KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

KUMASI, GHANA

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF POPULATION, FAMILY AND REPRODUCTIVE HEALTH



FACTORS INFLUENCING THE RETURN TO FERTILITY AFTER

CONTRACEPTIVE DISCONTINUATION AMONG CONTRACEPTIVE EVER-

USERS IN THE ACCRA METROPOLITAN AREA, GHANA



ANGELA AKUA AMOANIMAA BOATENG (BSC. BIOLOGY)

NOVEMBER 2015

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY KUMASI, GHANA

FACTORS INFLUENCING THE RETURN TO FERTILITY AFTER

CONTRACEPTIVE DISCONTINUATION AMONG CONTRACEPTIVE EVER-

USERS IN THE ACCRA METROPOLITAN AREA, GHANA



ANGELA AKUA AMOANIMAA BOATENG (BSC. BIOLOGY)

A THESIS SUBMITTED TO THE DEPARTMENT OF POPULATION, FAMILY &

REPRODUCTIVE HEALTH

COLLEGE OF HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN POPULATION, FAMILY AND REPRODUCTIVE HEALTH

NOVEMBER 2015

DECLARATION

I hereby do declare that except for references to other people's work which have been duly acknowledged, this piece of work is my own composition and neither in whole nor in part has this work been presented for the award of a degree in this university or elsewhere.



ABSTRACT

Although more women in Ghana are opting for more reliable modern methods of family planning- trends in contraceptive use for married women (15-49 years) show an increase from 5% in 1988 to 17% in 2008 (GSS/GHS/ORC Macro 2009), the family planning acceptor rates in Ghana have fallen from 33.8% in 2008 to 31.1% in 2009 to as low as 23.5% in 2010 (GHS, 2010). Fear of adverse effects on subsequent fertility following reversible contraceptive use is an important concern for a number of women. Women explain that the fear of delayed return to fertility and even in some cases "infertility" after contraceptive use prevents them from using a long-acting method or taking up a family planning method, even after a service provider has been consulted.

This study aimed to assess the factors influencing return to fertility as measured by the time to pregnancy after discontinuing contraception. The influences of the factors were assessed before and after adjustment for the individual and lifestyle characteristics.

A Cox regression analysis was performed to estimate the influence of background and lifestyle characteristics on return to fertility among the women in this study. The probability to conceive after discontinuing a contraceptive method does not differ with respect to age, number of children, body mass index, history of gynecological disease, alcohol intake, secondary smoking, type of contraceptive and the duration of contraceptive usage.

As such, the issue of fear of side effects' particularly future infertility, which can lead to contraceptive discontinuation should be a key point addressed during counseling for contraceptive use. Service providers should be educated and updated on the relationship between different socio-economic, demographic and lifestyle factors and return to fertility, such that they can provide adequate information to clients.

DEDICATION

I dedicate this final work to God Almighty, for seeing me though from the beginning of this program until this point, and to my entire family and many friends.

A special feeling of gratitude to my loving parents, Yaw and Gladys Boateng whose words of encouragement and push for success rang in my ears throughout this journey. My sister Alberta Serwaa Boateng who has never left my side is also very special to me, and I thank her for the numerous hours she spent up with me. To my late grandmother, Mrs. Comfort Martin-Peprah, thank you for encouraging me and for being my own personal cheerleader.

I also dedicate this dissertation to my friends and work colleagues for their support throughout the process. I will always appreciate all they have done.



ACKNOWLEDGEMENTS

I wish to acknowledge my supervisor, Dr. Easmon Otupiri, School of Public Health, Kwame Nkrumah University of Science and Technology, whose constructive criticisms and priceless proposals dictated the final form of this work. I genuinely appreciate his immense contributions.

My sincerest gratitude goes to the men and women who participated in the data collection for their cooperation in this research, and the health facilities that allowed for data to be collected at their institutions.

To Mr. Emmanuel Nakuah and Dr. Blay Nguah who guided me in the analysis of my data, my deepest appreciation.

Finally I am grateful to my family, colleagues and staff of the Department of Community Health for their support and encouragement during the MPH course.



TABLE OF CONTENTS

DECLARATIONi
ABSTRACTii
DEDICATION iii
ACKNOWLEDGEMENTSiv
TABLE OF CONTENTSv
LIST OF ACRONYMS AND ABBREVIATIONS viii
LIST OF TABLES
LIST OF FIGURES
LIST OF APPENDICES
CHAPTER 1
1.0 INTRODUCTION
1.1 Background Information1
1.2 Problem Statement
1.3 Rationale of Study
1.4 Conceptual Framework/Hypotheses
1.5 Research Questions
1.6 Objectives
1.6.1 General Objective
1.6.2Specific Objectives
1.7 Health Profile of Study Area
CHAPTER 2
2.0 LITERATURE REVIEW
2.1 Family Planning in Ghana15
2.2 Return to Fertility17
2.3 Women's Knowledge of Factors Influencing Return to Fertility20
2.4 Relationship between Method of Contraceptive Used and Return to Fertility
2.5 Relationship between Duration of Contraceptive Use and Return to
Fertility27

2.6 The Relationship between the User's Characteristics and Life	style on
Return to Fertility after Contraceptive Use	29
CHAPTER 3	35
3.0 METHODOLOGY	35
3.1 Study type and design	35
3.2 Data Collection Techniques and Tools	35
3.3 Study Population	
3.4 Criteria for selection	
3.4.1 Inclusion Criteria	36
3.4.2 Exclusion criteria	37
3.5 Study Variables	37
3.6 Sampling techniques and sample size	
3.6.1 Sampling techniques	
3.6.2 Sample size determination	40
3.7 Pretesting	41
3.8 Ethical Consideration	42
3.9Assumptions and Limitations of Study	42
CHAPTER 4	43
4.0 RESULTS	43
4.1 Background and lifestyle characteristics of respondents	43
4.2 Knowledge of factors influencing return to fertility	48
4.3 Contraceptive use information of participants	50
4.4 Influence of background and lifestyle characteristics on contra	aceptive use
before pregnancy	
4.5 Return to fertility	54
4.6 Contraceptive use and return to fertility	55
4.7 Behavior/Lifestyle characteristics and return to fertility	
CHAPTER 5	60
5.0 DISCUSSION	60
5.1 Knowledge of factors influencing return to fertility	61
5.3 Return to fertility	

5.3.1 Influence of contraceptive methods on return to fertility	64
5.3.2 Duration of contraceptive use and return to fertility	69
5.3.3 User characteristics and return to fertility	71
CHAPTER 6	75
6.0 CONCLUSIONS AND RECOMMENDATIONS	75
6.1 CONCLUSIONS	75
6.1.1 Women's Knowledge of Factors Influencing Return to Fertility	75
6.1.2 Relationship between Method of Contraceptive Used and Return to Fertility6.1.3 Relationship between Duration of Contraceptive Use and Return to Fe	76 rtility 76
6.1.4 The Relationship between the User's Characteristics and Lifestyle on Return to Fertility after Contraceptive Use	76
6.2 RECOMMENDATIONS	77
REFERENCES	80
APPENDIX 1 - QUESTIONNAIRE	94

LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome			
BMI	Body Mass Index			
CHAG	Christian Heath Association Of Ghana			
CHPS	Community-Based Health Planning And Services			
CI	Confidence Interval			
COC	Combined Oral Contraceptive			
DHS	Demographic And Health Survey			
DMPA	Depot Medroxy Progesterone Acetate			
GHS	Ghana Health Service			
GSS	Ghana Statistical Service			
HIV	Human Immune Deficiency Virus			
IUCD	Intrauterine Contraceptive Device			
LEKMA	Ledzokuku Krowor Municipal Assembly			
MDG	Millennium Development Goal			
MOH	Ministry Of Health			
NICE	National Institute For Health And Care Excellence			
NMIMR	Noguchi Memorial Institute For Medical Research			
ORC	Operational Research Consultants			
PID	Pelvic Inflammatory Disease			
RCH	Reproductive And Child Health			
RRR	Relative Risk Ratio			
STIs	Sexually Transmitted Infections			
TFR	Total Fertility Rate			
WHO	World Health Organization			
NGO	Non-Governmental Organization			
	WJ SANE NO BROME			

LIST OF TABLES

Table 1.1: Breakdown of Accra Metropolitan Area Health Facilities by Ownership and Type	13
Table 1.2: Contraceptive Method Preference in Accra Metropolitan Area	14
Table 3.1: Study Variables and operational definitions	38
Table 3.2: Breakdown of sample size per health facility	41
Table 4.1: Socio-demographic characteristics of study respondents	45
Table 4.2: Lifestyle characteristics of respondents	47
Table 4.3: Knowledge of respondents on factors influencing return to fertility	50
Table 4.4: Individual characteristics for all women by the contraceptive method used before pregnancy	54
Table 4.5: Lifestyle characteristics for all women by the contraceptive method used before pregnancy	55
Table 4.6: Overall time taken to pregnancy after discontinuation of contraceptives	56
Table 4.7: Influence of contraceptive use on time to fertility	58
Table 4.8 : Influence of contraceptive use on time to fertility; categorized by duration of action	58
Table 4.9: Multivariable analysis of factors influencing return to fertility after contraceptive usage	60
WJ SANE NO	

LIST OF FIGURES

Figure 1.1: Conceptual framework	9
Figure 3.1: Study flow chart	38
Figure 4.1: Responses on other factors influencing return to fertility	51
Figure 4.2: Contraceptives used by respondents	52
Figure 4.3: Duration of contraceptive use	53
Figure 4.4: Type of contraceptive and time to fertility	57
Figure 4.5: Duration of contraceptive use and time to fertility	57
MIND SANE NO BROME	

Appendix 1: Study Questionnaire



CHAPTER 1

1.0 INTRODUCTION

1.1 Background Information

Family planning is defined by the American Heritage Dictionary of the English Language (2000) as 'a programme to regulate the number and spacing of children in a family through the practice of contraception or other methods of birth control. According to the World Health Organization (WHO) family planning gives couples and individuals the opportunity to plan, space and decide the number of children to have and when to have them, through contraception and treatment of 'involuntary infertility' (WHO, 2012). As stated in the WHO's Family Planning Fact Sheet N°351, a woman's ability to choose if and when to become pregnant has a direct impact on her health and well-being, with studies showing that "women who have more than four children are at increased risk of maternal mortality" (WHO, 2012).

According to the International Conference on Population and Development Programme of Action (1994),

"All countries should, over the next several years, assess the extent of national unmet need for good-quality family-planning services and its integration in the reproductive health context, paying particular attention to the most vulnerable and underserved groups in the population. All countries should take steps to meet the family-planning needs of their populations as soon as possible and should, in all cases by the year 2015, seek to provide universal access to a full range of safe and reliable family-planning methods and to related reproductive health services which are not against the law. The aim should be to assist couples and individuals to achieve their reproductive goals and give them the full opportunity to exercise the right to have children by choice (Paragraph 7.16)"

The effect of family planning can be seen in the global increased use of contraceptive from 10% to 60% as well as in the reduction of fertility from 6 births per woman to 3 births per woman in the past 40 years (Cleland, et al., 2006). According to the authors, when birth rates are reduced, especially in countries with high fertility rates, maternal and infant mortality may reduce by 32% and 10% respectively. This according to the researchers may also reduce poverty and hunger in these countries. Therefore, a reduction in family planning use will hinder the reduction in fertility especially in the poorest countries where population doubles every 25 to 30 years and a decrease in the reduction of fertility rate which comes with increase population will have negative socio-economic impacts (Cleland, et al., 2006). Family planning has been shown to avert maternal deaths by allowing women to postpone motherhood, space births, avoid unintended pregnancies and abortions, and stop childbearing when they have reached their ideal family size (Ghana MOH, 2011). According to a study by Ahmed et al., to estimate maternal deaths averted by contraceptive use in 172 countries, it was observed that contraceptive use led to approximately 44% reduction in maternal mortality (2012).

In order for Ghana to achieve Millennium Development Goal (MDG) 5, certain specific interventions are required. One of these interventions is the increased uptake and effective implementation of family planning (MOH, 2011). As such, the Ghana Family Planning Program has been targeted for additional investment and strategies that will both directly and indirectly contribute to the reduction of maternal mortality from 451/100,000 live births in 2008 to 185/100,000 live births by year 2015 (GHS, 2007).

According to Cleland et al, (2006) even though half of the 75 most low-income and middle-income countries have high fertility rates as well as high unmet need, global priority given to family planning has declined since the mid-1990s. From the 1990's till 2012, global contraceptive use has increased from 54% in 1990 to 57% in 2012, especially in Asia and Latin America, but remains low in sub-Saharan Africa. However, there are a projected 222 million women in developing countries who would like to postpone or discontinue childbearing but don't use any method of contraception (WHO, 2012). This unmet need for contraception remains too high; in Africa, 53% of women of reproductive age have an unmet need for modern contraception, compared with Asia, and Latin America and the Caribbean - where the levels of unmet need are 21% and 22%, respectively. Similarly, Ghana recorded an unmet need of 34% in 2003, which rose to 35% by 2008 and was currently recorded as 37.2% in 2013 (GSS/GHS/ORC Macro 2009; PMA2020, 2013). According to the 2008 Ghana Demographic and Health Survey, more women are opting for more reliable modern methods of family planning; trends in modern contraceptive use for married women (15-49 years) show an increase from 5% in 1988 to 17% in 2008; however, this figure is still too low as less than one quarter of married women in Ghana are using a method of contraception (GSS, GHS and ORC Macro 2009). The family planning acceptor rates in Ghana have fallen from 33.8% in 2008 to 31.1% in 2009 to as low as 23.5% in 2010 (GSS, GHS & ORC Macro, 2009; GHS, 2011). The most current contraceptive prevalence rate is reported by the PMA 2020rates which at 19.5% for all family planning methods; 18.4% for modern methods and 1.1% for traditional methods (PMA2020, 2013). This clearly expresses the continuously declining CPR in Ghana despite the numerous efforts of all stakeholders.

The continuous decline in family planning uptake has resulted in numerous studies which reveal that a range of obstacles and factors other than physical access to services prevents women from using family planning (WHO, 2012). These factors and/or obstacles to family planning service utilization include but are not limited to: a need for more accessibility to long-acting methods of contraception, limited choice of methods, a lack of male involvement in decision-making around family planning, fear or experience of side-effects, myths and misconceptions about the "consequences" of family planning, cultural or religious barriers, poor quality of available services, and other gender-based barriers (WHO, 2012). A client's perception of the time taken to return to fertility and to conceive after discontinuation of a contraceptive has been identified as one of these myths and misconceptions. Several Ghanaian women explain that the fear of delayed return to fertility and even in some cases infertility after contraceptive use prevents them from using a long acting method or taking up a family planning method, even after a service provider has been consulted (Parr, 2003).

In general, the majority of couples desire to have children, though many delay this stage until they have established themselves; with a suitable partner, and in a suitable job with all the comforts deemed necessary (Chen & Morgan, 1991; Martin, 2000) and this is no different for Ghanaian couples. To use contraception confidently for many years with very little to no concern, it is important that one clearly understands the effect or lack thereof of contraception on ones' future ability to conceive after discontinuation. Research shows that for adolescents and young women contraception is approached with an ambivalent attitude because of this underlying desire to guarantee and prove their fertility, in lieu of several misconceptions relating to contraceptive use and infertility (Greydanus et al.,2001; Ekstrand et al.,2005). Especially for women using contraceptionto space their pregnancies, the impact on later fertility is a key determinant of their contraceptive behavior; method choice and consistent correct use, thus information on return to fertility should represent an essential part of the contraceptive counseling process (Hassan & Killick, 2004).

For improved uptake of contraceptives, couples and/or individuals must be assured of low rates of contraceptive failure, and informed that such failures may not actually reflect a reduced efficacy of the contraceptive method. Failures may reflect other factors such as a high fecundity of the couple, and improper behavior with regard to contraceptive use, based on a couples' inadequate contraceptive knowledge, their fear of side-effects or their belief that they will become less fecund in future (Ranjit et al, 2001; Hassan & Killick, 2004). Consequently, while the immediate return to fertility after discontinuing barrier contraception is to be expected in the light of the mechanisms of action of most barrier methods such as condoms, cervical caps and spermicides, the effect of hormonal and intrauterine contraception; which have multiple mechanisms of action on future fertility is less certain (Whitelaw, 1967; Vessey et al, 1978). Evidence also explains that, the effect on future fertility by all methods of modern contraceptives may be confounded by other factors such as the individual's personal and lifestyle characteristics (Doll, Vessey& Painter, 2001).Knowledge of the different factors associated with a woman's fertility pre- and post-contraceptive use is important in clinical practice; in counseling, education and in dispelling such myths. It is important that both service providers and clients receive adequate knowledge on the different types

of contraceptives and their average return to fertility duration, and the negative effects on fertility if any.

1.2 Problem Statement

In Ghana, while the proportion of women who have never used any form of modern contraceptive methods has declined over time, there have been significant increases in the proportions of those who have previously used modern contraceptive methods but are no longer using (Parr, 2003). Most of these women, regarded as "former users/ever users/discontinuers" still fall within the reproductive age range (15 - 49 years), and thus remain at risk for pregnancy. Despite the numerous efforts of the government, health workers and civil society organizations involved in the family planning program of Ghana, family planning acceptor rates have recorded a decrease from 33.8% in 2008, to 23.5% in 2010 (GHS, 2010).

Ideally, family planning users should remain on a contraceptive method, or change to another method as long as they remain within the reproductive age range, and discontinue a contraceptive method only to conceive and return to the same or a different method after delivery. Unfortunately, many women discontinue the use of a contraceptive even before planning to conceive, whereas some may also discontinue in order to conceive, failing to return to a method after delivery due to concerns about the effects of previous contraceptive use on one's cycle, current ability to conceive and future fertility. In the 2002 Ghana Trend Analysis for Family Planning Services, Hong et al., (2005) report that an average of one-in-five observed and interviewed clients reported that during the current visit, they did not receive information on at least one of the major points queried; how to use their method, what the side effects are, or what to do for problems. This may be as a result of lack of adequate knowledge of the subject by the service providers themselves, thus inadequate explanation to convince and allay the fears of clients. It may also stem from the client's lack of proper knowledge on factors relating to fertility, and consequently infertility. Since contraceptive users are concerned about return to fertility after discontinuation, there is the need to provide them with accurate information regarding this. However, there is not much information available on the factors that influence return to fertility among Ghanaian women who use contraceptives. Research into factors affecting return to fertility after contraceptive discontinuation is heavily weighted to western countries and some Asian countries and as such the findings may not be reflective of Ghanaian women, and they in turn may not be able to relate to the findings.

Although the Greater Accra Region generally records the lowest unmet need when comparing regional variations, the unmet need is generally reported as more than 30%, indicating that about one third of married women who report not wanting any more children or wanting to delay the next child, thus need to use contraceptives, are not using any method of contraception. This may indicate gap between women's reproductive intentions and their contraceptive behavior, as well as an inability of the health sector to meet contraceptive demands. According to the PMA2020 report and the GDHS 2013, an unmet need of 31.8%, and 30% respectively has been reported among married women in the Greater Accra Region (PMA2020, 2013; GSS, GHS& DHS Program ICF International, 2015).According to a study by Hindin, McGough & Adanu (2014), a sample of women from a hospital in Accra with an unmet need for family planning

indicated that fear of side effects, especially the perceived impairment of fertility deterred them from using modern contraceptives.

1.3 Rationale of Study

It is important that managers, policy-makers and service providers understand and take a holistic approach to improving uptake of family planning. By understanding factors that influence an individual's decision to take up a family planning method, effective interventions to address and improve uptake can be put in place.

This study sought to assess the contraceptive and user characteristics/factors that have been documented to influence return to fertility after the discontinuation of a family planning method. This study evaluates the impact of each of the commonly used contraceptive methods on subsequent fertility as measured by the return to fertility (RTF) rates for users of each method after discontinuing contraception, before and after adjustment for the effects of the user's and lifestyle characteristics. The effect of the duration of contraceptive use, overall and for the individual methods, was also assessed, to determine the degree of impact the duration of contraception has on fertility.

With this information, improved health education programs and counseling techniques can be developed for service providers, aimed at dissuading the myths and misconceptions relating to contraceptive use and its effect on fertility after discontinuation. Effectively addressing this and other myths and misconceptions, will impact the uptake of family planning services, and will assist in the achievement of The MDG Acceleration Framework (MAF) Operational Plan targets set by the Ghana Ministry of Health/Ghana Health Service (MOH/GHS) and development partners to increase contraceptive prevalence rate from 17% in 2008 to 40% by 2020 (MOH, 2011).



1.4 Conceptual Framework/Hypotheses

Figure 1: Conceptual Framework (Source: Author's construct, 2013)

<u>Hypothesis (H₀₁)</u>: There is no relationship between contraceptive method and return to fertility after contraceptive discontinuation.

<u>Hypothesis (H_{02})</u>: There is no relationship between duration of contraception and return to fertility after contraceptive discontinuation.

1.5 Research Questions

1. Is there a relationship between the type and duration of contraceptive used and

how long it takes to return to fertility after discontinuation?

2. What is the relationship between the user's characteristics and lifestyle on the time taken to return to fertility upon discontinuation for whatever reason?

1.6 Objectives

1.6.1 General Objective

To assess the relationship between contraception and return to fertility after discontinuation.

1.6.2Specific Objectives

- To determine women's knowledge of factors influencing return to fertility after contraceptive use
- 2. To assess the relationship between the type of modern contraceptive used and how long it takes to return to fertility after discontinuation.
- 3. To assess the relationship between the duration of contraceptive use and how long it takes to return to fertility after discontinuation.
- 4. To examine the relationship between the user's characteristics and lifestyle on the time taken to return to fertility after contraceptive use.

SANE

1.7 Health Profile of Study Area

The Greater Accra Region is the smallest of the 10 administrative regions in terms of area, occupying a total land surface of 3,245 square kilometers or 1.4 per cent of the total land area of Ghana. In terms of population, however, it is the second most

populated region, with a population of 4,010,054 in 2010, accounting for 16.3% of Ghana's total population (Ghana Statistical Service, 2012).

The study site was the Accra Metropolitan Area, one of the 10 districts of the Greater Accra region. The site was chosen because this is the most densely populated district in the region with a population of 1,848,614 contributing 46.1% of the regions' population of which there are 960,941 females constituting approximately 52% of the population of the district (Ghana Statistical Service, 2012). This district is representative of most of the tribes in Ghana. The region made up of 39.8% Akans, 29.7% Ga-Dangme and 18% Ewe (http://www.ghanaweb.com/GhanaHomePage/tribes/ 2013) of which 83% are Muslims Christians, 10.2 % and 1.4% practicing traditional religion(http://www.modernghana.com/ GhanaHome/regions/greateraccra.asp).

The Accra Metropolitan Area is divided in to 13 sub-metros, of which two (Ledzokuku and Krowor) have been repealed to form (LEKMA), the Ledzokuku-Krowor Municipal Assembly. The remaining 11 sub-metros are Ablekuma North, Ablekuma Central/Abbosey-Okai, Ablekuma South, Ashiedu-Keteke, Ayawas East, Ayawaso Central, Ayawaso West Wagon, La, Okaikoi South, Okaikoi North, and Osu-Klotey(http://ama.gov.gh/ama/page/5052/sub-metro).However prior to 2004, there were only 6 sub-metros (Ablekuma, Ashiedu-Keteke, Ayawaso, Kpeshie, Okaikoi, and Osu-Clottey) and the health sector continued to work according to this old system until 2012 when Kpeshie was joined with La to form the La-Dadekotopon Municipal Assembly. Thus, there are only 5 sub-metro health administrations under the Accra Metropolitan Health Directorate.

(http://www.ghanahealthservice.org/region.php?dd=4®ion=Greater Accra&nb sp;Region).

The Accra Metropolitan Area has several categories levels of health facilities, most of which offer some degree of reproductive health, maternal health and family planning services. According to the Ghana Health Service, health services are classified according to the types of services they can provide in the following hierarchy (lowest level to highest level); Community based Health Planning and Services (CHPS) compounds, health centers, district hospitals, regional hospitals and teaching hospital. Health services can also be classified as; government, quasi-government, CHAG or private. Each of the 5 sub-metros is served by a government polyclinic or hospital. In addition there are several small government clinics and numerous private clinics and hospitals. The metropolitan area also has one district hospital; Maamobi Government Hospital, one regional hospital; Ridge Regional Hospital and one teaching hospital; Korle-Bu Teaching Hospital.

(http://www.ghanahealthservice.org/region.php?dd=4®ion=Greater Accra&nb sp;Region).

 Table 1.1: Breakdown of Accra Metropolitan Area Health Facilities by Ownership

and Type

Type of Health Facility

Health
Clinics/Poly
Maternity
Specialists
Total

		CHPS	Health Centers	Clinics/Poly Clinics	Maternity Homes	Specialists /Hospitals	Total
Ownership	Government	9	0	20	2	3	34
of Health	Quasi						
Facility	Government	0	1	4	0	3	8
	Private	0	0	55	24	16	95
	Faith Based	0	0	1	0	0	1
	Other	0	0	0	0	0	0
TOTAL							138

Source: Accra Metro Annual RCH Report, 2014

With respect to contraceptive use in the metropolitan area, over the past three years, the short-acting contraceptive methods have maintained preference in comparison to the long-acting and permanent methods. However, in general, the family planning acceptor rate has continuously risen since 2012 from 5.8% to a current rate of 11.7% in 2014 (Accra Metro Annual RCH Report, 2014). The most commonly preferred contraceptive method in the metropolitan area over the same three year period, i.e. 2012 to 2014 remained Depo Provera, and the least preferred method during that period was the intra uterine contraceptive device (IUCD). Table 1.2 below details the contraceptive method preference recorded for the Accra Metropolitan Area from 2012 to 2014.

COMMODITY	2012	2013	2014
Male condom	66.2%	60.3%	91.8%
Female condom	1.4%	3.89%	6.7%
Depoprovera	63.5%	74.92%	76.7%
Norigynon	7.09%	7.1%	7.6%
Implants (Jadelle and Implanon)	1.75%	3.0%	4.4%
IUD	2.1 %	1.9%	1.7%
Microlut	2.0%	2.06%	3.9%
Microgynon	18.18	18.5%	19.4%

 Table 1.2: Contraceptive Method Preference in Accra Metropolitan Area

Source: Accra Metro Annual RCH Report, 2014

CHAPTER 2

2.0 LITERATURE REVIEW

Surveys and other in depth research reveal a range of obstacles and constraints other than physical access to services prevents women from using family planning (Ashford, 2003; Sedgh et al, 2007). Several studies show that the causes of unmet need are complex, and may be based on social, cultural and religious differences that in one way or other influence fertility intentions (Westoff & Bankole, 1995; Ashford, 2003; Sedgh et al, 2007; Ankomah, Anyanti & Oladosu, 2011). In a number of surveys, methodrelated problems, inadequate knowledge about contraception, and health concerns about using modern contraceptives are cited by a large proportion of women with unmet need; especially in countries with relatively high unmet needs (Westoff, 2001; Ashford, 2003; Sedgh et al, 2007). In a study to determine the common myths, misinformation, and communication about family planning and its influence on contraceptive use in Nigeria, 33% of the respondents indicated that they believed contraceptive use led to infertility in women and cited this as a major reason for not using any contraceptive method. In general, belief in myths and misinformation correlated negatively with use of modern contraceptives, and contributed significantly to the high unmet need in the country (Ankomah, Anyanti & Oladosu, 2011). NO

Unmet need for contraception poses several severe risks for women, their families, and societies. There are several consequences of unmet need: unintended pregnancies leading to increase in maternal and child morbidity and mortality, and increase in unsafe abortions (Ashford 2003; Grimes et al, 2006; Mackenzie et al. 2010), aggravating women's lower social status and gender disparity by compromising their abilities to be

productive in their communities and national economies (Mackenzie et al. 2010), increasing the incidence of HIV and sexually transmitted infections (STIs) and contributing to unsustainable population growth (Ashford 2003).

2.1 Family Planning in Ghana

Ghana was one of the first countries in sub-Saharan Africa to implement a precise and complete population policy in 1969, a policy of which the major goal was to curtail the high rate of population growth, as a tool to facilitate socio-economic development (Hong et al, 2005; Gyimah, Adjei & Coffie, 2011). To achieve this, the Ghana National Family Planning Programme was launched in May 1970 under the Ministry of Finance and Economic Planning (Hong et al, 2005).Plagued with a myriad of issues not limited to poor institutional coordination among organizations, and emerging issues such as the prevalence of HIV/AIDS and other STI's, the programme achieved limited success and the policy was revised in 1994 (Gyimah, Adjei & Coffie, 2011). Major goals of the revised policy were to reduce the total fertility rate (TFR) from 5.5 to 3.0 by 2020, increase the modern contraceptive prevalence rate to 50 percent by 2020 and achieve a minimum birth spacing of at least two years for all births by 2020(National Population Council, 1994).

Currently, the Family Planning Programme is under the Reproductive and Child Health Unit of the Family Health Division, Ghana Health Service (GHS, 2011). The Ghana Demographic Health Survey designed to provide information to monitor the population and health situation in Ghana is a series of national-level population and health surveys conducted in Ghana nearly every five years as part of the worldwide Demographic and Health Surveys (DHS) programme. According to the Surveys, knowledge and use of family planning have noticeably increased in Ghana, and the country is on its way to achieving its population policy goals; overall contraceptive use among married women has steadily increased over the last 15 years, from 13% in 1988 to 25% in 2003, with use of modern methods increasing from 5% to 19%(GSS, NMIMR & ORC Macro, 2004). Between 1988 and 2008, the use of modern methods more than tripled (from 5% to 17%), and within that same period, Ghana's total fertility rate (TFR) dropped from 6.4 to 4.0, making Ghana's TFR one of the lowest in sub-Saharan Africa(GSS, GHS & ORC Macro, 2009). Currently, the total fertility rate for all women of reproductive age(15-49 years) in Ghana is reported at its lowest 3.7, with a corresponding rate of 18.4% use of modern contraceptive methods (PMA2020, 2013). In the 1998, 2003 and 2008 surveys, most of the 15 to 49 year old women surveyed claimed to have heard of contraceptives; 93%, 98% and 98% respectively had knowledge about contraceptives, but only 18%, 25% and 17% respectively were on contraceptives at the time of surveys (GSS &MI, 1999; GSS, NMIMR & ORC Macro, 2004; GSS, GHS &ORC Macro, 2009). These findings may suggest that although the number of women who used contraceptives for the first time was increasing over the years, the percentage of those who stayed on it might be declining.

In 2008, the trends of family planning use in Ghana showed that, injectables (6%) and the pill (5%) were the most commonly used methods, followed by female sterilization and the male condom (2% each), with22% of women in reproductive age in the Greater Accra region using some form of modern family planning method (GSS, GHS & ORC Macro, 2009).Currently, the method mix remains the same with injectables and pills

SAME

accounting for 41.4% and 26.3% of methods used respectively when married women surveyed as part of the 2013 survey by Ghana PMA2020 (PMA2020, 2013). In Ghana, there is low uptake of intra uterine contraceptive devices (IUCDs), particularly due to myths and misconceptions regarding its use, as well as facilities not stocking the product and providing insertion and removal services; Hong et al., 2005 report in the Ghana Trend Analysis for Family Planning Services that in 2002, only 51% of the different types of health facilities surveyed offered IUCD services. As at 2013, IUCDs still remain one of the least accepted contraceptives in Ghana among both married and unmarried women; 3.5% and 1.1% of the method mix for married and unmarried women of reproductive age respectively (PMA2020, 2013).

2.2 Return to Fertility

In the demographic context, the term fertility refers to the actual reproductive behavior expressed by the number of childbirths, whereas clinicians often use the term to describe the biological ability to conceive, or in some cases the ability to produce live offspring (Baird, Wilcox & Weinberg, 1986; Weekes, 1998). There are various opportunities and incentives for childbearing, and these differ significantly from one social environment to another, resulting in variability in fertility intentions of women all over the world. There are several biological and social components that influence the fertility intentions, and contraceptive behavior of any woman and or community. It is important to understand these factors, since they have an impact on the uptake of family planning services, the levels of unmet need and the reasons behind these unmet needs. These factors include but are not limited to, women's empowerment and education, tradition, culture and religion, health and nutritional status, availability of and access to contraceptive methods and/or abortions, urbanization, and standard of living (Schlott, 2012).

The time to pregnancy, or as otherwise called return to fertility is a term used to define the time span, or the number of menstrual cycles after exposure to unprotected intercourse, until conception, and is measured by the interval between the starting date of unprotected sexual intercourse and the date of conception (Baird et al., 1986; Rowe & Farley, 1988; Joffe, 1997). Approximately 90% of fertile couples conceive within 12 months of trying, thus a time to pregnancy of one year or more after contraceptive use is often used as a measure of sub-fecundity/sub-fertility, and in most cases this delay in returning to fertility can indicate reproductive loss due to several factors (Baird et al., 1986; Spira, 1986). Concern regarding possible impaired fertility after contraceptive use has always been an issue for many women, and temporary delays in conception have been reported after contraceptive use (Vessey et al., 1978; Vessey, Smith & Yeates, 1986; Buck et al., 1997; Chasan-Taber et al., 1997; Farrow et al., 2002). However, a review of studies to determine the relationship between contraceptive use and time to pregnancy/return to fertility shows that overall, 1-year pregnancy rates following discontinuation of contraceptives for oral pills, implants, injections, copper intra uterine devices and the Levonogesterol intra uterine systems are generally similar to those reported following discontinuation of barrier methods or use of no contraceptive method (Mansour et al., 2011). Irrespective of this, there are conflicting schools of thought on the impact of contraceptive duration and method on the time to pregnancy after discontinuation. In a study by Farrow et al (2002) to investigate the association of total duration of oral contraceptive usage with time to conception, results suggested that previous prolonged use of oral contraception was associated with rather improved fecundity independent of other factors such as age and parity, findings that were very different from previous studies. In another study, Banhartand Schriber, (2009) suggest that although there is no delay in time to pregnancy after discontinuation of continuous use of oral contraceptives, and that the pregnancy rate after continuous combined oral contraceptives (COC) use is similar to the pregnancy rate after the traditional cyclic COC use, there is no direct benefit of oral contraceptive use on subsequent fertility. There are yet still other studies that suggest that even though there is a slight delay to return to fertility in former contraceptive users, these delays are not significant when compared with fertility/conception rates of women who are not previous contraceptive users; an 84%-88% return to fertility rate within one year of previous contraceptive use, compared with 90% in non-users(Weigratz et al., 2006). Some studies also compare the different methods of contraceptives, and suggest a modest to significant reduction in fecundity after using combined oral contraceptives, intrauterine devices or injectables, such that mean time to pregnancy doubled in most cases (Hassan &Killick, 2004; Vessey et al., 1986).

However, in most of these studies, the effect of one contraceptive on subsequent fertility when compared with another, especially comparing hormonal to barrier methods, was trivial and mostly became more evident when other user characteristics and lifestyle risk factors of infertility such as age, weight, menstrual disorders, and gynecological problems were considered (Vessey et al., 1993; Hassan et al., 1994; Ford &MacCormac, 1995; Chasan-Taber et al, 1997).

2.3 Women's Knowledge of Factors Influencing Return to Fertility

According to several studies, there are widespread concerns about contraceptive use in most under-developed countries, where most women and men overestimate the risk of side effects or possible negative health outcomes from the use of contraceptives, reflecting a general lack of accurate, actionable knowledge about fertility awareness and family planning (Witte, 1997; Dyer, 2004; Kaye, 2009; Witt, 2013). In most countries the most common rationale women give for not using contraception are side effects and health concerns; up to 50% of married women at risk of unintended pregnancy in some of the countries surveyed cited these reasons (Sedgh et al, 2007). Women may base their concerns on individual familiarity with contraception, experiences of women they know, or simply on their perceptions of family planning. One can conclude that where reasons for non-use prevail, women likely have not obtained sufficient information regarding contraception.

Similarly, the Institute of Reproductive Health reports that inadequate fertility awareness may contribute to non-use or discontinuation of contraception, delayed method use after pregnancy (postpartum or post abortion), and incorrect attempts to use methods only during the fertile days (IRH, 2013). In a study of mostly educated, Caucasian women in Canada, over 50% (n=3345) of the respondents believed that taking oral contraceptives for more than 5 years negatively affected a woman's fertility (Daniluk, 2012).Likewise, a 2012 analysis of data from the demographic and health surveys of60 countries found that about a quarter of pill and injection users discontinue their method in the first 12 months because of side effects or health concerns if the method is used "continuously" and for "too long" (Ali, 2012). This same analysis also reported that women preferred to

take "breaks" from their regular contraceptives to allow their bodies and blood to relax, and as such ensure that they remained fertile (Ali, 2012). Tuladhar & Khanal (2008) reported that although most of the women (more than 70% knew of at least five out of the ten methods mentioned) interviewed in a study to assess the awareness and practice of family planning methods in women attending a gynecological clinic in Nepal were aware of the different contraceptive methods, more than fifty percent (50%) were ignorant about other details. Details such as duration of protection, general and adverse side effects, return of fertility on discontinuation and non-contraceptive benefits were unknown to the respondents. A wide knowledge practice gap was evident in this study, which was similar to the findings of studies done in other developing countries (Tuladhar & Khanal, 2008).

With the lack of fertility awareness knowledge worldwide, there is great potential to build on what is already known with accurate information and supportive attitudes so as to contribute to sexual and reproductive health behaviors and outcomes. Brieger (2001) reports that for interventions that included fertility awareness elements in Ghana, Nigeria, Chile and the United States, there was a resultant increase in the use of family planning, increase in abstinence or return to abstinence, and reduction in pregnancies. Particularly in Ghana, a peer education intervention for both girls and boys included educational messages on reproductive anatomy and function along with education on FP, STIs, and HIV/AIDS prevention. Following this intervention, the author reports increased perceived self-efficacy in FP use and willingness to buy condoms amongst other things (Brieger, 2001).

2.4 Relationship between Method of Contraceptive Used and Return to Fertility

Oral Contraceptives

In Ghana, progestin only oral contraceptive pills (POPs) and combined oral contraceptives (COCs) are available in both the public and private sector. In the public sector, Microgynon (the combination pill of ethinylestradiol and levonorgestrel) and Microlut (levonorgestrelonly) are available whereas in the private sector, other branded combined oral contraceptives such as Secure and Lydia Oral Contraceptive Pills and Lydia Daphne Pill which is progestin only are available (GHS, 2014).

Due to their high efficacy, there is an opinion by some women that the use of oral contraceptives may be associated with impairment in fertility after their discontinuation. Some studies have shown an initial temporary delay in return to conception within the first few months after oral-contraceptive cessation, which is usually resolved within 1 year after cessation (Vessey et al., 1978; Bracken, Hellenbrand & Holford, 1990; Hassan & Killick, 2004; Wiegratz et al., 2006; Cronin, Schellschmidt & Dinger (2009). A study of different oral contraceptives by Cronin, Schellschmidt & Dinger (2009) provided further evidence that oral contraceptives had no significant effect on fertility rates after discontinuation. Results showed that progestin type, ethinylestradiol dose, and duration of oral-contraceptive use had no significant influence on the rate of pregnancy after oral-contraceptive cessation. Davies et al., (2008) conducted a study to evaluate the time to return to spontaneous (without any intervention) menses after discontinuation in women who had used daily continuous combined oral contraceptives (COC) (levonorgestrel 90 microgram and ethinyl20 microgram) for a year. Of the participants who completed this

study, 96% returned to spontaneous menses within 90 days after the last dose the COC, with a median time to return to menses being 32 days. Similarly, in a phase 3 trial by Banhart et al. (2009) to determine the effect on return to fertility of oral contraceptive containing levonorgestrel 90 micrograms and ethinyl 20 micrograms, 21 subjects at risk of pregnancy (discontinued use of the contraceptive) were studied and the following pregnancy rates were recorded; 57% at 3 months, 81% at 12 months, and 86% at 13 months after discontinuation of treatment (Banhart et al., 2009). These results suggest as in the Davies (2008) study that continuous use of oral contraceptives containing levonorgestrel 90 micrograms and ethinyl20 micrograms does not significantly delay the return to fertility. In another study among women taking another oral contraceptive containing 30 micrograms of ethinyl estradiol and 2 milligrams of dienogest, the cumulative pregnancy rate was 86.6% after 1 year of follow-up, with the mean time to pregnancy being 3.5 cycles (Wiegratz et al., 2006). The researchers concluded that the cumulative rate of conception within one year did not differ from that observed in fertile women who attempted to become pregnant without prior contraception (Wiegratz et al.,

2006).

<u>Implants</u>

The method mix in Ghana includes three brands of contraceptive implants; Jadelle (two flexible levonorgestrel containing silicone rods labeled for five years of use), Implanon (one flexible etonogestrel containing plastic rod labeled for three years of use) and Sino Implant (two flexible levonorgestrel containing silicone rods labeled for four years of use) (GHS, 2014).
Progestogen-only contraceptive implants are highly effective (Glasier, 2001; WHO, 2011). Fertility returns rapidly following implant removal, and pregnancy rates of 76% – 100%, within 1 year after removal are rerecorded, and in some cases return to ovulation (Kiriwat et al., 1998) and fertility (Davies et al., 1993) are recorded to occur within 3 months after discontinuation of Implanon and Norplant. These rates are usually no different from those following discontinuation of any other contraceptive method; some studies (Singh et al., 1990; Sivin et al., 1992; Affandi, 1999) demonstrated no significant differences in pregnancy rates between Norplant or Implanon, after removal, and other methods of contraception. The Population Council also reports that reversibility of contraception by Jadelle is one of the advantages of the method, in that once the rods are removed; the contraceptive effect wears off within a few days (Population Council, 2013). Contrarily, certain low rates of return to fertility and conception have been recorded, as in the case of a post-marketing surveillance study of Norplant where only 55.6% of the users studied became pregnant within the first year after discontinuation (Meirik, et al., 2001).

<u>Injectables</u>

Two contraceptive injectables are provided at both public and private health facilities in Ghana. A monthly injectable, Norigynon contains 2 hormones—a progestin and an estrogen whereas a Depo Provera is a progestin-only contraceptive injectable given every three months (GHS, 2014).

There are a number of studies ascertaining that after discontinuation of use of Depo Provera (DMPA) or Noristerat there is some delay in resuming fertility restoration; however fertility is not impaired once the progestogen is cleared from the body (Pardthaisong, 1984; Fotherby& Howard, 1986;Bigrigg et al., 1999).

Bahamondes et al. report that the return to fertility rate after the discontinuation of Cyclofem; a monthly hormonal injectable contraceptive was 1.4 per 100 women at the end of the first month and reached 82.9 per 100 women at one year during studies conducted in Brazil, Chile, Colombia, and Peru. In this same study, further analysis showed that more than 50% of the respondents were pregnant at 6 months and this return to fertility was not related to the woman's age, her weight, or the number of Cyclofem injections at the time of discontinuation (Bahamondes et al, 1997).

A similar trend was found among 796 Thai women who stopped using the long-acting injectable contraceptive DMPA or Depo Povera to have a planned pregnancy. A study by Pardthaisong (1984), followed up the women to ascertain the delay to conception after the end of contraception and to determine the proportion of women who did not conceive by 4 years after discontinuation. The median delay to conception found was 5.5 months plus the estimated duration of the effect of the last injection of DMPA (which is approximately3 months after their last shot). Results also showed that the proportion of women who did not conceive within 9 months after discontinuation of DMPA was similar to that of ex-IUD users and that of the ex-pill users, and by 36 months after discontinuation, only 6.4% of the 796 DMPA former users surveyed had failed to conceive, allowing the author to conclude that there is no evidence to suggest that use of DMPA increases the delay to conception (Pardthaisong, 1984).

Intra Uterine Contraceptive Devices

There are several myths and misconceptions governing IUCD use among women, including Ghanaian women, some of which include the sexual partner feeling the device, the device causing abortions, and the device being ineffective such that babies are born holding the device. These concerns are important in the assessment of reversible contraceptive use and may influence their uptake or otherwise.

Several studies from different parts of the world have demonstrated that fertility in women both parous and nulliparous is not significantly affected by the use of IUCDs (Whitelaw, 1960; Vessey et al., 1976;Dofman at al., 1979;Vessey et al., 1983;Issa&Amr, 1998). In a study conducted by Issa and Amr in Jordan, the rates of conception after IUCD removal recorded were 76.0%, 90.9%, 95.0%, and 98.3% at 3, 6, 12, and 18 months, respectively(Issa & Amr, 1998). Another study in the United States of America compared the rates of conception after removal of a non-copper IUCD with discontinuation of oral contraceptives and diaphragms and reported that 87.5% of women delivered within 18 months of removal of the IUCD compared with 78.9% and 87.3% after discontinuation of oral contraceptives and diaphragms respectively (Dofmanet al., 1979). Conversely, a study by Doll, Vessey and Painter (2001) in England and Scotland recorded a lower rate of conception, 39% after removal of intra uterine devices. However, this study was undertaken in nulliparous women, and this may have had an effect on the return to fertility.

2.5 Relationship between Duration of Contraceptive Use and Return to Fertility

Nulliparous women using oral contraceptives until they are 30 years or older are reported to have increased cases of infertility (Vessey et al., 1986). The return to fertility for women who discontinue oral contraceptives after a long duration (greater than or equal to24 months) takes longer when compared with women who discontinue other methods of contraception; however this "infertility" is not a permanent impairment -88% of the 1,917 nulliparous women in the United States of America in a study by Chasan-Taber et al, (1997) who were unable to become pregnant for at least 1 year after discontinuation of oral contraception reported an eventual pregnancy by 1993. In this same study, after allowing for 2 years of suppressed fertility following discontinuation of oral contraceptive use and excluding women with signs of menstrual or hormonal disorder, the authors found that there was no statistically significant trend of increasing risk with increasing duration of use. In another study, increased duration of oral contraceptive use was rather associated with improved fecundity independent of other factors; irrespective of the parity of the woman (Farrow et al., 2002). The researchers found that increasing duration of oral contraceptive use is statistically significantly associated with an increased proportion of conceptions within 12 months and that especially among fertile couples, prolonged use of oral contraception is associated with greater subsequent fecundity, an association that is strongest after at least 5 years of usage. The study concluded that women who had prolonged use of oral contraceptives were not at risk of delay in time taken to achieve conception.

According to a population based cohort study in Germany by Wiegratz et al., (2006), there is no association between return to fertility and duration of contraceptive use

among women taking an oral contraceptive containing 30 micrograms of ethinyl estradiol and 2 milligrams of dienogest. However, the same study revealed that increasing duration of intrauterine device use was associated with decreasing fertility after adjusting for potential confounding factors, including maternal age, husband's social class, and history of gynecological illnesses. In comparing short term intra uterine contraceptive devices (IUCD) users (any duration less than 78 months) and long term IUCD users (78 months or more), the most impaired were the long term users; only 28% of long term users had delivered by 12 months after removal versus 46% of short term users. Similarly, at 36 months, the corresponding figures were 79% and 91% of women had delivered respectively for long term and short term users (Wiegratz et al., 2006). With respect to intrauterine devices, there is evidence from a number of studies that there is no increased risk of delayed fertility after IUCD use in terms of duration of use (Whitelaw, 1960; Tetze & Lewit, 1970; Issa & Amr, 1998). Issa and Amr (1998), report that among previous IUCD users, the mean duration of IUCD use before removal for a planned pregnancy was 21 months (ranging from 3 to 39 months). Following removal, 98.5% of the 67 long-term users (defined as greater than 2 years) compared with 98.1% of the 54 short-term users (defined as less than or equal to 2 years) conceived within 18 months of removal of the IUCD; a difference that is not statistically significant. It should however be noted that for Wiegratz et al., (2006), and Issa and Amr (1998), the classifications of short and long term IUCD use differed significantly and could account for why one study reports statistically significant delays (Wiegratz et al., 2006) in return to fertility, while the other (Issa & Amr, 1998) reports a delay that is not statistically significant.

2.6 The Relationship between the User's Characteristics and Lifestyle on Return to **Fertility after Contraceptive Use**

They are many characteristics of an individual, both biological and lifestyle/behavior that may affect fertility. These characteristics may work independently of, and/or concurrently with previous contraceptive use to influence fertility especially after contraceptive use. Common factors that influence fertility include; the patient's age, previous pregnancies, coital frequency, certain drugs and medications, emotional factors, smoking, alcohol intake, sexually transmitted infections and other gynecological diseases, nutritional factors (being malnourished, overweight or underweight), and being overweight or underweight (Krysiewicz, 1992; Hassan & Killick, 2004; American Society for Reproductive Medicine, 2009; Akhter & Jebunnaher, 2012). Characteristics of the male partner have also been shown to affect fertility both before and contraceptive use (Vessey, Smith & Yeates, 1986; Buck et al., 1997; ASRM, 2012; Akhter & Jebunnaher, 2012). All these factors need to be taken into account in assessing the impact of contraceptive usage. However, this study will consider the following factors; age, gynecological diseases/surgeries, weight/body mass index, alcohol intake and tobacco ingestion (smoking, sniffing, drinking). BAD

Age and fertility

A woman's fertility is affected by her age, the effects of which occur as a continuum after a certain age (Akhter & Jebunnaher, 2012; NICE, 2013). Fertility peaks in the early and mid twenties, after which it starts to decline, with this decline being accelerated after age 35 and women who conceive after this age are at greater risk of pregnancy

W

JSANE

complications (Anderson, Dallal& Must, 2003; Al Sahab, et al.,2010; NICE, 2013; Akhter &Jebunnaher, 2012). Furthermore, advancing age is associated with prolonged average time for achieving conception irrespective of contraceptive use, non-use, method or duration, such that the probability of achieving a pregnancy in one menstrual cycle begins to decline slowly but significantly in the early 30s, and increasingly in the latter 30s onwards (Practice Committee of American Society for Reproductive Medicine, 2008a; Faddy et al., 1992; Menken, Trussel& Larsen, 1986).

There are several studies that provide supporting evidence with respect to the relationship between age and fertility from both natural and assisted cycles, and with respect to contraceptive use. A study by Dunson, Colombo and Baird (2002)drawing participants from seven cities in Europe(Milan, Verona, Lugano, Dusseldorf, Paris, London, Brussels), reported that the probability of clinical pregnancy occurring after unprotected intercourse on the most fertile day of a woman's cycle in women of "average fertility" showing a decline as age increased, such that the probability of clinical pregnancy in women 19 to 26 years, 27 to 34 years, and 35 to 39 years was approximately 50%, 40%, and 30% percent, respectively. Issa and Amr, (1998) also report that although patients aged \geq 30 years appeared to require slightly more time to conceive than did women <30 years with respect to removal of intrauterine contraceptive devices this difference is not statistically significant.

Gynecological diseases and fertility

A proportion of female infertility is attributable to pelvic inflammatory disease (Westrom et al., 1992; Wiesenfeld et al., 2012). Westrom et al., (1992) conducted a

study in Sweden of 1,844 women with abnormal laparoscopic findings and 657 with normal findings to assess clinical suspicion of acute pelvic inflammatory disease (PID) and followed up to assess future fertility. During the follow-up period, 75.6% of the women with abnormal laparoscopic findings attempted to conceive and 16.0% of this proportion failed to achieve conception, compared with 75.0% of the control subjects who attempted to conceive with only 2.7% failing to achieve conception. Further investigations indicated that the possible causes of increased infertility among those with abnormal laparoscopic findings were as follows: 10.8% of them had confirmed tubal factor infertility, 1.6% of them had other causes of infertility and a 9.1% rate of ectopic pregnancy, leading the authors to suggest that infertility after PID was associated with number and severity of PID episodes (Westrom et al., 1992). Likewise, to assess whether women with subclinical PID have an increased risk for infertility, Wiesenfeld et al., recruited a cohort of 418 women with or at risk for gonorrhea or chlamydia or with bacterial vaginosis and grouped them into those with subclinical PID and those without subclinical PID. After provision of therapy, participants were followed-up for fertility outcomes. Among these women, those without subclinical PID were not at increased risk for infertility. However, for those with subclinical PID, there was a decrease in subsequent fertility despite provision of treatment for sexually transmitted disease; 40% reduced incidence of pregnancy compared with women without subclinical PID (Wiesenfeld at al., 2012).

Body mass index (BMI) and fertility

According to the American Society for Reproductive Medicine (ASRM), 12% of all infertility cases in women is a result of a woman either being underweight or overweight

(ASRM, 2009). A number of studies show that obstetric complications have a linear relationship with body mass index (BMI) in both underweight and overweight/obese women (Hamilton-Fairley et al., 1992;Zaadstra., 1993;Abenhaim et al., 2007).Fat cells produce estrogen and as such excess body fat causes production of too much estrogen and the body begins to react as if it is on birth control, whereas too little body fat causes insufficient production of estrogen and disruption of the menstrual cycle; thus both under and overweight women have irregular cycles in which ovulation is either inadequate to achieve pregnancy or absent all together (American Society for Reproductive Medicine, 2013; Nelson and Bulun, 2001). Interestingly, a study comparing the ovarian reserve and BMI in fertile and infertile women by ultrasonography revealed that ovarian volume decreases with an increase in the BMI, indicating the possible decrease in fertility with an increase in a woman's weight (Zaida et al., 2009). In contrast, in a study relating to assisted pregnancies in women by Balen et al. (2006), higher BMI was associated with increased gonadotrophin requirements but not with reduced pregnancy rates.

Alcohol intake and fertility

Intake of alcohol may affect return to fertility. Women with high and/or frequent alcohol intake have been found to have higher rates of menstrual disorders, such as amenorrhoea, dysmenorrhoea, and irregular menstrual periods (Wilsnack, Klassen & Wilsnack, 1984; Becker et al., 1989;Bahomondes et al., 1994). While some studies have found no relationship between reduced fertility and moderate alcohol intake in women (Olsen et al., 1982; Zaadstra et al., 1994; Florack, Zalhuis & Rolland, 1994; Olsen et al.,

1997;Eggert, Theobold & Engfeldt, 2004),other studies report that a high intake has been associated with reduced fertility (Olsen et al., 1982;Florack, Zalhuis & Rolland, 1994; Zaadstra et al., 1994;Olsen et l., 1997; Jansen et al., 1998; Eggert, Theobold & Engfeldt, 2004).

A follow up study of 7,393 Swedish women to investigate the long-term effects of alcohol consumption on female fertility revealed that high consumers had an increased risk for infertility examinations, as compared with moderate consumers (relative risk ratio = 1.59, 95%, CI:1.09-2.31); and low consumers had a decreased risk compared with high consumers (relative risk ratio= 0.64; confidence interval= 0.46-0.90), such that for high consumers there was a significantly lower number of first and second partus (Eggert, Theobold & Engfeldt, 2004).

Conversely, a study by Jansen et al., (1998) observed that similar to the reduction of female fecundability with higher alcohol intake (more than five drinks a week) as recorded in several other studies (Olsen et al., 1982; Olsen et al., 1997), there was also an unexpected and previously un-reported reduction of female fecundability among women with a low alcohol intake (five or less drinks a week).

<u>Tobacco use and fertility</u>

The association between smoking and the incidence of infertility in women is well established by several studies. There is a significant increase in the incidence of infertility among smokers (Baron,Vecchia& Levi, 1990; Hughes & Brennan, 1996; Soares, 2009)such that in the United Kingdom, smokers are 60% more likely to be infertile than non-smokers (United Kingdom Department of Health, 2009) and there is a

younger age at menopause of smokers (Midgette& Baron, 1990) by approximately 1–4 years before the average age of onset (Practice Committee of American Society for Reproductive Medicine, 2008b).

Tobacco smoking is harmful to the ovaries, and the degree of damage is dependent upon the amount and length of time a woman smokes or is exposed to a smoke-filled environment (Van Voorhis et al., 1996; Dechanet et al., 2011). It is also documented that women who smoke have an increased incidence of tubal infertility and a markedly increased risk of ectopic pregnancy, and when compared to women who have never smoked, those who smoke more than 20 cigarettes a day have an almost four-fold incidence of ectopic gestation (Bouyer et al., 2003; Talbot &Riveles, 2005; Soares, 2009).



CHAPTER 3

3.0 METHODOLOGY

3.1 Study type and design

This study used a quantitative cross-sectional survey design. A cross-sectional design was considered appropriate given that the sample used for this study was only surveyed at one particular point in time and there was no follow up. It was a quantitative study because it generated numerical data that will be used to establish and test the strength and significance of a relationship between contraceptive use and time taken to return to fertility.

3.2 Data Collection Techniques and Tools

Interviews were used as the technique to obtain information from respondents. Interviews were conducted using a pretested questionnaire that was administered by the principal investigator and research assistants. The questionnaire asked clients to provide responses on certain socio-economic and demographic characteristics, most current previous contraceptive use and their knowledge of all factors that affect return to fertility after discontinuation of contraceptive use, where their knowledge was obtained from and its influence on their contraceptive method choice.

The questionnaire also asked clients to provide information on their lifestyle and behavior characteristics. The following characteristics were explored: body mass index, gynecological disorders, alcohol use and tobacco use. Completion of the survey questionnaire took approximately 30 minutes per client.

3.3 Study Population

The study population was pregnant women of reproductive age (15 – 49 years) attending antenatal clinics (ANC) from a selected number of health facilities in the Accra Metropolitan Area of the Greater Accra Region. Respondents self-completed/ interviewer-completed a questionnaire inquiring about their return to fertility after discontinuing all modern contraceptives. Respondents were informed of the study design and objectives and a signed, informed consent form obtained from each individual. Respondents were assured of their ability to drop out of the study at any given time. They were also informed that to assure confidentiality of their responses, no names would be used on the questionnaires.

3.4 Criteria for selection

3.4.1 Inclusion Criteria

To be included in the study, women had to meet certain inclusion criteria.

SANF

- i. Respondents must currently be pregnant and within 15 49 years of age.
- ii. Respondents must have ever used any modern contraceptive, and should have been using a modern contraceptive before the current pregnancy.
- iii. Respondents must have achieved pregnancy naturally.



Figure 3.1: Study Flow Chart (Source: Author's construct, 2013)

3.4.2 Exclusion criteria

A woman did not qualify to participate in the study if

i. She was younger than 15 years or older than 49 years old.

SANE

ii. She had never used any modern contraceptive.

3.5 Study Variables

The variables for the study were categorized into dependent and independent variables. The dependent variable was return to fertility, defined as time taken to become pregnant after discontinuation of modern contraceptive use. The independent variables were the various factors that are known to influence return to fertility among women who used modern contraceptives before getting pregnant. These factors are contraceptive method

and duration, as well as user's behaviour and socio-demographic factors.

Variable	Operational definition	Measurements/Indicators to
variable	operational definition	be taken
Contraceptive method	Most recently used modern	No method, Condoms,
used	method before	Injectables, Combined pills,
	discontinuation to achieve	Progestin only pills, Implants,
	pregnancy	IUD
Duration of use of	Length of continuous use of	\leq 1-3 months, 3-6 months, 6-12
contraceptive method	most recently used method	months, >12 - 24 months, >24
	(in months)	months
Return to Fertility	The time interval between	\leq 1-3 months, 3-6 months, 6-12
(time to pregnancy)	discontinuation of	months, >12 - 24 months, >24
	contraceptive method; thus	months
	subsequent exposure to	
	unprotected sex and	
	achievement of	
	conception/pregnancy	77
Age	Number of completed years	Date of birth and Age as
79	Set 1 Set	supplied by respondent
Gynecological disease	Any condition that affects a	Fibroids, Polycystic Ovarian
and/or surgery	woman's reproductive organs	Syndrome, Sexually Transmitted
	and outcome and may have	Diseases, Urinary Tract
	required medication and/or	Infections, Uterine Bleeding,
	surgery as diagnosed by a	Vaginitis, Others
2	health professional	3
BMI	Measurement of the relative	Weight, Height
40,	percentages of fat and muscle	2
	mass in the human body as	
	an index of obesity	
Alcohol intake	Ever consumption of any	Units of alcohol per day
	kind of alcoholic beverages	Interval between consecutive
		consumption of alcoholic
		beverages.
Tobacco use	Ever smoked, chewed or	Number of sticks/packets of
	sniffed tobacco and its	tobacco per day
	products in a life time	Interval between consecutive
		tobacco use

 Table 3.1: Study Variables and operational definitions

(Source: Author's construct, 2013)

3.6 Sampling techniques and sample size

3.6.1 Sampling techniques

A multistage sampling approach was required; firstly to select the health facilities and then the clients to be interviewed at each facility.

A list of all government and quasi-government hospitals and polyclinics that provide antenatal services in the Accra Metropolitan Area was used as the sampling frame. Using simple random sampling, with a table of random numbers, and based on the fact that there are only 5 sub-metropolitan health administrations, 10 facilities were selected; with two facilities from each sub-metro selected.

At each facility, the medical officer in charge was the first point of contact. He/she in turn put us in contact with the mid-wife in charge of the antenatal clinic who was first briefed about the purpose of the study. She in turn approached all women at the clinic to give their support and assist in the study to the best of their ability. In order to not interfere with the activities of the clinics, the women were only interviewed after their exit from the antenatal clinic. Women were approached individually, and the purpose of the study explained in detail. If the woman was literate and expressed willingness to participate, she was given the participant information leaflet/informed consent form to read and provide or refuse consent. If the woman was non-literate, another person of her choice was approached to be a witness to the consent process and approval. In some cases, this same person also acted as a translator, if the researcher and the respondents spoke different languages. The total sample size for the study is estimated as follows:

n =
$$\underline{Z^2 \rho q}$$
 (Kirkwood and Sterne, 2003),
 d^2

Where,

n = the desired sample size z = the standard coefficient of reliability = 1.96p = proportion of women in reproductive age, i.e. 23% = 0.23q = 1.0 - p = 1.0 - 0.23 = 0.77

72

d =degree of accuracy desired at 0.05

$$n = \frac{0.23 \times 0.77 \times 1.96^2}{0.05^2} = 2^{-10}$$

10% of non-respondent effect would be used to complement the calculated sample size, thus

 $0.10*272 = 27.2 \approx 27$ n = 272 + 27 = 299

Using the default design effect (*deff*) of 2.0 (to achieve the same reliability that a *SRS* would produce), the sample size is therefore given as $299 \times 2.0 = 598$.

Therefore a sample size of **598** participants was surveyed in the study.

In order for the sample to be representative of the metropolitan area, the sample size was distributed according to the population breakdown of the proportions of expected pregnancies in 2012 in each sub-metropolitan. For the two facilities in each sub-metropolitan area, the catchment area of each facility, as well as the estimated annual antenatal attendance was used to determine how the sample size specific to the sub-metropolitan area was divided between the two facilities to ensure representativeness.

Table 3.2:	Breakdown	of sample size	per health facility
-------------------	-----------	----------------	---------------------

SUB-METROPOLITAN AREA	SAMPLE SIZE	PROPORTION
Ablekuma	244	40.73
Dansoman Polyclinic (30%)	73	
Mamprobi Polyclinic (70%)	171	
Ayawaso	158	26.37
Maamobi Polyclinic (40%)	63	
37 Military Hospital (60%)	95	
Okaikoi	110	18.33
Achimato Hospital (50%)	55	
Kaneshie Polyclinic (50%)	55	
OsuClottey	45	7.6
Adabraka Polyclinic (70%)	32	
Osu Government Maternity Home (30%)	14	
AhieduKeteke	42	6.97
Ussher Fort Polyclinic (60%)	25	
James Town Government Maternity Home		
(40%)	17	
Accra Metropolitan (TOTAL)	598	100
(Source: Author's construct, 2013)	The second	

3.7 Pretesting

The study was piloted at the Civil Servants Polyclinic in Accra. This facility was not selected for the study.

Pre testing of the questionnaire was to ascertain overall quality and clarity of the instrument, find out total time to complete the survey, and establish the data coding procedures in the statistical software to be used; STATA. Clients were asked to write their comments about vague and confusing questions, as well as any other suggestions they deemed helpful. After the pretest exercise, appropriate revisions were made to the instrument before the major study took place.

3.8 Ethical Consideration

The Committee on Human Research, Publications and Ethics (CHRPE) from Kwame Nkrumah University of Science and Technology/KomfoAnokye Teaching Hospital, approved the study. In addition to this, administrative clearance was also obtained from the Municipal Health Administration. The respondents were assured of privacy and confidentiality.

3.9Assumptions and Limitations of Study

3.9.1 Limitations of Study

The problem of recall bias could have occurred because of the retrospective nature of the questions.

3.9.2 Assumptions of Study

It was assumed that:

1. The respondents understood the questions that were asked and their answers were accurate and a true reflection of their experiences.

2. The selected study population was a true representation of the larger population from which accurate findings were made.

JSANE

W

CHAPTER 4

4.0 RESULTS

This section reports on results obtained on participants' socio-demographic and lifestyle characteristics, contraceptive use information (method and duration of use) and knowledge of return to fertility. It also reports on analysis of the relationship between knowledge of factors influencing return to fertility and contraceptive use, and factors influencing return to fertility.

4.1 Background and lifestyle characteristics of respondents

Table 4.1 shows the background characteristics of the women involved in this study. A total of 600 pregnant females of reproductive age were recruited into the study. Less than one percent (0.83%) of the participants were adolescents (15 – 19 years of age). All five adolescents were 19 years of age. Majority of the respondents were above 29years and the highest representation was from women 25 to 29 years of age at 33.5% (n=201). Only five of the women were above 45 years. One hundred and eighty one women constituting 30.2% of the respondents were Akans and 34.5% were Ga/Dangme. Other represented ethnic groups included Ewes 17%, Mole/Dagbani 3.2%, Hausas 10.8% and Guans 2.2%.

The larger majority of the women that participated in the study were currently married (n=370) as represented by 61.67% of the sample, whereas just one participant (0.17% was widowed. Forty-seven (7.8%) of the women had never been in a union whereas 28.3% were currently living with a man but were not married. About 35% of the women in this study had Middle/JHS education whereas 30.7% had secondary school education. Only 10.8%

had tertiary or post-secondary education whereas 8% had no formal education. Majority of the women in the study had average monthly income from all sources of less than GHC500. With about 21.3% of the respondents with an income of less than GHC 200.00 and 56.6% of the respondents with an income from GHC 200.00 to GHC 499.99. Only 2.8% and 1.3% had incomes of GHC 1000.00 to GHC 1499.99 and GHC 1500.00 and above respectively. The majority, 86.2% of the women recruited into the study were Christians whereas 13.3% were Muslims. The mean BMI of the women was 26.8kg/m².



Vari	iable	Frequency	Percentage (%)	
Age	(n=600)			
—	15 - 19	5	0.83	
—	20 - 24	50	8.33	
—	25 - 29	201	33.5	
—	30 - 34	185	30.83	
—	35 - 39	108	18	
—	40 - 45	46	7.67	
	46 - 49	5	0.83	
Ethr	nicity (n=600)	LZN LL	ICT	
	Akan	181	30.17	
	Ga-Dangme	207	34.5	
—	Ewe	102	17	
	Guan	13	2.17	Source: Field data, 2013
—	Mole/Dagbani	19	3.17	
—	Hausa	65	10.83	
	Others	8	1.33	
	Refused	5	0.83	
Mar	rital Status (n=600)			
	Never in a union	47	7.83	
	Married	370	61.67	
	Cohabitation	170	28.33	
	Separated/Divorced	12	2 3 3 5 5	
	Widowed	Park J	0.17	
High	hest Education (n=600)	CG T	200-2	
_	No formal education	48	8	
	Primary	90	15	
_	Middle/JSS/JHS	213	35.5	
	Secondary/ <mark>SSS/SH</mark> S	184	30.67	7
	Higher	65	10.83	
Ave	rage monthly income (n=600)			
	< GHC 200	128	21.33	
	GHC 200 to GHC 499.99	339	56.5	
	GHC 500 to GHC 999.99	108	18	
	GHC 1000 to GHC 1499.99	17	2.83	
	>/= GHC 1500	8	1.33	
Reli	gious Affiliation (n=600)			
	Christian	517	86.17	
—	Moslem	80	13.33	
_	Traditionalist	2	0.33	
	Others	1	0.17	
BM	I (n=600)			
—	Mean (SD)	26.80 (3.7)		
	Min/max	2.42/ 47.22		

Table 4.1 Socio-demographic characteristics of study respondents (n=600)

Majority, (78.5%) of the women had ever given birth and the mean number of children was five (5). Majority of them had given birth to less than three children with 32.3% and 36.3% giving birth to one child and two children respectively. Only 39 (6.5%) had ever lost a child and all but one of these women had lost only one child. Of the women interviewed, only 30, constituting 5% stated that they had problems getting pregnant although they were not using contraceptives. Only 3.2% (n=19) had any history of gynecological disease and these included fibroid (10), pelvic inflammatory disease (4), chlamydia (4), and other STIs (n=1, 5.3%). One hundred and sixteen women (19.3%) took in alcohol. About 2.6% of those who took alcohol drunk daily, 37.1% weekly, 48.3% monthly and 12.1% more than monthly. In terms of quantities consumed by the women by glass of beer, 36.8% consumed one glass a day, 44.4% consumed two or three glasses, 17.9% consumed four or five glasses and only 0.9% consumed more than four glasses. Only 2 out of the 600 respondents (0.3%) smoked tobacco, with one having smoked for less than one year while the other had smoked for approximately one year. Both respondents reported that they smoked 1 to 4 sticks per day. About 26% of the women (n=156) indicated that someone in their household smoked and 30 out of this number (19.2%) disclosed that smoking was done in their presence. (Table W J SANE

1 BADHE

4.1)

Variables	Frequency	Percentage
Ever given birth (n=600)		
— Yes	471	78.5
— No	128	21.3
— Non-response	1	0.2
Number of children alive (n=474)		
— 1	153	32.3
— 2	172	36.3
	94	19.8
— >3	55	11.6
Mean (SD)	2(1)	
Min/max	1/5	
Ever lost a child (n=600)		
— Yes	39	6.5
<u>— No</u>	561	93.5
Number of children lost (n=39)	20	
-1	38	97.4
	1	2.6
Ever had problems getting pregnant though you		
were having unprotected sexual intercourse	20	5.0
regularly (n=000)	570	5.0
- res	370	95.0
<u>— No</u> History of gynacological diagona (number) (n=(00)	27	
History of gynecological disease/surgery (II=000)	10	3.2
- Tes	581	96.8
$\frac{-100}{\text{Alcohol intake } (n-600)}$	501	
	116	193
	484	80.7
Smoking (n=600)	54	
— Yes	2	0.3
	598	99.7
Someone in household smoke (n=600)		
— Yes	156	26.0
— No	444	74.0
Smoking done in your presence (n=156)		
— Yes	30	19.2
— No	126	80.8

Table 4.2 Lifestyle characteristics of respondents
--

Source: Field data, 2013

4.2 Knowledge of factors influencing return to fertility

Respondents were assessed on their belief regarding contraceptive use and return to fertility, and the influence of this belief on their decision to use modern contraceptive methods. They also answered a few questions aimed at assessing their knowledge about the existence and influence of various factors affecting return to fertility.

Of the six hundred respondents in the study, two hundred and sixty six (44.3%) stated that they believed modern contraceptive use had and will have no effect at all on their future fertility. On the other hand, thirty-five (5.8%) stated that they believed very strongly that use of modern contraceptives had and will continue to affect their future fertility. About 9% were however unsure of their belief regarding the use of modern contraceptives affecting future fertility

Three hundred and nine respondents (50.7%) stated that the fear of infertility had no influence whatsoever on their decision to use modern contraceptives, as compared to the twenty-seven (4.5%) respondents who reported that the fear of future infertility had very strongly influenced their decision to use modern contraceptives. Only one respondent stated that they didn't know if the fear of future infertility had influenced their use of modern contraceptives. (Table 4.2)

Variables	Frequency	Percentage		
Belief modern contraceptives affect fertility (r	n= 600)			
Very strongly	35	5.9		
Strongly	101	16.8		
Somewhat	142	23.7		
Not at all	266	44.3		
Don't know	56	9.3		
Fear of future fertility influence contraceptive use (n=600) Very strongly274.5 Strongly12520.8 Somewhat14323.8 Not at all30951.5				
Believe other factors influence return	to			
fertility (n=600)				
— Yes	219	36.5		
— No	280	46.7		
— Don't know	101	16.8		
Source of information on contraceptiv	ve	5		
(n=219)	P(122)			
— Family and friends	110	50.2		
 Health facility/ professional/ activity/ event Mass modio (TV radio Newspaper) 	88	40.2		
Internet)	21	9.6		

Table 4.3 Knowledge of respondents on factors influencing return to fertility

Source: Field data, 2013

Two hundred and nineteen respondents representing 36.5% acknowledged that there were factors other than contraception that affected return to fertility after contraceptive use and discontinuation. Approximately 50% reported having obtained their information from friends and family, whereas 40.2% obtained their information from health facility or through interaction with a health professional. However, a slightly larger number of women, two hundred and eighty (46.7%) stated that they believed there were no other

factors that affected return to fertility after contraceptive use and discontinuation. One hundred and one respondents 16.8%) on the other hand were unsure of the existence of any such factors affecting return to fertility after contraceptive discontinuation. The other factors indicated by respondents to affect return to fertility after contraceptive use and discontinuation included parity (33%), BMI (25.1%), past and present gynecological disease or conditions (24.3%), alcohol intake (7.1%) and smoking (1.5%). (Figure 4.1)



Figure 4.1 Responses on other factors influencing return to fertility

4.3 Contraceptive use information of participants

Almost half of the women in this study (49%) used oral contraceptive pills whiles 37% used injectables. Only 13% and 1% used implants and IUCDs respectively. The types of injectables, pills, implants and IUCDs used were not specified in this question. (Figure 4.2)



Figure 4.2 Contraceptives used by respondents

Most of the respondents used various contraceptive methods for less than or equal to twelve months, that is one hundred and thirty respondents (22%) used contraceptives for less than six months before discontinuation and one hundred and eighty three (30%) used contraceptives for six to twelve months before discontinuation. One hundred and ninety-five women representing 32% used contraceptives up to 24 months whereas 13% had used up to 36months. Only 3% of the women had used contraceptives for more than 36 months.



Source: Field data, 2013

4.4 Influence of background and lifestyle characteristics on contraceptive use before pregnancy

There were significant differences in some of the lifestyle characteristics of women by the used contraceptive method respectively. With respect to the individual characteristics, there were significant differences by the contraceptive method used for contraceptive duration (p<0.001), women's BMI (p<0.001), marital status (p=0.013) and parity (p=0.006). On the other hand, there was no significant difference in the women's ages by the contraceptive method used, their educational level and marital status. (Table 4.4)



	Contraceptive Method					
Characteristics	Contraceptive	^				
	pills	Injectable	Implants	IUCD	P-value	
Women's age/mean					0.0001	
(SD)	30.8 (5.4)	31.7 (5.0)	31.8 (5.6)	33.9 (7.4)	0.089*	
Contropontivo						
duration in months/						
mean (SD)	9.5 (2.5)	12 (2 - 42)	15.5 (3.5)	27 (15.4)	< 0.001*	
			CILI,			
Women's BMI		NU.				
$(kg/m^2)/mean (SD)$	261(32)	269(32)	278(37)	287(23)	<0.001*	
	20.1 (3.2)	20.9 (3.2)	21.0 (3.1)	20.7 (2.3)	<0.001	
Parity/ mean (SD)	1(0.5)	2 (0,5)	2(0.4)	2(0.4)	0.006*	
· · · ·	1 (0.0)	2 (0.0)	2 (0.1)	2 (0.1)	0.000	
Marital status (%)	6.1		2			
— Never in union		-				
— Married						
— Living with a	57.4	19.1	21.3	2.1		
man but not	45.4	40.3	13.0	1.4		
married	CHE!	G B	15	<i>x</i>		
— Separated/	56.5	34.1	8.8	0.6	0.117**	
divorced/	22.2	50.0	167	0.0		
widowed	33.3	50.0	16.7	0.0		
widowed		77.77				
Education (%)				_		
None formal	E			E.		
- None Iorman	47.9	35.4	16.7	0.7		
— Basic	50.5	35.6	13.2	1.1	0.148**	
— Secondary	<u>49.5</u>	40.8	8.7	1.1		
— Higher	43.1	35.4	16.9	4.6		
Keligion (%)						
— Christian	49.7	38.5	10.6	1.2		
— Muslim	45.0	30.0	23.8	1.2	0.013**	
— Other	66.6	0.0	33.4	0.0		
*One way ANOVA	**Fisher	's exact test				

 Table 4.4 Individual characteristics for all women by the contraceptive method used

 before pregnancy

Among the lifestyle characteristics, women's history of gynecological diseases/surgeries showed significant differences with respect to the contraceptive method used(p<0.001). (Table 4.5)

	Contraceptive Method				P-value
Characteristics	Contraceptive pills	Injectables	Implants	IUCD	
Alcohol intake (%)	1		-1		
— Yes	42.2	47 4	86	17	0.065
— No	50.8	34.7	13.4	1.0	0.005
	N.	1,22			
Second hand smoking	511	117			
(%)					
— Yes	49.5	37.0	12.5	1.1	0.665
— No	43.3	40.0	13.3	3.3	0.002
	EN		TH		
History of	TEA.	3	FS .		
gynecological	CAL !	X-LAR	2		
disease/surgery (%)	TTP 1	A			
— Yes	15.8	42.1	26.3	15.8	< 0.001
— No	50.3	37.0	12.0	0.7	
Test: Fisher's exact				1	
E	2		12		
540	-		No.		
4.5 Return to fertility	2 R	5	34		
the rectain to rectainty	WJSAN	IE NO	h		

 Table 4.5: Lifestyle characteristics for all women by the contraceptive method used before pregnancy

Majority of the women involved in the study conceived in less than six (6)months after discontinuing contraception (54.5%), and it took 35.1% six to twelve months to conceive after contraceptive discontinuation. A Kaplan Meier survival estimate showed a mean time to conceiving after discontinuing contraception to be 7.60 months (95% CI=7.19-8.0) and a median time to discontinuing contraception to be 5months (95% CI =4.79-5.21). Nearly

one-in-five women(21.5%) stopped using modern FP methods for reasons other than conceiving and these reasons included: fear of infertility (23.3%) and experience of side effects (62.8%). (Table 4.6)

	Frequency	Percentage
Variables	(n=600)	(%)
Time taken to pregnancy after contraceptive		
discontinuation		
- < 6 months	327	54.5
-6-12 months	210	35.1
-12 - 24 months	56	9.3
-24-36 months	5	0.8
- > 36 months	2	0.3
Ever stopped using modern FP method for reasons other		
than conception		
— Yes	129	21.5
— No	470	78.3
— Refus <mark>ed</mark>		0.2
Reasons for stopping(n=129)		
— Fear of infertility	30	23.3
— Experienced side effects	81	62.8
— Infrequent sex / husband away	4	3.1
— Husband / partner disapproved	8	6.2
— Wanted more effective method	6	4.7
Source: Field data, 2013		

 Table 4.6 Overall time taken to pregnancy after contraceptive discontinuation

4.6 Contraceptive use and return to fertility

More than 85% of users of the various methods conceived within a year after discontinuation. Among users of IUCDs, all the respondents conceived within a year after discontinuation. There was no significant difference between the various methods with respect to time to fertility. (Figure 4.4)



Figure 4.4 Type of contraceptive and time of return to fertility

Source: Field data, 2013

There was no significant difference in the duration of contraceptive use and the time to fertility; 89.3% of short-term users and 90.3% of long-term users conceived within one year after discontinuation. Short-term users were individuals who had used contraceptives for a maximum of 2 years (\leq 2 years), and Long-term users were individuals who had used contraceptives for more than 2 years (>2 years). (Figure 4.5)



Figure 4.5 Duration of contraceptive use and time of return to fertility

Source: Field data, 2013

To address issues of skewed data, the median time to pregnancy was preferred over the corresponding mean value. The results show no significant difference in time to fertility among the various methods and/or duration of contraceptive use. Although the mean and median time to fertility were slightly higher among users of implants when compared with other methods, these differences were not significant. The difference in time to fertility among various contraceptive methods was still not significant even after adjustment duration of contraceptive use as shown. (Table 4.8)

	Median	SE	Mean	SE	p-value*
Variables	(RTF)		(RTF)		
	(95% CI)		(95% CI)		
Contraceptive used		-			
— Pill	5.0 (4.8, 5.2)	0.1	7.3 (6.8, 7.9)	0.3	
— Injectable	5.0 (4.6, 5.4)	0.2	7.7 (7.0, 8.4)	0.4	0.368
- Implants	6.0 (3.3, 8.7)	1.4	8.3 (7.3, 9.3)	0.5	
— IUCDs	5.0 (3.7, 6.3)	0.7	7.6(4.4, 10.7)	1.6	
			PIE	7 ×	
Duration of use	1200		-1750		
— <6months	5.0 (4.6, 5.4)	0.2	7.4 (6.5, 8.3)	0.4	
— 6-12months	5.0 (4.8, 5.2)	0.1	7.3 (6.5, 8.0)	0.4	0.122
— 12-24 months	6.0 (5.4, 6.6)	0.3	8.2 (7.5, 9.1)	0.4	
— 24-36months	5.0 (4.8, 5.2)	0.1	6.8 (6.0, 7.6)	0.4	
— >36months	5.5 (2.9, 8.1)	1.3	8.1 (5.7, 10.5)	1.2	
Test: Kaplan Meier s	urvival estimate	-	*based on T	Tarone-w	vare

 Table 4.7 Results of influence of contraceptive use on return to fertility

Contraceptive use is categorized by long-term (>2 years) and short-term (≤ 2 years), and the time to fertility is compared for these two categories. There is no statistically significant difference between the times to return to fertility for the different methods when compared by duration of contraceptive use. (Table 4.8)

0

	Shorter duration	Longer duration	p-value*
-	Median (95% CI)	Median (95% CI)	
Contraceptive used			
— Pill	5.0 (4.8, 5.1)	5.0 (4.6, 5.4)	
— Injectable	5.5 (5.1, 5.9)	5.0 (4.5, 5.5)	0.251
— Implants	6.0 (3.4, 8.6)	6.0 (1.9, 10.1)	
— IUCDs	5.0	4.0	
Test: Kaplan Meier su	rvival estimate *	based on Tarone-ware	

 Table 4.8 Influence of contraceptive use on return to fertility; categorized by short- vs.

 long-term use

4.7 Behavior/Lifestyle characteristics and return to fertility

Multivariable analysis of factors influencing return to fertility after contraceptive use

A Cox regression analysis was performed to estimate the influence of background and lifestyle characteristics on return to fertility among the women in this study. The outcome shows that the probability to conceive after discontinuing with a contraceptive method does not differ with respect to age, number of children, BMI, history of gynecological disease, alcohol intake, secondary smoking, the type of contraceptive method or the duration of contraceptive use. In the multivariable analysis, the adjusted hazard ratios (AHR) were not very different from the observed HR and the probability to conceive after contraceptive discontinuation was not significantly influenced by any of the background or lifestyle characteristics.

	HR (95%CI)	SE	AHR (95%CI)	SE
Age	0.97 (0.9, 1.0)	0.01	1.0 (0.9, 1.0)	0.01
Number of children	0.94 (0.9, 1.0)	0.05	0.9 (0.8, 1.0)	0.06
BMI	1.0 (0.9, 1.0)	0.01	1.0 (0.9, 1.0)	0.01
Gynecological diseases	0.8 (0.5, 1.3)	0.23	0.9 (0.5, 1.4)	0.25
Alcohol intake	1.0 (0.8, 1.2)	0.10	1.0 (0.8, 1.3)	0.11
Secondary smoking	1.2 (0.8, 1.7)	0.2	1.1 (0.7, 1.7)	0.22
Type of contraceptive (ref=pill)	C.L.	127		
— Injectable	1.1 (0.5, 2.2)	0.4	1.2 (0.5, 2.7)	0.43
— Implant	1.2 (0.5, 2.1)	0.4	1.1 (0.5, 2.6)	0.43
— ICUD	0.9 (0.4, 1.9)	0.4	0.8 (0.3, 1.9)	0.44
Duration of	E R	P/	H	
contraceptive	1.0 (1.0, 1.0)	0.01	0.98 (0.9, 1.0)	0.01
$ \land$	CAL)	-125	N	474
	Mint	277	-2 Log likelihood	4985.406

Table 4.9 Multivariable analysis of factors influencing return to fertility after contraceptive usage

Test: Cox regression analysis


CHAPTER 5

5.0 DISCUSSION

This chapter discusses the important findings of this study in relation to available literature. The sections are organized according to the objectives of the study.

This study explored the type and duration of contraceptives used by respondents and background and lifestyle factors influencing choice of contraceptives and return to fertility after contraceptive discontinuation. The outcome showed that use of oral contraceptive pills and injectables were higher when compared with implants and IUCDs. Almost half of the women in this study (49%) used oral contraceptive pills while 37% used injectables. Only 13% and 1% used implants and IUCDs respectively. The preference for modern contraceptives is in line with the 2008 Ghana Demographic and Health Survey Report, which showed an increased preference for injectables (6% increase) and the pill (5% increase) in the Greater Accra region (GSS, GHS and ORC Macro, 2009). The low uptake of IUCDs is also consistent with the Ghana 2002Trend Analysis for Family Planning Services (Hong et al., 2005), which also reported lower utilization of IUCDs. This has been attributed to myths and misconceptions regarding its use, as well as facilities not stocking the product and providing insertion and removal services. Similarly, the Multiple Indicator Cluster Survey (MICS) 2011 indicates that of the only 35% of women married or in union who use any method of contraception, 24% of them use modern methods and 11% use traditional methods. The most popular modern methods as per the survey are the injectable (9%) and the pill (8%). Service data from the 2013 Annual Report of the Family Health Division of the Ghana Health Service also indicates that 58.1% of all women receiving

family planning services from health facilities are using the injectables, whilst only 1.5% is using intra uterine contraceptive devices (GHS, 2014).

Choice of contraceptive method among women in this study was influenced by BMI, parity, religion and history of gynecological disease. Among the lifestyle characteristics, women's history of gynecological diseases/surgeries showed significant differences with respect to the contraceptive method used (p<0.001) and with respect to the individual characteristics, there were significant differences by the contraceptive method used for contraceptive duration, women's BMI, marital status and parity. On the other hand, there was no significant difference in the women's ages by the contraceptive used, their education level and marital status.

5.1 Knowledge of factors influencing return to fertility

Fear of side effects, especially those perceived to negatively affect fertility, has been the leading cause of non-use of modern contraception in Ghana (GSS, GHS & ICF Macro, 2009; Hindin, McGough&Adanu, 2014).

Hindin, McGough and Adanu, report that apprehension regarding menstrual irregularities as well as concern that hormonal methods lead to infertility was a key theme identified in a study in Accra, aimed at understanding why women are not using contraception.

The current study explored the knowledge of women related to the influence of contraceptive use on return to fertility. It is believed that the understanding of women on how contraceptives influence their return to fertility could inform women's choice and use of contraceptives. The relationship between knowledge and behavioral change has been

established in previous studies. Knowledge has been proposed to account for health behaviors and sustained behavioral changes in several models (Prochaska, DiClemente& Norcross, 1992). These models stress the importance of evaluating the perceptions, attitudes, beliefs, and outcome expectations of individuals as crucial means to understand observed behaviors and to guide behavioral change interventions. Knowledge of influence of contraceptives on return to fertility was not universal among the women studied. About44% believed that modern contraceptives had not and will not have any effect on their future fertility. Only 23% believed modern contraceptives had and will have any effect on their future fertility, whereas 9% were unsure of their belief regarding the use of modern contraceptives affecting future fertility. Majority of the women also believed that the fear of infertility had no influence whatsoever on their decision to use modern contraceptives whereas about 25% reported that the fear of future infertility had very strongly influenced their decision to use modern contraceptives. Belief in influence of other factors on fertility also differed among the respondents. About 35% believed other factors influenced return to fertility whereas 46.7% did not. Majority of these respondents had their information from family and friends (50.2%) whereas 40.2% stated health facility/professional as their source of information.

According to an assessment by Cooper et al., (2013) in Bangladesh, lack of and inadequate knowledge of factors influencing return to fertility after contraception discontinuation and in postpartum women was a major issue affecting uptake of family planning. It was observed that perceived risk of using family planning and incorrect assessments of susceptibility to pregnancy were barriers to knowledge of return to fertility. It was also

explained that gaps in knowledge and acceptance of fertility return and pregnancy risk were linked to low uptake of family planning methods.

5.3 Return to fertility

Return to fertility involves the time span, or the number of menstrual cycles after exposure to unprotected intercourse, until conception. This is measured by the interval between the starting date of unprotected sexual intercourse and the date of conception (Joffe, 1997; Baird et al., 1986). A time span of a maximum of one year is accepted as normal because approximately 90% of fertile couples conceive within this period of trying. A time to pregnancy of one year or more after contraceptive use is often used as a measure of sub-fecundity/sub-fertility, and in most cases this delay in returning to fertility can indicate reproductive loss due to several factors (Baird et al., 1986; Spira, 1986). Concern regarding possible impaired fertility after contraceptive use has always been an issue for many women (Farrow et al., 2002).

This study explored return to fertility among women in the Greater Accra region after contraceptive use. The outcome of the study showed that within a year after contraceptive discontinuation, almost 90% of the women had returned to fertility. This constitutes 55% who took less than 6 months and 35.1% who returned to fertility within 6 to 12 months. The mean and median time to conceiving after discontinuing contraception was 7.60 months (95% CI=7.19-8.0) and a median time to discontinuing contraception to be 5 months (95% CI =4.79-5.21). This is in line with the normal period of conception for fertile couples. A review of previous studies to determine the relationship between contraceptive

use and return to fertility have also shown an overall 1-year pregnancy rates following discontinuation of most contraceptives including oral pills, implants and injectables (Mansour et al., 2011). Similarly, the study by Weigratz et al (2006) also found that 84%-88% of women return to fertility after contraceptive discontinuation within a year.

5.3.1 Influence of contraceptive methods on return to fertility

The influence of contraceptive use on return to fertility has been explored in many previous studies. Doll, Vessey and Painter report that overall, women in a prospective study who had discontinued the use of a barrier method achieved the quickest return to fertility, however, as the time after discontinuation of use increased, return to fertility was more similar among the three groups they compared: 76% percent of barrier method users, 70% of pill users and 67% of IUD users had given birth. Some studies however have found no significant difference in conception rates between users and non-users of contraceptives. In this study, the results show no significant difference in return to fertility among the various methods of contraception. Although the mean and median time to return to fertility was slightly higher among users of implants when compared with other methods, these differences were not statistically significant. In the regression analysis, the HRs and AHRs for the influence of various contraceptive methods when compared to the pill was not statistically significant. This is consistent with other previous studies, which also found no significant difference for time to fertility among previous users of different contraceptives (Vessey et al., 1993; Hassan et al., 1994;Ford &MacCormac, 1995;Chasan-Taber et al, 1997). Other studies have also concluded that the cumulative rate of conception within one year did not differ from that observed in fertile women who attempted to become pregnant without prior contraception (Wiegratz et al., 2006). This supports the findings of this study that majority of women return to fertility within one year after use of oral contraceptive method.

5.3.1.1 Oral Contraceptive Pills

Some studies have shown an initial temporary delay in return to conception within the first few months after oral-contraceptive cessation, which is usually resolved within 1 year after cessation with most studies reporting that the effect of previous oral contraceptive use on subsequent fertility is trivial (Bracken, Vessey et al., 1978; Hellenbrand&Holford, 1990;Hassan &Killick, 2004;Wiegratz et al., 2006; Cronin, Schellschmid& Dinger 2009). In this study, 93% of the women who used pills returned to fertility within a year. 65% of them conceived within 6 months of contraceptive discontinuation and 28% within 6months to one year, findings which are similar to a phase 3 trial by Banhart et al. (2009) to determine return to fertility of continuous oral contraceptive pills recordeda 86% at 13 months after discontinuation of use. The mean and median time to fertility was 5 months and 7.3 months respectively.

In this study, the time to return to fertility after oral contraceptive use was not significantly different from other contraceptive methods. This is consistent with a study by Schellschmidt & Dinger (2009), which found no significant effect of oral contraceptives on fertility rates after discontinuation. However, some other studies which also compared the different methods of contraceptives, suggested a modest significant reduction in fecundity after using combined oral contraceptives, intrauterine devices or injectables. In a study by Hassan and Killick it is explained that the negative effect of previous oral contraceptive use

on subsequent fertility is probable, and could be due to the persistence of ovulation suppression during its use.

5.3.1.2 Implant

This study revealed that 88% of the women who used implants conceived within one year after contraceptive discontinuation. In line with the study findings, other studies also found that time to fertility following implant removal is comparable to fertility rates in women not using contraception, with pregnancy rates of 76% -100%, within 1 year after removal (Kiriwat et al., 1998).

The median time to fertility after the use of implants in this study was 6months (95% CI 3.3, 8.7)which when compared to the study by Davies et al (1993) with a return to fertility within 3 months after discontinuation of Implanon and Norplant, shows that return to fertility after implant discontinuation is significantly quick.

The rates of pregnancy and return to fertility after discontinuation of implants did not differ significantly from other contraceptive methods and this is consistent with reports from other previous studies (Affandi, 1999; Sivin et al., 1992; Singh et al., 1990). These studies demonstrated no significant differences in pregnancy rates between Norplant or Implanon, after removal, and other methods of contraception. Glasier (2002) also reports similar findings, stating that ovulation after removal of implants, particularly Norplant, Jadelle, Uniplant and Implanon has been shown to resume within 3 months. He further explains that this is because all implants are known to release low doses of progestogen that rapidly clear from a woman's system after removal of the implant.

However, contrary to this study outcome, some other studies have recorded low rates of return to fertility and conception after contraceptive use; post-marketing surveillance study by Meirik, et al. (2001), found that only 55.6% of Norplant users retuned to fertility within the first year.

5.3.1.3 Injectables

Although there has been no evidence of permanent infertility being caused by use of contraceptive injectables, the return to fertility may take up to 2 years in some women (Kaunitz, 1998).

This study revealed that 85% of the women who used injectables conceived within one year after contraceptive discontinuation. About 44% of these women were pregnant within the first 6 months and 42% more women within 6months to one year. This was consistent with the study by Bahamondes et al (1997) in Brazil, Chile, Colombia, and Peru, which found an 82.9% rate of return to fertility among previous users of injectables. In thesame study by Bahamondes et al., 1997, further analysis showed that more than 50% of the respondents were pregnant at 6 months, making this return to fertility slightly higher than the rate of return to fertility within three months found in this study.

The median time of returning of fertility in this study was 5 months and this was in line with other studies, which had reported a median time of 5.5months to return to fertility after discontinuation of Depo Provera (DMPA) or Noristerat (Pardthaisong, 1984). Depo Provera injectable for hormonal contraception has a common side effect of prolonged amenorrhea in some individuals and as such is likely to cause an increase in the mean time

SANE

to pregnancy after discontinuation. Although some studies associated injectable use with some delay in returning to fertility, they concluded that fertility is not impaired once the progestogen is cleared from the body (Killick et al., 2009; Bigrigg et al., 1999; Fotherby and Howard, 1986). Several studies suggest that the effect of the injectables on subsequent fertility could in part be due to residual ovarian suppression; one of the modes of action of injectables, even after stopping use (Hassan and Killick, 2004).

KNUST

5.3.1.4 IUCDs

Use of IUCD among women has been associated with several myths and misconceptions including sexual partner feeling the device, the device causing abortion, and the device being ineffective such that some babies are born holding the device. Its influence on time to fertility in this study however does not reflect these misconceptions. In this study, the mean and median time to fertility was 5 and 8months respectively and the rate of fertility within a year was 100% among IUCD users. The study by Abdullah and Mahmoud (1998) which considered the Copper T IUD also found 95% fertility rate after removal within a 12month period and Dofman et al (1979) also found 87.5% fertility rate within 18months after removal of the IUCD.

Delbarge et al.,(2002) in a study to determine return to fertility in nulliparous and parous women after removal of another type of IUCD; GyneFix intrauterine contraceptive system report that 88% and 99% of the past users of GyneFix interviewed had conceived, at 12 months and after 2 years' observation respectively. However, a strong statistical significance in pregnancy rate was shown (p = 0.007) between parous and

nulligravid/nulliparous women, leading the researchers to conclude that nulliparous women conceive significantly earlier than parous women, after discontinuation of IUCD use. Due to the small sample of IUCD users in the study, this comparison could however not be done.

5.3.2 Duration of contraceptive use and return to fertility

There are conflicting schools of thought on the impacts of contraceptive duration and method on the time to pregnancy after discontinuation.

Most of the respondents in this study used contraceptives for the short term; which is two or less years. Among the women who used contraceptives for the short term, the majority (89.3%) conceived within the first year whereas 10% conceived after the first to second year. About 88.3% of the women who used contraceptives for long term; more than two years, also conceived within the first year after contraceptive discontinuation. As such, return to fertility was not statistically significantly different between the durations (short term; ≤2years, long term: >3years)of contraceptive use. This is consistent with some previous studies, which also found no statistically significant influence of duration of contraceptive use on return to fertility (Abdullah & Mahmoud, 1998). Similarly, according to a prospective study conducted in England and Scotland by Doll, Vessey and Painter (2001), there was no association between return to fertility and duration of contraceptive use for all contraceptives except IUDs even after individual and lifestyle characteristics of the women interviewed were adjusted for in the multivariable analysis.

However, in the Doll, Vessey and Painter (2001), study, women who have never given birth and have used an IUD for an extended period of time faced decreased fertility when they tried to conceive. According to the study, 39% of nulliparous women after the discontinuation of IUD conceived within 12 months, compared with 54% of those who stopped using a barrier method. Further, after other factors that affect fertility were taken into account, the proportion of nulliparous women who conceived within 12 months after the discontinuation of IUD was significantly lower among women who had used an IUD for 78 months or more at 28%, than for those who had used one for a shorter periodie less than 78 months at 45% (Doll, Vessey & Painter, 2001). However, the same study results indicate that for short term intrauterine device users (as defined by the study to be < 42) months), the return to fertility pattern was more favorable than seen in those discontinuing oral contraceptives(Doll, Vessey& Painter, 2001). Other studies such as Wiegratz et al., (2006), also found that increasing duration of intrauterine device use was associated with decreasing fertility after adjusting for potential confounding factors, including maternal age, husband's social class, and history of gynaecological illnesses. The study by Chasan-Taber et al (1997) also found that the return to fertility for women who discontinue oral contraceptives after a long duration (greater than or equal to 24 months) takes longer when compared with women who discontinue other methods of contraception.

In contrast, a study by Farrow et al (2002) to investigate the association of total duration of oral contraceptive usage with time to conception, results suggested that previous prolonged use of oral contraception was associated with rather improved fecundity independent of other factors such as age and parity.

JSANE

5.3.3 User characteristics and return to fertility

The relationship between lifestyle factors and fertility has been studied using differing methodological approaches, in a variety of contexts. One's individual and lifestyle characteristics age, previous pregnancies, coital, frequency, certain drugs, and medications, emotional factors, smoking, alcohol intake, sexually transmitted infections and other gynecological diseases, nutritional factors (being malnourished, overweight or underweight), and being overweight or underweight have been shown to influence infertility (Krysiewicz, 1992; Hassan &Killick, 2004; ASRM, 2009;Akhter &Jebunnaher, 2012). This study considered the age, gynecological diseases/surgeries, weight/body mass index, harmful alcohol intake and tobacco ingestion; smoking, sniffing, drinking.

5.3.3.1 Age and return to fertility

Evidence from previous studies show that a woman's fertility is affected by her age; the effects of which occur as a continuum after a certain age (Akhter &Jebunnaher, 2012; NICE, 2013).Fertility is known to peak in the early and mid-twenties, and decline after age 35 (Anderson,Dallal& Must, 2003; Al Sahab, et al., 2010;Akhter&Jebunnaher, 2012; NICE, 2013).

This study found no significant influence of age on fertility, after contraceptive use both in the uni-variable and multivariable analysis. This is consistent with the study by Issa and Amr, (1998), that also reports that although patients aged \geq 30 years appeared to require slightly more time to conceive than did women <30 years with respect to removal of IUCDs, this difference is not statistically significant.

However, other studies report that advancing age is associated with prolonged average time for achieving conception irrespective of contraceptive use, non-use, method or duration, such that the probability of achieving a pregnancy in one menstrual cycle begins to decline slowly but significantly in the early 30s, and increasingly in the latter 30s onwards (Menken, Trussel& Larsen, 1986; Faddy et al., 1992;Practice Committee of American Society for Reproductive Medicine, 2008).

KNUST

5.3.3.2 Gynecological disease and return to fertility

This study found no significant association between gynecological disease and fertility after contraceptive discontinuation.

However, an association between gynecological disease and infertility has been established from many previous studies. This includes the impairment of female fertility by pelvic inflammatory disease (Wiesenfeld et al., 2012; Westrom et al., 1992; Westrom et al., 1992). The purpose of these studies however differed since the current study focused on fertility after contraceptive discontinuation and history of gynecological disease. Khan at al., (2007) suggest that in women who already have gynaecological issues use of some hormonal contraceptives such as some pills and injectables might have a brief left over negative effect on subsequent fertility. They thus suggested that women who may have pre-existing issues of fertility should be encouraged to use other methods that provide an effective means of contraception without a significant impact on future fertility. Similarly, Glasier (2000) who studied return to fertility after removal of implants compared the ovarian function of women who had discontinued the use of implants to conceive. He observed that the ovarian function of the women before insertion of the implants, and during the time that the implants were inserted affected their return to fertility; however this effect was based on the extent of the compromised ovarian function. He thus reported that women who had normal ovarian function at the time of insertion of implants consequently have a faster return to fertility after discontinuation (Glasier, 2002).

5.3.3.3BMI and return to fertility

A number of studies have shown a linear relationship between obstetric complications and body mass index (BMI) in both underweight and overweight/obese women (Abenhaim et al., 2007; Zaadstra., 1993; Hamilton-Fairley et al., 1992). The American Society for Reproductive Medicine (ASRM) also indicated that 12% of all infertility cases in women is a result of a woman either being underweight or overweight (ASRM, 2009).

This study found no significant influence of BMI on fertility after contraceptive discontinuation in both uni-variable and multivariable analysis and this is consistent with Balen et al. (2006), where BMI was not related to pregnancy rates. On the other hand, in a study by Bolumar et al., (2000), after adjustment for socio-demographic, biologic, and lifestyle-related factors, there was a strong association between obesity (body mass index of \geq 30 kg/m2) and delayed conception (odds ratio = 11.54, 95% confidence interval: 3.68, 36.15)and underweight(body mass index was <20 kg/m2)and delayed conception (odds ratio = 1.70; 95% confidence interval: 1.01, 2.83).However, this association was only seen in women smokers, leading the researchers to conclude that those who are underweight or obese require a longer time to conceive only if they also smoke.

5.3.3.4Alcohol intake, Smoking and Return to Fertility

The outcome of this study shows that alcohol intake and secondary smoking have no significant influence on return to fertility after contraceptive discontinuation. Although there was increased probability to conceive among women who had not experienced secondary smoking, this was not significant.

In line with this, most studies have also found no relationship between reduced fertility and moderate alcohol intake in women (Eggert, Theobold and Engfeldt, 2004; Olsen et l., 1997; Florack, Zalhuis and Rolland, 1994; Zaadstra et al., 1994; Olsen et al., 1982). This is however in contrast to previous report of increased rates of infertility among women who take alcohol frequently (Bahomondes et al., 1994; Becker et al., 1989; Wilsnack, Klassen and Wilsnack, 1984; Eggert, Theobold and Engfeldt, 2004; Jansen et al., 1998; Olsen et al., 1997; Florack, Zalhuis and Rolland, 1994; Zaadstra et al., 1994; Olsen et al., 1982).

With respect to tobacco use, it has been documented that women who smoke have an increased incidence of tubal infertility and a markedly increased risk of ectopic pregnancy, and when compared to women who have never smoked, have an almost four-fold incidence of ectopic gestation (Bouyer et al., 2003; Talbot &Riveles, 2005; Soares, 2009). In comparison, the study findings report that there is no significant relationship between smoking and return to fertility, and this may be due to the small number of study participants who were smokers or had been exposed to second hand smoking.

CHAPTER 6

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

This section draws conclusions about the objectives of the study, based on the study results. Generally, based on the results of this study, it appears that the effect of previous contraceptive use, irrespective of the method and/or duration of use has no statistically significant effect on future fertility before and after adjustment of confounding factors.

6.1.1 Women's Knowledge of Factors Influencing Return to Fertility

The study explored the knowledge of women about influence of factors other than contraceptive use on return to fertility. Knowledge of factors influencing return to fertility after contraceptive discontinuation was not universal among the women studied, with only about 35% believing that factors other than contraceptive use also influenced return to fertility. As such, it can be concluded that the lack of and inadequate knowledge of factors influencing return to fertility after contraception discontinuation is a major issue, that could be arising from inadequate information given by service providers; considering over 40% or respondents received return to fertility information from service providers. It can also be concluded that these gaps in information about contraceptive methods provided to clients, contributes to myths, misconceptions and fear of side effects, and thus may be linked to low uptake of family planning methods.

6.1.2 Relationship between Method of Contraceptive Used and Return to Fertility

Regardless of the contraceptive method used, this study shows that there is no significant relationship between contraceptive use and return to fertility after discontinuation. Although the mean time to return to fertility differed for the different methods, these differences were statistically insignificant. In light of this, it can be concluded that despite the delay in return to fertility after discontinuation of some contraceptives as compared to others, the delays don't differ significantly by method. As such, method of contraceptive used can be concluded to have no effect on return to fertility after discontinuation.

6.1.3 Relationship between Duration of Contraceptive Use and Return to Fertility

This study found no statistically significant relationship between duration of contraceptive use and return to fertility after contraceptive use. Although longer use of hormonal methods is associated with longer delay in return to fertility, the differences in the return to fertility are not statistically significant, leading to the conclusion that duration of prior contraceptive use does not influence the time to return to fertility after discontinuation.

6.1.4 The Relationship between the User's Characteristics and Lifestyle on Return to Fertility after Contraceptive Use

SANE

With respect to demographics and lifestyle characteristics, this study considered the age, gynecological diseases/surgeries, weight/body mass index, harmful alcohol intake and tobacco ingestion; smoking, sniffing, drinking, and their influence on return to fertility after

contraceptive discontinuation. Based on the results of this study, there is no significant relationship between any of the above listed characteristics and return to fertility after contraceptive discontinuation.

In conclusion, a key factor for the discontinuation or non-use of contraception is fear of experiencing side effects and the fear of impaired fertility in the future. High rates of contraceptive discontinuation for reasons other than the aspiration for pregnancy are of public health concern due to their association with negative reproductive health consequences. As such, ensuring that family planning strategies and interventions address these concerns is pertinent in ensuring contraceptive uptake and continuation.

6.2 RECOMMENDATIONS

By taking a multi-faceted approach, the myths and misperceptions that Ghanaian women report regarding contraception could be overcome.

Service Providers

Service providers should ensure that they provide return to fertility information before the client requests the information, such that from the get-go, clients are well informed to make informed choices, since the issue of fear of side effects' particularly future infertility which can lead to contraceptive discontinuation should be a key point addressed during counseling for contraceptive uptake. Similarly, service providers can ensure that during campaigns, durbars and any gathering for family planning promotion, return to fertility, myths and misconceptions and non-contraceptive benefits are stressed.

District Health Directorate

The metropolitan health management team should ensure that:

- Trainings and updates for service providers on counseling should be frequently conducted. The counseling approaches should be geared towards providing clients with clear and current information on return to fertility as one of the key points mentioned for every method.
- Service providers are educated and updated on the relationship between different socio-economic, demographic and lifestyle factors and return to fertility, such that they can provide and emphasize adequate information to clients. This will improve uptake since there is evidence from some studies on the relationship between clients' characteristics such as age, body mass index, and alcohol intake, etc. and return to fertility.
- Information, education and communication (IEC) programmes and materials should be improved to provide detailed and up-to-date information, so as to enhance the commitment and motivation of users. IEC programme such as community campaigns and radio and television advertisements and discussions programs can be used to dispel the myths and misconceptions surrounding contraceptive use. Similarly, IEC materials such as fliers, posters and brochures can also be produced to cover return to fertility and factors influencing return to fertility, such that clients can have easy access to information. Materials and programs should highlight the importance of using family planning and the benefits that accompany its use as compared to the possible side effects and limitations.

• The results of this study should be used to guide and facilitate collaboration between the metropolitan area and other agencies including private and development partners and Non-Governmental Organization (NGO) to provide interventions which are geared towards the improvement of contraceptive uptake and continuation.

NGOs/Other Stakeholders

For a multi faceted approach, all stakeholders in family planning, reproductive health and public health in general should be encouraged to work together for integration. By doing this, it will improve collaboration with other agencies to provide interventions which are geared towards the improvement of contraceptive uptake and continuation. It will also improve the quality and access to information if all stakeholders recognize the importance of family planning in national development, and recognize their roles in delivering the right messages to address myths and misconceptions.

Future Research

- In this study, no differentiation was made between the use of combined oral contraceptives, and progestin only pills, as well as combined and progestin only injectables, although there is some supporting evidence of the differences in effects on subsequent fecundity between users of the two types contraceptives. Future studies can consider these differences.
- Due to the small number of Implant and IUCD users sampled in the study, there is the need for further studies involving larger numbers of IUCD and implant users, in order to ratify their effects on later fertility after discontinuation.

REFERENCES

Abdullah AI&Mahmoud FA(1998). Fertility After Removal Of Intrauterine Contraceptive Devices. *Current Therapeutic Research, vol. 59, (4), pp. 257-61.*

Abenhaim HA, Kinch RA, Morin L, Benjamin A, & Usher R, (2007). Effect of pre pregnancy body mass index categories on obstetrical and neonatal outcomes. *Arch GynecolObstet vol.* 275, pp. 39–43.

Accra Metropolitan Assembly, Health sector - Ghana » Greater Accra Region » Accra Metropolitan: Health Characteristics. Accessed at<u>http://ama.ghanadistricts.gov.gh</u>/?arrow=atd&_=3&sa=1151[20 August, 2013]

Accra Metropolitan Assembly, (2013). Accessed at <u>http://ama.ghanadistricts.gov. gh/</u> [15 December, 2012]

Affandi B., (1999). Pregnancy after removal of etonogestrel implant contraceptive (Implanon). *MedJ Indonesia vol. 8 pp. 62–4*.

Ahmed S, Li Q, Liu L & Tsui AO, (2012). Maternal deaths averted by contraceptive use: an analysis of 17 countries. *The Lancet, vol. 380 (9837), pp: 111-125*

Akhter N, &Jebunnaher S, (2012). Evaluation of Female Infertility. *J Medicine, vol. 13, pp. 200-209.*

Ali, MM., Cleland J., & Shah, I.H., (2012). Causes and consequences of contraceptive discontinuation: evidence from 60 demographic and health surveys. *WHO. Geneva*

SANE

Al-Sahab B, Ardern CI, Hamadeh MJ, Tamim H, (2010). Age at menarche in Canada: results from the National Longitudinal Survey of Children & Youth. *BMC Public Health, vol. 10, pp. 736*

American Society for Reproductive Medicine (ASRM). (2012). Infertility: An Overview.Accessed <u>at https://www.asrm.org/Booklet_Infertility_An_Overview/</u> [March 28 2013]

American Pregnancy Association, (2013). Fertility Awareness; Natural Family Planning(NFP). Accessed at <u>www.americanpregnancy.org/preventingpregnancy/fertilityawarenessNFP.html</u> [January 30 2013]

Ankomah A, Anyanti J, &Oladosu M, (2011). Myths, Misinformation and communication about Family Planning and Contraceptive use in Nigeria. *Open Access Journal of Contraception. vol. 2, pp. 95-105.*

Ann K, Blan C, & Steve G, (2002). Greater Than Expected Fertility Decline in Ghana: Untangling a Puzzle. *J. Biosoc, Sci, vol. 34 pp. 475-495.*

Anderson SE, Dallal GE, &Must A, (2003). Relative weight and race influence average age at menarche: results from two nationally representative surveys of US girls studied 25 years apart". *Pediatrics vol. 111 (4)Pt 1, pp. 844–50.*

Archer DF, Jensen JT, Johnson JV, Borisute H, Grubb GS, Constantine GD, (2006). Evaluation of a continuous regimen of levonorgestrel/ethinyl estradiol: Phase 3 study results. *Contraception*, *vol*.74 (6) *pp*. 439-445.

ASRM (American Society for Reproductive Medicine). (2013). Female Risk Factors -Protect Your Fertility. Accessed at <u>http://www.protectyourfertility.org/femalerisks.html</u> [24 August, 2013].

Bahamondes L, Vera S, Bueno JGR, Pimental E, Hardy E, Ramos M. (1994). Identification of main factors for tubal infertility. *Fertil Steril, vol.* 61 pp. 478-82.

Bahamondes L, Lavín P, Ojeda G, Petta C, Diaz J, Maradiegue E, & Monteiro I. (1997) .Return of fertility after discontinuation of the once-a-month injectable contraceptive Cyclofem. *Contraception, vol.* 55 (5) pp. 307-10.

Baird DD, Wilcox AJ, & Weinberg CR., (1986). Use of Time to Pregnancy to Study Environmental Exposures. Am. J. Epidemiol. vol. 124 (3) pp. 470-480.

Balen AH & Anderson R, (2007). Impact of obesity on female reproductive health: British fertility society, policy and practice guidelines. *Hum Fertil, vol. 10, pp. 195–206.*

Barnhart K, Mirkin S, Grubb G, & Constantine G, (2009). Return to fertility after cessation of a continuous oral contraceptive. *Fertil Steril, vol. 91 (5), pp. 1654-6.*

Barnhart KT & Schreiber CA, (2009). Return to fertility following discontinuation of oral contraceptives. *Fertil Steril, vol. 91 (3), pp. 659-63.*

Baron JA, La Vecchia C, & Levi F, (1990). The antiestrogenic effect of cigarettesmoking in women. *Am J ObstetGynecol, vol. 162, pp. 502–4*.

Becker U, T¢nnesen H, Kaas-Claesson N, &Gluud C., (1989). Menstrual disturbances and infertility in chronic alcoholic women. *Drug Alcohol Depend, vol. 2 pp. 75-82.*

Bolúmar F, Olsen F, Rebagliato M, Sáez-Lloret I, Bisanti L, and the European Study Group on Infertility and Sub fecundity, (2000). Body Mass Index and Delayed Conception: A European Multicenter Study on Infertility and Subfecundit. *Am. J. Epidemiol. 151 (11), pp. 1072-1079*

Bouyer J, Coste J, Shojaei T, Pouly J. L, Fernandez H, Gerbaud L & Job-Spira N.(2003). Risk factors for ectopic pregnancy: a comprehensive analysis based on a large case-control, population-based study in France. *Am J Epidemiol, vol. 157, pp. 185–94*.

Bracken MB, Hellenbrand KG, &Holford TR, (1990). Conception delay after oral contraceptive use: the effect of estrogen dose. *Fertil Steril, vol. 53 pp. 21–7.*

Brieger, W. R., Delano, G. E., Lane, C. G., Oladepo, O., &Oyediran, K. A.,(2001). West African Youth Initiative: outcome of a reproductive health education program. *Journal of Adolescent Health, vol* 29(6), pp. 436-446.

Buck GM, Lowell ES, Batt RE & Mendola P, (1997). Life-style factors and female infertility. *Epidemiology. vol. 8, pp. 435–441.*

WJSANE

Chasan-Taber L, Willett WC, Stampfer MJ, Spiegelman D, Rosner BA, Hunter DJ, Colditz GA, & Manson JE, (1997). Oral contraceptives and ovulatory causes of delayed fertility.*Am. J. Epidemiol. vol. 146, pp. 258–265.*

Che Y, Cleland J, & Ali M, (2004). Periodic abstinence in developing countries: an assessment of failure rates and consequences. *Contraception vol.* 69 (1), pp.15–21.

Chen R.B & Morgan S.P, (1991). Recent trends in the timing of first births in the United States. *Demography, vol. 28, pp. 513-533.*

Cleland J, Bernstein S, Ezeh A, Faundes A, Glasie A, & Innis J, (2006). Family planning: The unfinished agenda. *The Lancet. vol. 368, pp.1810-1827.*

Clifton D, Kaneda T, & Ashford L, (2008). Family Planning Worldwide 2008 Data Sheet. *Population Reference Bureau*

Cronin M, Schellschmidt I, & Dinger J, (2009). Rate of Pregnancy after Using Drospirenone and Other Progestin-Containing Oral Contraceptives.*ObstetGynecol, vol.* 114, pp. 616–22.

Daniluk, J. C., Koert, E., & Cheung, A., (2012). Childless women's knowledge of fertility and assisted human reproduction: identifying the gaps. *Fertil Steril, vol.* 97(2), pp. 420-426.

Davis AR, Kroll R, Soltes B, Zhang N, Grubb GS, (2008). Constantine GD. Occurrence of menses or pregnancy after cessation of a continuous oral contraceptive.*Fertil Steril, vol. 89* (5) pp. 1059-63.

Davies GC, Li XF, Newton JR, Van Beek, A, &Coelingh-Bennink HJ, (1993). Release characteristics ovarian activity and menstrual bleeding with a single contraceptive implant releasing 3-ketodesogestrel. *Contraception, vol.* 47 pp. 251–61.

Dechanet C, Anahory T, Mathieu Daude JC, Quantin X, Reyftmann L, Hamamah S, Hedon B, &Dechaud H, (2011). Effects of cigarette smoking on reproduction. *Hum. Reprod*, *Update vol.* 17, (1), pp. 76–95

Department of Health UK, (2009). Regulated fertility services: a commissioning aid. London

Delbarge W, Batar I, Bafort M, Bonnivert J, Colmant C, Dhont M, Fonze V, Gevers R, Janssens D, Lavalley P, Salmin E, Dequeldre M, Vrijens M, Van Kets H & Widermeersch D. (2002) Return to fertility in nulliparous and parous women after removal of the GyneFix intrauterine contraceptive system. *Eur J ContraceptReprod Health Care vol. 7, pp. 24 - 30.*

Dofman SF, Grimes DA, Cates W, Binkin NJ, Kafrissen M,& O'Reilly KR(1984). Ectopic pregnancy mortality, United States 1979 to 1980: Clinical aspects. *ObstetGynecol, vol.* 64(3), pp. 386-390

Doll H, Vessey M, & Painter R, (2001). Return of fertility in nulliparous women after discontinuation of the intrauterine device: comparison with women discontinuing other methods of contraception. *Br J ObstetGynaecol, vol. 10, pp. 304-314*

Dunson DB, Colombo B, & Baird DD, (2002). Changes with age in the level and duration of fertility in the menstrual cycle. *Hum Reprod*, vol. 17, (5) pp.1399-1403

Edelman A, Gallo MF, Jensen TJ, Nichols DM, & Grimes DA, (2010). Continuous or extended cycle vs. cyclic use of combined hormonal contraceptives for contraception. *CochraneDatabase of Systematic Reviews* 8.

Eggert J, Theobald H, &Engfeldt P. (2004). Effects of alcohol consumption on female fertility during an 18-year period. *Fertil Steril. vol.* 81 (2),pp.379-83.

Ekstrand M, Larsson M, Von Essen L, &Tyde'n T, (2005). Swedish teenager perceptions of teenage pregnancy, abortion, sexual behavior, and contraceptive habits—a focus group study among 17-year-old female high-school students. *ActaObstetGynecol Scand. vol.* 84, *pp.980–986*.

Farrow A, Hull MGR, Northstone K, Taylor H, Ford W.C.L & Golding J, (2002). Prolonged use of oral contraception before a planned pregnancy is associated with a decreased risk of delayed conception. *Hum Reprod*, vol. 17, (10), pp. 2754-2761.

Florack EIM, Zielhuis GA, & Rolland R, (19940. Cigarette smoking, alcohol consumption, and caffeine intake and fecundability. *Prev Med. vol.* 23 pp.175-180.

NO

Ford JH &MacCormac L, (1995). Pregnancy and lifestyle study: the long-term use of the contraceptive pill and the risk of age-related miscarriage. *Hum. Reprod. vol. 10, pp.1397–1402.*

FPA (Family Planning Association), (2010). Contraception: past, present and future factsheet. Accessed at

SANE

http://www.fpa.org.uk/professionals/factsheets/contraceptionpastpresentfuture [15 June, 2013].

Ghana Statistical Service (GSS), Ghana Health Service (GHS) and the DHS Program ICF International (2015). Ghana Demographic and Health Survey 2014 – Key Indicators. *Rockville, Maryland, USA: GSS, GHS, and ICF International.*

Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro. (2009). Ghana Demographic and Health Survey 2008.*Calverton, Maryland, USA: GSS, GHS, and ICF Macro*.

Ghana Statistical Service, 2011. Ghana Multiple Indicator Cluster Survey with an Enhanced Malaria Module and Biomarker, 2011, Final Report. *Accra, Ghana*.

Ghana Statistical Service (GSS), Noguchi Memorial Institute for Medical Research (NMIMR), and ORC Macro. (2004). Ghana Demographic and Health Survey 2003.*Calverton, Maryland: GSS, NMIMR, and ORC Macro*.

Ghana Statistical Service (GSS) and Macro International Inc. (MI). (1999). Ghana Demographic and Health Survey 1998. *Calverton, Maryland: GSS and MI*.

GHS (Ghana Health Service), (2007). Ghana Maternal Health Survey. Ghana Statistical Service, Ghana Health Service, and Macro International.

GHS (Ghana Health Service), (2011). Family Health Division 2010 Annual Report.

GHS (Ghana Health Service), (2014). Family Health Division 2013 Annual Report.

Glasier A, (2002). Implantable contraceptives for women: effectiveness, discontinuation rates, return of fertility, and outcome of pregnancies. *Contraception, vol. 65, pp. 29–37.*

The Greater Accra Region. Accessed at http://www.modernghana.com/GhanaHome/regions/greateraccra.asp [28 July 2013]

Greydanus DE, Patel DR, &Rimsza ME, (2001). Contraception in the adolescent: an update. *Pediatrics. Vol. 107, pp. 562–573.*

Grimes DA, Benson J, Singh S, Romero M, Ganatra B, Okonofua FE, & Shah IH, (2006). Unsafe abortion: the preventable pandemic.*The Lancet, vol. 368 (9550), pp.1908 – 1919.*

Guida M, Sardo Di S, Bramante S, Sparice S, Giuseppe A, Tommaselli GA, Costantino Di Carlo, Pellicano M, Greco E, &Nappi C, (2005). Effects of two types of hormonal contraception—oral versus intravaginal—on the sexual life of women and their partners. *Human Reproduction. vol.20 (4) pp. 1100–1106*.

Guttmacher Institute, (2012). Fact Sheet: Contraceptive use in the United States. Accessed at <u>www.gutmacher.org/pubs/fb_contr_use.pdf[</u>28 August 2013]

Gyimah SO, Adjei J, &Coffie N, (2011). Ghana's Family Planning Policy: A review and preview of the success story of Ghana's Family Planning Policy. Think Africa Press. Accessed online at www.thinkafricapress.com/Ghana/family-planning-policy[30 August 2013]

Hamilton-Fairley D, Kiddy D, Watson H, Paterson C, & Franks S, (1992). Association of moderate obesity with a poor pregnancy outcome in women with polycystic ovary syndrome treated with low dose gonadotrophin. *Br J ObstetGynaecol, vol. 99, pp. 128–131*.

Hang R, Li W, & Lo SST, (2005). Evolutionary Voyage of Modern Birth Control Methods. *Hong Kong Journal of Gynaecology, Obstetrics and Midwifery.* 5 (1):40-45

Hasson HM, (1978). Copper IUDs. J Reprod Med, vol. 20 pp. 139-154.

Hannaford P., (2000). Health consequences of combined oral contraceptives. *Br Med Bull* vol. 56, pp. 749 - 760

HindinMJ,McGough LJ, and Adanu RM.(2014). Misperceptions, misinformation and myths about modern contraceptive use in Ghana. J FamPlannReprod Health Care, vol. 40, pp. 30–35.

Hong R, Fronczak N, Chinbuah A, & Miller R, (2005). Ghana Trend Analysis for Family Planning Services, 1993, 1996, and 2002. *Calverton, Maryland, USA: ORC Macro*.

NO

Hughes EG & Brennan BG, (1996). Does cigarette smoking impair natural or assisted fecundity? *Fertil Steril, vol. 66, pp. 679–90.*

International Conference on Population and Development (ICPD), (1994). Programme of Action. Accessed online at<u>http://www.un.org/ecosocdev/geninfo/populatin/icpd.htm[</u>20 November, 2013]

IRH (Institute for Reproductive Health), (2013). Fertility Awareness across the Life Course: A comprehensive literature review. FAM Project.Washington, DC. Institute for Reproductive Health, Georgetown University

James S, &Kepron C, (2001). Of Lemons, Yams and Crocodile Dung: A Brief History of Birth Control. *University of Toronto Medical Journal, vol.* 79 (1), pp. 156-158

Jansen TK, Hjollund NHI, Henriksen TB, Scheike T, Aleksander HG, Ernst E, Bonde JP, Skakkebæk NE, & Olsen J, (1998). Does moderate alcohol consumption affect fertility? Follow up study among couples planning first pregnancy, *British Medical Journal*,317:505.

Joffe M, (1997). Time to pregnancy: a measure of reproductive function in either sex. Occup. *Environ. Med, vol. 54, pp. 289–299.*

Justyna RS, (2000). Contraception in the Ancient Times. The Proceedings of the 9th Annual History of Medicine Days, Faculty of Medicine, The University of Calgary - Health Sciences Centre Calgary, AB. *Edited by Dr. W. A. Whitelaw, pp 18-22.*

Kaunitz AM. (1998)Injectable depot medroxyprogesterone acetate contraception: an update for U.S. clinicians. *Int J Fertil Womens Med.*, vol. 43(2), pp.73-83.

Kent MM, (2008). Demand for Family Planning is rising. Population Reference Bureau Accessed at <u>www.prb.org/Publications/Datasheets/2008/familyplanningworldwide.aspx</u> [28 July 2013]

Khan, S., Mishra V., Arnold F., and Abderrahim N., (2007). Contraceptive Trends in Developing Countries. DHS Comparative Reports No. 16. *Calverton, Maryland, USA: Macro InternationalInc.*

Killick S., Trussel J., Cleland K., and Moreau C., (2009). Factors associated with sub fertility among women attending an antenatal clinic in Hull. *Hum Fertil (Camb), vol. 12(4), pp. 191-197*

Kiriwat O, Patanayindee A, Koetsawang S, Korver T,&Bennink HJ(1998). A 4-year pilot study on the efficacy and safety of Implanon, a single rod hormonal contraceptive implant, in healthy women in Thailand. *Eur J ContraceptReprod Health Care vol. 3 pp. 85–91.*

Lal A, (1966). Early Fertility-Management Concepts in China. *Hawaii Med J, vol. 26* (2)pp. 110-114.

Maheshwari A, Stofberg L, & Bhattacharya S. (2007). Effect of overweight and obesity on assisted reproductive technology—A systematic review. *Hum Reprod Update, vol. 13, pp. 433–444.*

Martin SP, (2000). Diverging fertility among U.S. women who delay childbearing past age 30. *Demography, vol. 37, pp. 52-533.*

Mansour D, Gemzell-Danielsson M, Inki P, &Jensen JT, (2011). Fertility after discontinuation of contraception: a comprehensive review of the literature. *Contraception, vol.* 84 (5) pp. 465-77.

Meirik O, Farley MM, Sivin I, & Diaz S, (2001). Post-marketing surveillance of Norplant contraceptive implants: contraceptive efficacy and reproductive health. *Contraception, vol.* 63, pp. 167–86.

Midgette AS, & Baron JA, (1990). Cigarette smoking and the risk of natural menopause. *Epidemiology, vol. 1, pp. 474–450.*

Milsom I, Lete I, Bjertnaes A, Rokstad K, Lindh I, Gruber CJ, Birkhäuser MH, Aubeny E, Knudsen T &Bastianelli C, (2006). Effects on cycle control and bodyweight of the combined contraceptive ring, NuvaRing, versus an oral contraceptive containing 30 mg ethinyl estradiol and 3 mg drospirenone. *Human Reproduction*, vol.21, (9) pp. 2304–2311.

MOH (Ministry of Health), (2011). MDG Acceleration Framework and Country Action Plan: Maternal Health. *Accra, Ghana*.

National Population Council, (1994) National Population Policy (Revised Edition, 1994). *Accra, Ghana*.

Nelson LR &Bulun SE, (2001). Estrogen production and action". J. Am. Acad. Dermatol, vol, 45 (3 Suppl): S116–S124.

NICE (National Institute for Health and Care Exellence), (2013). Fertility: assessment and treatment for people with fertility problems. *NICE clinical guideline CG156*.

Olsen J, Bolumar F, Boldsen J, &Bisanti L, the European Study Group of Infertility and Subfecundity, (1997). Does moderate alcohol intake reduce fecundability? A European multicenter study on infertility and sub-fecundity. *Alcohol ClinExp Res, vol. 21, pp. 206-12.*

Olsen J, Rachootin P, Schi¢dt AV, &Damsbo N, (1982). Tobacco use, alcohol consumption and infertility. *Int J Epidemiol, vol. 1, pp. 179-84.*

Parr Nicholas J., 2003. Discontinuation of Contraceptive Use in Ghana. *Journal of Health, Population and Nutrition, vol. 21 (2) pp. 150-157.*

Performance Monitoring and Accountability 2020 (PMA2020) Project, Kwame Nkrumah University of Science and Technology (KNUST). (2013). Detailed Indicator Report: *Ghana 2013. Baltimore, MD: PMA2020*.

Practice Committee of American Society for Reproductive Medicine. (2008a). Age-related fertility decline: a committee opinion. *Fertil Steril, vol. 90, (5 Suppl) pp. S154-155*

Practice Committee of American Society for Reproductive Medicine, (2008b). Smoking and Infertility. *Fertil Steril vol. 90 (5 Suppl) pp. S254–9*.

Quarin CA, (2005). History of contraception. *Women's Health Medicine, vol.* 2 (5) pp. 28-30.

Ranjit N, Bankole A, Darroch JE, & Singh S, (2001). Contraceptive failure in the first two years of use: differences across socioeconomic subgroups.*FamPlannPerspect, vol. 33, pp. 19-27.*

RHTP (Reproductive Health Technologies Project), 2013. Hormonal Contraception. Accessed at www.rhtp.org/contraception/hormonal/default.asp#q1 [22 February, 2014)

Ryder Re, (1993). Natural family planning: effective birth control supported by the Catholic Church. *Department of Endocrinology, Dudley Road Hospital, Birmingham. pp.723-726.*

Schlott K, (2012). Population Geography, GEOG 241 (Lecture notes). *Hunter College of the City University of New York, New York.*

Sedgh G, Hussain R, Bankole A, & Singh S, (2007). Women with an Unmet Need for Contraception in Developing Countries and Their Reasons for Not Using a Method.New York: Guttmacher Institute. Accessed online at <u>http://www.guttmacher.org/pubs/2007/07/09/or37.p[20 November, 2013]</u>

Singh K, Viegas OA, &Ratnam SS, (1990). Norplant contraceptive implants—a comparison of capsules versus rods in Singapore. *Singapore Med Journal, vol.31 pp.568–572.*

Sivin I, Stern J, Diaz S, Pavéz M, Alvarez F, Brache V, Mishell DR Jr, Lacarra M, McCarthy T, HolmaP, Darney P, Klaisle C, Olsson SE, &Odlind V. (1992). Rates and outcomes of planned pregnancy after use of Norplant capsules, Norplant II rods, or levonorgestrel-releasing or copper TCu 380Ag intrauterine contraceptive devices. *Am. J ObstetGynecol, vol.166, pp. 1208–1213.*

Spira A, 1986. Epidemiology of human reproduction. Hum. Reprod, vol. 1 pp.111–115.

Talbot P, &Riveles K, (2005). Smoking and reproduction: the oviduct as a target of cigarette smoke. *ReprodBiolEndocrinol, vol. 3, pp. 52–8.*

Tatum HJ, Schmidt FH, & Jain A, (1976). Management and outcome of pregnancies associated with the copper T intrauterine device. *Am J ObstetGynecol, vol. 126 pp. 369-370.*

Tetze C, &Lewit S, (1970). Evaluation of intrauterine devices: Ninth progress report of the cooperative statistical program. *Stud FamPlann, vol. 55 (40) pp. 22-76.*

SANE

The American Heritage® Dictionary of the English Language, (2000). Fourth Edition copyright by Houghton Mifflin Company. Updated in 2009. Published byHoughton Mifflin Company.

The history of vasectomy. (2013) Assessed at <u>http://www.vasectomy-information.com/</u> <u>moreinfo/history.html[15 June, 2013]</u>. Trang Pham TN & Hieu TH, (2011). Effects of Population Growth on Economic Growth In Asian Developing Countries. Bachelor Thesis in Economics. Mälardalen University, Västerås.

Trussell J, (2004). Contraceptive failure in the United States. *Contraception, vol.70* (2)pp.89-96.

Tuladhar H. & Marahatta K.R., (2008). Awareness and practice of family planning methods in women attending Gyne OPD at Nepal Medical College Teaching Hospital. *Nepal Med Coll J.; 10 (3), pp. 184 – 191.*

Valdiserri R, (1988). *Cum Hastis Sic Clypeatis: The Turbulent History of the Condom*. Bulletin of the New York Academy of Medicine, 64 (3):237-245. Accessed online www.ncbi.nlm.nih.gov/pmc/articles/PMC1629326/pdf/bullnyacadmed00030-0039.pdf[15 June 2013].

Vessey MP, Villard-Mackintosh L, & Painter R, (1993). Epidemiology of endometriosis in women attending family planning clinics. *British Medical Journal vol. 306 pp. 182–184*.

Vessey MP, Smith MA & Yeates D, (1986). Return of fertility after discontinuation of oral contraceptives: influence of age and parity. *Br. J. Fam. Plann.*, *11*, *pp. 120–124*.

Vessey MP, Lawless M, McPherson K, &Yeates D, (1983). Fertility after stopping use of intrauterine contraceptive device. *British Medical Journal vol.* 286 (6359) pp.106.

Vessey MP, Wright NH, McPherson K, & Wiggins P, (1978). Fertility after stopping different methods of contraception. British Medical Journal, vol.1 p.265–267.

Vessey M, Doll R, Peto R, Johnson B, & Wiggins P, (1976). A long-term follow up study of women using different methods of contraception: An interim report. *J BiosocSci, vol.* 8 *pp.* 373-427.

Weekes JR, (1999). *Population: An Introduction to Concepts and Issues*. 7th ed. Wadsworth Publishing Company, Belmont, USA.

Weigratz I, Mittman K, Dietrich H, Zimmerman T, &Ruhl H, (2006). Fertility after discontinuation of treatment with oral contraceptives containing 30µg of ethinly estradiol and 2mg of dienegest. *Fertil Steril, vol. 85 p.1812-9*

Westoff CF, (2001). Unmet Need at the End of the Century: DHS Comparative Reports 1. Calverton, MD: ORC Macro

Westoff CF, &Bankole A, (1995). *Unmet Need 1990-1994: DHS Comparative Studies 16*. Calverton, MD: ORC Macro. Accessed at <u>http://www.measuredhs.com/publications/</u><u>publication-CS16-Comparative-Reports.cfm[</u>28 July 2013]

Westrom L., Joesoef R., Reynolds G., Hagdu A., & Thompson SE, (1992). Pelvic Inflammatory disease and fertility. A cohort study of 1844women with laproscopically verified disease and 657 control women with normal laproscopic results. *Sex, Transm. Dis.vol 19 pp185-192*

Whitelaw MJ, (1960). Statistical evaluation of female fertility. *Fertil Steril.vol.* 18 pp. 428-429.

Whitelaw MJ, (1967). Should nullipara and infertility patients be given oral contraceptives? *Trans N EnglObstetGynecolSoc*, vol. 21 p. 131-40.

WHO, (2011) (World Health Organization). Family Planning: A Global Handbook for providers. WHO Department of Reproductive Health and Population; Johns Hopkins Bloomberg School of Public Health and USAID.

WHO, (2012). Family Planning Fact Sheet N°351. Accessed at http://www.who.int/mediacentre/factsheets/fs351/en/index.html [15 June 2013]

WJSANE

WHO, (2004). Medical Eligibility Criteria for Contraceptive Use: Fertility awarenessbased methods. Third edition. *World Health Organization*.

NO

Wiesenfeld HC, Hillier SL, Meyn LA, Amortegui AJ, & Sweet RL, (2012). Subclinical Pelvic Inflammatory Disease and Infertility. *Obstetrics & Gynecology, vol. 120, (1), pp 37–43*

Wilsnack SC, Klassen AD, & Wilsnack RW, (1984). Drinking and reproductive dysfunction among women in a 1981 national survey. *Alcohol ClinExp Res, vol. 8, pp. 451-8.* Van Voorhis BJ, Dawson JD, Stovall DW, Sparks AE, &Syrop CH, (1996). The effects of smoking on ovarian function and fertility during assisted reproduction cycles. *ObstetGynecol, vol. 88 no. 5, pp. 785-91.*

Zaadstra BM, Habbema JDF, Looman CWN, Karbaat J, &Velde ER, (1994). Moderate drinking:no impact on female fecundity. *Fertil Steril, vol. 62 pp. 948-54*.

Zaadstra BM, Seidell JC, Van Noord JC, teVelde ER, Habbema JD, Vrieswijk B, &Karbaat J, (1993). Fat and female fecundity: prospective study of effect of body fat distribution on conception rates. *British Medical Journal, vol. 306,pp.* 478–487.

Zaidi S, Usmani A, Shokh IS, &Alam SE, (2009). Ovarian reserve and BMI between fertile and subfertile women. J Coll Physicians Surg Pak, vol. 19 (1) pp. 21-4.



APPENDIX 1 - QUESTIONNAIRE

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY SCHOOL OF MEDICAL SCIENCES DEPARTMENT OF COMMUNITY HEALTH

Good day Madam,

We are a research team conducting a research on the factors influencing the return to fertility after contraceptive discontinuation among contraceptive ever-users in the Accra Metropolitan Area, Ghana.

We request your kind assistance in completing this research. The questionnaire is purposefully designed to elicit information on your past contraceptive use, prior to your current pregnancy, and certain behavioral/lifestyle characteristics. This information will assist us in determining the factors that affect return to fertility after contraceptive discontinuation among women in the Accra Metropolitan Area.

It would be appreciated if you could spend a few minutes of your time to kindly respond to the items on the questionnaire. The questionnaire is divided into 4 sections; demographic information, contraceptive use information, knowledge about return to fertility and risk factors information. Please read all the questions and options given carefully and, follow the correct instructions at each section.

Please note that the information is being used for research purposes, therefore your name will not be required. All information collected is confidential and as such will be kept secure by all researchers. Please read the participant information leaflet carefully for further details. At the end of it all, please provide your signature or thumb print on the informed consent form if you agree to participate in this study. You may begin to answer the questionnaire after signing/thumb printing the informed consent form.

Thank you very much for your cooperation.

TOPIC:Factors Influencing the Return to Fertility after Contraceptive Discontinuation among Contraceptive Ever-Users in the Accra Metropolitan Area, Ghana.

TARGET GROUP: Pregnant women of reproductive age (15 – 49 years) who used contraceptives prior to the current pregnancy and are attending antenatal clinic in the Accra Metropolitan Area.

DISTRICT:			
		KNUST	
SUB-DISTRICT:			
FA	CILITY:		
DA	TF OF INTERVIEW.		
DATE OF INTERVIEW.			
INTERVIEWER NAME:			
		The state	
PARTICIPANT CODE:			
SECTION 1: DEMOGRAPHIC INFORMATION			
Qu	estions	Response	Code
А	What is your date of birth	J SANE NO	
		Day Month Year	
В	How old were you on your		
	last birthday?		
С	What is your ethnic	Akan	1
---	--	--	------
	background?	Ga/Dangme	2
		Ewe	3
	(Please circle the	Guan	4
	corresponding number)	Mole /Dagbani	5
		Hausa	6
		Other	7
		Refused	8
D	Are you currently married	No, never in union	1
	or living together with a	Yes, currently married	2
	man as if married?	Yes, living with a man but not married	3
	(Diagga single the	Not currently in union: Divorced/Separated	4
	(Please circle the corresponding number)	Not currently in union: Widow	5
Е	What is the highest level of	Never Attended	1
	school you have attended?	Primary	2
		Middle / JSS/JSH	3
	(Please circle the	Secondary / SSS/SHS	4
	corresponding number)	Higher	5
F	Over the past year, what has	Less than GH CEDIS 200.00	1
	income from all sources?	GH Cedis 200.00 to less than GH Cedis	2
		500.00	3
	(Please circle the	GH Cedis 500 to less than GH Cedis 1000	4
	corresponding number)	GH Cedis 1000 to less than GH Cedis 1500	5
	15		5
		More than or equal to GH Cedis 1500	
G	Religious affiliation	Christian	1
	I	Moslem	2
	(Please circle the	Traditionalist	3
	corresponding number)	Other	4
SECTION 2: CONTRACEPTIVE USE INFORMATION (Please circle the corresponding			
numbers)			
\cap	actions	Pesnonse	Code

numbers)			
Questions		Response	Code
Η	Please select which of these	Pills (Ovrette/Microgynon/Microlut/Micronor)	1
	contraceptive methods that	Injectables (Depo Provera/Norigynon)	2
	you used immediately	Implants (Jadelle/Implanon/Sino implant)	3
	before conception	IUCD/IUD	4
	_	Other	5
Ι	How long did you use the	< 6 months	1
	chosen method before you	6 to 12 months	2
	stopped to have a baby?	12 to 24 months	3
		24 to 36 months	4

	Dlagge estimate the number	>36 months	5
			5
	10		
	Months		
J	After discontinuation, how	< 6 months	1
	long did it take you to get	6 to 12 months	2
	pregnant?	12 to 24 months	3
		24 to 36 months	4
	Please estimate the number	>36 months	5
	of		-
	01		
	Months	INTERNAL	
Κ	Have you ever stopped	YES	1
	using a modern family		2
	planning method for reasons		-
	other than to conceive?		
	other than to concerve:		1
	If VES places indicate by	Econ of infortility	1
	II TES, please indicate by	Fear of finefunity	2
	ticking why you stopped	Experienced side effects	5
		Infrequent sex / husband away	4
		Husband / partner disapproved	5
		Wanted more effective method	6
		Other	
SECTION 3: KNOWLEDGE ABOUT RETURN TO FERTILITY (Please circle the			
SEC	TION 5. KINOWLEDGE ADU	JUT RETURN TO FERTILITY (Please circle the	
SEC corr	esponding numbers)	JUI KETUKN TO FERTILITY (Please circle the	
corr Que	estions S. KNOWLEDGE Above and the second seco	Response	Code
Corr Que L	estions Do you think/believe that	Response Very strongly	Code 1
SEC corr Que L	estions Do you think/believe that using modern contraceptives	Response Very strongly Strongly Strongly	Code 1 2
SEC corr Que L	estions Do you think/believe that using modern contraceptives has affected or will affect	Response Very strongly Strongly Somewhat	Code 1 2 3
SEC corr Que L	estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility?	Response Very strongly Strongly Somewhat Not at all	Code 1 2 3 4
Corr Que L	by some set of the set	Response Very strongly Strongly Somewhat Not at all Don't know	Code 1 2 3 4 5
Corr Que L	Do you think/believe that using modern contraceptives has affected or will affect your future fertility?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly	Code 1 2 3 4 5 1
SEC corr Que L	estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly	Code 1 2 3 4 5 1 2
Corr Qua L	Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Strongly Somewhat Strongly Strongly Strongly Strongly Strongly Strongly Somewhat	Code 1 2 3 4 5 1 2 3
Corr Que L	Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all	Code 1 2 3 4 5 1 2 3 4 5 1 2 3 4
SEC corr Qua L M	esponding numbers) estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all Somewhat Not at all YES	Code 1 2 3 4 5 1 2 3 4 5 1 2 3 4 1 1
SEC corr Que L M	Endows S. KNOWLEDGE ABC estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Strongly Somewhat Not at all Somewhat Not at all YES NO	Code 1 2 3 4 5 1 2 3 4 5 1 2 3 4 1 2 4 1 2 3 4 1 2 3 4 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1
SEC corr Que L M	<i>esponding numbers</i>) estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know	Code 1 2 3 4 5 1 2 3 4 5 1 2 3 4 1 2 3 4
SEC corr Qua L M	Endows S. KNOWLEDGE ABC estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Strongly Somewhat Not at all YES NO Don't know	Code 1 2 3 4 5 1 2 3 4 1 2 3 4 3 3 3
SEC corr Que L M	esponding numbers) estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? Which of these factors could	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to)	Code 1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 1 1 2 3 1 1
SEC corr Qua L M	critical S. KNOW LEDGE ABC estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? Which of these factors could affect return to fertility after	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all Yery strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner)	Code 1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 1 2 3 1 2 3
SEC corr Qua L M N	 Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? 	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner) Body mass index(overweight or underweight)	Code 1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 1 2 3
SEC corr Que L M	Endows S. KNOWLEDGE Above estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? Which of these factors could affect return to fertility after contraceptive use?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner) Body mass index(overweight or underweight) Gynecological diseases/conditions	Code 1 2 3 4 5 1 2 3 4 1 2 3 1 2 3 1 2 3 4
SEC corr Que L M	Endows S. KNOWLEDGE ABC estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? Which of these factors could affect return to fertility after contraceptive use?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner) Body mass index(overweight or underweight) Gynecological diseases/conditions Alcohol intake	Code 1 2 3 4 5 1 2 3 4 1 2 3 4 1 2 3 4 5
SEC corr Qua L M N	Endows S. KNOW LEDGE ABC estions Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? Which of these factors could affect return to fertility after contraceptive use?	Response Very strongly Strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner) Body mass index(overweight or underweight) Gynecological diseases/conditions Alcohol intake Smoking (tobacco/marijuana/etc)	Code 1 2 3 4 5 1 2 3 4 1 2 3 1 2 3 4 5 6
SEC corr Que L M	 Do you think/believe that using modern contraceptives has affected or will affect your future fertility? Did/does the fear of infertility affect your use of modern contraceptives? Do you believe there are factors that affect return to fertility after contraceptive use? 	Response Very strongly Somewhat Not at all Don't know Very strongly Strongly Somewhat Not at all YES NO Don't know Parity (number of children given birth to) Age (woman and/or her partner) Body mass index(overweight or underweight) Gynecological diseases/conditions Alcohol intake Smoking (tobacco/marijuana/etc) Other	Code 1 2 3 4 5 1 2 3 4 1 2 3 1 2 3 4 5 6 7

Р	Where did you obtain your	Family and friends	1
	information about return to	Health facility/professional/activity/event	2
	fertility?	Mass media(radio, TV, newspaper, internet	3
		etc.)	4
		Other	
SE	CTION 4: RISK FACTORS INF	CORMATION (Please circle the corresponding	
numbers)			
Qu	estions	Response	Code
Q	Have you ever given birth?	YES	1
		NO	2
	How many children have you	One	
	given birth to?	1WO	2
	(Please circle the	Four	5
	corresponding number)	Four	4
		Civ.	5
		More than six	0
D	Have you ever lost a child?	VES	/
K	Have you ever lost a clind?	NO	$\frac{1}{2}$
			2
	How manychildren have you	One	1
	lost?	Two	2
	(Please circle the	Three	3
	corresponding number)	Four	4
	I I I I I I I I I I I I I I I I I I I	Five	5
	199	Six	6
		More than six	7
S	Have you ever had problems	YES	1
	getting pregnant even though	NO	2
	you were having unprotected		
	sexual intercourse regularly?		
	The state	5	
	For how long were you	< 6 months	1
	unable to get pregnant?	6 to 12 months	2
	W.	12 to 24 months	3
		24 to 36 months	4
		>36 months	5
Т	What is your weight?	kg	
	What is your height?	meters	
U	Have you ever had any	YES	1
	Gynecological disease and/or	NO	2
	surgery? (diagnosed by a		
	doctor)		

	If YES, please indicate the	Fibroids	1
	condition by circling the	Pelvic Inflammatory Disease	2
	corresponding number.	Chlamydia	3
		Other Sexually transmitted infections (STIs)	4
		Others	5
V	Do youdrink alcohol now?	YES	1
		NO	2
	If YES, how frequently do	Daily	1
	you drink alcohol?	Weekly	2
	(approximately)	Monthly	3
		>Monthly	4
	K		
	How much alcohol do you	One	1
	drink during these times (in	Two/Three	2
	terms of glasses of beer)	Four/Five	3
		Six	4
		More than six	5
W	Do you smoke, chew or sniff	YES	1
	tobacco?	NO	2
	How long have you been	Less than a year	1
	smoking?	1 year	2
	- CEE	More than a year	3
	How frequently do you	1 – 4 sticks per day	1
	smoke?	5 - 10 sticks per day	2
	(number of sticks/day)	11 sticks - 1 pack per day	3
	(number of sticks/day)	> 1 pack per day	4
			1
	Z	VEC	
		NO	2
	household amoles?	NO SE	1
	nousenota smoke?	YES S	
	Doos ha/sha smalta in mus	NO	
	processie/site sittoke ili your	SANE	
	presence?		

THANK YOU FOR YOUR COOPERATION!