DETERMINANTS OF CONTRACEPTIVE USE IN KENYA

By

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DECLARATION

The research paper is my original work and has not been presented for any award in any other university.

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

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This research paper has been presented for examination with my approval as university supervisor.

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

DR.URBANUS KIOKO MUTUKU

DEDICATION

I dedicate this paper to Mum, the late Jane Chebelyon Kirui. Mum, you were a great mother and above all a mentor.

ACKNOWLEDGEMENTS

ABSTRACT

The study seeks to examine the determinants of contraceptives use among women aged 15-49 in Kenya. Data from the Kenya Demographic and Health Survey 2008/2009 were used and probit regression model was used in analysis. The results shows that post primary education, wealth index, age, religion and exposure to family planning are determinants of contraceptive use. Contrary to expectations the association between the use of contraceptive and women who are at a greater risk of getting HIV/AIDS is negative although insignificant. Based on these results, the study recommends increase in awareness on the availability, importance and possible side effects of contraceptive use, enrollment to secondary and higher education, economic empowerment of women and an increase in the accessibility of health services in North Eastern province.

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ABBREVIATIONS

CPR	Contraceptive Prevalence Rate
DHS	Demographic Health Surveys
HPI	Health Policy Initiative
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
MDGs	Millennium Development Goals
MLE	Maximum Likelihood Estimation
MOH	Ministry of Health
NCPD	National Council for Population and Development
NFPC	National Family Planning Council
NGO	Non-Governmental Organisation
TFR	Total Fertility Rate
2SRI	Two Stage Residual Inclusion

CHAPTER ONE:
INTRODUCTION

1.0 Background

Family planning is the planning and the timing of when to have children. It involves the use of contraceptives and the treatment of uncontrolled fertility. As a birth control measure family planning enables couples or individuals attain the number of children they desire and also space the timing of their births. The services offered include educational, comprehensive medical or social activities. According to the World Health Organisation (WHO, 1994), a woman's ability to space and limit her pregnancies has a direct impact on her health and well being as well as on the outcome of each pregnancy.

Past studies have associated the use of family planning to reduction of maternal, infant and child mortalities. According to the World health organization report (WHO, 2012), satisfying the unmet need for family planning alone could cut the number of global maternal deaths by almost a third. The report is in line with the findings of other studies done in sub-Sahara Africa (Ahmed et al.; 2012 and Cleland et al.; 2012) which revealed that the use of family planning helps in reducing maternal deaths by 40%, infant mortality by 10% and childhood mortality by 21%. In addition, utilization of family planning helps in reducing the cost of health care (Singh and Darroch, 2012) and in prevention of sexually transmitted infections (STIs) including HIV/AIDS.

Besides the health benefits, family planning is important for economic development. According to (USAID/HPI, 2007), the use of family planning helps in slowing the growth of the population and in the process reduces the demographic pressure. This will enable countries elevate themselves out of poverty. A small population sizes imply a decreased burden on national expenditures for education, health and other social services, as well as less strain on natural resources and the environment. In order to maintain a sustainable economic development, improvement in the well being of the population as well as maintain the environment, population growth should be kept at an appropriate level (Beegle, 1995).

At the household level the use of family planning services help improves the well being of the household members. With a small family size, households are able to obtain the essential requirements in life for example food, clothing, health care and education and in the process improve the quality of their lives. Studies shows that children with many siblings are less likely to join and remain in school and are more likely to have poor health and high mortality rates as compared with those who have fewer siblings (Population Report, 1999). In addition, a small family size will reduce the portion of household's income used for consumption and thus encourages savings and investment. This in the long run will improve the economic and social status of the households.

Despite the known benefits, women especially in developing countries have limited access to family planning, based on social-economic, cultural conditions and inaccessibility of health facilities in terms of availability and distance. Globally, the unmet need for family planning is estimated to be around 215 million (WHO, 2012). A majority of this are from developing countries and in particular sub-Sahara Africa. According to the World Bank, sub-Sahara Africa has an average CPR of 21% (World Bank, 2010).

The low contraceptives use in sub-Sahara Africa is attributed to the low acceptance and high cultural resistance to family planning. The social, financial and the strong kingship values attached to children in the region are also believed to influence the uptake of contraceptives (Caldwell and Caldwell, 1987). According to (Cleland et al.; 2006), family planning in the region is an unfinished agenda as high fertility and rapid population growth is likely to be an impediment towards the realization of Millennium development goals (MDGs). The Millennium Development goal seeks to promote universal education, gender equality, maternal and child health and prevention and treatment for HIV/AIDS (UN, 2011). However, Provision of comprehensive reproductive health care is central to attaining these goals.

In Kenya, the total fertility rate is currently estimated to be around 4.6 and the contraceptive prevalence rate for all methods is around 46 percent, while the unmet need for family planning services is averaged at 24% (KDHS, 2009). In addition, significant variation in fertility level and

contraceptive use is observed among rural and urban residents. For example, according to the 2009 KDHS report, TFR in urban areas was reported to be at 2.9 compared to 5.2 in rural areas; CPR in rural areas was 43% compared to 53% in urban areas and the unmet need for family planning services in urban areas was 17 percent against 27 percent in rural areas

1.1 Provision of Family planning services

Family planning services in Kenya are provided by both the public and private health facilities including non-government organizations (NGOs). Community based distribution and social marketing of contraceptives have also been effective in increasing coverage. In order to ensure cooperation among the stakeholders involved in provision of family planning the Government established the National Council for Population and Development (NCPD) in 1982. The mandate of the council is to formulate population policies and strategies, and to coordinate population oriented activities (Republic of Kenya, 1984, 1996a).

The Ministry of Health through the department of reproductive health takes full responsibility for the coordination and implementation of family planning programmes (Republic of Kenya, 1996a). To ensure quality provision of the services, guidelines and standards for family planning service providers were developed in 1991. The guidelines were later reviewed in 1997 and incorporated in the Reproductive Health/Family Planning Policy Guidelines and Standards for Service Providers (Republic of Kenya, 2007).

 The main contraceptive methods available include the pill, injectables, Intra-uterine device (IUD), hormonal implants, barrier methods (condom, diaphragm, cervical cap, spermicides and sponge), sterilization, and natural family planning.

1.2 Trends in Total Fertility Rate and Contraceptive Prevalence Rate

Since the establishment of Family Planning (FP) Programme the country has experienced a significant decline in fertility levels. According to the KFS and the KDHS statistics, Total Fertility Rate have declined from 8.1 children per woman in 1977 to 7.7,6.7, 5.4, 4.7, 4.9 and 4.6 in 1984,1989, 1993,1998 ,2003 and 2009 respectively (Republic of Kenya, 2009). This decrease in fertility rate is attributed to an increase in the uptake of contraceptives.

Similarly, there has been a steady increase in Contraceptive Prevalence Rate among the married women from 7% in 1979 to 17% in 1984, 27% in 1989, and 33% in 1993, 39% in 1998. However, between 1998-2003CPR leveled off at 39% and rose to 46% in 2009. According to (Pathfinder International, 2005), the stall in contraceptive prevalence rate during that period was caused by problems in the supply of contraceptives, weaknesses in the quality of care, and changes in the contraceptive method mix. Moreover, the stall is also attributed to introduction of the HIV/AIDS program, which pushed family planning off the agenda (Aloo-Obunga, 2003; Pathfinder International, 2005). Figure 1 and figure 2 below presents the trends of total fertility rates (TFR) and contraceptive prevalence rate (CPR) from 1979 to 2009 and the NCPD projections to the year 2050

Figure 1: Total Fertility Rates
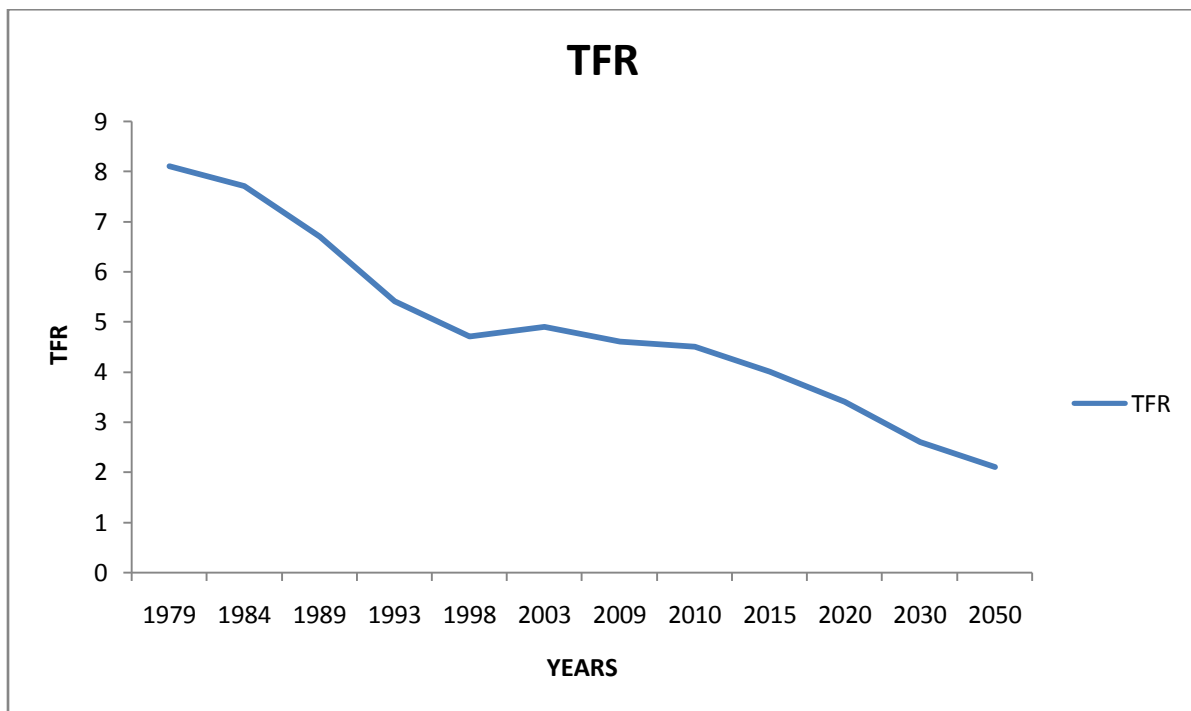
Source: Sessional Paper No. 3 of 2012 on Population Policy for National Development

Figure 2: Contraceptive Prevalence Rate
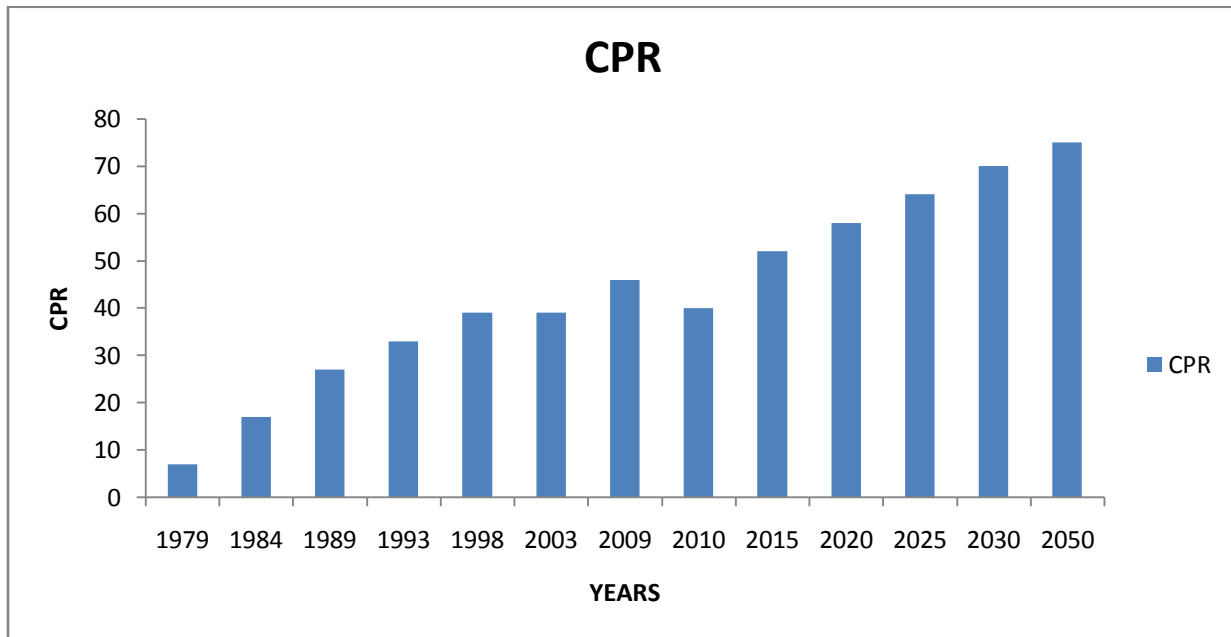
Source: Sessional Paper No. 3 of 2012 on Population Policy for National Development

1.3 Statement of the problem

High fertility rates and low contraceptive use have remained a major problem in Kenya since independence. The current total fertility rate in the country is estimated to be 4.6 while the contraceptive prevalence rate is 46%. This is despite the existence of family planning programmes initiated by the government and other stakeholders with an aim of reducing the level of fertility and increasing the use of contraceptives.

Past studies on contraceptive use in Kenya have continued to link the use of contraceptive to social economic conditions, proximity to health facilities and exposure to knowledge on family planning. The studies did this by comparing the contraceptive behavior of individuals who are considered to have a higher social economic status to those who are considered to have a low social economic status. However, none of these studies considered the family planning behavior of individuals who are considered to be at a higher risk of getting HIV/AIDS.

1.4 Research Questions

The study seeks to answer the following questions

1. What factors determine the use of contraceptives use in Kenya?
2. What are the effects of the above factors on the use of contraceptives?
3. What policy implications can be drawn from the study?

1.5 Study Objectives

The overall objective of this paper is to analyze the determinants of contraceptives use in Kenya. Specific objectives include:

1. To identify factors that influences the use of contraceptives in Kenya.
2. To evaluate the effects of the above factors on contraceptive use in Kenya.
3. Make policy recommendations based on the study findings.

1.6 Significance of the study

In order to reduce the unmet need of family planning and increase the use of contraceptives, a clear understanding of the factors that determine their use is necessary. Unlike previous studies on determinants of family planning services in Kenya this study will incorporate the variable women at risk of getting HIV/AIDS to determine their behavior towards the use of contraceptives. It is hypothesized that women who are at a greater risk are more likely to use contraceptives in particular condoms as a way of reducing the risk of infections than those who are not at risk.

It is hoped that the results of the study will improve policymakers understanding of the determinants of contraceptive use. The results can serve as an input in the design of interventions aimed at reducing the transmission of STIs including HIV/AIDS. The study will also add to the existing literature on contraceptives use in Kenya and suggest areas for further studies.

1.7 Limitations of the study

This study used the 2008 Kenya Demographic and Health Survey (KDHS) data which is limited in the sense that it lacks information on some of the variables like distance to health facilities, availability and quality of family planning services. As a result the variables were not included in the model despite their significant effect in determining the uptake of contraceptives.

1.8 Organization of the paper

The rest of the research is organized as follows; chapter two gives the theoretical framework upon which the analysis is based and the review of literature, chapter is on methodology used in the study, descriptive of data used and description of variables included in the model. Chapter four is on estimation of the model and analysis of the result and chapter five gives the conclusion and policy recommendation based on the results.

CHAPTER TWO:
LITERATURE REVIEW

2.0 Introduction

In this chapter, theoretical literature and empirical literature relating to demand for contraceptives is reviewed.

2.1 Theoretical literature

The study uses a theoretical framework developed by Bertrand et al (1995) for evaluating family planning programs. In the framework the use of contraceptives is considered to be a function of individual factors, societal factors, external development assistance as well as the existing political and administrative systems in a country. According to Bertrand et al (1995), the factor indirectly affects contraceptive practice through demand for family planning services, value and demand for children.

According to the framework individual and societal factors, such as number of living children, age, personal beliefs, the level of education and socioeconomic status, fertility preference and attitudes towards family planning methods influences demand for family planning. Other factor that determine demand for family planning services include; national policies and development programs. On the other hand, the supply for family planning services are influence by the existing policies and administrative factors such as political commitment, resource allocation and regulations; organizational factors like infrastructure, public-private partnerships, and delivery systems; operational factors and service outputs including management, training, supervision, IEC, access, and quality of services.

2.2 Empirical Literature

Mlinga et al.; (2014) conducted a study to examine the determinants of contraceptive use among married women and policy implication in Tanzania. Data from Tanzania Demographic and Health Survey 2004-2005 was used in the study. A sample of 2,635 individual males, 10,329 individual females and 1,244 couples were used in the study. The relationship between the dependent and the independent variables were examined using a logistic regression model an.

The results showed that factors that were found to positively influence the use of contraceptives included; husband approval of contraceptive use, women and husband's higher education level, discussion of family planning among the partners, wealth index while those that negatively influence the use of contraceptive were; religion.

Asiimwe et al. ; (2013) carried out a study to identify the socio-demographic factors associated with Contraceptive use among young women in comparison with older women in Uganda. Data from the Uganda Demographic and Health Survey (UDHS) collected in 2006 and 2011 were used in the study. The sample used was restricted to fecund, non-pregnant married women age 15-34 who were sexually active within one year prior to the survey. These resulted in a sample of 2,802 and 2,814 women in 2006 and 2011 respectively. Logistic regression model was used to establish the relationship between the selected independent variables and the outcome variable (current use of modern contraception) for each group of women in each year. The findings of the results revealed that living in rural areas and the desire for more children had negative significant effect on contraceptive use among married women aged 15-24 in both 2006 and 2011, while the higher household wealth and higher education level, and the desire for no more children had a positive significant effect on contraceptive use among women age 25-34.

Sileo (2009) sought to identify factors that determine family planning service uptake and use of contraceptives among postpartum women in rural Uganda. The study was a cross sectional study which involved 258 women who attended antenatal care at a rural Ugandan hospital and completed an interview approximately 13 weeks postpartum. Bivariate logistic regression model was used to test the hypothesized factors. From the findings variables such as education, prior use of contraceptives, partner communication about contraceptives, and perceived need of contraceptives were identified as key determinants of family planning service uptake and contraceptive use by postpartum women.

Stephenson et al.; (2007) sought to determine the role of community facilitators in explaining geographic variations in modern contraceptive use in six African countries. Data from demographic health surveys from the six countries was used. The findings of the study showed that there was a significant relationship between community facilitators and the use of modern

contraceptives. In addition it was noted that community facilitators contributed to increasing awareness among the potential users on the availability, importance and possible side effects of of family planning services.

Beekle et al,; (2006) carried out a study to determine the levels and determinants of family planning awareness and practice in a town in Ethiopia. A quantitative study using descriptive survey design was conducted. The findings revealed that the knowledge and practice of modern contraception methods was low in that town. The results also showed that women's contraceptive knowledge and practice was influenced by socio-cultural norms such as husband dominance, disapproval of contraceptive use by the husband and low social status of women. Lack of formal education for women was also identified as key factor in preventing changes in the patterns of contraceptive knowledge and use.

Tsui et al.; (2009) explored the patterns and trends in adolescent contraceptive use and discontinuation in developing countries using demographic and health survey data from more than 40 countries. The objective of the study was to examine the rates of contraceptive adoption, discontinuation and switching trends among married and unmarried women aged between 15 and 19 years, and sexually active proportions of 15 to 19 year-old women who were married or unmarried, but sexually active compared to older women who were perceived to be sexually inactive. The study revealed that in most of the countries, the proportion of adolescent women using contraceptives had increased substantially and that the rate at which the contraceptive prevalence rate was increasing was faster among the adolescent than among older women.

Abiodun and Balogun (2009) carried out a study to determine the pattern of sexual behavior and contraceptive use among female students attending tertiary institutions in Nigeria. Data collected from self-administered and semi-structured questionnaires were used in the study. The findings of the study showed that although all the respondents were aware of contraceptives, only a quarter of them admitted to have ever used any contraceptive method. Friends/relatives were identified to be the most common source of information about contraceptives. Moreover, fear of side effects was identified as the reason for non-use of modern contraceptives. The study further

revealed that the quality of contraceptives affected their uptake amongst female students attending tertiary institutions.

Mamun et al.; (1998) conducted a study to determine the socio demographic and programmatic determinants of contraceptive use and non-use among the married teenage women and newlywed couples. The study used data from surveys conducted in six rural villages in Bangladesh. A sample of 13, 515 rural married women were used and cross-tabulations and logistic regression methods were used in analysis. The descriptive results of the study showed that the contact rates for the teenage married women and newlyweds were lower compared to those of other age groups. The logistic regression results showed that the likelihood of using contraceptive was lower among the teenage and newlywed women who had no children compared to those who already have children. The desire for small family size was also found to be lower among the younger married women compared to the other age groups. In addition, the intention to use modern contraceptives in the future was significantly higher among the teenage married women than the older women who were non users. Furthermore, it was observed that once the teenage women and the newlyweds have had a child, contraceptive use rises to a level comparable to that of women in their twenties.

Maletela et al.; (2004) carried out a study to examine the use of family planning services in Lesotho. The study was a two-step process where the decision to use contraceptive was considered first before considering the choice of a contraceptive method. In the first process multivariate regression analysis was used to identify the individual and community factors that contribute towards the uptake of contraceptives while multinomial logistic regression was used on current users with the reference category for the dependent variable being injectables. The study identified factors such as ; infrastructure of facilities, time taken to reach the facility, opening hours to cater for working women, government policy regarding uniform pricing of contraceptives and costs in terms of travelling costs to be significant determinants of contraceptive use.

Okezie et al,; (2010) examined the socio-economic determinants of contraceptive use among rural women in Ikwuano state in Nigeria. The state was purposively selected because of its

classification as rural and highly dependent on agriculture. Data was collected through a service questionnaire where a total of 200 women were randomly selected from each of the four clans in the state. Descriptive statistics and maximum likelihood probit regression analysis were used to determine the relationship between the dependent and the explanatory variables. The results showed that mass media messages and higher education level were positively significant in determining the use of contraceptives by women. The results further revealed that the existence of an extended family system negatively influences the use of contraceptives.

Njogu (1991) carried out a study to examine the trends and determinants of contraceptive use and choice among women aged 15-49 in Kenya. The study used data from the 1977-1978 Kenya Fertility Survey and the 1989 Kenya Demographic and Health Survey. The explanatory variables used in the study included age, type of current residence, region or province of residence, type of current marital union, mother's educational level, mother's future intentions regarding fertility and whether the mother had experienced the death of a child. The results of the trends in contraceptive use showed that there has been a substantial increase in contraceptive use and that the increase was shared by all the groups in the country. Logit model was used in analysis and the results showed that woman's education level, her intention to have more children and the availability of family planning clinics significantly affected the aggregate change in contraceptive use by women in all the regions.

Kyalo (1996) carried out a study to examine the determinants of contraceptive non-use in Kenya. The study used data from 1989 Demographic Health Survey .Binary logit model was used in analysis. The results indicated that contraceptive non use was common among women with no education, those whose partners have no education, younger women, unemployed and those whose partners do not approve the use of contraceptives.

Wawire et al,; (2011) sought to examine the determinants of demand for family planning services in city slums in Kenya. Primary data were collected from the women using a structured interview schedule questionnaire. A binomial logit model was developed and estimated using two-step regression procedures. The results revealed that the use of family planning was low among women living in the slums. Factors that were found to determine the use of contraceptives

included; partner's approval, religious background, exposure family planning services, friendliness of the staff administering the services, quality of the services and proximity to the facility.

Ettarh and Kyobutungi (2012) carried out a study to determine the spatial variation in modern contraceptive use and unmet need for family planning in Kenya. The study also examined whether the variations in contraceptive use were associated with inequalities in physical access to health facilities. Data from the 2008-2009 Kenya Demographic and Health Survey was used. Multivariate logistic regression was used to examine the influence of distance to the nearest health facility and health facility density, in addition to other covariates, on modern contraceptive use and unmet need. The findings of the study revealed that modern contraceptives use was significantly less among the respondents who lived more than 5 km from the nearest health facility compared to women who reside 5 km or less from the nearest health facility. In addition, women from counties with higher health facility density were 53% more likely to use modern contraceptives compared to those who live in counties with low health facility density. However, the distance and health facility density in the county were not significantly associated with unmet need.

Kinaro (2012) sought to examine the perceptions that affect the use of contraceptives among Adolescents in Nairobi County. The study used primary data from household survey collected using a systematic random sampling in eight administrative divisions in Nairobi County in 2010. The study utilized information collected using structured interviews, focus group discussions (FGDs) and in-depth interviews (IDIs).The findings revealed that perceptions on parental approval, adolescent approval, ability to get contraceptives for self, knowledge of how to use contraceptives and sexual partner communication had significant effect on the use of contraceptives. It was also noted that parents, teachers and service providers had negative perceptions and discouraged contraceptive use among adolescents which influences use. Moreover, it was established that parents and teachers had inadequate knowledge and skills to communicate about sexuality to creating an environment that was likely to indirect negative influence on adolescents' perceptions on contraception.

2.3 Overview of the literature

A review of the literature reveals that higher education level, age, place of residence, number of living children, partner's level of education, exposure to family planning knowledge; marital status, wealth index and proximity to health facilities influences the use of contraceptives. Most of the studies treated demand for contraceptives as discrete choice and therefore only estimated a logit or probit model. Some of the studies focused on specific groups for example adolescents, married teenagers, women from the slums and women from rural areas while other were nationwide studies. However, none of the studies considered women at risk of getting HIV/AIDS as an explanatory variable to determine the behavior of at risk population towards using contraceptives. This study seeks to fill this gap.

CHAPTER THREE:
METHODOLOGY

3.0 Introduction

In this chapter the methodology that was used to achieve the objectives of the study is explained. It includes the analytical and econometric models.

3.1 Analytical framework.

The study is based on the theory of the consumer behavior. The theory states that households allocate income among different goods and services to maximize their satisfaction subject to budget constraint (Pindyck &Rubinfeld, 2005).

It is assumed that a household maximizes utility function given as

$$U = f (H, C) \dotfill (1)$$

Where;

U = the household utility

H = the family health

C = the consumption of market goods.

The household maximizes utility subject to a budget constraint and a health production function which is dependent on market acquired inputs such as health care services (family planning services) ; socio-economic characteristics of the households etc.

The budget constraint can be expressed as;

$$I= Pf +PJ + Pc \dotfill (2)$$

Where;

I= household income.

Pf = costs of using a family planning services

PJ = costs of other market inputs.

Pc = costs of other household consumption goods.

The health production function (H) is expressed as H = f (f, j, c)... (3)
Where;

f = FP services

j = other market inputs

c = other household consumption goods.

Using equation 1, 2 and 3 the following function can be developed;

U = f (H, C) + Y_1(I–(Pf + Pj_+ Pc)) + Y_2 (H- f (j, f, c))... (4)

Solving equation (4) above yield a demand function for family planning services (contraceptives) shown below

D_F = f (P_f, P_j, P_c, I, K)... (5)

Where;

K = other variables.

3.2.1 Probit model

This study employs the use of binary probit model to analyze the determinants of contraceptive use. The dependent variable in this case is the use of contraceptives which takes the value of 1= the woman used contraceptive and 0 otherwise. The choice of probit model is because the variables are binary (Green, 2002). By adopting the probit model an assumption is made that the error term takes a normal distribution.

The probability of an individual using or not using contraceptives is assumed to be determined by the underlying response variable.

$$Y_i = X_i\beta + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (6)}$$

Where Y_i is the dependent variable; contraceptive use; β are regression coefficient to be estimated; X_i is a vector of explanatory variables that affect utilization of contraceptives and E is the random error term.

In order to interpret the sign and the magnitude of the coefficient marginal effects are estimated and interpreted. The marginal effect for the probit model for continuous variables is derived from equation 2.

Differentiating equation 2 with respect to the independent variables yields the probability density function given as

$$\partial P(Y = 1|X)\partial X_k = \beta_k f(X\beta) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (7)}$$

Where $f(\cdot) = \dfrac{\partial F(\cdot)}{\partial F(X\beta)}$

Where the marginal effect for discrete variables are computed using the formula;

$$P(Y = 1)|X_k = 1) - P(Y = 1|X_k = 0) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (8)}$$

$$= F(X\beta|X_k = 1) - F(XB|X_k = 0) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (9)}$$

3.2.2 Model specification

The Multivariate regression model for demand for family planning services will be represented as shown;

$$Y_i = X_i\beta + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (10)}$$

$$Yi = \beta_0 + \beta_1 MS + \beta_2 REL + \beta_3 RES + \beta_4 ED + \beta_5 PED + \beta_6 WS + \beta_7 NCL + \beta_8 PI + \beta_9 WI + \beta_{10} RHIV + \beta_{11} AGE + \beta_{12} REG + \beta_{13} DFC + \beta_{14} HDC + \varepsilon \dots\dots\dots\dots \text{ (11)}$$

Where,

MS = Marital status; REL= Religion; RES= Residence; ED= Education level; PED= Partners education level; WS=Working status; NCL=Number of living children; PI=Professional information; WI=Wealth Index; RoHIV=Risk of contracting HIV/AIDs; AGE=Age group of the respondent; REG=Region; DFC=Desire for Children; HDC=Husbands desire for children; E=Error term

3.3 Definition of variables used in the model

Table 1: Definition of the variables and their expected signs

Variable	Variable definition	Measurement	Expected sign.
Dependent variable.			
1. Contraceptive use	Current use of contraceptive by either the respondent or the partner	1= using a contraceptive, 0 otherwise.	
Independent variables.			
1. Marital status (MS)	Marriage association grouped into; married, divorced, separated or single	1= married, 0 otherwise.	Positive
2. Religion (REL)	Religious affiliation grouped into Catholic, protestant, Muslim, no religion	1= catholic, 0 otherwise	Negative
3.Residence (RES)	Respondent place of residence rural or urban	1= urban, 0 otherwise.	Positive
4.Education (ED)	Highest Level of education categorized into no education, primary, secondary and higher	1= post primary, 0 otherwise.	Positive
5.PartnersEducation(PED)	Highest Level of education categorized into no education, primary, secondary and higher	1= post primary, 0 otherwise.	Positive
6.Working status(WS)	Employment status at the time of the survey	1= working, 0 otherwise.	Positive.
7.Wealth Index (WI)	Wealth quintile grouped into poor, poorer, middle, rich,	1= middle and above, 0 otherwise.	Positive.

	richer		
8.Number of living children (NLC)	Number of living children	1= none , 0 otherwise	Positive.
9. Professional Information.(PI)	Heard about family planning at the health facility	1= receive information at health facility, 0 otherwise.	Positive.
10.Risk of HIV (RoHiv)	Respondents threat of getting HIV	1= the risk is great, 0 otherwise.	Positive.
11.Age	Age group of the woman(15-19; 20-24; 25-29; 30-34; 34-39; 40-44; 45-49)	1= age group is (25-49), 0 otherwise	Positive
12.Region.(REG)	Province where the respondent comes from	1= north eastern, 0 otherwise	Negative
13. Desire For Children(DFC)	Desire to have more children	1= no, 0 otherwise	Positive
14.Husband Desire for Children Compared to Wife's(HDC)	The number of children a husband want compared to the wife's	1= more, 0 otherwise	Negative

3.4 Data source

The study used the 2008-09 Kenya Demographic and Health Survey (KDHS) which is a nationally representative sample of 3,465 men aged 15 to 54 and 8,444 women age 15 to 49 selected from 400 sample points throughout Kenya.

The survey is usually carried out after 5 years. The survey utilized a two stage sample based on the 1999 population and Housing Census and was designed to produce separate estimates for key indicators for each of the eight provinces in Kenya. The first stage involves selecting sample points form a national master frame maintained by the Central Bureau of Statistics (CBS). A total of 400 clusters, 129 urban and 271 rural were selected. The second stage of selection involves the systematic sampling of households from list of all households that had been prepared for National sample survey and evaluation program (NASSEP IV) in 2007.

Data collection took place over a three month period, from 13 November 2008 to late February 2009. The survey collected information regarding fertility levels, marriage, sexual activity, fertility preference, awareness and use of family planning methods, breastfeeding practices, nutrition status of women and young children, childhood and maternal mortality, maternal and child health, awareness and behavior regarding HIV/AIDS and other sexually transmitted infections (STIs). This study made use of information on family planning.

CHAPTER FOUR:
RESULTS AND INTERPRETATIONS

4.0 Introduction

This chapter gives the results of the findings obtained by estimating the model and the interpretations of the results.

4.1 Descriptive Statistics

Table 2 below presents the descriptive statistics of the variables under study. The descriptive statistics shows the mean, standard deviation, minimum and maximum value of every variable considered.

Table 2: Descriptive Statistics

Variables	Freq.	Percent	Mean	Std.dev	Min	Max
MS	4837	79.56	0.7956	0.403	0	1
REL	1065	17.51	0.1751	0.380	0	1
RES	1467	24.13	0.2413	0.427	0	1
ED	1349	22.19	0.2219	0.415	0	1
PED	2324	38.22	0.3822	0.495	0	1
WS	3316	54.54	0.5454	0.497	0	1
WI	3223	53.0	0.5300	0.499	0	1
Age	4006	65.99	0.6599	0.474	0	1
RoHIV	1005	16.53	0.1653	0.371	0	1
HDC	1062	17.46	0.1746	0.379	0	1
DFC	2640	43.42	0.4342	0.495	0	1
PI	1244	20.46	0.2046	0.403	0	1
REG	583	9.59	0.0959	0.294	0	1

Out of the 6079 women sampled and interviewed 79.56 percent were married, 17.51 percent subscribed to the Catholic religion and 24.13 percent lived in urban areas. In terms of education

22.19 percent had post primary education while 38.22 percent had sexual partners with post primary level of education. Women who were employed at the time of the survey were 54.54 percent while those whose age groups were between 25-49 years were 65.99 percent.

In addition, women who reported to be at a higher risk of getting HIV/AIDS were16.53 percent while those whose husbands desire more children than they do were 17.46 percent. The percentage of women who did not want any more children was 43.42 while those who receive information about family planning from health facility were 20.46 percent. Women respondents from North Eastern were 9.59 percent of the sampled population.

To test for presence of Multicolinearity between the variables used in the study correlations analysis was done. The problem of multicolinearity arises when two or more explanatory variables are highly but not perfectly correlated with each other. According to Gujarati (2003), multi collinearity is present if the pair wise or zero-order correlation coefficient between two variables is more than 0.8. A coefficient closer to one implies that there is a strong positive or negative relationship for a positive and a negative sign respectively. The signs show whether the relationship is positive or negative. From the Appendix 4 the problem of multicolinearity is not evident in the study as most values fall below the 0.8 threshold.

4.2 Empirical Results

In this section a presentation of the results of the analysis is given out. Table 3 shows the estimates of contraceptive use model while table 4 is the presentation of the 2SRI estimates of contraceptive use model .The 2SRI estimation strategy is used in the study so that it can controls for potential unobserved heterogeneity.

Table 3: Estimates of contraceptive use model

Contraceptive use	Coefficients	Std. Err.	Z	P>z	[95% Conf. Interval]	
MS	0.409*	0.045	8.97	0.000	0.320	0.499
REL	-0.087**	0.045	-1.93	0.054	-0.176	0.001
RES	0.095*	0.045	2.10	0.036	0.006	0.185
ED	0.298*	0.046	6.42	0.000	0.207	0.389
PED	0.119*	0.041	2.90	0.004	0.038	0.199
WS	0.221*	0.036	6.06	0.000	0.150	0.293
WI	0.413*	0.041	9.96	0.000	0.332	0.494
NLC	-0.292	0.226	-1.29	0.196	-0.735	0.150
AGE	0.196*	0.039	4.92	0.000	0.118	0.274
RoHIV	-0.042	0.046	-0.92	0.357	-0.133	0.048
HDC	-0.105*	0.048	-2.20	0.028	-0.20	-0.011
DC	0.019	0.037	0.52	0.605	-0.053	0.092
PI	0.229*	0.041	5.47	0.000	0.147	0.311
REG	-1.327*	0.112	-11.76	0.000	-1.548	-1.106
_cons	-1.293*	0.059	-21.87	0.000	-1.409	-1.177
No. of obs. =6079 Prob>chi2=0.0000 LR chi2(14)= 947.17 PseudoR2=0.1203 Log likelihood=3462.4576						

*p values <0.05; **p values<0.10

Table 4: 2SRI Estimates of contraceptive use model

Contraceptive use	Coefficients	Std. Err.	Z	P>z	95% Conf. Interval	
MS	0.4097*	0.0470	8.71	0.000	0.3176	0.5019
REL	-0.0873**	0.0452	-1.93	0.054	-0.1760	0.0014
RES	0.0959*	0.0458	2.09	0.036	0.0060	0.1858
ED	0.2984*	0.0468	6.37	0.000	0.2066	0.3903
PED	0.1192*	0.0419	2.84	0.004	0.0370	0.2013
WS	0.2218*	0.0367	6.03	0.000	0.1497	0.2939
WI	0.4134*	0.0417	9.90	0.000	0.3315	0.4953
NCL	-0.2922	0.2479	-1.18	0.239	-0.7783	0.1937
AGE	0.1961*	0.0403	4.86	0.000	0.1170	0.2753
RoHIV	-0.0427	0.0459	-0.93	0.353	-0.1327	0.0473
HDC	-0.1059*	0.0485	-2.18	0.029	-0.2012	-0.0107
DFC	0.0192	0.0376	0.51	0.609	-0.0545	0.0931
PI	0.2294*	0.0425	5.40	0.000	0.1461	0.3127
REG	-1.3272*	0.1060	-12.52	0.000	-1.5350	-1.119
_cons	-1.2934*	.0615	-21.02	0.000	-1.4141	-1.1728

*p values <0.05; **p values<0.10

The results indicate R-square of 0.1203 which means that 12.03 percent of the variation in contraceptive use can be explained by the explanatory variables in the model, while the remaining 88 percent are explained by variables not included in the model. In addition, nine independent variables had coefficient that were statistically significant at 5 % level of significance (p<0.005) while the remaining four were statistically insignificant (p>0.05).

Interpreting continuous variables, holding all other variables constant the probability of using contraceptives among women in Kenya is - 1.293. Being married increases the probability of using contraceptives by 0.4097 ceteris paribus while belonging to the catholic religion reduces the probability of using contraceptives by 0.0 873 holding all other variables constant. Residing

in urban areas increases the probability of using contraceptives by 0.0959 when all the other variables are held constant.

In respect to the level of education post primary education level increases the use of contraceptives by 0.2984 other things held constant. Similarly a post primary level of education among the sexual partners increases the use of contraceptives by 0.1192 holding other variables constant. Wealth index has a positive relationship with the use of contraceptives with the results showing that belonging to the middle, rich and richer wealth quintiles increases the use of contraceptives by 0.4134 when all other variables are held constant. Likewise having no living child reduces the use of contraceptives 0.2922 ceteris paribus.

In terms of age, being older increases the use of contraceptive with the result showing that belonging to age group 25-49 years increases the use of contraceptives by 0.1961. The use of contraceptives reduces by 0.1059 when the husband wants more children than the wife ceteris paribus while getting information about family planning at the health facility increases the use of contraceptives by 0.2294 holding all other variables constant. The use of using contraceptives reduces by 1.32 when all other variables are held constant if a woman lives in North Eastern than when she lives in other provinces and lastly, the use of contraceptives reduces by 0.0042 if the risk of getting HIV is greater holding other variables constant.

Table 5: Average marginal effect

	dy/dx	Std. Err.	Z	P>z	95% Conf. Interval	
MS	0.1327	0.0149	8.91	0.000	0.1035	0.1619
REL	-0.0282	0.0146	-1.93	0.054	-0.0570	0.0004
RES	0.0310	0.0148	2.09	0.036	0.0019	0.0601
ED	0.0966	0.01500	6.45	0.000	0.0672	0.1260
PED	0.0386	0.0135	2.85	0.004	0.0120	0.0651
WS	0.0718	0.0118	6.09	0.000	0.0487	0.0950
WI	0.1339	0.0131	10.16	0.000	0.1080	0.1597
NCL	-0.0946	0.0802	-1.18	0.238	-0.2520	0.0626
AGE	0.0635	0.0129	4.89	0.000	0.0380	0.0890
RoHIV	-0.0138	0.0148	-0.93	0.353	-0.0430	0.0153
HDC	-0.0343	0.0157	-2.19	0.029	-0.0651	-0.0035
DFC	0.0062	0.0122	0.51	0.609	-0.0176	0.0301
PI	0.0743	0.0136	5.43	0.000	0.0475	0.1011
REG	-0.4299	0.0338	-12.69	0.000	-0.4963	-0.3635

Contrary to expectations the use of contraceptive is lower though insignificant among women who are at a greater risk of getting HIV/AIDS. The probability of using contraceptives is 0.013 (p>0.05) lower among women who are at a greater risk of getting HIV/AIDS compared to those who are not at risk of getting HIV/AIDS.

From the table it can be observed that marital status positively influence the use of contraceptive. The use of contraceptives is higher among married women compared to single or divorced women. The likelihood of using contraceptives is 0.1327 (p>0.05) higher among married women compared to single or divorced women. This might be due to the fact that married women are sexually active and may have to consider the use of contraceptives if they don't want children or want to space the timing of giving birth. The findings are in line with those of other studies like

Njogu (1991) and Wawire et al,; (2011) which reported a higher contraceptive prevalence among married women.

Being a catholic religion reduces the likelihood of using contraceptives by 0.028 (p>0.01) compared to being a muslim, protestant or having no religion. This is explained by the fact that Catholic faith discourages the use of modern family planning services and encourages the use of natural methods. The results are in agreement with those of Wawire et al,; (2011) which found that religion and in particular catholic religion negatively influences the use of contraceptives among women living is city slum in Kenya.

The probability of using contraceptives is 0.0312 (p<0.05) higher among women who resides in urban areas compared to those who live in rural areas. The low contraceptive use in rural areas is attributed to lack of access to health facilities and inadequate exposure to knowledge on family planning. The findings are in line with those of Njogu (1991) who found that contraceptives use was lower among women living in rural areas compared to those who reside in urban areas.

Higher level of education is associated with higher utilization of health care services including contraceptives. From the analysis the probability of using contraceptives is 0.096 (p<0.05) higher among women with post primary education compared with those with primary or no education. The results compliment those of Njogu (1991); Wawire et al,; (2011) and Asiimwe et al,; (2013) who found that women with higher level of education were more likely to use contraceptives than those with primary or no education.

Similarly, higher level of education among the sexual partners positively influences the use of contraceptives. The likelihood of using contraceptive is 0.038 (p<0.05) higher among women who reported that their partners had post primary education compared to those whose partners had primary or no education. This is attributed to the fact that with higher education partner can appreciate the importance of contraceptives and thus encourages their partners to use. They are also more likely to be stable financially and therefore can afford to pay for both the direct and the indirect costs of contraceptives. The findings are in line with those of Kyalo (1996) who found that contraceptive non use was higher among women whose partners had no education.

Wealthy women are more likely to use contraceptives compared to poor women. From the study the probability of using contraceptives is 0.133 (p<0.05) higher among women who belong to the middle, rich and richer wealth quintiles compared to those who are from poor and poorer wealth quintiles. This could be due to the fact that wealthy women can afford the direct and the indirect cost of using family planning services. The results are in line with those of Mlinga et al,; (2014) who found that contraceptive prevalence was higher among wealthy women compared to poor women.

The use of contraceptives is higher among women who are employed compared to those who are unemployed. From the analysis the likelihood of using contraceptives is 0.0718 (p<0.05) higher among women who were employed at the time of the survey compared to those who were unemployed. The finding compliments those of Kyalo (1996) which found that contraceptive nonuse was popular among the unemployed women.

The use of contraceptives is lower among women with no children compared to women with children. The analysis showed that the probability of using contraceptives is 0.094 (p<0.05) lower among women with no children compared to those with children. This is attributed to the fact that women without children avoid the use of contraceptives as their desire for children compared to those who already have a child or children. The results are in line with those of Mahidu et al,; (1998) which reported that the use of contraceptives was low among married teenagers and newlyweds.

Desire for children reduces the probability of using contraceptives. Women who want to have children at a sooner date are less likely to use contraceptives compared to those who do not want children. The results shows that the probability of using contraceptives is 0.06 (p<0.05) higher among women who do not want to have more children compared to those who want more children or those who are undecided. The results are in line with those of Wawire et al,; 2011 and Mlinga et al,; 2014 who found low contraceptive use among women who desire to have more children.

The age of a woman is positively related to the use of contraceptives. This means that as a woman becomes older the probability of using contraceptives increases. From the study the likelihood of using contraceptives is 0.196 (p<0.05) higher among women aged between 25-49

years compared to those who are below 15-24 years of age. The results are in line with those of Wawire et al,; (2011) who found that the use of contraceptive is higher among older women than young women.

The probability of using contraceptive is low when the husbands want more children than the wife. From the study the probability of using contraceptive is 0.034 (p>0.05) lower for women whose husband's want more children compared to those who agree on the number of children or those whose partners want fewer children than they want.

Exposure to knowledge about family planning services increases the use of contraceptives. From the analysis the probability of using contraceptives is 0.074 (p<0.05) higher among women who got information about family planning services at the health facility compared to those who did not. This suggests that in order to increase the use of family planning services, promotion that facilitates awareness about the availability, possible side effects and the importance of contraceptives is important. The findings are in agreement with those of Okezie et al,; (2010) which reported high contraceptives prevalence among women who heard information about family planning at health facilities.

The probability of using contraceptives by women living in North Eastern is -0.429(p<0.05) compared to women from other provinces. This can be explained by the existence of traditional cultural beliefs which are against the use of family planning. Difficulties in accessing health facilities in terms of distance and lack of transport in the region is also another reason for the low contraceptives use in the North Eastern. The results are in line with those of (Njogu, 1991) who reported variations in contraceptive use according to regions.

CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.0 Introduction

In this section summary, conclusion and recommendation of the study are presented.

5.1 Summary and Conclusion

This study examined the determinants of contraceptive use among women in Kenya with the aim of estimating the contraceptive behavior of women who are at risk of getting HIV/AIDS. The estimation strategy adopted the 2SRI that controls for potential unobserved heterogeneity.

The result of the analysis showed that post primary education level among the woman, post primary education among the partners, wealth index, being married residing in urban areas, being older (above 25 years old), exposure to professional information on family planning , desire for no more children increases the probability of using contraceptives. While having no children, husband desire for more children compared to wife, belonging to the catholic religion, having a greater risk of getting HIV/AIDS and living in North Eastern negatively influences the use of contraceptives.

5.2 Policy Recommendations

Policies that promote increasing awareness on the availability and the importance of contraceptive should be supported and increased. This can be done through the use of media and chief *barazas*. In addition primary health centers should be well-equipped to render family planning services.

Beliefs against family planning based on religion must be countered through training religious leaders on the importance of contraceptives for individual, societies and the nation as a whole. In addition the family planning programs should consider involving religious leaders during policy formulations so that they can own the programmes and policies initiated and in the process appreciate the importance of family planning services.

The government through the ministry of health and with the support of donors should improve the availability of health care services including family planning in North Eastern province. This can be done by taking the services closer to the people by establishing mobile clinics in every

community or village which offers health care services including family planning. The ministry of health should also use the services of Community Health Workers (CHWs) to increase awareness and educating the communities on the benefits of family planning. It is important that the health workers are drawn from within the communities so that they can be accepted and the communities my feel free to interact with them.

5.3 Suggestions for Further Research

The study is limited to KDHS data which did not measure many other important factors which affect the use of contraceptives, for example, family planning service availability and quality and proximity to health facilities a research which incorporates these variables should be done. In addition, the results of the study found a negative relationship between the use of contraceptive and a greater risk of getting HIV/AIDS though insignificant. Further researches which will focus on this group for example the commercial sex workers should be conducted to find out reasons behind the low uptake of contraceptives.

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APPENDIX

Appendix 1

. su married catholic urban postprimary ppostprimary employed middleabove fiveabove age greatrisk more nomore professional northeastern

Variable	Obs	Mean	Std. Dev.	Min	Max
married	6079	.7956901	.4032296	0	1
catholic	6079	.1751933	.3801636	0	1
urban	6079	.2413226	.4279207	0	1
postprimary	6079	.2219115	.4155661	0	1
ppostprimary	6079	.3822997	.4859892	0	1
employed	6079	.5454845	.4979678	0	1
middleabove	6079	.5301859	.499129	0	1
fiveabove	6079	.2715907	.4448165	0	1
age	6079	.65899	.4740877	0	1
greatrisk	6079	.1653232	.3715026	0	1
more	6079	.1746998	.3797413	0	1
nomore	6079	.434282	.4957031	0	1
professional	6079	.2046389	.4034707	0	1
northeastern	6079	.0959039	.2944837	0	1

Appendix 2

. probit contraceptiveuse married catholic urban postprimary ppostprimary employed middleabove fiveabove age greatrisk more nodesire professional northeastern

```
Iteration 0:   log likelihood = -3936.0447
Iteration 1:   log likelihood = -3464.3974
Iteration 2:   log likelihood =  -3448.685
Iteration 3:   log likelihood = -3448.4916
Iteration 4:   log likelihood = -3448.4916
```

Probit regression				Number of obs	=	6079
				LR chi2(14)	=	975.11
				Prob > chi2	=	0.0000
Log likelihood = -3448.4916				Pseudo R2	=	0.1239

contraceptiveuse	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
married	.4211933	.0458128	9.19	0.000	.3314017	.5109848
catholic	-.0895027	.0454338	-1.97	0.049	-.1785513	-.0004542
urban	.0813118	.0458456	1.77	0.076	-.0085439	.1711675
postprimary	.2673897	.0468918	5.70	0.000	.1754834	.359296
ppostprimary	.1034344	.0411955	2.51	0.012	.0226927	.1841761
employed	.2266167	.036658	6.18	0.000	.1547683	.2984651
middleabove	.3887206	.0417658	9.31	0.000	.3068612	.4705801
fiveabove	-.2540954	.0467669	-5.43	0.000	-.3457569	-.162434
age	.2721859	.0419393	6.49	0.000	.1899864	.3543855
greatrisk	-.0410616	.0464142	-0.88	0.376	-.1320317	.0499085
more	-.1003041	.0482843	-2.08	0.038	-.1949395	-.0056687
nodesire	.065827	.038119	1.73	0.084	-.0088847	.1405388
professional	.2402227	.0420427	5.71	0.000	.1578206	.3226249
northeastern	-1.294928	.1135741	-11.40	0.000	-1.517529	-1.072327
_cons	-1.286676	.0591481	-21.75	0.000	-1.402604	-1.170748

Appendix 3

```
. margins, dydx( married catholic urban postprimary ppostprimary employed middleabove nol age greatrisk more nodesire professional northeastern)


Average marginal effects                        Number of obs   =       6079
Model VCE    : OIM


Expression   : Pr(contraceptiveuse), predict()
dy/dx w.r.t. : married catholic urban postprimary ppostprimary employed middleabove nol age greatrisk more nodesire professional northeastern
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
married	.1327362	.0145161	9.14	0.000	.1042852	.1611872
catholic	-.0282815	.0146762	-1.93	0.054	-.0570464	.0004833
urban	.0310803	.0147757	2.10	0.035	.0021203	.0600402
postprimary	.0966893	.0148922	6.49	0.000	.0675011	.1258774
ppostprimary	.0386143	.0132645	2.91	0.004	.0126163	.0646123
employed	.07186	.0117452	6.12	0.000	.0488398	.0948801
middleabove	.1339303	.0131179	10.21	0.000	.1082197	.1596409
nol	-.0946791	.0732054	-1.29	0.196	-.2381591	.0488008
age	.0635522	.0128319	4.95	0.000	.0384021	.0887024
greatrisk	-.0138343	.0150078	-0.92	0.357	-.043249	.0155804
more	-.0343336	.0155759	-2.20	0.028	-.0648618	-.0038054
nodesire	.0062451	.0120678	0.52	0.605	-.0174073	.0298976
professional	.0743173	.0134765	5.51	0.000	.0479039	.1007307
northeastern	-.4299297	.035738	-12.03	0.000	-.499975	-.3598845

Appendix 4 Correlation Matrix

	married	catholic	urban	postpr~y	ppostp~y	employed	middle~e	nol	age	greatr~k	more	nodesire	profes~l	northe~n
married	1.0000													
catholic	-0.0563	1.0000												
urban	-0.0355	-0.0324	1.0000											
postprimary	-0.0151	0.0403	0.2669	1.0000										
ppostprimary	-0.1681	0.0497	0.2493	0.4572	1.0000									
employed	-0.0307	0.0331	-0.0195	0.1170	0.0736	1.0000								
middleabove	-0.0478	0.0558	0.4770	0.3250	0.3221	0.0820	1.0000							
nol	-0.0254	-0.0182	-0.0017	0.0069	0.0023	-0.0254	0.0087	1.0000						
age	0.1321	0.0011	-0.0533	0.0668	0.0082	0.1455	-0.0451	-0.0718	1.0000					
greatrisk	0.0190	0.0290	0.0088	0.0373	0.0199	0.0923	0.0418	0.0047	0.0044	1.0000				
more	0.1633	-0.0240	-0.0610	-0.0737	-0.1221	-0.0333	-0.1198	-0.0285	0.0806	0.0355	1.0000			
nodesire	-0.0606	0.0642	-0.0319	0.0433	0.0422	0.1706	0.0408	-0.0700	0.2676	0.0469	-0.0072	1.0000		
professional	0.0072	0.0065	0.0198	0.0667	0.0473	0.0708	0.0584	-0.0136	0.0208	0.0410	-0.0079	0.0673	1.0000	
northeastern	0.0805	-0.1501	-0.0453	-0.1565	-0.1769	-0.2558	-0.2139	0.0192	0.0328	-0.1194	0.0620	-0.2628	-0.1043	1.0000