CONTRACEPTIVE USE BY WOMEN OF DIFFERENT LEVELS OF EDUCATION AND FERTILITY IN KAKAMEGA NORTH DISTRICT, KENYA

ODERO EVERLYNE AKOTH*

Leo Odongo*

Francis Onsongo*

ABSTRACT

Contraceptives use has been a global issue for both men and women. The purpose of the study was to find out the levels of contraceptives use by women of different levels of education versus fertility in Kakamega North District. The study employed the sample survey method of data collection. Women of child bearing age formed the study population. The data collected was analyzed by use of Chi-Squares to test the degree of relationship between the variables of study and sexuality. Poisson Regression was also used to come up with a model of how the variables of study influenced fertility in the District. The study revealed a negative correlation between education and sexuality. It was evident from the analysis result that, women who had higher levels of education embrace the use of contraceptives as compared to those with low levels of education.

* DEPARTMENT OF MATHEMATICS, KENYATTA UNIVERSITY, NAIROBI, KENYA

Introduction

Previous studies have found a strong inverse correlation between the TFR and contraceptive use (United Nations, 2001).Increased use of modern contraception is likely to be linked to improvements in women's educational attainment. Growth in the use of modern contraception is believed to have contributed to more rapid fertility decline (Shapiro and Tambashe, 2002). It is also widely believed that education affects fertility by increasing the practice and effectiveness of contraception (Jejeebhoy, 1995). The relationship between a woman's education and contraceptive use tend to be positive which is likely to be because schooling provide detailed knowledge of the number of methods, the correct use of a particular method and from where a particular method can be acquired. Improvement in women's education has been shown to be associated with lower infant mortality hence lowering the need for many children. This has led to unmet need of contraception as a way to lower fertility (Casterline and Sinding, 2000). Better educated women marry later and less often, use contraception more effectively, have more knowledge about and access to contraception, have greater autonomy in reproductive decision making, and are more motivated to implement demand because of the higher opportunity costs of unwanted child bearing (Bongaarts, 2010)

In order to be economically independent and stable, women need to have a good level of education in Kenya. This not only enhances their economic independence but also helps them understand the importance of having a manageable family size, which they can feed and educate. With high fertility rates in Kenyan rural communities such as Kakamega North District, a lot of strain has been put on the available resources, which has led to increased poverty amongst many. Enhancement of women's education would help in controlling the population growth in the District, hence would enable the Stakeholder in the District to be able to implement its development agenda by catering for its citizens needs effectively, and in the process reduce poverty in the District. It was therefore necessary to carry out this research in Kakamega North District. This was geared towards helping to sensitize the inhabitants of the district on education of the girl child, as key towards smaller family sizes, which would in turn lead to proper upbringing of children, better health conditions and reduction of poverty hence promoting development.

Up to 1970s, the fertility in sub – Sahara Africa remained high with an average total fertility rate of about 6.7 births per woman and the differences between countries and regions were modest.

Over the past quarter century, significant fertility declines have occurred particularly in Eastern and Southern Africa, while fertility has remained at high pre-transitional levels in many countries in Western and Middle Africa (Bongaarts, 2010). The total fertility rates of individual countries in 2000–2005 ranged from a high of 7 births per woman in Niger to below 3 births in South Africa (United Nations, 1995). In addition, fertility is usually higher in rural, than in urban areas, higher among the uneducated than among the educated women, and higher in households with low, rather than high incomes (Rutstein, 2002, Merrick, 2001)

It is also widely believed that education affects fertility through a number of indirect ways such as, delaying the age at first marriage and also increasing the practice and effectiveness of contraception (Jejeebhoy, 1995). Education is thought to enhance women's autonomy and control over childbearing decisions through conjugal relationships and increased control over economic resources (Jejeebhoy, 1995, Stromquist, 1998). Moreover, while fertility remains high in Africa as a whole, this is changing in several parts of the continent, most notably in Southern Africa and Kenya (Watkins, 1995). The fertility decline in South Africa and in Kenya has been attributed to a number of factors such as increased use of contraceptives, the rising age at marriage, and the higher levels of education for women in countries like Zimbabwe, Botswana, and Kenya, relative to the rest of the continent. In Kenya the TFR decreased from as high as 6.7 for women with no education to as low as 3.1 for women with at least some secondary education (Republic of Kenya -2009(KDHS), 2008-2009). This rapid fertility decline in Kenya has received a great deal of attention from demographers over the past decade (Watkins, 1998). Comparing to neighboring Tanzania and Uganda, Kenya has achieved a higher level of economic development and a higher level of educational attainment for girls at the primary and secondary levels, which are factors that may help explain the fertility transition underway in the country (UNICEF, 1999).A study done in Central Kenya, revealed that women with high level of educational attainment experience lower fertility levels (Mathenge, 2008). In Western Kenya, increase in schooling led to a decrease in fertility (Duflo, Dupas and Kremer) .Many studies that have been done in Kenya have revealed that fertility is declining in many areas due to rising levels of education of women. On the contrary, this is not the case in Kakamega North District. Kakamega North District From the literature review, it was noted that the relationship between education of women

and fertility was negative. Education was realized to be operating through the five determinants namely; Woman's Sexuality, Contraception, Induced Abortion, Sterility and Post Partum Insusceptibility to reduce fertility. It was also noted that the main reason why developing countries have always had high populations was because many females dropped out of school early, due to early pregnancies, and then afterwards, ended up into early marriages. This encouraged them to give birth to many children, as compared to their counterparts who proceeded with their education to higher levels. Exploring the relationship between women's use of contraceptives and fertility in the Kakamega North District had not yet been done, since such data was absent. This motivated the current study. This knowledge gap if filled will help the stake holders in the Kakamega North District when planning on how to encourage females to continue with their use of contraceptives with a view to reduce fertility in the District.

Methodology

This chapter covers research methodology under the following topics; research design, target population, sample size and sampling procedures, methods of data collection (research instrument), administration of the instrument, techniques of data analysis and operational definition of variables.

Research design

Descriptive and Correlation designs were used in this research. Descriptive design was used because the research involved collection of information by administering of questionnaire to a sample of women from households (Kombo and Tromps, 2006), after which, the current status of affairs was determined. Correlation design was used to assess the degree of relationship that existed between two or more variables in the study. The researcher surveyed households and gathered information as per the sample frame. The researcher used primary data which was obtained by use of questionnaires.

Target Population

A population is an entire group of individuals, events or objects having a common observable characteristic. The target population was women of child bearing age in Kakamega North

District. The District had five Divisions which were made up of thirteen Locations and twenty nine Sub Locations.

Sampling procedures, Study population and Sample size

Sampling Procedures

A sample is a subset of a population. The study used the probability sampling technique where multi – stage cluster sampling design was employed.

The Kakamega North District has its administrative boundaries as follows

Division	Location	Sub-Locations
Kabras North	Chegulo	1. Chebwai 2. Matsakha
	Sirungai	1. Tombo 2. Manda 3. Shiandiche
	Shivanga	1.Fuvuye 2.Teresia
Kabras Central	Shirugu	1. Samitsi 2. Malekha
	Mugai	1. Sundulo 2. Lukala
	Matioli	1. Shipala 2. Tande
Kabras West	Lukume	1. Lukala West 2. Shikutse 3. Shimuli
	Burundu	1. Mutsuma 2. Sawawa
Kabras South	Mahira	1. Shamberere 2. Shamoni 3. Chevoso
	Shianda	1. Mukhonje 2. Shilongo
Kabras East	East Kabras	1. Kimang'eti 2. Lukhokho
	Chesero	1. Lwanda 2. Kakunga
	Chimuche	1. Musingu 2. Chimoroni

The district had five geographical boundaries called Divisions, these acted as clusters. The clusters were heterogeneous in nature.

Sample size

The study targeted the women of child bearing age of Kakamega North District whose population was 38,537 persons as had been projected by the Kakamega North District Development Plan (2008-2012). The population was divided among the five Divisions as follows: Kabras West- 4262 persons, Kabras East-9158 persons, Kabras Central-8886 persons, KabrasNorth-9702 persons, Kabras South-6529 persons. The three Divisions which were selected at stage one, seven Locations selected at stage two and the seven Sub Locations which

were selected at stage three , had their populations of women of child bearing age put in brackets as outlined in the table below.

Division selected at Stage one	Location Selected at stage two	Sub Location	Sub Location selected at Stage three
Kabras West (4262)	Burundu (2131)	Mutsuma (710) Sawawa (710) Shimuli (711)	Sawawa (710)
	Lukume (2131)	Lukala West (1066) Shikutse (1065)	Lukala West (1066)
Kabras North (9702)	Chegulo (3234)	Chebwai (1617) Matsakha (1617)	Chebwai (1617)
	Sirungai (3234)	Tombo (1078) Manda (1078) Shiandiche (1078)	Shiandiche (1078)
	Shivanga (3234)	Teresia (1617) Fuvuye (1617)	Fuvuye (1617)
Kabras South (6529)	Mahira (3264)	Shamoni (1088) Chevoso (1088) Shamberere (1088)	Shamberere (1088)
	Shianda (3265)	Muhonje (1632) Shilongo (1633)	Muhonje (1632)
TOTAL	20,493	20,493	8,808

Sample Size determination

The clusters selected at the final stage were seven with differing numbers of women of reproductive age; the sample size was thus determined by proportionally calculating the number of samples to be taken from each cluster. This was determined by use of the formula, $n=\frac{Z^2 pq}{d^2}$, which was adopted from Mugenda and Mugenda (1999).

The n, z, p q, and d in the formula represented the following;

n = desired sample size.

Z = standard normal deviate set at 1.96 at 95% confidence level.

P = the proportion in the target population estimated to have a particular characteristic.

95% of the women population of Kakamega North District are at child bearing ages (15-49).

q = 1-p

d = degree of accuracy desired which is 95%

If desired n population is less than 10,000 persons then sample size is calculated as follows;

$$n_f = \frac{n}{1+\frac{n}{N}}$$

n_f = desired sample size if less than 10,000

N = Total number of households in the sample frame

In our case the desired n population was 120 households, which was less than 10,000, hence, desire sample size was determined by;

$$n_f = \frac{n}{1+\frac{n}{N}} \quad \text{thus} \quad n_f = \frac{120}{1+\frac{120}{8808}}$$

$$n_f = \frac{120}{1.014}$$

$$n_f = 119$$

The sample was then proportionally allocated to the selected clusters as follows:

Sawawa $= \frac{710}{8808}$ 119 = 10 households

Lukala West $= \frac{1066}{8808}$ 119 = 14 households

Chebwai $= \frac{1617}{8808}$ 119 = 22 households

Shiandiche $= \frac{1078}{8808}$ 119 = 15 households

Fuvuye $= \frac{1617}{8808}$ 119 = 22 households

Shamberere $= \frac{1088}{8808}$ 119 = 15 households

Muhonje $= \frac{1632}{8808}$ 119 = 22 households

Research instrument

The data was collected by use of Questionnaires. The questionnaires had both closed and open ended questions to enable the respondent to be free in providing the needed information to guide the research study.

Pilot testing

The data collection tool was tested in Isanjiro Sub Location which had similar characteristics with the target group. The updated data collection tool was then used to collect data from the sampled population. Cluster sampling was used to come up with the study population. Equal chances were given to all households in the study area.

Techniques of Data analysis

Data analysis refers to a variety of activities and processes that a researcher administered to make certain decision regarding the data collected from the field. This is done in order to get meaning from data collected and to be able to explain various features from the raw data.

The study applied both qualitative and quantitative approaches. Statistical package for social sciences software (SPSS) .A high significance value (below 0.05) indicated existence of a relationship between the study variables. R- Programming language was also used to analyze the data. Poisson Regression Analysis was used to determine the significance of various factors while the chi-square was also used to determine if there was a relationship between the variables.

Operational definition of variables

In this study, independent variables included; level of Sexuality of women of different levels of education, level of Contraceptive use by women of different levels of education, level of Sterility of women of different levels of education and level of Post Partum Insusceptibility of women of different levels of education.

Operational definition of variables

Objective Research Question	Variable	Type of Information	Data Collection Instruments	Data Analysis
1. Is there a relationship between level of Sexuality of women of different levels of education and fertility in Kakamega North District?	**Independent** Sexuality	-Age at 1st intercourse -Age at 1st marriage	Questionnaire	Descriptive Analysis
	Dependent	Number of births	Questionnaire	Descriptive Analysis
2. Is there a relationship between level of Contraceptive use by women of different levels of education and fertility in Kakamega North District?	**Independent** Contraceptive use	-ever used contraceptives -used contraceptives to stop or to space child births	Questionnaire	Descriptive Analysis
	Dependent	Number of births.	Questionnaire	Descriptive Analysis
3. Is there a relationship between level of Sterility of women of different levels of education and fertility in Kakamega North District?	**Independent** Sterility of women	- frequency of coitus in the last five years.	Questionnaire	Descriptive Analysis
	Dependent	Number of births	Questionnaire	Descriptive Analysis
4. Is there a relationship between level of Post Partum Insusceptibility of women of different levels of education and fertility in Kakamega North District?	**Independent** Post Partum Insusceptibility	- number of breastfeeding during the day -Period of exclusive breast feeding -Duration of abstinence after birth	Questionnaire	Descriptive Analysis
	Dependent	Number of births	Questionnaire	Descriptive Analysis

Model for Analysis (Case Study of Onoja and Osayomore's Work)

This study involved a statistical investigation of education on fertility, the work of Onoja and Osayomore (2012),entitled,"Modelling of Determinants of Fertility Among Women of Child

Bearing Age in Nigeria" was therefore found to be very useful to borrow from. In their study, generalized linear model (Poisson Regression Model) and a Natural Log link function was used to explore the extent to which determinants of fertility affected the level of fertility among women of child bearing age in Nigeria. In this Analysis, the dependent variable was level of fertility. The predictor variables were divided into two categories as follows; proximate determinant of fertility: current marital status, age at first marriage, age at first sexual intercourse, age at recent sexual intercourse, post partum amenorrhea, abstinence and insusceptibility, age at first birth as well as use of contraceptives. Next, the Sociodemographic variables which were found to significantly impact on the level of fertility. These included: place of residence (Rural or Urban), Individual Wealth Index (poor, average, rich), Household Wealth Index (poor, average, rich – measured as the median wealth index of all members of the household to which a respondent belongs), highest educational status and whether a husband lived in the house with the woman.

Data Management and Editing

A total of 33,385 women age 15 – 49 years participated in the Nigeria Demographic Health Survey (NDHS). Also, a total of 10 variables were listed as proximate determinants of fertility. Unfortunately variables such as post partum amenorrhea, abstinence and insusceptibility and recent sexual activity had missing observations, and were removed from the modeling process, which brought the total sample to 20,974 women. This was 62.8% of the total women interviewed in the 2008 NDHS.

Statistical Modeling

Given the count nature of their dependent (outcome) variable, a generalized linear model (GLM) with a natural logarithmic link function was used. Poisson regression was adopted to assess how the predictor variables influence the level of fertility.

Specifically,

Let $\mathbf{y_i}$, denote the number of children ever born by a woman i, of child bearing age and t_i, denote the observation time for the i^{th} woman.

Let λ_i denote the mean rate of children per unit time so that the mean number of children for the i^{th} woman is given by $\boldsymbol{\lambda}_i t_i$.

Since $\mathbf{y_i}$ gives an aggregate count of children ever born, it was assumed to have a Poisson distribution with log of the mean given by;

$$\ln E(y_i) = \ln (\boldsymbol{\lambda}_i t_i)$$

$$= \ln \boldsymbol{\lambda}_i + \ln t_i$$

$$= B_o + \sum_{j=1}^{p} B_j X_{ji} + \ln t_i$$

……(3.1)

Where:

x_{ji} is the j^{th} characteristic (predictor variable) of the i^{th} woman.

$\mathbf{B_o}$ is an intercept term

B_j represent measures of the effects of the predictor variable

$\ln t_i$ is an offset variable

In this study, the current age of the woman was the time at which observation for the number of children ever born was made on the i^{th} woman, since these differed across women, the offset Variable was set to ln (current age).The Equation (3.1) show that the main part of the model (consisting of all the terms except for the offset term), is modeling the rate of the children born by women of child bearing age per unit time.

$$\ln (\boldsymbol{\lambda}_i) = B_o + \sum_{j=1}^{p} B_j X_{ji}$$

……(3.2)

or equivalently, exponentiation of both sides gives

$$\boldsymbol{\lambda}_i = \exp (B_o + \sum_{j=1}^{p} B_j X_{ji} + \ln t_i)$$

……(3.3)

The modeling process involved four stages; in the first stage, the predictive ability of each variable was assessed using simple Poisson regression models. The second stage involved a multiple Poisson regression model consisting of only the selected sociodemographic variables found to posses individual predictive capability in order to reaffirm their contributions when other sociodemographic characters are adjusted for. In the third stage, only the proximate determinants of fertility were used in the modeling exercise. This was to assess the effect of each proximate determinant on fertility in the presence of others. The final step consisted of a multiple Poisson regression modeling using the selected sociodemographic characters (found to be significant in the third model) and the proximate determinants of fertility. In the modeling

processes, the category assumed to have low level fertility was referenced in order to study the likelihood of having high level of fertility in the population. Incidence rate ratio (IRR) with 95% confidence interval (CI) was used to assess the association of the selected demographic variables and the proximate determinants with fertility. The models were investigated using the HYBRID (encompassing both Fisher and Newton – Raphson methods) procedure of the SPSS with a robust covariance (standard error) estimator in the SPSS software (version 20). Estimates of the corrected Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) provided with the output of the analysis from the SPSS were used for goodness of- fit- test. A lower value of AIC or BIC indicated a better fit of the model.

The Generalized Linear Model Results

The table below shows the results of the association of variables with the Level of Fertility that was modeled by Onoja and Osayomore, (2012)

	Model for the individual variable	**Model for Selected Sociodemographic factors**	**Model for NDHS Proximate determinants Of fertility**	**Full Model**
Variables	**Wald chi-square**	**Adjusted IRR(95% CI)**	**Adjusted IRR(95% CI)**	**Adjusted IRR(95% CI)**
Age of respondent at first birth	2181.48***			
<15				
15-30			0.82(0.81-0.84)***	0.83(0.81-0.84)***
30-49			0.39(0.37-0.42)***	0.42(0.39-0.45)***
Current Contraceptive method	136.02***			
No				
Yes			1.02(1.01-1.04)**	0.91(0.90-0.93)***
Current Marital	80.31***			

Status				
Married				
Living together			1.24(1.17-1.32)***	1.18(1.12-1.26)***
Number of other Wives	468.24***			
None				
≥ 1			0.91(0.91-0.92)***	0.95(0.94-0.96)***
Age at first Marriage	1966.28***			
<15				
15-30			0.85(0.84-0.86)***	0.91(0.89-0.92)***
30-49			0.82(0.76-0.87)***	0.90(0.85-0.97)**
Age at first intercourse	1611.937***			
<15				
15-30			0.89(0.87-0.90)***	0.91(0.89-0.92)***
30-49			1.09(1.07-1.11)***	0.90(0.85-0.97)***
Type of place of residence	447.79***			
Urban				
Rural		1.02(1.00-1.04)*		1.02(1.00-1.03)
Highest education Level	2516.839***			
No education				
Primary		1.48(1.43-1.53)***		1.36(1.32-1.41)***
Secondary		1.47(1.42-1.52)***		1.38(1.34-

				1.42)***
Higher		1.19(1.15-1.22)***		1.17(1.13-1.20)***
Religion	809.67***			
Christianity				
Islam		0.98(0.94-1.02)		1.00(0.96-1.05)
Others		1.03(0.98-1.07)		1.03(0.98-1.07)
Ethnicity	1797.45***			
Hausa				
Igbo		1.02(1.01-1.04)*		1.01(1.10-1.03)
Yoruba		1.00(0.98-1.02)		1.01(0.99-1.03)
Others		0.82(0.81-0.84)***		0.85(0.84-0.87)***
Personal Wealth Index	1180.76***			
Poor				
Average		1.04(1.02-1.06)***		1.05(1.03-1.07)***
Rich		1.04(1.02-1.06)***		1.04(1.03-1.06)***
Household Wealth Index	27.92***			
Poor				
Average		1.06(1.01-1.11)*		1.06(1.01-1.11)*
Rich		1.06(1.01-1.11)*		1.06(1.01-1.11)*
Husband Lives in House	200.570***			
No				
Yes		1.09(1.06-1.11)***		1.07(1.05-1.10)***
AICC		85064.68	84198.94	82927.79
BIC		85183.92	84278.43	83118.56

The * gives the level of significance of the variables. Thus, the variable with *** is a more significant determinant of the dependent variable, followed by the one with ** and then lastly the variable with *.

The results above showed that all variables studied individually were significant predictors of fertility. Among the variables was the level of education which showed that women with

secondary, primary education or no formal education respectively had 1.19, 1.47 and 1.48 times more children compared to those who had completed tertiary education and that poor women had 1.04 times more children than the rich women while women from poor households had 6% higher fertility compared to those from rich households. The present study involved the investigation of the extent to which level of education of women operated through determinants of fertility to affect fertility of women of child bearing age in Kakamega North District, Kakamega County.

Results

Relationship between Level of Contraceptive Use and Level of education

Table 4.6 Level of Contraceptive use versus Level of Education cross tabulation

		Level of contraceptive use			Total
		low	average	High	
Level of education	primary	20	3	19	42
	secondary	1	1	21	23
	diploma or higher	2	1	41	44
Total		23	5	81	109

Table 4.6 shows the relationship between the level of education of women and their level of contraceptive use. Majority of women who use contraceptives at low levels (20 out of 23) had primary education as their highest level of education. Those who used contraceptives at the highest levels (41 out of 81) had Diploma and higher levels of education. Although it has yet to be directly tested with regards to contraceptive use, education could potentially impact upon women's attitudes towards contraceptive use and family size. Studies have shown that the ideal number of children a woman has, is related to the level of contraceptive use and that the number of living children is a strong determinant of "unmet need" for family planning strategies (Shapiro and Tambashe, 2003). Supporting the economic arguments outlined above, it is possible to hypothesize that education operates through contraceptive use to influence women's ideal number of children , as studies mainly focusing on developed nations have argued.

Table 4.7 Relationship between level of contraceptive use and the level of education - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44.423[a]	4	.001
N of Valid Cases	109		

Table 4.7 shows a chi-square test results that sought to determine the relationship between the levels of contraceptive use and the level of education of women. The results indicate that there is a significant relationship between the levels of contraceptive use and the level of education of women. $P< 0.05$ ($df=4$, $P= 0.001$).

Relationship between level of contraceptive use and the number of children born.

Table 4.8 Level of contraceptive use versus the number of children born.

		Level of contraceptive use			
		low	average	high	Total
Number of children Born to a woman	0-2	13	1	12	26
	3-4	14	1	9	24
	5-6	46	1	1	48
	Above 6	9	1	1	11
Total		82	4	23	109

Table 4.8 shows the relationship between the level of contraceptive use and the number of children born to a woman. Majority of women who use contraceptive at the lowest level had the highest number of children born to them (5-6). Majority of the women who use contraceptives at the highest levels had the fewest number of children born to them (0-2). The results show that the level of contraceptive use is highly correlated to the number of children born to a woman.

Table 4.9 Relationship between level of contraceptive use and number of children born – Chi-Square tests.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.630[a]	6	.016
N of Valid Cases	109		

Table 4.9 shows a chi-square test results that sought to determine the relationship between the level of contraceptive use and the number of children born to a woman. The results indicate that there is a significant relationship between the level of contraceptive use and the number of children born to a woman P< 0.05 (df=6, P= 0.016).

Coefficient of determination of contraceptive use versus number of children born model.

Coefficient of determination measures the explanatory power of the independent variables**.**

Model summary

Model	R Square	Std. Error of the Estimate
1	.561	.980

dependent variable=number of children born,

independent variable =age at first sexual intercourse

R square is 0.561 thus the model is 56.1% explained by the independent variable.

Testing the second hypothesis

Null hypothesis (H_0)

There is no significant relationship between level of contraceptive use by women of different levels of education and fertility in Kakamega North District.

Alternative hypothesis (H_1)

There is significant relationship between level of contraceptive use by women of different levels of education and fertility in Kakamega North District.

Table 4.7 gives the analysis of the relationship between level of contraceptive use and level of education. The P-value determined was 0.001 thus ($P<0.05$), which was significant.

Table 4.9 gives the analysis of the relationship between level of contraceptive use and number of children born to a woman. The P-value determined was 0.016 thus ($P<0.05$), which was significant.

Since $P<0.05$ in both cases, we reject the null hypothesis of no significance and conclude that there is a significant relationship between level of contraceptive use by women of different levels of education and fertility in Kakamega North District.

REFERENCES

Bongaarts, J. (2010).*The Causes of Educational Differences on Fertility in sub-Saharan Africa.* Population Council, New York. www.popcouncil.org/publications/wp/index.html.Accessed on 5th November, 2012.

Bongaarts, J. (2007). Fertility Transition in the Developing World: Progress or Stagnation? Paper presented at the Annual Meeting of the Population Association of America, New York, NY, March 2007.

Bongaarts, J, and Watkins, S.C. (1996). Social Interactions and Contemporary Fertility Transitions. *Population and Development Review*, **22**(4): 639-682.

Bongaarts, J. and Potter, G. (1983). *Fertility, Biology and Behaviour: An Analysis of the Proximate Determinants*. New York. Academic Press.

Casterline, J.B. and Sinding W.S. (2000). Unmet need for family planning in developing countries and implications for population policy. *Population and Development Review* **26**(4):691-723.

Cleland, J. and Georgia K. (1998). *Education, fertility, and child survival: Unravelling the links*.In *The Methods and Uses of Anthropological Demography*. Malwade B.A. and Aaby P. Oxford: Clarendon Press:128-152.

Duflo E.,Dupas P. and Kremer M. (2011). Education, HIV, and Early Fertility: Experimental Evidence from Kenya. Working Paper

Elizaga, J.C. (1974). The participation of women in the labour force of Latin America. *Fertility and other factors.International Labour Review* **109**(576):519-538.

Jeffery, R., and Basu, A.M. (1996).*Girl's schooling,women's autonomy and fertility change in South Asia*.New Delhi:Sage.

Jejeebhoy, S. J. (1995*).Women's Education, Autonomy and Reproductive Behaviour*. Experiences from Developing Countries. Oxford, Clarendon Press.

Kakamega North District Development plan (2008 - 2012), *Implementation of the national population policy for sustainable development*.

Kombo, D.K. and Tromps D.L.A. (2006). *Proposal and Thesis Writing. An Introduction.* Nairobi. Paulines publications Africa.

Kwesiga, C.J. (2002).*Women's Access to Higher Education in Africa*. Fountain Publishers. Kampala.

Mathenge G.W. (2008). Role of education in influencing fertility levels of Women in Central Province, Kenya. Working paper.

Merrick, T. (2001) .*Population and Poverty; A Review of Reviews* in Birdsall N.,Allen C. and Sinding W. S. *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World*. New york: Oxford University Press : 201-212.

Mugenda, O.M. and Mugenda A.G (1999).*Research Methods: Quantitative and Qualitative Approaches*, Nairobi: Act Press.

Ominde, S. (1975). *The Population of Kenya, Tanzania, and Uganda*. Nairobi: Heinemann.

Onoja, M. and Osayomore,I. (2012). Modelling Determinants of Fertility among Women of Child Bearing Age in Nigeria. *Humanities and Social Sciences*,**2**(18):167-175.

Republic of Kenya (2009).KDHS 2008-2009.Kenya Demographic and Health Survey.Carlverton,Maryland: Kenya National Bureau of Standards and ICF Macro International.

Republic of Kenya (1993).KDHS 1993.Kenya Demographic and Health Survey.Carlverton,Maryland: Kenya National Bureau of Standards and ICF Macro International.

Republic of Kenya (1989).KDHS 1989.Kenya Demographic and Health Survey.Carlverton,Maryland: Kenya National Bureau of Standards and ICF Macro International.

Republic of Tanzania (1996).TDHS 1996.Tanzania Demographic and Health Survey.Carlverton,Maryland: Tanzania National Bureau of Standards and ICF Macro International.

Republic of Tanzania (1993).TDHS 1993.Tanzania Demographic and Health Survey.Carlverton,Maryland: Tanzania National Bureau of Standards and ICF Macro International.

Republic of Uganda (1995).UDHS 1995.Uganda Demographic and Health Survey.Carlverton,Maryland: Uganda National Bureau of Standards and ICF Macro International.

Republic of Uganda (1989).UDHS 1988-1989.Uganda Demographic and Health Survey.Carlverton,Maryland: Uganda National Bureau of Standards and ICF Macro International.

Rodriguez, G. (1996). The spacing *and limiting components of the fertility transition in Latin America. In. the Fertility Transition in Latin America*. Guzman, J.M., Singh, S., Rodriguez, G., and Pantelides, E.A.Oxford, Clarendon Press:27-47.

Rutstein, S. (2002). Fertility levels, trends and differentials: 1995–1999, *Demographic and Health Survey Comparative Reports No. 3. Calverton, MD:* Macro International, Inc.

Shapiro, D. and Tambashe B.O. (2003). *Kinshasa in Transition: Women's Education, Employment, and Fertility.* Chicago: University of Chicago Press.

Shapiro, D. and Tambashe, B.O. (2002).Fertility Transition in urban and Rural Sub-Saharan Africa: Preliminary Evidence of a Three-Stage Process. *Journal of African Policy Studies*, **8**(3): 103-127.

Stromquist, N. (1998).*Agents in women's education*: Some trends in the African context. In Women and Education in Sub-Saharan Africa: Power, Opportunities, and Constraints. Marianne B., Josephine A., Beoku B. and Tabachnick R.B. Boulder and London: Lynne Rienner. Pp. 25-46.

Tuman, J. P. (2007). The Effects of Education on Fertility in Colombia and Peru. *Implications for Health and Family Planning Policies. Global health governance*,**1**(2):110-132.

UNICEF (1999). *The State of the World's Children*. New York: UNICEF.

United Nations (1995). *Women's Education and Fertility Behavior:* Recent Evidence from the Demographic and Health Surveys. New York: United Nations.

United Nations (2001). Levels and Trends of Contraceptive Use as Assessed in 1998. New York: United Nations.

Watkins, C. S. (1998). *Local Transformations in Reproductive Ideologies in a Global Context 1930-1997.* Paper prepared for the Rockefeller Foundation meeting on Global Fertility Transition. Bellagio, Italy.

Watkins, C. S. (1995). *Diffusion and Debate: Controversy about Reproductive Change in Nyanza Province, Kenya.* Paper presented at the 1995 Annual Meeting of the Population Association of America. San Francisco, CA.

Westoff, C. F. and Rodriguez G. (1995). The mass media and family planning in Kenya. *International Family Planning Perspectives*, **21**(1): 26-31,36.