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## Statistical modelling of determinants of contraceptive use in Kenya.

Research Report in Mathematics, Number 50, 2020

Collins Kariuki

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**Research Report in Mathematics, Number 50, 2020**

Collins Kariuki

School of Mathematics  
College of Biological and Physical sciences  
Chiromo, off Riverside Drive  
30197-00100 Nairobi, Kenya

Master Thesis

Submitted to the School of Mathematics, in partial a for a degree in Master of Science in Biometry



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## Abstract

The world population has been increasing as the years progress. The world population as of 2020 stands at 7.8 billion people and is estimated to be approximately 9.9 billion people by 2050. Kenya's population in the year 2019 stands at 47.7 million people (KNBS,2019). Previous research has established that population increase harms economic development due to changes in the population composition and size, leading to the rise in dependency level and poverty levels. Eighteen percent of currently married women are experiencing an unmet need for limiting and spacing (KDHS,2014). The government and non-governmental organisations have made a deliberate effort to introduce and expose those women with the unmet need for family planning to minimize unwanted pregnancies, leading to mortality or morbidity.

This project aims to determine the Socioeconomic and Social demographic factors associated with the use and non-use of contraceptives. The study used secondary data obtained from the Kenya Demographic Health Survey 2014. Based on previous studies, the outcome variable was the use or non-use of contraceptives while the independent variables were; current marital status, highest education level, religion, total children ever born, type of place of residence, frequency of listening to the radio, age in five-year interval and wealth index. A multicollinearity test was performed, and it was established that there was no collinearity since the variance inflation factor was less than five for all the variables. The study used binary logistic regression to model the relationship between contraceptive use or non-use and the independent variables. The backward elimination method was adapted to terminate the non-significant variables. Type of place of residence and age in five-year group intervals were eliminated from the model. The variables that had a statistically significant relationship with the use and non-use of contraceptives were; current marital status, highest education level, religion, the total number of children ever born, frequency of listening to the radio, and wealth index.

Roman catholic women were 2.802 more likely to use contraceptives than those with other religions rather than Muslims, protestant, with no religion. The women with no education were 0.188 less likely to adopt contraceptives than those with a higher education level. Married women were 2.058 times more likely to use contraceptives than those who were no longer living together with their spouses. In terms of wealth, the poorest women are 0.46 times less likely to adopt contraceptives than the wealthiest women under the study. Those women who do not listen to the radio are 0.703 times less likely to use contraceptive than those who listen to the radio at least once a week.

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## Declaration and Approval

I the undersigned declare that this dissertation is my original work and to the best of my knowledge, it has not been submitted in support of an award of a degree in any other university or institution of learning.

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Signature

Date

**COLLINS KARIUKI**

Reg No. I56/12368/2018

In my capacity as a supervisor of the candidate's dissertation, I certify that this dissertation has my approval for submission.

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Signature

Date

Dr Idah Orowe  
School of Mathematics  
University of Nairobi,  
Box 30197, 00100 Nairobi, Kenya.  
E-mail: [orowe@uonbi.ac.ke](mailto:orowe@uonbi.ac.ke)







## Dedication

I dedicate this project to my dad and mum who have continually supported me both financially and emotionally through out this process.

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Collins Kariuki

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Nairobi, 2020.





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# 1 Chapter 1: Introduction

The aim of this thesis is to investigate socio-demographic and socio-economic factors which are associated with use and non use of contraceptives in Kenya.

## 1.1 Background

The world population has experienced tremendous growth from 1 billion in the 1800s to about 6.1 billion in 2000 (Andrews et al., 2001). In 2020 the world population is estimated to be 7.7 billion and will increase by 2 billion people by 2050. Africa's population is increasing more than the world rest of the world and is estimated to be 21 percent of the world's population by the year 2050, which is a huge increase from 9% in the year 1950 (Force et al., 2014). Kenya's population has risen from about 37.7 million in 2009 to 47.6 Million in the year 2019 (KNBS, 2019).

Kenya's total fertility rate (TFR) has reduced from 4.9 births per woman in 2003 to 3.9 births per woman in the year 2014, a one-child decline in the past ten years (KDHS, 2014). Reduction in TFR is one of the significant determinants of a general decrease in population growth. Coale and Hoover (1958) analyzed the connection between economic development and population increase in India. They concluded that the population increase adversely affects economic development due to changes in population composition and size, leading to a rise in dependency ratio and poverty levels. Countries across the globe have taken voluntary measures to reduce their population growth rate. One of the Vision 2030 policy objectives is a reduction of TFR from the current 3.9 births per woman to 2.6 births per woman. Children's desire is still strong and is less likely to change unless there is a significant change in the desired family size (Kenya, 2013).

Contraception is any deliberate use of any device or technique to prevent pregnancy due to sexual intercourse. Kenya's population policy promotes family planning to balance resources and population; hence, contraceptive entitlement is based on an informed, voluntary choice. Contraceptives are either traditional methods or modern. The modern contraceptive includes; Male condoms, female condoms, female sterilization, the pill, vasectomy, intrauterine device (IUD), injectable, lactation amenorrhea, implants, and emergency contraception. Traditional methods are the calendar method or rhythm and withdrawal method (WHO, 2012). The trend of contraceptive prevalence rate (CPR) among married women in Kenya has been increasing as follows; in the year 2003, CPR was 39%; in the year 2009, CPR was 46% in the year 2014, CPR was 58%.

Discontinuation of contraceptive use is an abandonment of any contraceptive method by women who ever used contraceptives. In sub-Saharan Africa countries, discontinuation rates are rising despite an increase in contraceptive use. One-third, one-half, and two-thirds of all women who start using contraceptives discontinue within twelve, twenty-four, and thirty-six months of initiation. Committing to family planning increases achievements across the five SDG areas: people, Peace, planet, prosperity, and Partnership (Starbird et al., 2016). Women with unmet need want to delay or stop childbearing but are not using any modern contraceptive method. Discontinuation for other reasons except to become pregnant has contributed significantly to unwanted fertility, unplanned pregnancy, unwanted births, and pregnancy termination, which may be done through unsafe aborting. Discontinuation of contraceptives rather than the desire to get pregnant is a concern within the health sector as it poses adverse consequences on reproductive health. (Blanc et al., 2002).

This study aims to look into the determinants affecting the application and non-application of the contraceptive method. Discontinuation of various methods will be analyzed to have an understanding of the most and the least discontinued contraceptive methods.

## 1.2 Statement of Problem

The desire to have a controlled family and space pregnancy through proper timing has been on a rising trend in Kenya. Variation exists across different counties. Eighteen percent of currently married women experience the unmet need for family planning, with 8% having an unmet need for limiting and 9% experiencing an unmet need for spacing (KDHS, 2014). Irrespective of such a rise, many women using contraceptives reach a point when they cease to use them where others don't use any method. Cases of children conceived due to unintended pregnancies are perceived to be at risk development and psychosocial delays (Cotten et al., 1992).

Thirty-one percent of family planning users discontinue the use of a method within twelve months of starting (KDHS, 2014); this may lead to unwanted pregnancies or related consequences. Globally there are 33 million reported cases of accidental pregnancies among women using either modern or traditional contraceptives methods (Marston & Cleland, 2003). Little studies have looked at why some women don't use any contraceptive method and what measures can be put in place to minimize the percentage of non-use of contraceptives. This study will investigate the factors that affect the use and non-use of contraceptives.

## **1.3 Objectives**

### **1.3.1 Overall objective**

The study's broad aim is to examine the determinants of contraceptive use among women aged between 15 to 49 years.

### **1.3.2 Specific objectives**

- (i) To establish the relationship between socio-demographic factors and current use of contraceptives in Kenya using binary logistic regression.
- (ii) To determine the relationship between socio-economic factors and current use of contraceptives in Kenya.

## **1.4 Justification of Study**

This research will help policymakers to formulate policies that will increase the contraceptive prevalence rate in Kenya. The ministry of health will also benefit from understanding the factors that are associated with contraceptive use. The study will make it possible to target a specific group of non-users of contraceptives during the contraceptive awareness campaign.

## **1.5 Limitation of the study**

At the time of the study 2019 Kenya Demographic and Health Survey (KDHS) data had not been made available; so, the study used the 2014 KDHS data. The KDHS data lacks some key variables such as the distance to the nearest health facilities, quality, and availability of family planning services, which are important when developing a model to estimate contraceptives' uptake.

---

## 2 Chapter 2: Literature Review

### 2.1 Contraceptives

Birth controls have been existing in the world for the past 80 years, with their approvals being made in the year 1960. The pill, as developed, has made multiple changes to the ability of women to have children with the main goal of the drug improving and making life convenient for families. However, there are multiple reasons why the use of contraceptives has been challenged around the globe. First, contraceptives have been challenged due to their effect on fertility. Making the USA a point of analysis, Bailey et al. (2012); Guldi (2008); Kearney & Levine (2009) affirm that there have been legal amendments on the access of this drug, all of which have resulted in a reduced birth rate in the United States. According to Bailey et al. (2012) the legalization of contraceptives and the rollout of federal financing on family programs led to a reduction and low rates of childbearing among women in the low-income levels. As affirmed by Guldi (2008) through the expansion and legalization of contraceptive pills within the minors, there is a high probability of a reduced birth rate within the young group. However, there have been cases where women in Africa have stopped using contraceptives due to various reasons rather than impact by the law.

Around the globe, women have stopped using birth controls due to different reasons. Some of the common arguments raised include; fears of side effects, negative beliefs about contraceptives and failure of necessity. For many years, family planning programs have been essential in Kenya in providing women with family planning programs. However, a report by Sedgh et al. (2016), has noted that a large group of women within the heterosexual group, all of whom are sexually active, yet fear getting pregnant, are not using these medications. Frost et al. (2013) has earlier reported that nearly 26% of sexually active women who do not use contraceptive have a rising fear that family planning pills will result to health risks (Sedgh et al., 2016). The other group of individuals is categorized to be at 24%, with all of them suggesting that they do not need family planning pills. Similarly, there is a group of women who do not use contraceptives simply because they are breastfeeding or at a point where they are thinking of getting pregnant. Nearly 23% of women who do not use contraceptives according to Frost et al. (2013) do so since they are not in any kind of relation or are not in a relationship with a person of opposite gender (Sedgh et al., 2016).

Sexually active but never married women often equate the reason behind not taking contraceptives with infrequency in having sex. According to the WHO, inequality and lack

of resource availability are also another reason why many women are not using contraceptives in Africa (Creanga et al., 2011). WHO has classified that most women fail to access Contraceptives, which subsequently results in an increased rate of mortality and abortions within the sub-Saharan regions. WHO currently realized that the world's total fertility rate had dramatically dropped from 5 children per woman in the 1950s to around 2.6 children per woman today; such has been accredited to the large spread of modern contraceptive use within the developing world. However, Creanga et al. (2011) also identified that modern contraceptives are only utilized by 43% of the women who are at reproductive age, and there is a wide gap between the highest and lowest wealth quartile amongst these users with nearly a difference of 17% of the poor quartile that does not have access to this medication.

Another reason for the reduced use of contraception, particularly in Kenya, is the rising spread of myths and rumours against these medications. Many women, particularly in Kenya, have been noticed to have limited access to information based on contraceptives, with the main source of their knowledge being misinformed individuals in the community (Choe & Park, 2019). As identified, social networks are core factors influencing the non-use decision amongst many women within northern and western regions of Kenya as a country. Choe & Park (2019) affirms that nearly 75% of the Brazilian population women believe that women who get involved in the use of intrauterine device affect their fertility particularly if they have not given birth. Thus, misinformation is also an additional cause of reduced use of contraceptives within Developing countries, including Kenya.

## 2.2 Discontinuation of contraceptive use

It is important to note that discontinuation is not always detrimental; some women discontinue due to method related factors. However, if they do not switch immediately to another plan, they don't want to become pregnant; this may lead to unwanted pregnancy. In developing countries, half of all unintended pregnancies get terminated Sedgh et al. (2016), most of them being done in an illegal or unsafe manner, consequently leading to mortality or morbidity. Children born from "unwanted pregnancy" or after short birth interval risk development, growth, and psychosocial delay (Rutstein, 2005; Crowne et al., 2012; Crissey, 2005). Blanc et al. (2002) approximated that a country's entire potency rate would reduce by 20%-48% if discontinuation of contraceptive gets terminated completely. Jain (2014) emphasized that contraceptives should be understood better and effectively to family planning programs, becoming a "leaking bucket." Understanding the reasons given by respondents as to why they discontinue using a specific method is vital in improving the quality of services provided to clients. Previous studies have established several demographic and socio-economic determinants such as the area of habitation, age, socio-economic status, education level, number of surviving offsprings, and availability/ accessibility of contraceptive services being essential factors in determining the use and non-use of contraceptive (Kiragu & Zabin, 1995; Kyalo, 1996; Tuoane, 1999)

Sato et al. (2020), examined reasons for discontinuation of contraceptives in Arusha, Tanzania. They used the odds ratio to explain how different causes contributed to the discontinuation of contraceptives use. GICHERU (2016), conducted a study on the discontinuation of a five-year implant in Nairobi health facilities in Nairobi county. He found out that married discussion and the number of existing offspring being significant factors in determining the rate of discontinuation of contraceptive use. This study can't give a general overview of contraceptive discontinuation since it focused only on implant discontinuation use. Our research will be looking at all forms of contraceptives.

Ncece (2017) used a probit regression model to estimate various factors that contributed to contraceptive utilization among youths in Turkana County. From the model, she found out that; Higher education level, being married, being employed, and gender of the household head was statistically significant in determining contraceptive uptake in Turkana County. Anguko (2014) used a logistic regression model in North Eastern Kenya to investigate the factors associated with contraceptive use among women aged between 15-49 years. Univariate logistic regression was conducted, and the results showed a relationship between variables such as; residence, education level, socio-economic status, mass media, occupation, and religion. From the findings it was concluded that rural dwellers were less inclined to use contraceptive as opposed to their urban counterparts; Women with primary, secondary, and higher learning were more inclined to use contraceptives as opposed to those who never attended school; Protestants were more prone to use contraceptives than Muslims (Anguko, 2014). After conducting a multivariate analysis Andrews et al. (2001) found out that only religion and watching television remained statistically significant.

## 2.3 Conceptual framework

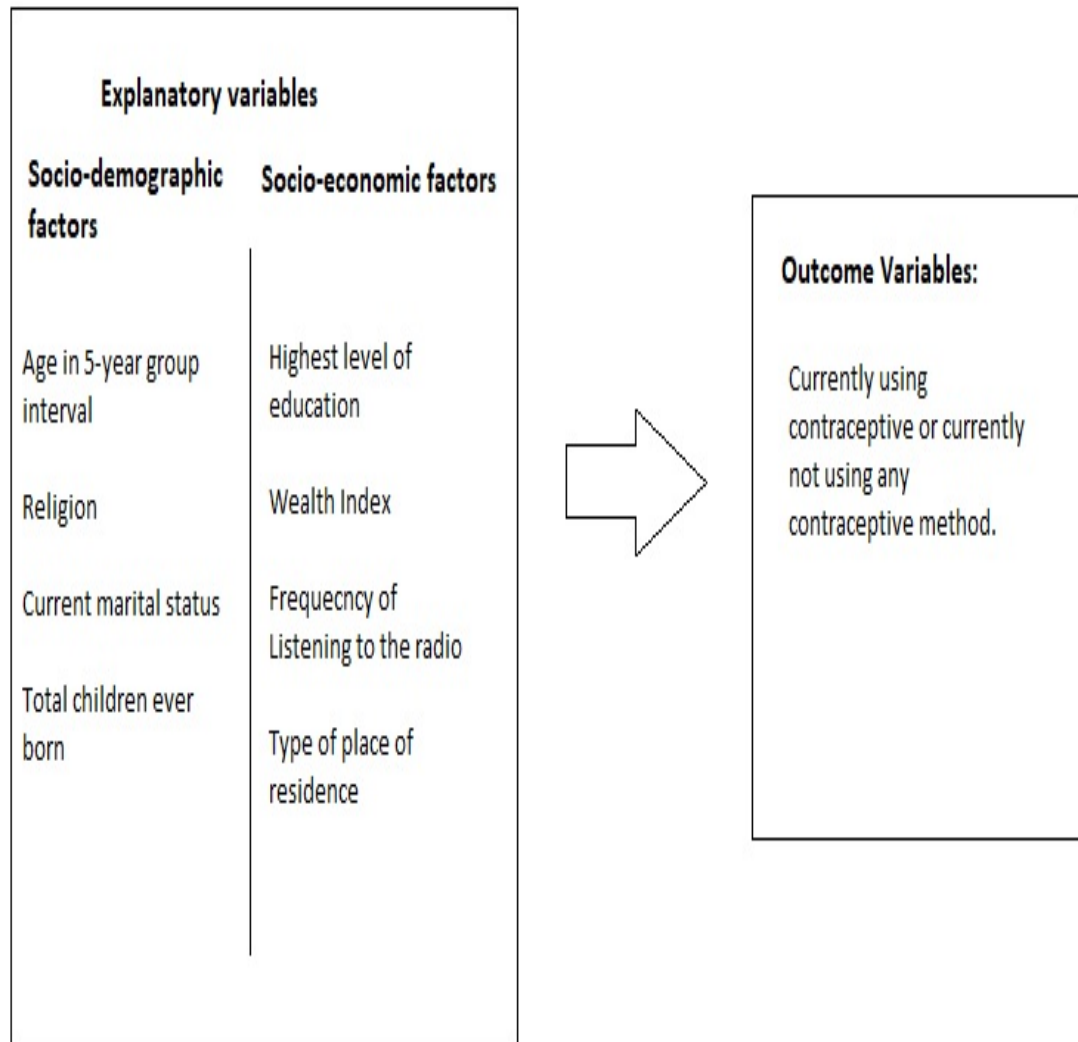


Figure 1. Conceptual Framework

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## 3 Chapter 3: Methodology

### 3.1 Introduction

This chapter entails the following: Data source and study design, the technique of analysis, outcome variable, Explanatory variable and control variables, Description of the model, Fitting the model.

### 3.2 Data source and Study design.

The study utilized secondary data obtained from the 2014 Kenya demographic Health Survey(KDHS). The request to access and analyse the data was made online by stating the objective and the methodology to be used in the study. The response rate was 99%. The total number of women who were eligible for the survey was 83591. The 2014 KDHS sample was obtained from a master sampling frame, the fifth National Sample Survey and Evaluation Programme (NASSEP V). KNBS uses this frame to conduct its survey in Kenya. The structure consists of 5360 clusters, which are divided into four equal subsamples. These clusters were obtained using a stratified probability proportional to the sampling methodology's size from 96251 enumeration areas (EAs). Two sub-samples from NASSEP V were used in KDHS. Kenya has 47 counties. Each county is stratified as either urban strata or Rural strata; since Mombasa county and Nairobi county have only urban areas, 92 sampling strata.

There are 40300 households designed to be in the sample from 1612 clusters across the country, with 617 clusters in urban areas and 995 clusters in rural areas. Models are selected independently in each sampling stratum using a two-stage sample design. During the first stage, 1612EAs were chosen with equal probability from the NASSEP V frame. The sampling frame was the households from listing operations. In each cluster, 25 families were selected. The interviewers only visited pre-selected homes, and there was no replacement for pre-selected homes. AS a result of Non-proportional assignment to sampling strata and fixed sample size per cluster, the survey wasn't self-weighting. The data was weighted to a representative at county, regional and national level.



### **3.2.1 Response variable.**

The response variable was current contraceptive use by the method, which had four possible outcomes, namely, No method (0), Folkloric method (1), Traditional method (2), Modern method (3). The outcome of interest was those who are currently using no method and those using contraceptives. The outcome variable was recorded to a different variable known as the current use of contraceptive, of which the outcomes were; using no method (0) and using a contraceptive method (1).

### **3.2.2 Explanatory variable.**

The explanatory variables comprised of both social demographic and social-economic factors. The selected social-demographic variables entailed; age in 5-year group interval, religion, current marital status and total children. The socio-economic characteristics were composed of residence, wealth index, highest education level and frequency of listening to the radio.

### **3.2.3 Study Population.**

Population refers to the entire pool of elements from which a sample is drawn. Collection requires the use of proper sampling techniques to avoid bias in the results. The technique is mainly dependent on the type of research design adopted. For this study, the population was women aged 15-49 residing in Kenya using the KDHS 2014 data set. The total number of observations was 83,591.

### **3.2.4 Study Design.**

Secondary data was used from a cross-sectional survey conducted in the year 2013/2014 using a sample drawn from a population.

### **3.2.5 Selection Criteria.**

A woman was deemed eligible for the study if she was resident and 15 years or more but less or equal to 49 years of age. The age of 15-49 years refers to women in the reproductive age.

### **3.2.6 The technique of analysis.**

The study used both descriptive and inferential statistics.

### **3.2.7 Descriptive Statistics.**

The descriptive statistics were; Frequency tables and histograms. The frequency tables were used to show the distribution of the following variables; Age in five-year group intervals, current marital status, type of place of residence, religion, the highest level of education, last method discontinued and wealth distribution of the respondents. A histogram of total children ever born was conducted to understand the distribution of that variable.

### **3.3 Inferential statistics.**

In this section, the data analysis method used was a binary logistic regression.

#### **3.3.1 Odds ratio.**

An odds ratio (OR) measures and quantifies the relationship between an exposure and an outcome. The OR is the ratio of observing an effect when exposed to not following a development without exposure. The regression coefficient ( $b_1$ ) in a logistic regression model is the approximate increment in log odds of the outcome per unit increment in the exposure variable.

## Calculation of odds ratio

Calculation of odds ratio using a two by two frequency table.

**Table 1. Calculation of odds ratio**

	Outcome(+)	Outcome(-)
Exposure(+)	a	b
Exposure(-)	c	d

Where;

- (i) a = Number of exposed cases.
- (ii) b = Number of exposed non-cases.
- (iii) c = Number of unexposed cases.
- (iv) d = Number of unexposed non-cases.

$$OR = \frac{a/c}{b/d} \quad (1)$$

$$OR = \frac{ad}{bc} \quad (2)$$

**OR interpretation**

- (i) OR=1 Exposure does not affect the odds of the outcome.
- (ii) OR>1 Exposure is associated with higher odds of the outcome.
- (iii) OR<1 Exposure is associated with lower odds of the outcome.

The more the value of OR is greater than 1, then it is more likely the relationship between exposure and outcome variable is causal.

**Calculating 95% confidence interval.**

$$\text{Upper 95\% CI} = e^{[\ln(OR) + 1.96SE \ln(OR)]} \quad (3)$$

$$\text{Lower 95\% CI} = e^{[\ln(OR) - 1.96SE \ln(OR)]} \quad (4)$$

$$SE \ln(OR) = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}} \quad (5)$$

### 3.3.2 Binary logistic regression.

Binary logistic regression models the relationship between predictor variables and a binary response variable. The dependent variable is dichotomous. There must be one or more independent predictor variables.

Variables: Let Y be a binary response variable.

$Y_i = 1$  if the trait is present in an observation  $i$

$Y_i = 0$  if the trait is NOT present in an observation  $i$

Let  $X = (X_1, X_2, \dots, X_k)$  be a set of explanatory variables.  $x_i$  is the observed value of the explanatory variables for observation  $i$ .

Model:

$$p = Pr(Y_i = 1/X_i = x_i) \quad (6)$$

$$\text{logit}(p) = \log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k. \quad (7)$$

$$\frac{1-p}{p} = \frac{1}{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}. \quad (8)$$

$$\frac{1}{p} = 1 + \frac{1}{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}. \quad (9)$$

$$\frac{1}{p} = \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k) + 1}{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}. \quad (10)$$

$$p = \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}. \quad (11)$$

$$\text{logit}(p) = \beta_0 + \beta_1 x_i + \dots + \beta_k x_{ik} \quad (12)$$

**Assumptions:**

- (i) The dependent variable is distributed independently.
- (ii) The dependent variable assumes binomial distribution; however, the dependent variable doesn't have to have normal distribution but must expect a distribution from an exponential family (e.g., Poisson, binomial, multinomial, normal)
- (iii) The model assumes the non-existence of linearity between the independent variable and the response variable.
- (iv) Uniformity of variance is not a requirement.
- (v) It is not a requirement that the errors are distributed normally.
- (vi) The system uses maximum likelihood estimation (MLE) over ordinary least squares (OLS) to estimate the parameters; therefore, it relies on large sample approximation.
- (vii) Goodness-of-fit measures depend on sufficiently large samples, where the expected cell counts are less than 5.

### 3.3.3 Multicollinearity

#### Variance inflation factor(VIF)

- The variance inflation factor for the  $i^{th}$  variable is:

$$VIF_i = \frac{1}{1 - R_i^2} \quad (13)$$

- where  $R_i^2$  is the R-squared value obtained by regressing the  $i^{th}$  independent variable on the remaining independent variables.
- Variance inflation factor (VIF) was used to check for multicollinearity between the independent variables.
- VIF were less than 5 hence there was no collinearity between the independent variables.

<i>Coefficients<sup>a</sup></i>		<u>Collinearity Statistics</u>	
Model		Tolerance	VIF
1	Age in 5-year groups	.608	1.644
	Type of place of residence	.801	1.249
	Highest educational level	.641	1.561
	Religion	.995	1.005
	Frequency of listening to radio	.778	1.286
	Wealth index	.550	1.817
	Total children ever born	.526	1.902
	Current marital status	.975	1.026

a. Dependent Variable: Current using contraceptive

### **3.3.4 Variable selection criteria.**

The purpose of this method was select few explanatory variables that predicts the model sufficiently.

#### **Backward Selection criteria.**

The study adapted Backward selection criteria. In this procedure, the model is fitted with all predictor variables at first. The variable with the smallest F-statistic is deleted given that its p-value is statistically non-significant. The model is refitted after deleting this variable and F statistics is calculated in which the variable that is less significant is deleted. The process is continuous to point in which the most significant variables are retained.



### 3.3.5 Probability, odds and log-odds plots

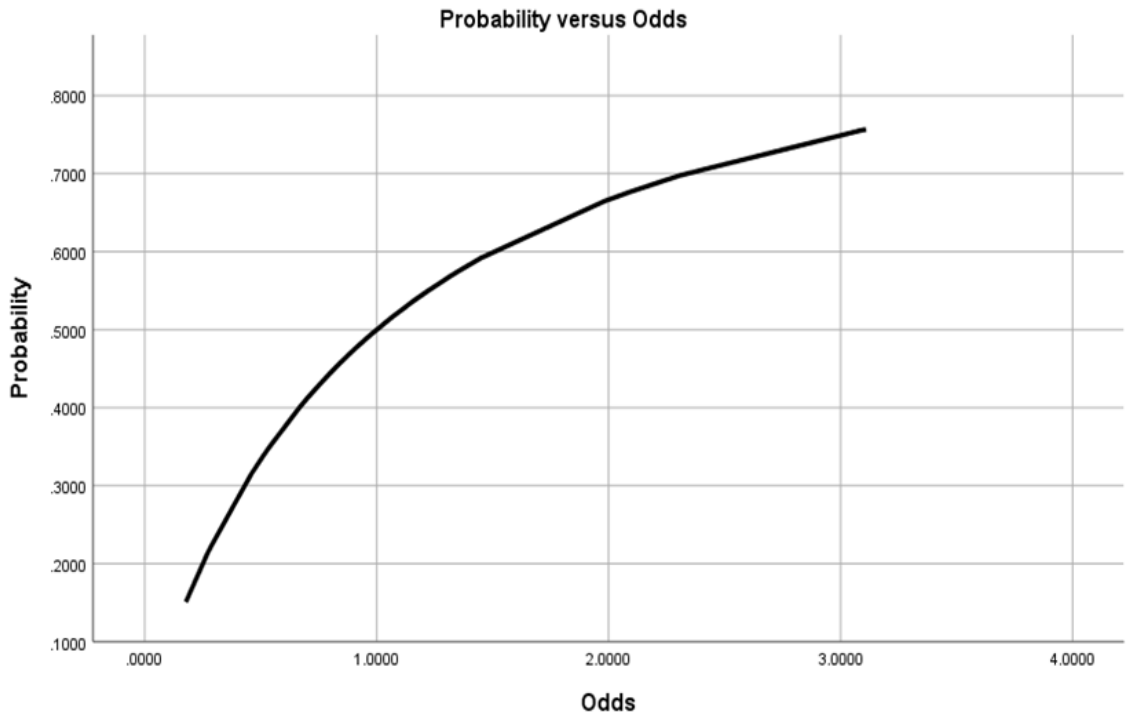


Figure 2. Probability versus Odds

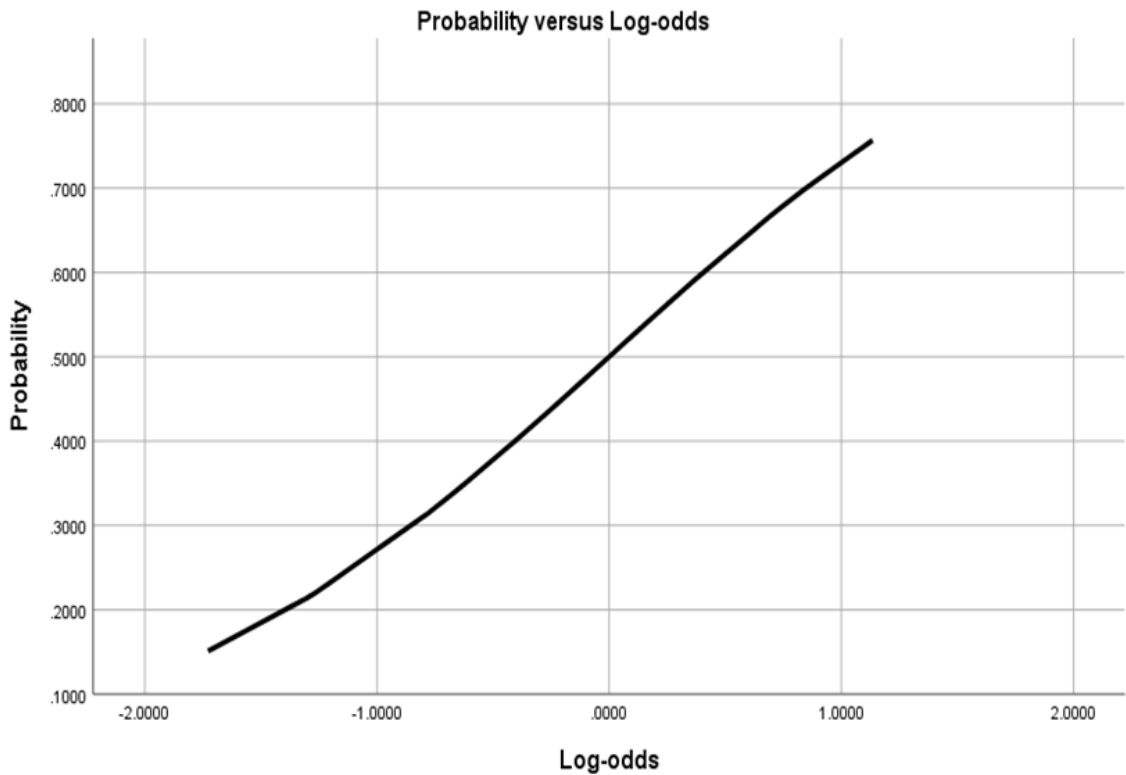
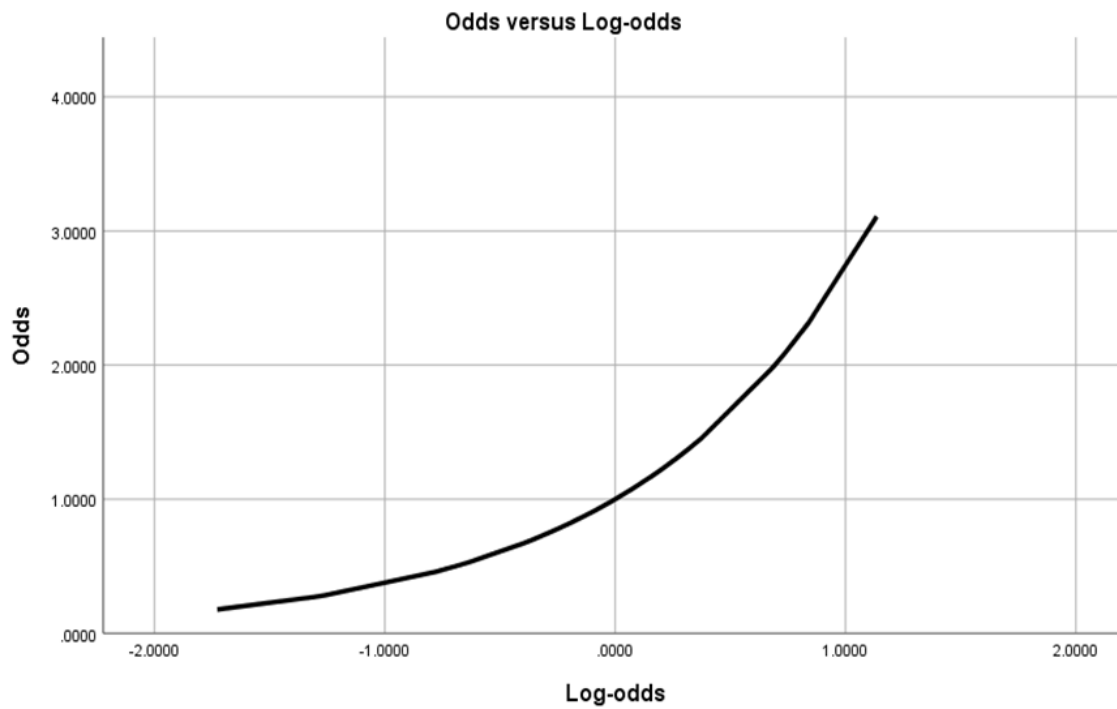


Figure 3. Probability versus Log-odds



**Figure 4. Odds versus Log-odds**

Objective	Variables in the objectives		Type of variables	Statistical method of Analysis
	Dependent	Independent		
To establish relationship between socio-demographic factors and current use of contraceptives in Kenya using binary logistic regression.	Use of contraceptives.	Socio-demographic factors (Age in 5-year group interval, Current marital status, Total children ever born and Religion.	Use of contraceptive-binary variable (Currently using or not using contraceptives) Social demographic variables – categorical variables.	Binary logistic regression since the dependent variable is binary in nature.
To establish relationship between socio-economic factors and current use of contraceptives in Kenya.	Use of contraceptives.	Socio-economic factors (Type of place of residence, wealth index, highest level of education, frequency of listening to the radio.	Use of contraceptive-binary variable (Currently using or not using contraceptives) Social demographic variables – categorical variables.	Binary logistic regression since the dependent variable is binary in nature.

**Figure 5. Variable definition**

## 4 Chapter 4: Data Analysis and Results

This chapter was composed of data analysis and results of the study.

### 4.0.1 Descriptive statistics

The descriptive statistics included summary tables, bar-graphs and histograms.

#### Distribution of women by 5-year age.

##### *Age in 5-year groups*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-19	1080	1.3	1.3	1.3
	20-24	6638	7.9	7.9	9.2
	25-29	14572	17.4	17.4	26.7
	30-34	15779	18.9	18.9	45.5
	35-39	17247	20.6	20.6	66.2
	40-44	15326	18.3	18.3	84.5
	45-49	12949	15.5	15.5	100.0
	Total	83591	100.0	100.0	

Women in age group 35-39 years account for the highest number being 20.6 % while women in age group 15-19 years account for the lowest number being 1.3 % of the in the study.

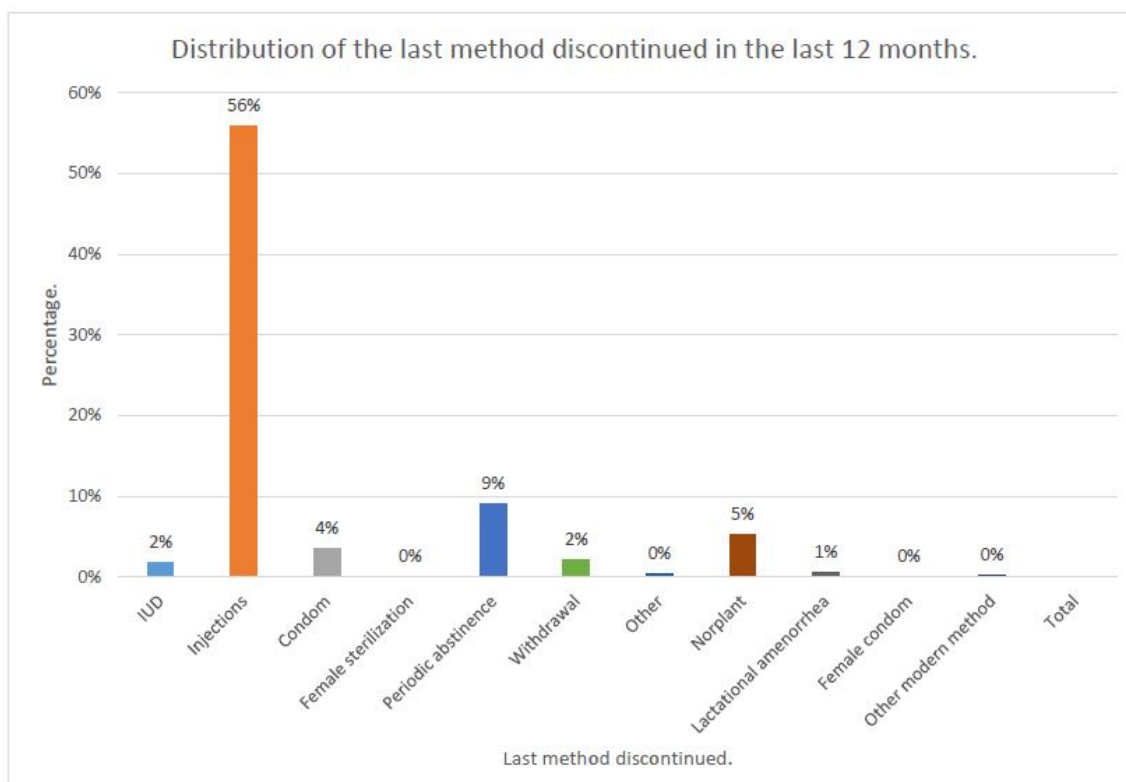
## Distribution of respondents by place of residence.

*Type of place of residence*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban	25261	30.2	30.2	30.2
	Rural	58330	69.8	69.8	100.0
	Total	83591	100.0	100.0	

Women in Rural area account for 69.8% while women in urban area account for 30.2% of all women involved in the study.

The bar graph below shows last method discontinued by the respondents.



Injections is the most discontinued method accounting for 56% while female sterilization, female condom, other and other modern method being the least discontinued method composed of 0%.

**The level of education of respondents were distributed as follows.**

*Highest educational level*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No education	18303	21.9	21.9	21.9
	Primary	47126	56.4	56.4	78.3
	Secondary	14220	17.0	17.0	95.3
	Higher	3942	4.7	4.7	100.0
	Total	83591	100.0	100.0	

Women who had attained primary education as the highest level of education were the highest having 56.4% while the those with higher education as the highest level of education were the least accounting for 4.7% of the women involved in the study.

**The figure below shows wealth distribution of the respondents.**

*Wealth index*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poorest	26170	31.3	31.3	31.3
	Poorer	17926	21.4	21.4	52.8
	Middle	15908	19.0	19.0	71.8
	Richer	13316	15.9	15.9	87.7
	Richest	10271	12.3	12.3	100.0
	Total	83591	100.0	100.0	

**Figure 6. Wealth distribution**

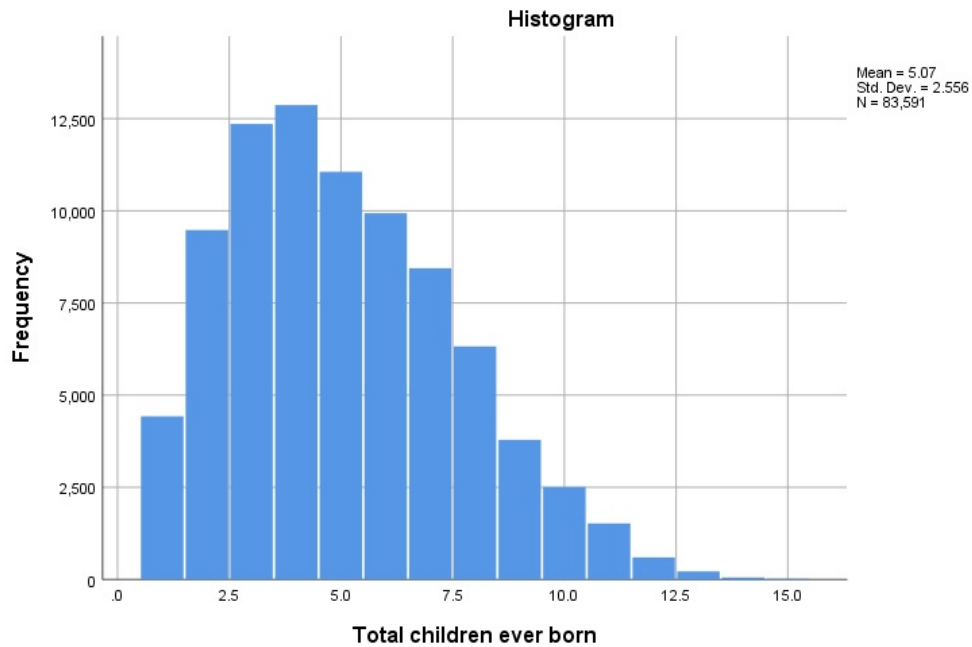
Women in the poorest wealth index group were the highest accounting for the 31.3% while women in the richest wealth index group are the least accounting for 12.3%.

<i>Variables in the Equation</i>		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	Age in 5-year groups	.014	.010	1.870	1	.171	1.014
	Type of place of residence	.052	.029	3.165	1	.075	1.053
	Highest educational level	.376	.019	387.272	1	.000	1.456
	Religion	-.022	.005	21.860	1	.000	.978
	Wealth index	.176	.012	222.852	1	.000	1.192
	Current marital status	.114	.011	113.452	1	.000	1.121
	Total children ever born	.221	.008	775.515	1	.000	1.247
	Frequency of listening to radio	.388	.017	504.795	1	.000	1.474
	Constant	-2.890	.077	1425.570	1	.000	.056
Step 2 <sup>a</sup>	Type of place of residence	.053	.029	3.341	1	.068	1.055
	Highest educational level	.379	.019	399.488	1	.000	1.461
	Religion	-.022	.005	21.824	1	.000	.978
	Wealth index	.179	.012	241.237	1	.000	1.196
	Current marital status	.118	.010	127.675	1	.000	1.125
	Total children ever born	.228	.006	1619.047	1	.000	1.257
	Frequency of listening to radio	.388	.017	505.647	1	.000	1.474
Constant	-2.884	.076	1423.975	1	.000	.056	

a. Variable(s) entered on step 1: Age in 5-year groups, Type of place of residence, Highest educational level, Religion, Wealth index, Current marital status, Total children ever born, Frequency of listening to radio.

**Figure 7. Model**

The histogram below shows distribution of total children ever born.



The number of children ever born was approximately skewed to the right. The average total number of children was 5.07 (SD=2.556).

#### 4.0.2 Elimination of non-significant variables

There are two variables which were eliminated from the model. The first to be eliminated was age in 5-year interval followed by type of place of residence.



### 4.0.3 Model Fit

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_i + \cdots + \beta_k x_{ik} \quad (14)$$

$$= -2.884 + 0.379x_1 - 0.022x_2 + 0.179x_3 + 0.118x_4 + 0.228x_5 + 0.388x_6 \quad (15)$$

- $x_1$ =Highest educational level
- $x_2$ =Religion
- $x_3$ =Wealth index
- $x_4$ =Current marital status
- $x_5$ =Total children ever born
- $x_6$ =Frequency of listening to radio

#### 4.0.4 Results interpretation.

Roman Catholic women are 2.802 times more likely to use contraceptives than those with other religions rather than Muslims, protestant, with no religion. Those women who are protestants are 2.742 times more inclined to practice contraceptives than those with different religions rather than Muslims, Protestants, with no religion. Muslim women are 0.948 times less inclined to practice contraceptives than those with different faiths rather than Muslims, protestant, with no religion. Women with no religion are 2.028 times more likely to use contraceptives than those with different faiths rather than Muslims, protestant, with no religion.

The women with no education were 0.188 less likely to adopt contraceptives than those with a higher level of education. Women with primary education were 0.787 less likely to adopt contraceptives than those with a higher level of education. The women with secondary education were 0.836 less likely to adopt contraceptives than those with a higher level of education.

Married women were 2.058 times more inclined to practice contraceptives than those who are no longer living together with their spouses. Women living with a partner were 2.044 times more inclined to practice contraceptives than those who are no longer living together with their spouses. Those women who were never in a union were 0.254 times less likely to use contraceptives than those who are no longer living together with their spouses. Widowed women were 0.573 times less likely to use contraceptives than women who are no longer living together with their spouses. Divorced women were 0.916 times less likely to use contraceptives than those who are no longer living together with their spouses.

In terms of wealth index, the poorest women were 0.46 times less likely to adopt contraceptives than the wealthiest group of women under the study. Women in the poorer category were 0.812 times less likely to adopt contraceptives than the wealthiest group of women under the study. Women in the middle wealth index were 0.986 times less likely to adopt contraceptives than the wealthiest group of women under the study. Wealthier women were 0.991 times less likely to adopt contraceptives than the wealthiest group of women under the study.

## 5 Chapter 5: Conclusion and Recommendations

### 5.0.1 Conclusion

The study adopted a binary regression model to determine critical factors associated with the uses and non-use of contraceptives in Kenya. The model used facilitated the elimination and retention of variables that were deemed non-significant and significant. The model's significant critical variable model was the highest education level, religion, wealth index, current marital status, the total number of children ever born, and frequency of listening to the radio. The non-significant factors eliminated from the model were the type of place of residence and age in the five-year group interval.

Those women with a higher education level tend to be more likely to use contraceptives than those without a higher level of education. Married and those living with a partner tend to be more likely to use contraceptives than those without a partner or not married. It was noted that women who listened to the radio more were more likely to use contraceptive than those that do not listen to the radio often. Women with more children tend to be more likely to use contraceptives compared to those with fewer children.

Roman catholic women were 2.802 more likely to use contraceptives than those with other religions rather than Muslims, protestant, with no religion. The women with no education were 0.188 less likely to adopt contraceptives than those with a higher level of education. Married women were 2.058 times more likely to use contraceptives than those who are no longer living together with their spouses. In terms of wealth, the poorest women are 0.46 times less likely to adopt contraceptives than the wealthiest group of women under the study. Those women who do not listen to the radio are 0.703 times less likely to use contraceptives than those who listen to the radio at least once a week.

## 5.0.2 Recommendation

As indicated in the results of the study, for the effective use of contraceptives, several factors need to be addressed. One of the factors is the level of education. Previous studies have proven that education is a natural way of contraceptive since when girls continue to advance in their education, they get married when they are older hence reducing their reproductive period when they are married, and hence they do not give birth to many children compared to their counterparts who get married at a younger age. The government is encouraged to empower the girl child to acquire higher education.

Women are also encouraged to be exposed to any media of communication, such as radios, televisions, and others. Exposure also brings out insight on the issue of awareness about the existence and advantages of various family planning methods; Therefore, there is a need for the government to allocate resources on capacity building and public awareness on the issue of contraceptives.

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