	YES……1	If

		NO……..0	Yes➔#13
	(If No) how long ago did you have your last menstrual period?	DAYS ___ ___ WEEKS___ ___ MONTHS ___ ___	➔#15
	(IF yes) How many months pregnant are you?	MONTHS ___ ___	
	At the time you became pregnant did you plan to become pregnant then OR did you want to wait till later OR did you want no more children?	THEN……1 LATER……2 NOT AT ALL……3	
	Have you ever had a pregnancy that miscarried,	NO……..0 YES……1	If no ➔#17
	How many of such pregnancies that miscarried have you had?		
	Have you ever had a pregnancy that aborted	NO……..0 YES……1	If no ➔#19
	How many of such pregnancies have you had?	_____	
	Have you ever had a pregnancy that ended in a stillbirth?	NO……..0 YES……1	If no ➔#21
	How many of such pregnancies that ended in a stillbirth have you had?	None……..0 1……1 2……2 More than 2……3	
	Did you visit a health facility during your most recent pregnancy?	NO……..0 YES……1	
	When did you seek care at the health facility? Probe for during the….	1st trimester……1 2nd trimester……2 3rd trimester……3	

**For respondents that have never given birth begin at #24 CONTRACEPTION QUESTINNAIRE*

Now I would like to record the times your children were born (whether alive or not) starting with the first child you had.

	What name was given to the first child?	Was this a twin pregnancy?	Is NAME a boy or girl?	What is NAME date of birth	Is NAME still alive?	How old was name at last birthday?	(If alive) is NAME living with you?	(If dead) How old was NAME when he/she died	Were there any other live births after NAME?
01	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-02 NO-#9
02	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-03 NO-#9
03	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-04 NO-#9
04	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-05 NO-#9
05	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-06 NO-#9
06	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS	YES 1 NO 0	(If under 1) DAYS	YES-07 NO-#9

						(If under 1) MONTHS		WEEKS MONTHS YEARS	
07	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-08 NO-#9
08	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-09 NO-#9
09	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-10 NO-#9
10	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-11 NO-#9
11	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES-12 NO-#9
12	[NAME]	SING .....1 MULT 2	BOY 1 GIRL 2	MONTH YEAR	YES 1 NO 0	YEARS (If under 1) MONTHS	YES 1 NO 0	(If under 1) DAYS WEEKS MONTHS YEARS	YES- NO-#9

CONTRACEPTION

Now I would like to ask you about family planning – the various ways or methods that a couple can use to delay or avoid pregnancy.

	Do you know of a place where you can obtain a method of family planning?		YES……..1 NO……..0
	Where can you obtain it from?		Name of Place_____
	I would like to find out about the methods you have ever used?		
A	Female Sterilisation Women can have an operation to avoid having any more children.	Have you ever used it?	YES 1 NO 0
B	Male sterilization: Men have an operation to avoid having any more children.	Have you ever used it?	YES 1 NO 0
C	Pill: Women can take a pill every day to avoid becoming pregnant.	Have you ever used it?	YES 1 NO 0
D	IUD: Women have a loop or coil placed inside them by a doctor or a nurse to help prevent pregnancy.	Have you ever used it?	YES 1 NO 0
E	Injectables: Women can have an injection by a health provider that stops them from becoming pregnant for one or more months.	Have you ever used it?	YES 1 NO 0
F	Implants: Women can have one or more small rods placed in their upper arm by a doctor or nurse which can prevent pregnancy for one or more years.	Have you ever used it?	YES 1 NO 0
G	Male Condom: Men can put a rubber sheath on their penis before sexual intercourse.	Have you ever used it?	YES 1 NO 0
H	Female condom: Women can place a sheath in their vagina before sexual intercourse.	Have you ever used it?	YES 1 NO 0
I	Diaphragm: A soft latex cap that a woman place over the cervix	Have you ever used it?	YES 1 NO 0
J	Foam/jelly:Foaming tablet or jelly that a woman uses before intercourse	Have you ever used it?	YES 1 NO 0
K	Periodic abstinence: To avoid pregnancy, women do not have sexual intercourse on the days of the month they think they can get pregnant.	Have you ever used it?	YES 1 NO 0
L	Withdrawal: Men can be careful and pull out before climax	Have you ever used it?	YES 1 NO 0
M	Lactational amenorrhea: When a woman who recently gives birth is fully breastfeeding and not menstruating	Have you ever used it?	YES 1 NO 0
N	Emergency contraception: As an emergency measure, within three days after they have unprotected sexual intercourse, women can take special pills to prevent pregnancy	Have you ever used it?	YES 1 NO 0
	Have you heard of any other ways? YES……..1 NO……..0 If yes PROBE for other methods _____		

	Have you ever used a method of family planning?	YES……1 NO……0	➔…#30
	Were you using a method two years ago?	YES……1 NO……0	
	Are you currently doing something or using a method to delay or avoid getting pregnant	YES……1 NO……0	➔…#34 ➔…#31
	Why are you not using a method?	Currently pregnant……1 Expecting pregnancy……2 Fear of Side effects……3 Experienced side effects……4 Inconvenient to use……5 Infrequent sex/no sex……6 Menopausal/had hysterectomy……7 Subfecund/infecund……8 Wants as many children as possible……9 Breastfeeding……10 Other……11 _____(Specify)	…#32
	You say you are afraid of side effects. Which side effects are you afraid of?	Irregular bleeding……1 No monthly bleeding……2 Heavy/prolonged bleeding……3 Unexplained bleeding……4 Headaches……5 Abdominal pain……6 Abdominal bloating……7 Acne……8 Weight change……9 Tiredness……10 Nausea……11 Abcess……12 Expulsion……13 Palpitations/Chest pain……14 Other……15 _____(Specify)	

	You say you have experienced side effects. Which side effects did you experience?	Irregular bleeding……1 No monthly bleeding……2 Heavy/prolonged bleeding……3 Unexplained bleeding……4 Headaches……5 Abdominal pain……6 Abdominal bloating……7 Acne……8 Weight change……9 Tiredness……10 Nausea……11 Abcess……12 Expulsion……13 Palpitations/Chest pain……14 Other……15 _____(Specify)	
	Were you using a method when you became pregnant? *OMIT IF #11 is NO*	YES……1 NO……0	
	You say you are currently using using something to delay or prevent pregnancy. What are you currently doing/using?	Female sterilization……1 Male sterilization……2 Pill……3 IUD……4 Injectables……5 Implants……6 Male Condom……7 Female condom……8 Diaphragm……9 Foam/Jelly……10 Lactational Amenorhea……11 Rhythm/Calendar……12 Withdrawal……13 Emergency contraceptive14 Other……15 _____(Specify)	
	Is the method you are using currently the same one you were using before (two years ago?)	YES……1 NO……0	
	Have you tried a different method ?	YES……1 NO……0	If NO ➔#43
	Which method did you try?	Female sterilization……1 Male sterilization……2 Pill……3 IUD……4	

		Injectables……5 Implants……6 Male Condom……7 Female condom……8 Diaphragm……9 Foam/Jelly……10 Lactational Amenorhea……11 Rhythm/Calendar……12 Withdrawal……13 Emergency contraceptive14 Other……15 _____	
	Why did you try a different method?	Fear of Side effects……1 Inconvenient to use……2 Experienced side effects……3 Wanted to try new method..4 Advised to switch……5 Other……6	
	You say you were advised to switch. Who advised you to switch methods?	Midwife……1 Other health worker……2 Pharmacist……3 Friend……4 Husband……5 Other Family member……6	
	Are you still using the second method you tried out?	YES……1 NO……0	
	Why are you not using the second method?	Currently pregnant……1 Expecting pregnancy……2 Fear of Side effects……3 Experienced side effects……4 Inconvenient to use……5 Wanted to try a new method.6 Advised to stop use……7 Other……8	
	You say you were advised to stop. Who advised you to stop the method?	Midwife……1 Other health worker……2 Pharmacist……3 Friend……4 Husband……5 Other Family member……6	
	Where did you get [CURRENT METHOD] from?	Hospital……1 FP clinic……2 Drugstore……3 Friend……4 Other……5 _____(Specify)	
	Were you counseled about the method before you begun using it?	YES……1 NO……0	

	Were you told about any side effects of the contraceptive method?	YES……1 NO……0	
	Were you told about how to use the contraceptive method?	YES……1 NO……0	
	Did you know of any side effects of the method before you begun using it?	YES……1 NO……0	If No ➔#50
	Which side effects did you know of?	Irregular bleeding……1 No monthly bleeding……2 Heavy/prolonged bleeding……3 Unexplained bleeding……4 Headaches……5 Abdominal pain……6 Abdominal bloating……7 Acne……8 Weight change……9 Tiredness……10 Nausea……11 Abcess……12 Expulsion……13 Palpitations/Chest pain……14 Other……15 _____(Specify)	
	How did you know of them	TV……1 Radio……2 Midwife……3 Other Health worker……4 Friend……5 Husband……6 Other Family member……7	
	Did you experience any side effects?	YES……1 NO……0	If NO➔#52
	Which side effects did you experience	Irregular bleeding……1 No monthly bleeding……2 Heavy/prolonged bleeding……3 Unexplained bleeding……4 Headaches……5 Abdominal pain……6 Abdominal bloating……7 Acne……8 Weight change……9 Tiredness……10 Nausea……11 Abcess……12 Expulsion……13 Palpitations/Chest pain……14 Other……15 _____(Specify)	

	Did you have any challenges with using the method?	YES……..1 NO……..0	If No➔#55
	What challenges did you have?	Inconvenient to use……..1 Forgetfulness……2 Cost……..3 Experienced side effects…….4 Opposition to use……5	If 4➔#53 All Others➔ #54
	You say you experience side effects. What side effects did you experience	Irregular bleeding……..1 No monthly bleeding……..2 Heavy/prolonged bleeding……..3 Unexplained bleeding……..4 Headaches……..5 Abdominal pain……..6 Abdominal bloating……..7 Acne……..8 Weight change……..9 Tiredness……..10 Nausea……..11 Abcess……..12 Expulsion……..13 Palpitations/Chest pain……..14 Other……15 _____(Specify)	
	Have you ever used another method in the time after you started using [METHOD]?	YES……..1 NO……..0	If No➔#58
	Which method did you try?	Female sterilization……..1 Male sterilization……..2 Pill……..3 IUD……..4 Injectables……..5 Implants……..6 Male Condom……..7 Female condom……..8 Diaphragm……..9 Foam/Jelly……..10 Lactational Amenorhea……..11 Rhythm/Calendar……..12 Withdrawal……..13 Emergency contraceptive….14 Other……..15 _____	
	Why did you try [ALTERNATE METHOD]?	Cost……..1 Side effects……..2 Health Concerns……..3 Inconvenient to use……..4 Became pregnant……..5 Other ……..6 _____(Specify)	
	Do you intend to continue using your ALTERNATE METHOD?	YES……..1 NO……..2	➔…#67 ➔…#59
	(If no) Why would you not wish to continue	Wants to get pregnant……..1 Expecting pregnancy……..2 Side effects……..3	If 2➔#60 If 3➔#61

		Health Concerns……4 Inconvenient to use……5 Other……6 _____(Specify)	All others ➔#63
	Did you intend to become pregnant at the time?	YES……1 NO……0	If yes➔#65
	Which side effects did you experience with your [previous method]?	Irregular bleeding……1 No monthly bleeding……2 Heavy/prolonged bleeding……3 Unexplained bleeding……4 Headaches……5 Abdominal pain……6 Abdominal bloating……7 Acne……8 Weight change……9 Tiredness……10 Nausea……11 Abcess……12 Expulsion……13 Palpitations/Chest pain……14 Other……15 _____(Specify)	
	Were you informed about these side effects?	YES……1 NO……0	
	Were you informed about what to do when you experienced these side effects?	YES……1 NO……0	
	Were you told about other forms of family planning you can use if you experienced side effects?	YES……1 NO……0	
	Do you intend to use contraceptive methods in future?	YES……1 NO……0	If no➔#68
	Which method would you consider using?	Female sterilization……1 Male sterilization……2 Pill……3 IUD……4 Injectables……5 Implants……6 Male Condom……7 Female condom……8 Diaphragm……9 Foam/Jelly……10 Lactational Amenorhea……11 Rhythm/Calendar……12 Withdrawal……13 Emergency contraceptive….14 Other……15	

	Why would you intend to use contraceptive methods in future?	Want to limit child bearing……..1 Wants to space……2 Want to have more children..3 Fear of how methods are used……..4 Fear of experiencing side effects……..5 Other……6 _____	
	Why would you intend to not use contraceptive methods in future?	Want to limit child bearing……..1 Wants to space……2 Want to have more children..3 Fear of how methods are used……..4 Fear of experiencing side effects……..5 Other……6 _____	
	From one menstrual period to the next there are certain days when a woman is more likely to become pregnant if she has sexual relations. Are you aware of this?	YES……1 NO……0	If Yes➔#70
	Is this time just before her period begins, during her period, right after the period had ended or halfway between periods?	Before her period begins…..1 During her period,……..2 Right after the period had ended……3 Halfway between periods……4 Other……..5 Don't know……..6	
	Where did you learn to use the Rhythm/calendar method from?	Hospital……..1 FP clinic……..2 Friend……3 Other (specify)……..4	
	Would you consider using a method such as this calendar method?	YES……1 NO……0	
	Why would you consider/not consider it?	Unreliable……..1 Difficult to use……2 Partner opposition……3 Safe to use(does not affect body's normal process)……4 Easy to use……..5	

	When a woman who recently gives birth in less than six months is fully breastfeeding (exclusive breastfeeding) and is not yet menstruating a woman is less likely to become pregnant if she has sexual relations. Are you aware of this?	YES……1 NO……0	
	Where did you learn to use the LAM method?	Hospital……1 FP clinic……2 Friend……3 Other (specify)……4	
	Would you consider using a method such as this Lactation amenorrhea method?	YES……1 NO……0	
	Why would you consider/not consider it?	Unreliable……1 Difficult to use……2 Partner opposition……3 Safe to use(does not affect body's normal process)……4 Easy to use……5 Do not intend to breastfeed exclusively……6	
	For participants who have ever used family planning, Did you use your family planning method before you begun childbearing?	YES……1 NO……0	
	Do you wish to get pregnant within the next two (2) years?	YES……1 NO……0	

APPENDIX 6

Now I would like to ask you about your family planning use over the last two years

CONTRACEPTIVE HISTORY CALENDAR

INSTRUCTIONS: Enter codes into corresponding box. For months 1, 6, 12, 18 and 24 all boxes must be filled in.

COLUMN 1 :Births, Pregnancies, Contraceptive Use

Ask respondent by each column, e.g. were you using a method in Jan 2014? Which method? [If no method probe why]

B Births
P Pregnancies
S Stillbirths
M Miscarriages
A Abortion
0 No Method
1 Pill
2 IUD (Intra-uterine device)
3 Injections
4 Implants
5 Condoms
6 Female Sterilization
7 Male Sterilization
8 Periodic Abstinence/Rhythm
9 Withdrawal
10 LAM/exclusive breastfeeding
96 Other(Specify MM/YYYY)

_____

COLUMN 2: Reason for Discontinuation of contraceptive use
1 Infrequent Sex/ Husband away
2 Became pregnant while using
3 Wanted to become pregnant
4 Husband disapproved
5 Wanted more effective method
6 Health concerns
7 Fear of Side effects
8 Side effects experienced
9 Lack of access/too far
10 Cost too much
11 Inconvenient to use
12 Difficult to get pregnant/ menopause
13 Marital dissolution/separation
98 Don't know

COLUMN 3 (If side effects experienced/feared):
1 Irregular bleeding
2 No monthly bleeding
3 Heavy/prolonged bleeding
4 Unexplained bleeding
5 Headaches
6 Abdominal pain
7 Abdominal bloating
8 Acne
9 Weight change
10 Tiredness

OTHER (Specify/MM/YYYY)

_____

MONTH		COLUMN 1	2	3	4	2015
JAN	01					
FEB	02					
MAR	03					
APR	04					
MAY	05					
JUN	06					
JUL	07					
AUG	08					
SEP	09					
OCT	10					
NOV	11					
DEC	12					

MONTH		COLUMN 1	2	3	4	2016
JAN	01					
FEB	02					
MAR	03					
APR	04					
MAY	05					
JUN	06					
JUL	07					
AUG	08					
SEP	09					
OCT	10					
NOV	11					
DEC	12					

MONTH		COLUMN 1	2	3	4	2017
JAN	01					
FEB	02					
MAR	03					
APR	04					
MAY	05					
JUN	06					
JUL	07					
AUG	08					
SEP	09					
OCT	10					
NOV	11					
DEC	12					

11 Nausea
12 Abcess
13 Expulsion
14 Palpitations/Chest pain
96 Other
_____(Specify)

COLUMN 4: Marriage/Union status
X Married/living together
D Not in union/separate

APPENDIX 7

In case of reply the number and date of this letter should be quoted.

Dodowa Health Research Centre
Ghana Health Service
P. O. Box DD1
Dodowa

Tel: +233-50-1336188
Email: IRBdodowa@gmail.com

My Ref. DHRC/1RB/1/06/17
Your Ref. No.

7th August, 2017

Ms. Emefa Modey
School of Public Health
University of Ghana
Legon, Accra

Dear Madam,

RE: CONTRACEPTIVE DISCONTINUATION AND SWITCHING AMONG WOMEN OF REPRODUCTIVE AGE IN THE SHAI-OSUDOKU DISTRICT: DHRCIRB/02/01/17

Reference is made to your letter dated 2nd February, 2017 on the above-mentioned subject. Upon addressing the comments raised after the initial and subsequent reviews, the IRB has approved your proposal.

The approval requires that you submit a periodic report on the progress of the project during the implementation period and a final full report to the Institutional Review Board (IRB) on completion of the study. The IRB may observe or cause to be observed procedures and records of the study during and after implementation. Please note that any modification of the project must be submitted to the IRB for review and approval before its implementation.

You are required to report all serious adverse events related to your study to the IRB where applicable within seven days verbally and fourteen days in writing. You are also to inform the IRB and your Institution before any publication of the research findings.

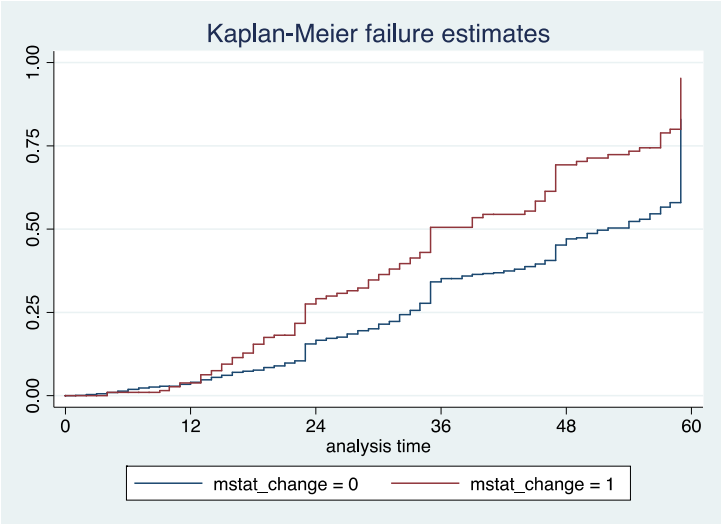
Please quote the protocol identification number in all future correspondence in relation to this protocol.

Ek Lutterodt

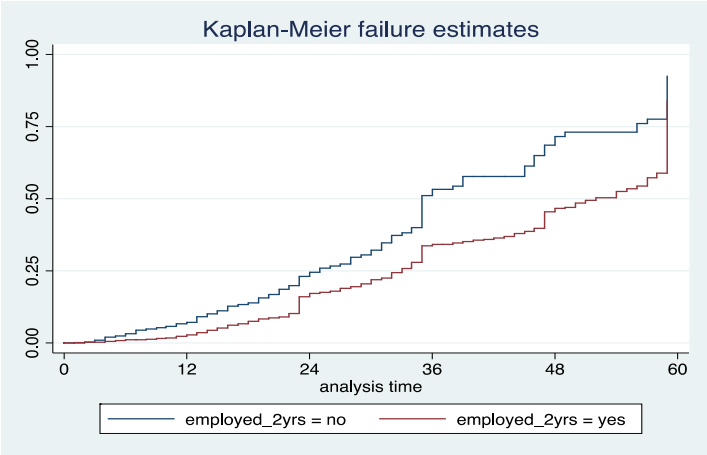
The Chairperson
Institutional Review Board
Dodowa Health Research Centre
Dodowa

Appendix 8

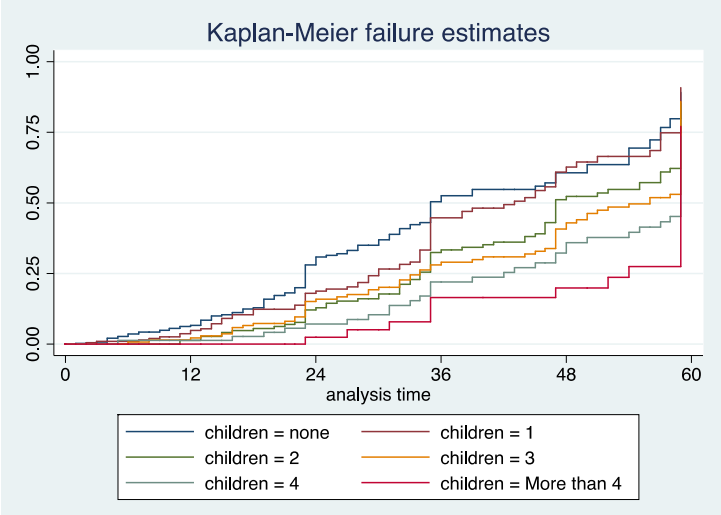
Kaplan Meier failure curves showing relationship between discontinuation and background/reproductive factors



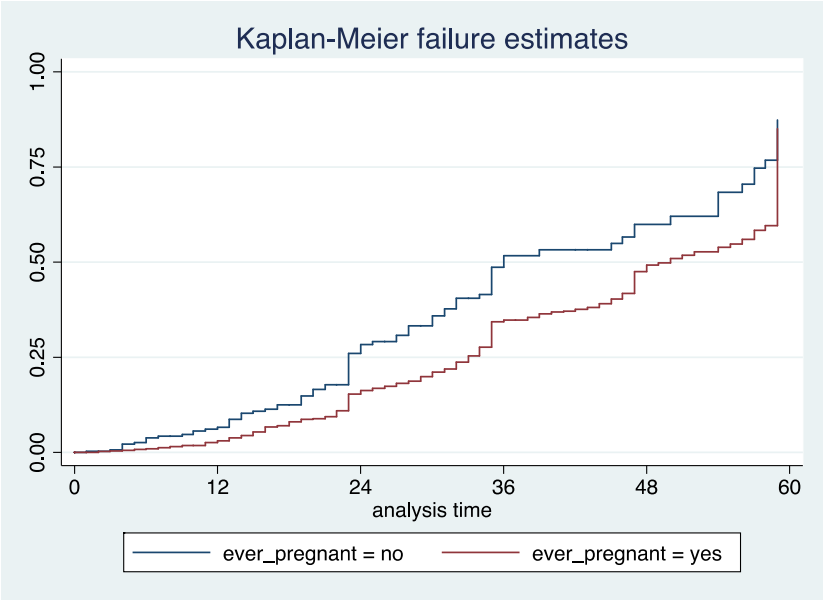
Change in marital status p<0.001



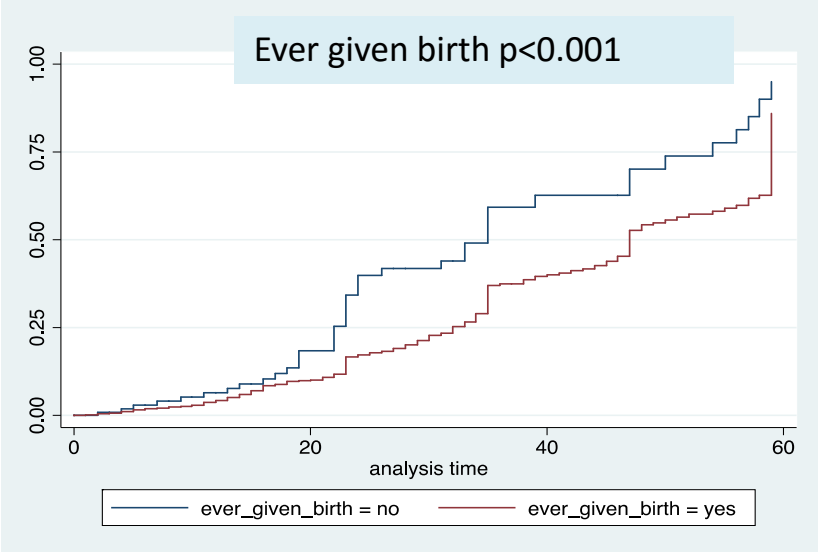
Employment status p<0.001



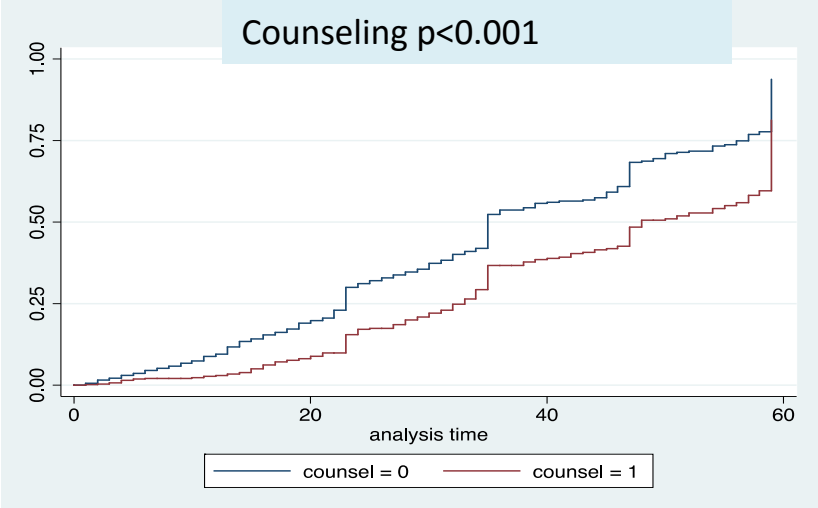
Number of living children p<0.001



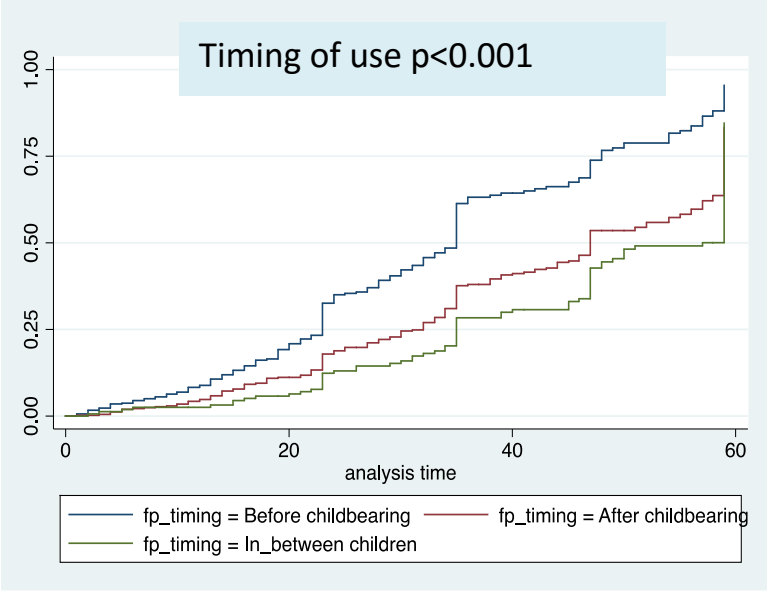
Ever pregnant status p<0.001

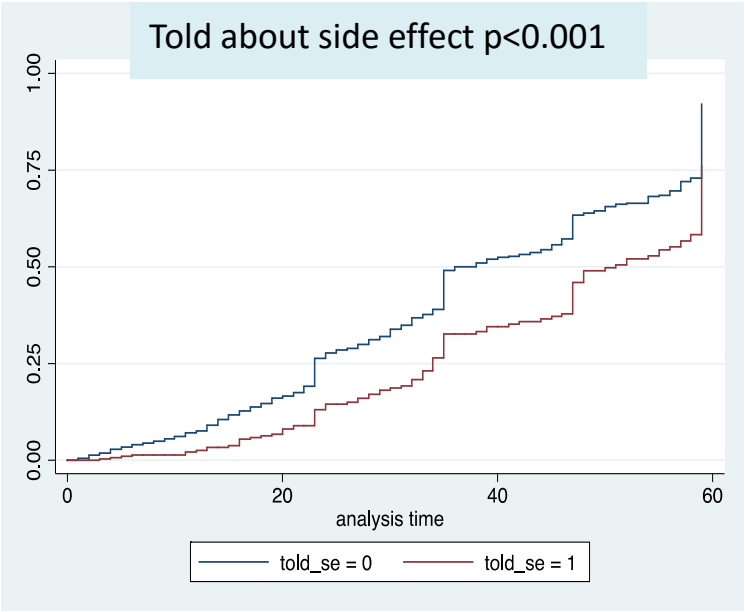


Ever given birth p<0.001

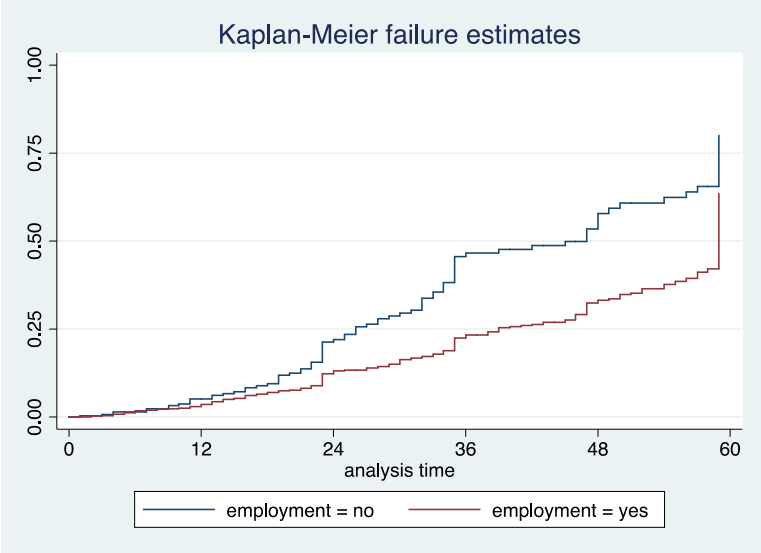


Counselling p<0.001

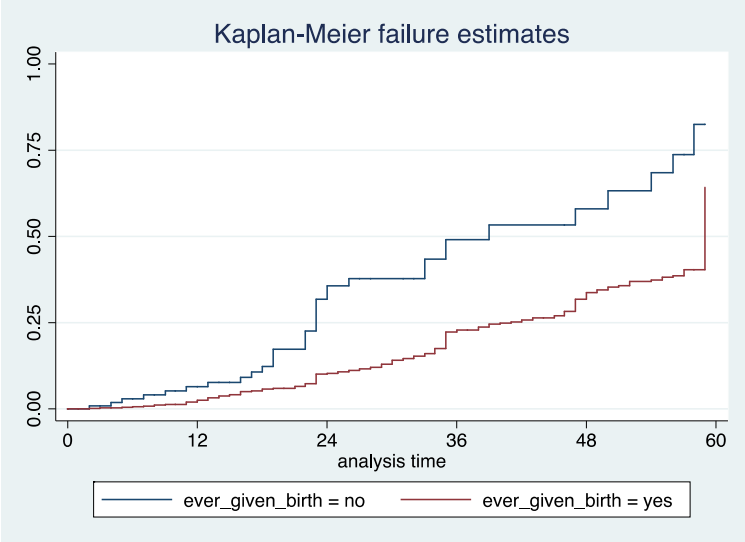




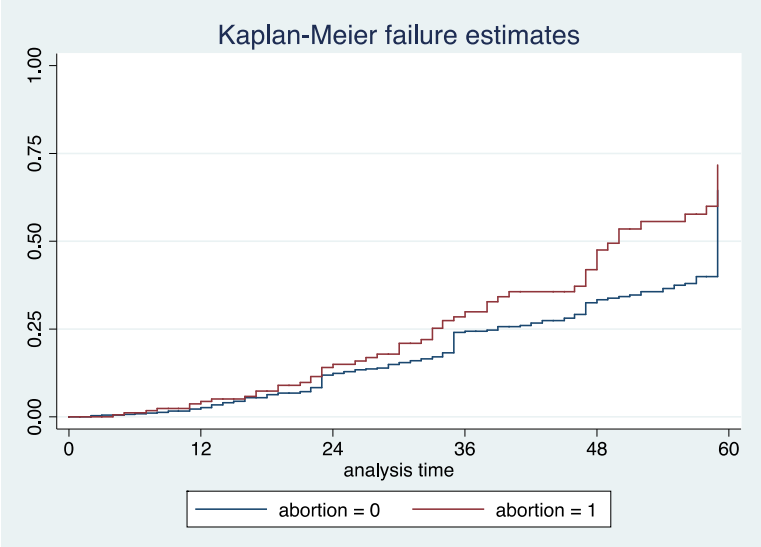
Kaplan Meier failure curves showing relationship between Abandonment and background/reproductive factors



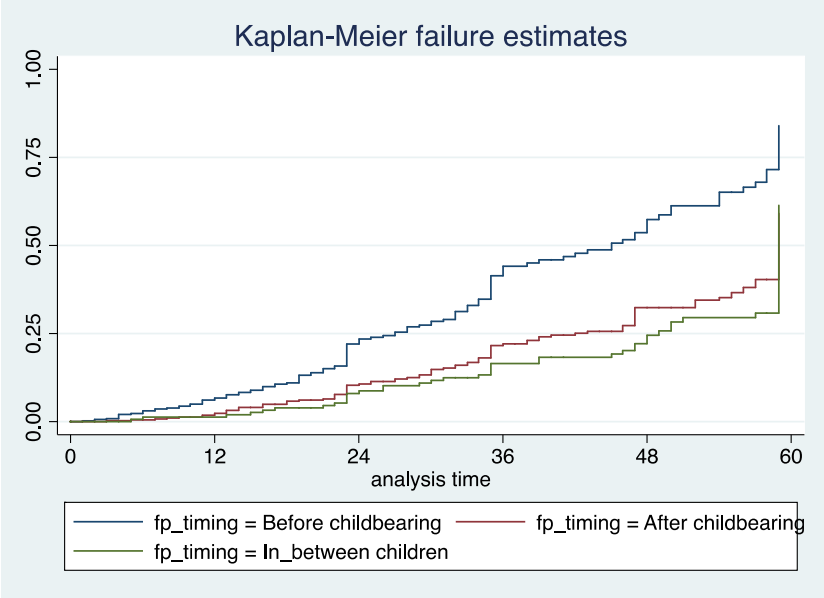
Employment status p<0.001



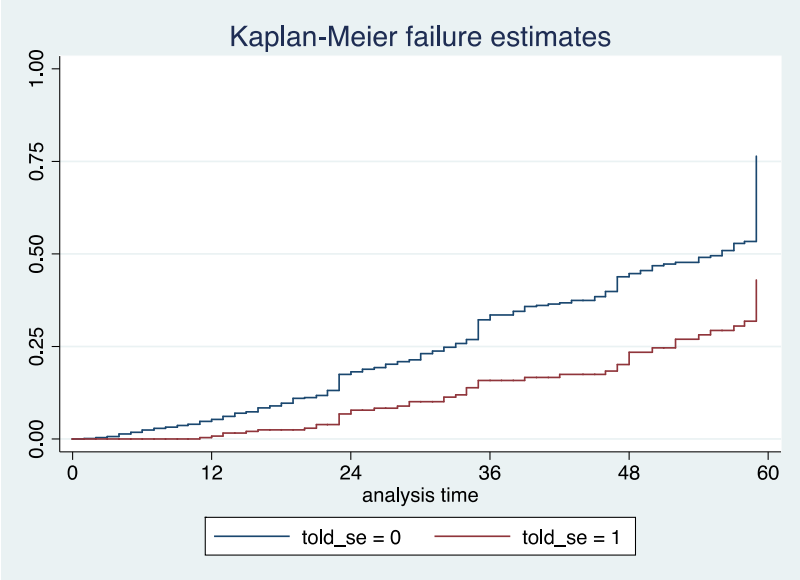
Ever given birth p<0.001



History of terminated pregnancy p<0.031

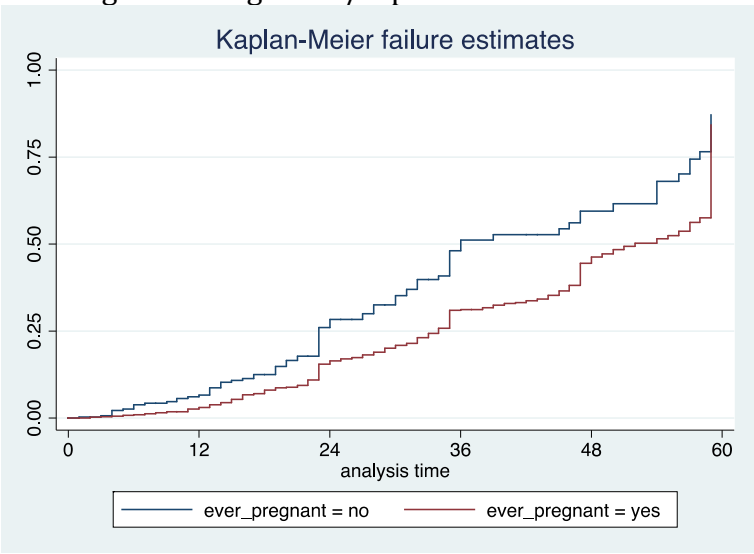


Timing of use of family planning
P<0.001

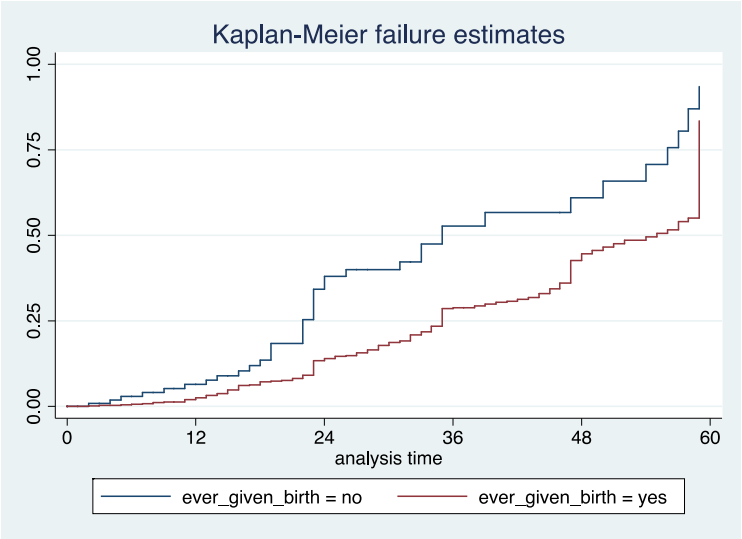


Told about side effects of methods
P<0.001

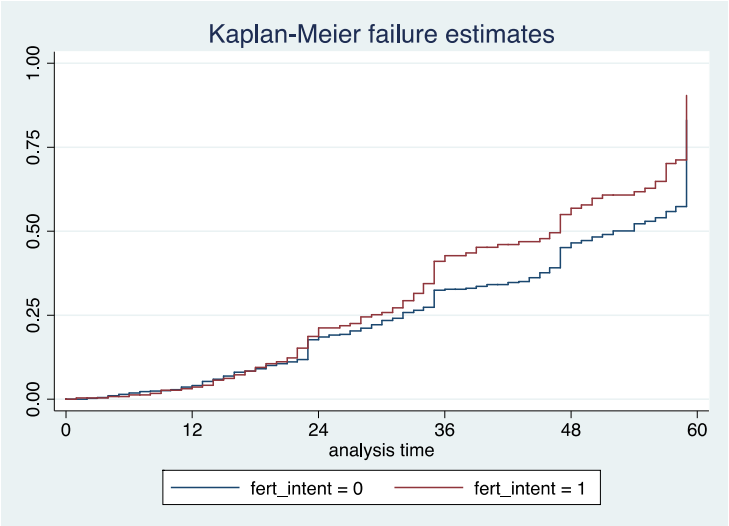
Kaplan Meier failure estimates and Log rank results of associations between switching and background/reproductive factors



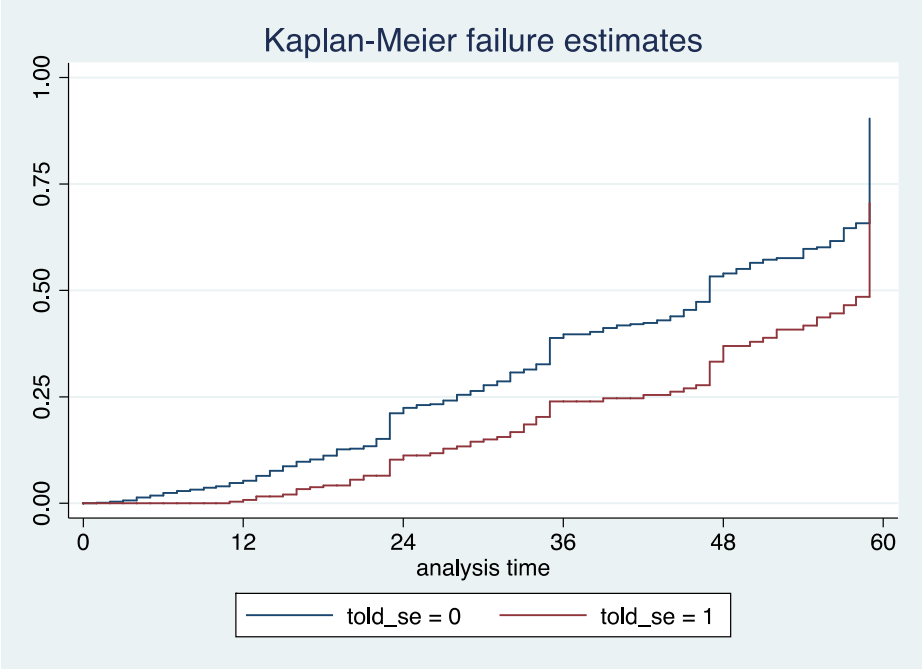
Ever pregnant status
P<0.001



Ever given birth
P<0.001



Fertility intentions
P<0.001



Told about side effects
P<0.001

UNIVERSITY OF GHANA
COLLEGE OF HEALTH SCIENCES
ETHICAL AND PROTOCOL REVIEW COMMITTEE

My Ref No.

12th April, 2016

Emefa Judith Modey
Department of Population Family and Reproductive Health
School of Public Health
University of Ghana
Legon

ETHICAL CLEARANCE

Protocol Identification Number: **CHS-Et/M.5 – P 4.9/2015-2016**

The Ethical and Protocol Review Committee of the College of Health Sciences on the 11th of April, 2016 unanimously approved your research proposal.

TITLE OF PROTOCOL: **"Contraceptive Discontinuation and Switching among Women in the Shai-Osudoku District"**

PRINCIPAL INVESTIGATOR: **Emefa Judith Modey**

This approval requires that you submit six-monthly review reports of the protocol to the Committee and a final full review to the Ethical and Protocol Review Committee at the completion of the study. The Committee may observe, or cause to be observed, procedures and records of the study during and after implementation.

Please note that any significant modification of this project must be submitted to the Committee for review and approval before its implementation.

You are required to report all serious adverse events related to this study to the Ethical and Protocol Review Committee within seven (7) days verbally and fourteen (14) days in writing.

As part of the review process, it is the Committee's duty to review the ethical aspects of any manuscript that may be produced from this study. You will therefore be required to furnish the Committee with any manuscript for publication.

This ethical clearance is valid till 30th April, 2017.

Please always quote the protocol identification number in all future correspondence in relation to this protocol.

Signed: .....

PROFESSOR ANDREW A. ADJEI
CHAIRPERSON, ETHICAL AND PROTOCOL REVIEW COMMITTEE

cc: Provost, CHS
Dean, SPH
Head of Department

• P. O. Box 52, Korle-bu, Accra, Ghana • Tel: +233 (0) 302665103/244061270 • Fax: +233 (0) 302660761
• Email: eprc@chs.edu.gh / provost@chs.edu.gh • Website: www.chs.ug.edu.gh

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: ghserc@gmail.com

MyRef. GHS/RDD/ERC/Admin/App/813
Your Ref. No.

Judith Emefa Modey
University of Ghana
School of Public Health
Legon, Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 08/02/17**
Project Title	Contraceptive Discontinuation and Switching among Women of Reproductive Age in the Shai-Osudoku District of the Greater Accra Region of Ghana
Approval Date	24th May, 2017
Expiry Date	23rd May, 2018
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra