

DETERMINANTS OF FERTILITY IN WESTPOKOT COUNTY

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**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF ECONOMICS IN
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DECLARATION

This research project is my original work and had not been presented for any partial fulfillment of award of degree in any other institution.

Signature..... Date.....

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This research project has been submitted to the School of Economics, University of Nairobi, with approval as university supervisor.

Signature Date.....

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DEDICATION

This project is dedicated to my parents for their support and encouragement during my postgraduate course. A special dedication goes to Almighty God.

ACKNOWLEDGMENT

I wish to acknowledge the contributions of my supervisor Dr. Phyllis Machio for her professional guidance that assisted me in writing this research proposal. The success of this research project would not have been possible without her dedicated support in equipping me with the skills of research writing.

I also extend my regard to my fellow class mates for their encouragement and sharing of the ideas during the study.

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ABBREVIATIONS AND ACRONYMS

KDHS	:	Kenya Demographic and Health Survey
KFS	:	Kenya Fertility Survey
KNBS	:	Kenya National Bureau of Statistics
LDCs	:	Less Developed Countries
MCH/FP	:	Maternal Child Health and Family Planning Programme
NCPPD	:	National Council for population policy and development
PRB	:	Population Reference Bureau
TFR	:	The total fertility rate
UN	:	United Nations
MoH	:	Ministry of Health
NCAPD	:	National Coordinating Agency for Population Development
NGO	:	Non-Governmental Organization
ICPD	:	International Conference on Population and Development
POA	:	Program of Action

ABSTRACT

The world's population has continued to increase and it's expected to reach 10.8 billion by 2015. Population growth has several negative consequences which include unemployment and food security problems. Kenya has been committed to reducing its population growth through various programs aimed at reducing fertility. This has borne fruits as Kenya's total fertility has actually declined considerably from 8.2 in the 1970s to 3.9 in 2014. Westpokot County, though had same fertility rate as Kenya in 1970s has had its fertility rate increase considerably over the past decade making it the County with highest fertility rate in 2014. Kenya's effort to manage population growth will be undermined if this county continues to record high and rising fertility rates. This study investigated the determinants of Westpokot's fertility. A Poisson regression was estimated. The study found that education of a woman is a very significant determinant of fertility rate in Westpokot. Women with secondary and tertiary education are more likely to have fewer children than those with no formal education. This study recommends promotion of girl child education especially secondary and tertiary education as a way of reducing high fertility rate in this County.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The human population in the world was about 1 billion in the 1800s, rose to about 2.5 billion in 1950, and 50 years later had increased to 6.1 billion (United Nations, 2001). The meant that the global population was increasing by about 78 million a year. If fertility did not decline, the world's population was estimated to reach 10.8 billion by 2015 (Martin, 2009).

There are several theories that have been used to explain population increase. The most famous being the theory of population by Thomas Robert Malthus. In his essay on principles of population he argued that it's the tendency of all animated life to increase beyond the means available for its subsistence. Malthus argued that while human population increased exponentially food production increased arithmetically. Malthus further argued for the reduction of population through preventive checks for example moral constraints and positive checks like poverty and disease (Malthus, 1978).

Ricardo (1809), in his theory of rent argued that as population increases more land will be required for cultivation, more cultivation will lead to diminishing returns of the land use and eventually leads to less productivity of the land thus leading to food shortage within the country. The population growth is concentrated in least developing countries and this pattern is expected to persist in the near future (United Nations, 2001). This is evident by looking at the evolution over a century of the share of the world population living in three different sub-samples of countries; more developed, less developed and least developed. The share of the human population living in the most developed regions is anticipated to decrease from a high of 32% to a low of 13% in the period 1950–2050, however it is expected to increase in the least developed regions from about 8% to about 20%. Therefore, the main concern arising from these data involves the long-run effects of population change on the economy of a Nation (United Nations, 2001).

Population growth has several negative consequences. These include: lower per capita GDP growth in most developing economies, unemployment and reduced the public expenditure that will be the education and the health. Large family size and low incomes also limit the opportunities parents have to educate their own children (Population Reference Bureau, 2005). Other negative

effects of high fertility include: harm to the health of mothers and children, food security problem, environmental degradation and urban congestion. (Population Reference Bureau, 2005).

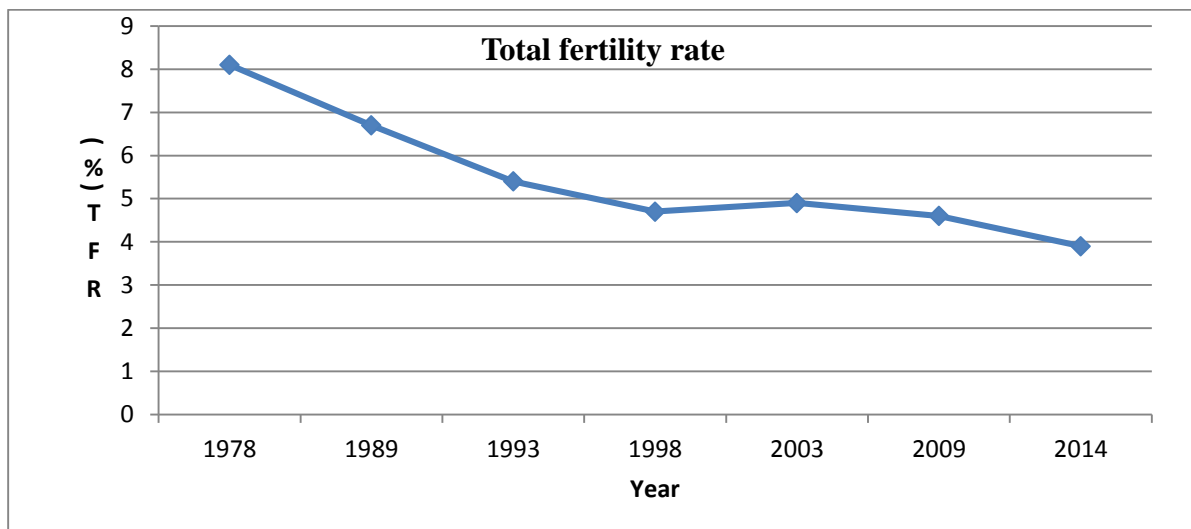
1.1.1 Fertility Trends in Kenya

The United Nations (2001) defines fertility rate as ‘average number of the live births a woman could have by about age 50 if she were subjected throughout her life to some the age specific fertility rates to be observed in a given year. The calculations assumption is that that no deaths will occur. The total fertility rate/fertility rate is expressed as number of children per woman.’

Kenya’s fertility has been on a declined significantly since late 1970s. Fertility rate in Kenya which was 8.2 births per woman in 1977/78 per woman has been declining to 3.9 births per woman in 2014 (KNBS, 2014).

From Figure 1.1 Kenya recorded its highest TFR of 8.2 in late 1970’s and 6.7 in the late 1980’s. In early 1990’s TFR dropped to 5.4 and further dropped to 4.7 in the late 1990’s. In early 2000s TFR increased to 4.9 but further dropped to 4.6 in the late 2000s. The lowest TFR of 3.9 was finally recorded in 2014.

Figure 1.1 Fertility trends in Kenya



Source: KNBS 2014, CBS 1978 & NCPD 1994, 2015

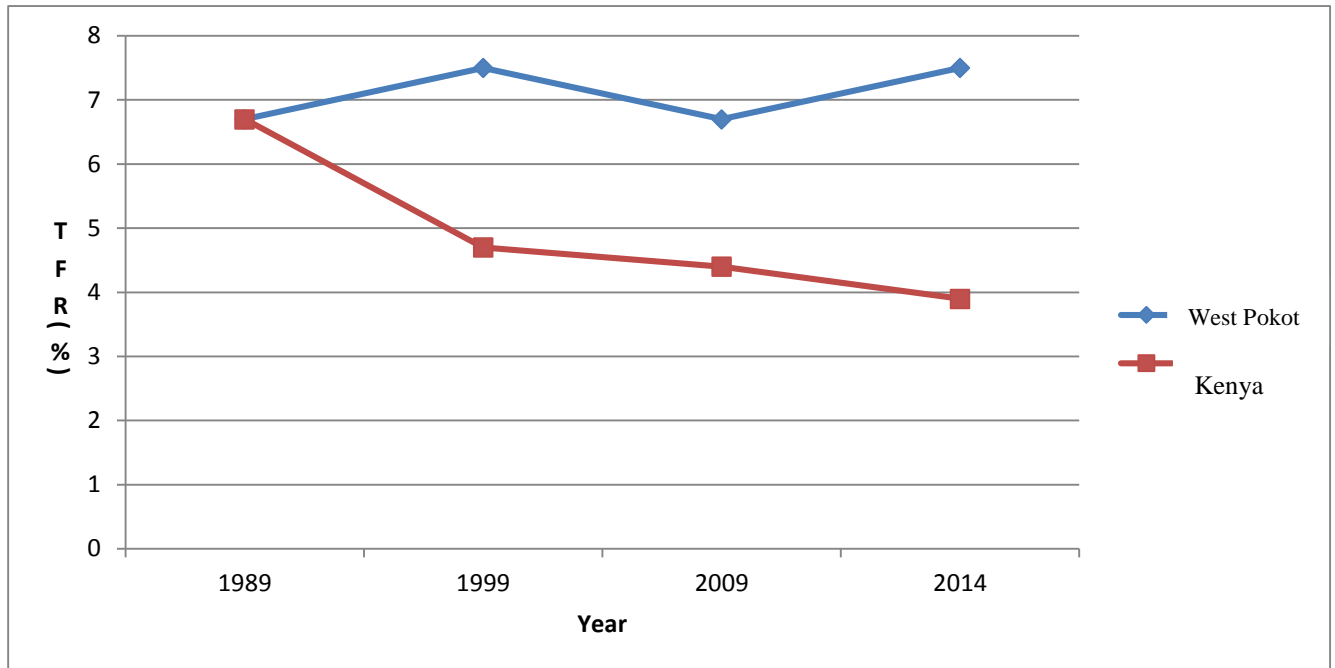
Several factors can be used to explain the significant drop in fertility in Kenya. An increase in knowledge on modern methods of contraceptives provides better alternatives in birth control. Knowledge on modern use of contraceptives has increased from 88.4% in 1993 to 98.4% in 2014 (KNBS, 2015 & CBS, 1994). Modern contraceptives use among married women has also improved from 27.3% in 1993 to 53% in 2014 (KNBS, 2015 & CBS, 1994).

Other factors that can be used to explain the drop in fertility is the age at first birth and age at first marriage. The earlier a woman got married the more children she is likely to have and the higher the fertility rate. In 1993 Kenya recorded a median age at first birth for women ages 15-49, and median age at first marriage for women ages between 25-49 at 19 years and 18.8 years respectively (NCPD, 1994). In 2014 Kenya recorded a significant improvement with the median age at the first marriage of women of ages 25-49 recorded at 20.2 years while the median age at first birth of ages between 15-49 recorded at 20.3 years (NCPD, 2015).

1.1.2 Fertility trend in Westpokot County

While Kenya's total fertility rate has been declining, Westpokot's total fertility has been rising and in fact Westpokot was ranked as the county with the highest fertility in the year 2014 in Kenya (NCPD, 2015). Westpokot actually had same fertility as Kenya is in 1970s but overtime the gap in total fertility rate in this county and that of Kenya has widened as shown in Figure 1.2 below.

Figure 1.2 Fertility trends in Kenya and Westpokot County



Source: KNBS, 2012 & NCPD, 2015

Westpokot's total fertility has been fluctuating. Total fertility in Westpokot County increased from 6.7 between late 1980s and early years of 1990s to 7.5 in the late 1990s then dropped marginally to 6.7 between the late 1990s and the late 2000s. Between around 2010 and 2014 a steady rise in total fertility to 7.5 can be observed making almost double Kenya's TFR.

Several factors explain incidences of high fertility rate in Westpokot. *Knowledge* on modern contraceptives in the county is significantly low as compared to the rest of the country. Little knowledge and use of modern contraceptives means women are using traditional methods of contraceptives which are ineffective leading to a higher TFR. In 2014 for example the percentage of women with knowledge in modern contraceptives in Kenya was 98.4% while in Westpokot it was 75.0% (NCPD, 2015). Modern contraceptive use among married women in Westpokot is also significantly lower than that of the rest of the country. While Kenya recorded a 39.1% modern contraceptive use among married women, Westpokot recorded a 13.3% modern contraceptive usage among married women (KNBS, 2015).

Teenage pregnancy can also be a factor contributing to increase in TFR in Westpokot. The larger the number of the teenage parents, the higher the fertility rate. While Kenya recorded the percentage of teenagers who had begun child bearing at 18.1%, Westpokot recorded a higher percentage of 28.6% (NCPD, 2015).

1.1.3 Policies on Population growth

Kenya has been strongly committed to reducing population growth through adoption of policies and programs on family planning. In early 1960's the Family planning association of Kenya was established by private individuals and opened its first family planning clinics. However, it was until the late 1960's that the official national family planning program was established making Kenya the first country in Sub-Saharan Africa to adopt a nationwide family planning programme. There was need to adopt this program as Population was increasingly growing. The major objective of this programme was to increase the use and knowledge on contraceptives and family planning (United Nations, 2004).

After the release of the 1969 census report, an increase in population from 5.4 million in 1962 to 10.9 million in 1969 was recorded, the government took the initiative to adopt a 5-year family planning programme (1975-1979) to reduce the annual rate of natural population and improve the health of the mother and children below 5 years (Henin,1986).

In early 1980's the government had demonstrated considerable commitment through the formation of the National Council for Population and development (NCPD) to improve on the weaknesses of earlier family planning programs. The councils mandate being the formulation of population policies and strategies, coordination of family planning programs and support increased disbursement of contraceptives through health facilities, extensive information, education, communication and (IEC) campaigns (Blacker, 2006; Ajayi and Kekovole,1999).

Towards the Mid 1990's The United Nations International Conference on Population and Development (ICPD)-Programme of Action 1994 was adopted. At the ICPD, 179 Countries adopted a 20 year programme of Action that was based on the success of population, maternal health and Family planning programmes of previous decades while tackling the needs of the 21st Century. In relation to family planning POA member countries were required to assess the extent of national unmet need for quality family planning with more focus on the vulnerable groups in

the population and institute systems to monitor, prevent and control abuses by family planning managers. POA also advocated for NGO's active involvement in increasing acceptability of reproductive health services. Countries in attendance were also required to identify and tackle inhibitors of utilization of family planning services. Community leaders were also urged to play a part in promoting the adoption and legitimizing use of family planning services (United Nations, 1995).

In the late 1990's the National Reproductive Health Strategy was adopted in response to the Program of Action formed in 1994 famously called the United Nations International Conference on Population and Development held in Cairo. The strategy's main goal being to promote the concept of reproductive health; family planning, unmet needs among other reproductive health issues (Ministry of Health, 1996).

Later in 1996, the NCPD launched The National advocacy on Population and IEC Strategy for Sustainable Development. The program was adopted to run from the late 1990's to the late 2000's to aid use and knowledge on contraceptives. However, the program failed when funding from UNFPA was withdrawn in 2000. Some clinics suffered commodity stock out (Population Action International, 2006).

In early 2000's the NCPD published the second Population Policy for Sustainable Development. The policy was instrumental in expanding policy space for family planning from 2003 onwards. This was through organizing focus events using a variety of policy narratives to 'reframe family planning' and also counter traditional skepticism about family planning among those who try to marginalize it as 'women issue' by presenting it as non-radical and for the benefit of all Kenyans(NCPD,2000). NCPD further experienced significant changes when it became an agency that will be working for the Ministry of Economic planning and Economic Development and became the National Coordinating Agency for Population and Development in 2004. A year later the 2005/6 budget was presented to parliament and adopted, allocating funds to family planning for the very first time. In April and July 2005 two advocacy workshops were convened by NCAPD with support from National and International NGO's and donors. This workshop helped lobby important officials (NCAPD, 2005; NCAPD, 2006b).

In late 2000's the Ministry of Health adopted the country's first ever National Reproductive Health Policy (2007) The policy emphasized on reaching the underserved communities and those in greatest need as well as most vulnerable through provision of equitable access to reproductive health services like family planning and improving the quality and effectiveness of services at all levels (Ministry of Health, 2007).

With the National Reproductive Health Policy 2007 reaching out to the marginalized and vulnerable in the society, there was need to strengthen reproductive health services across the country through provision of modern contraceptives for users and increase diversity capital per person financial flow to the health sector. The Kenya Health Policy 2014-2030 was thus adopted. The policy objectives were to look into increasing the private sector and the community involvement in the provision of health service (Ministry of Health, 2014).

1.2 Statement of the problem

The fertility in Westpokot is significantly higher than that of Kenya. By 2014 Westpokot's fertility was almost double that of Kenya. The Kenyan government has shown strong committed to reducing population through the reduction of the overall TFR. Efforts by the government will be undermined if Westpokot continues to record significantly high TFR (NCPD, 2015). Previous study have focused on the consequence of fertility on child health in Kenya (Kabubo-Mariara, Mwabu and Ndeng'e, 2009) and Fertility decline in Kenya(Milne,1993).

1.3 Research Objectives

The general objective of the study is to investigate the determinants of fertility rate in Westpokot County.

The specific objectives of the study are;

- i. To investigate the determinants of fertility in Westpokot.
- ii. To suggest policy recommendations to lower TFR in Westpokot.

1.4 Research Questions

- i. What are the factors that affect fertility rate in Westpokot?
- ii. What policies can be recommended to lower TFR in Westpokot?

1.5 Significance of the study

The research will benefit policy makers in Westpokot in formulating policies that will curb TFR in the county. The ministry of health will also benefit from this research in understanding why this county has high TFR and how they can partner with the county government to reduce it. This research will also beef up research done in the field of fertility.

1.6 Organization of the study

Following this introduction, the next chapter will present the literature review which is divided into theoretical and empirical reviews. The theoretical review shall discuss the proximate fertility determinants theory and the conceptual framework. The empirical review section shall review literature on income, education, contraceptives, marital status, age at the first birth and age at the first union as determinants of fertility. After the literature review the next chapter will present the methodology that will be used in the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter discusses the theoretical review which captures the various theories that inform the study. The chapter also presents the empirical review from other scholars that are relevant to this study.

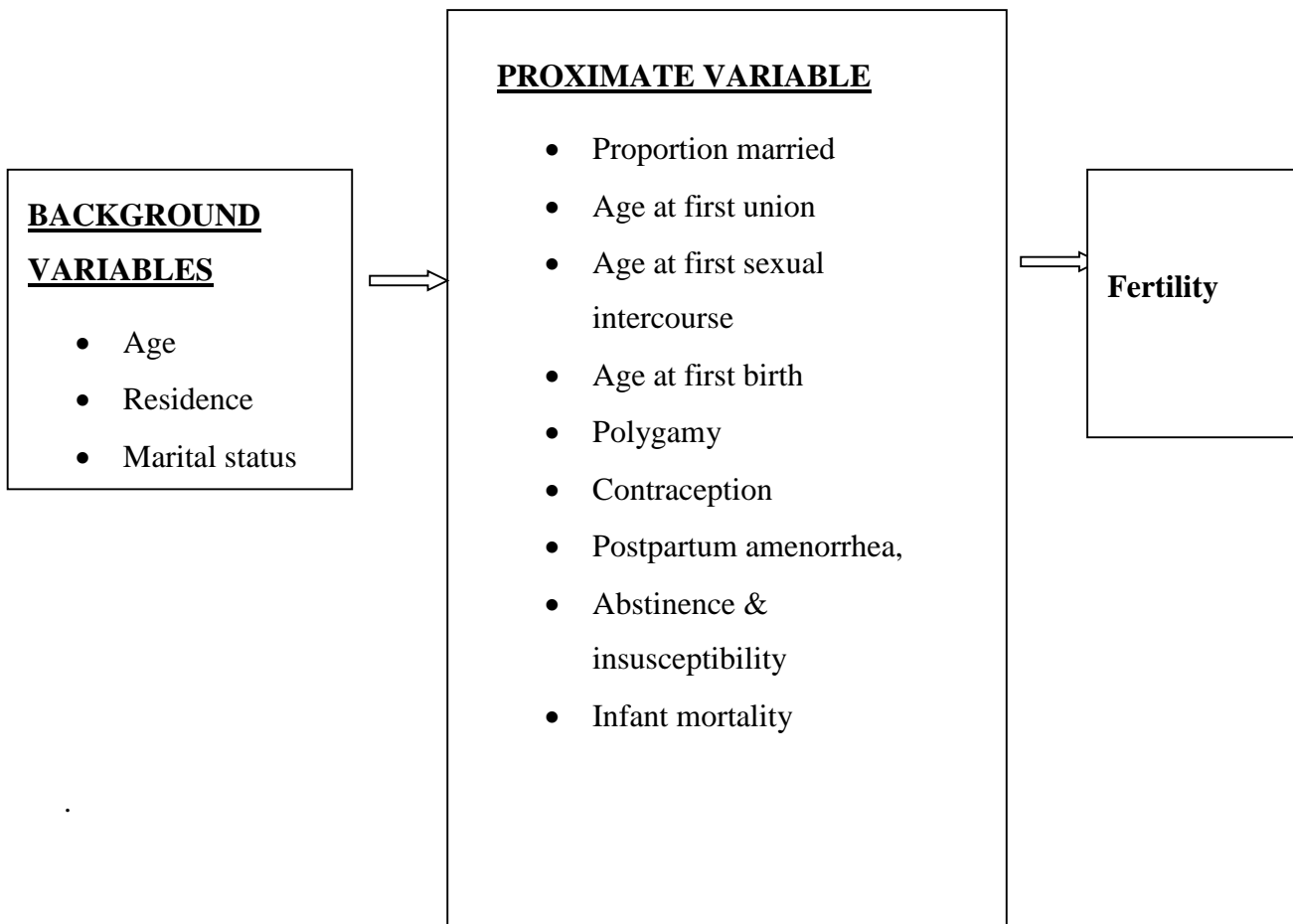
2.2 Proximate Determinants of Fertility Theory

The proximate determinants theory was first developed by Davis and Blake (1956). In their book “Economic development and cultural change” they suggested that reproduction involved three steps. First the intercourse, then conception and finally gestation and parturition. They suggested eleven intermediate variables that influence fertility. Each of the eleven variables may have a negative or positive effect on fertility. The eleven intermediate variables include age of entry into unions, permanent celibacy, post widowhood celibacy, voluntary abstinence, and involuntary abstinence, frequency of coitus, involuntary sterility, contraception, sterilization, involuntary fetal death and voluntary fetal deaths (Davis and Blake, 1956).

The proximate determinant of fertility theory was further improved in the 1970’s by John Bongaarts who opted to collapse the eleven proximate determinants into eight. This determinant were either biological or behavioral factors. They include proportion married, frequency of intercourse, induced abortion, sterility, lactational infecundability, sudden intrauterine deaths and duration of fertility. However, four of the eight intermediate variables were deemed more important. These four major fertility determinants are the proportion married, the contraception usage, incidences of induced abortion and lactational infendability. A simple model with measurable and quantifiable variables based on these four variables was there after developed (Bongaarts, 1978). In this model marriage is used as a variable measure of extent to which women of reproductive age, that is between 15-49 years, are exposed to the risk of conceiving while contraception is used as a variable measure of conceiving where there is inability to conceive by a woman until the pattern of ovulation and menstruation is restored. In the model also, abortion is used as a measure of conceptions failure to end in a live birth because some in certain cases pregnancies suddenly terminate prematurely in a miscarriage or stillbirth. Lastly Fecundity is used as a variable measure of natural sterility where only a small percentage of women of reproductive

age are sterile at the beginning of the reproductive years whereas pathological sterility is where a number of diseases, especially gonorrhoea can result to both secondary and primary sterility. Primary sterility more often leads to childlessness because a sterilizing disease is contracted before the birth of a first child whereas secondary sterility results in difficulty to bear any more children and is prevalent in women that have started child bearing. The conceptual framework below shows the relationship between the background variables, the proximate variable and fertility.

Figure 3.1 Conceptual Framework



Source: (John Bongaarts, 1978).

2.3 Review of Empirical Literature

Previous Researchers have investigated the effect of several behavioral, social and economic factors on fertility. Most research work has been done on the effect of four determinants of fertility which include income, education, contraceptives and marital status. Several studies have been done on the effect of income on fertility and consistent findings have been observed so far (Bbaale, 2011; Rutaremwa, et al.,2015; Adebowale et al., 2014). Rutaremwa et al., (2015) observed that in Uganda fertility levels were highest among the poor than among the rich. Bbaale (2011) also found that a higher number of children were born among the poorest wealth quintiles compared to the richest ones. Moreover, Adebowale et al., (2014) in Malawi observed that the adjusted total fertility rate among the poorest women was at a high of 7.60 compared to the adjusted total fertility rate of the rich which was at 4.45. This studies point to a negative effect of the incomes by a woman on fertility.

Several studies have been done on the determinant fertility with education as an explanatory variable. Kwame (2002) found a negative relationship between education and fertility in Ghana. Longwe et al. (2012) found that districts with more highly educated populations indicated a higher reduction in births. Rutaremwa et al. (2015) found that the total fertility rate among persons with no education, primary education and secondary education was 8.0, 6.6 and 4.2 respectively. Mburugu (1986) found that in both Mbogoini areas in Mathira division, Nyeri District and Hamisa division in Kakamega both in Kenya, women with between classes 1-4 level of education had an average of 6.4 children while those with education between classes 5-8 and above class 8 had 4.9 and 2.7 children per woman respectively. Bbaale (2011) found that women with no education, those with primary school level of education, those with secondary school level of education and those with Post-secondary school level of education had an average of 5.5, 3.5, 1.8 and 1.6 respectively.

Contraceptive usage is also a significant fertility determinant. Gertler and Molyneaux (1994) observed that 75% of fertility decline in Indonesia resulted from increased contraceptive use. Kwame (2002) found that contraceptive use was negatively correlated to fertility. Ayoub (2004) found that contraceptives usage significantly lowers the total number of children a woman can bear. Njenga (2010) found that in Kenyain 2003 the index of contraception was at 0.70 which meant that the total natural marital fertility was reduced by 30% as a result of contraception use

and in 2008/09 the index of contraception was 0.65 which meant that the total natural marital fertility was reduced by 0.35 as a result of contraceptive use. Longwe et al, (2012), found that an increase in modern contraception associated with a standard deviation of 0.161, reduction in number of birth in a district. From the findings above, it is evident that the use contraceptives have a negative effect on fertility.

Studies have found that being married is an important determinant of fertility. Rutaremwa et al. (2015) in a Ugandan study found that the bigger the proportion of women in a region who were married, the higher the total fertility rate. In his study on fertility differences between married and cohabiting couples, Zhang and Song (2007) sampled 655 unmarried couples and 3701 married couples. They observed that the married couples had on average 1.63 children. This is considerably more than the average of 0.42 among unmarried couples. About 61% of the unmarried couples didn't have children while only 22% of married couples were childless. Ndahindwa et al. (2014) found that in Rwanda the ever married women sample, 5% had no children, 45.7% had 1-3 children and 49.3% had 3 children or more. In the never married women sample, 49.6% had no children, 48.3% has 1-3 children and 2.1% had more than 3 children. The studies suggest a positive effect of marital status on fertility.

Consistent findings have been found by several researchers on impact of age at first birth on fertility (Ngalinda, 1998 and Kohles et al., 2001) Ngalinda (1998) found that in Tanzania, women with age at first marriage lower than 15 years had a higher fertility rate of 5.9 as compared to those with the age of birth at 25 years who recorded a lower total fertility rate at 3.2. Kohles et al. (2001) found that an additional year of delay of childbearing reduces fertility by 3% among women. The studies above suggest a negative effect of age at the first birth effect on fertility.

Previous studies have found age at first marriage to reduce fertility. (Mahari et al, 2011 and Handy et al.,2015). Mahari et al., (2011) found that in India as the mean age at first union increased from 21.6 years in the 1970s to 25.1 years in the 2000 fertility also dropped from 4.9 in 1970 to 3.0 in 2000, In another research by Handy et al (2015) on marriage, age and schooling in Madagascar found that if one delays marriage by 1 year birth of a child is reduced by 0.5 years. These studies show a negative relationship between the age at first union of a woman and the fertility rate.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes theoretical framework of the study and the empirical model that will be adopted during the study. Data sources, variable definitions was also be presented.

3.2 Theoretical Model

The theoretical model is drawn from the works of Becker (1960) and works of Becker and Lewis (1973) The theoretical model that we shall use is famously known as ‘The Chicago model’ In this model children are treated as analogous to consumer durables in an attempt to analyze the number of children demanded in a household. Becker also puts in place an assumption that the demand for children/preference is not determined by any economic factors but rather on the income of the family and the wages of the woman.

In his assumption the opportunity cost of getting children is increased only when the woman’s wages are increased and this leads to a reduction in the demand for children. In his model Becker (1960) argued that as a result of an increase in income of a family the resulting demand for children will be dependent on the strength of both the income effect and substitution effect. Some households might choose to increase both the number and quantity of children. When a family chooses to increase the quality of his/her children the expense of raising this child increase and this results to a decrease in fertility. This is the substitution effect. Therefore, a family with a higher income often has fewer children of higher quality and this happens whenever income effect is weaker than the substitution effect. Another important assumption by Becker is that the quality and quantity of children can be separated by a family in their planning and decision making. Moreover, Becker (1960) assumes that in more developed countries like the western nations the need to have more children is positive but very small whereas the need to have quality children is very high. This is because the society has put more pressure on families to maintain or improve the quality of their children and this will be possible only if the number of children is reduced through the use of modern contraceptives.

Becker (1970) however argues that while knowledge on contraceptives can affect the number of children demanded on a family. Many regions in the world have little or no knowledge of contraceptives leading to uneven demand for children. The 4 main elements of this model include

the utility function, a household production technology, external labor-market environments and a set of household resources constrain.

The lifetime utility function is expressed as following:

$$U=U (C, S) = (\bar{Q} N, S) =U (N, S)..... (1)$$

C- Child services

\bar{Q} - a constant

N- No of Children

S- Standard of living

The utility function is maximized subject to the budget and time constraint. The arguments of the utility function are produced separately within the household with the inputs of wife and husband's time and market purchased inputs. The production functions are:

$$N= f^N(T_{fn}, T_{mn}, X_n).....(2)$$

$$S=f^S (T_{fs}, T_{ms}, X_s).....(3)$$

Where T_{ij} - Total input of person i into a unit commodity j

i= (male, female)

x_j = Market good input

Families maximize their utility subject to the time and budget constraints

$$\text{Time constraints} = T_{in} + T_{is} = T_i, \text{ where } i = f, m(4)$$

$$\text{Budget constraints} = V + T_{ml} W_m T_{fl} W_{f+} = P (X_n + X_s).....(5)$$

P- Prices of market goods

V- Non-labor income

T_{ml} - Total time input of the husband in the labor market

T_{fl} - Total time input of the wife in the labor market

T_i - Total time input of the individual

The standard of living and number of children is thus limited by total time of the husband and wife available, average market wage earned by each family member and non- labor income.

3.3 Empirical Model

The starting model in analyzing the determinants of fertility would be a linear regression model because the dependent variable is continuous.

However linear regression model will not be the best model to estimate the determinants of fertility because fertility is a count variable. A count data model will be the preferred model. The basic count data model is the Poisson model

The basic Poisson regression model assumes that y given $x = (x_1, \dots, x_k)$ is independently Poisson distributed with conditional density function of the count given x

$$f(y_i / x_i) = \frac{e^{-\mu_i} \mu_i^{y_i}}{y_i!}, y_i = 0, 1, 2, \dots, 12 \dots \dots \dots (i)$$

And the mean parameter;

$$\mu_i = \exp(x_i' \beta) \dots \dots \dots (ii)$$

β is a $k \times 1$ parameter vector. Taking exponential of $x_i' \beta$ in equation (ii) ensures that the parameter μ_i is nonnegative. This implies that the conditional mean i.e. the expected count is given by;

$$E(y_i / x_i) = \exp(x_i' \beta) \dots \dots \dots (iii)$$

Usually the interest lies in the changes in the conditional mean due to changes in the regressor with the variance and mean being equal and is given by;

$$Var(y / x) = E(y / x) \dots \dots \dots (iv)$$

This is one of the weaknesses of the Poisson model where it is required that the mean be equal to the variance.

The standard estimator for this model is the maximum likelihood estimator (MLE). Given (i) and (ii) and assuming independent observations, the log-likelihood function is

$$l(\beta) = \sum_{i=1}^n (y_i x_i' \beta - \exp(x_i' \beta) - \ln y_i!) \dots\dots\dots (v)$$

The basic Poisson regression model assumes that y given $X = (X_1 \dots X_K)$ is independently Poisson distribution with conditional function of the count given X

Since for the Poisson model the mean and the variance are the same, any factor affecting the mean affects the variance therefore if the mean exceeds the variance or becomes less than the variance under-dispersion or over-dispersion occurs therefore inappropriate use of this model will lead to underestimated standard errors and overestimation of the parameters. In this data there is likely to be over dispersion (excess zeros). This study will test for over-dispersion. If present, negative binomial model will be used to for estimation instead

Table 3.1 Variables definition and expected sign

Variable Name	Variable Definition	Expected sign
Fertility	Number of children that were ever born to a woman	
Contraceptive use	Measured as a dummy variable taking value 1 if a woman used modern contraceptives and 0 otherwise	Negative
Marital status	Measured as a dummy variable taking value 1 if married a 0 otherwise	positive
Income	Measured in wealth quintiles from poorest, poorer, middle, richer and richest	Negative
Age at first birth	Age of a woman at first birth	Negative
Age at first Marriage	Age of a woman at first marriage	Negative
Level of Education	Measured in four dummy variables: No education dummy taking value 1 if a woman has no education and 0 otherwise, primary education taking value 1 if a woman has primary education and 0 otherwise, secondary education taking the value 1 if an woman has secondary education and zero otherwise, tertiary education taking the value 1 if a woman has tertiary education and zero otherwise.	Negative

3.4 Data Source

The data used was survey data and was obtained from the Kenya Demographic and Health survey 2014. The survey was conducted by the Kenya National Bureau of statistics in partnership with the Ministry of Health, The National Council of Population and Development, Kenya Medical Research Institute and the National Aids Control Council. It is the first to provide representative data for the all the 47 counties both national and regional . The study focused on data on Westpokot County.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Descriptive statistics

Table 4.1 presents the descriptive statistics.

Table 4.1: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Fertility	592	4.56	2.50	1	11
No education	592	0.35	0.48	0	1
Primary level	592	0.55	0.50	0	1
Secondary level	592	0.078	0.27	0	1
Tertiary level	592	0.021	0.15	0	1
Marital status	592	0.91	0.29	0	1
Age at first marriage	564	18.38	3.52	11	33
Age at first birth	592	19.26	3.42	11	35
income	592	1.58	1.08	1	5
Contraceptive use	592	0.14	0.35	0	1

The descriptive statistics summarizes the standard deviation, the mean of the sample, the minimum and the maximum of both the dependent and independent variables. The mean fertility was 5. This means the average number of children ever to be born to a woman in this sample was 5. The statistics show that most women in the sample had primary education level and below. About 30 percent of the women had no formal education, about 50 percent attained primary education, 7 percent had attained secondary education and only 2 percent had attained tertiary education. The average age at which women in this sample got married was at 18.4 years. The mean age at which women in this sample had their first child was at 19.3 years. Very few women in the sample reported using contraceptives (14%) and most of them 90% were married.

4.2 Econometric Results and Discussion

The descriptive statistics showed that there is no much variation between the mean and variance of fertility, thus the study used the Poisson model in analyzing the fertility determinants. Table 4.2 presents the results of Poisson regression: both the coefficients and marginal effects.

Table 4.2 Poisson regression outcomes

Variable	Coefficients	Marginal effects
Primary level	-0.06 (0.44)	-0.27(0.21)
Secondary level	-0.24(0.11)**	-1.15 (0.50)**
Tertiary level	-0.94 (0.23)***	-4.44 (1.07)***
Marital status	0.1826025(0.10)*	0.860563(0.47)*
Age at the first marriage	-0.01 (0.01)	-0.03 (0.05)
Age at the first birth	-0.01 (0.01)	-0.03 (0.05)
Income	-0.01 (0.03)	-0.061(0.11)
Contraceptive use	-0.05 (0.07)	-0.26 (0.322)
Constant	1.71 (0.16)	

No of observations=564

Pseudo R²= 0.0215

Table 3: Poisson regression model results

The result from Table 3 shows that all independent variables are negatively related to the dependent variable (fertility) except for marital status. The secondary level of education is significant at 5%, marital status is significant at 10% while tertiary level is significant at 1%. The other remaining variables are not significant at any level hence not significant determinants of fertility. Tertiary education level has a huge impact on fertility. From the observations in Table 4.2 women with tertiary level of education are estimated to have 4 children lesser than women with no education. The secondary level variable also has a huge impact on fertility. Women with secondary level of fertility are expected to have 1 child less compared to women with no education. The results further show that being married increases the expected number of children by 1 compared to being single. This is in line with findings by Kwame, 2002 and Longwe et al., 2012 who found that women with higher levels of education have less children as compared to those with no education. Rutaremwa et al., 2015 also found that women in married unions has more children than those not married.

CHAPTER FIVE

5.1 Introduction

The world's population has been increasing and is expected to reach 10.8 billion by 2015. Fertility rates of Westpokot and that of Kenya were at the same level in the late 1980's but while that of Kenya has been decreasing fertility rates in Westpokot have been increasing. This study investigated the determinants of fertility in Westpokot and gave policy recommendations on how to reduce fertility. Poisson regression model was used to estimate the determinants of fertility. Data was drawn from 2014 KDHS.

5.2 Summary of findings

This study found tertiary and secondary levels of education to have significant effects on fertility rates of women in Westpokot County. Women with secondary and tertiary levels of education are more likely to have fewer children than those with no formal education. Married women are also more likely to have more children than their unmarried counterparts. Contraceptive use, age at first birth, age at first marriage and income are not significant determinants of fertility in Westpokot County.

5.3 Conclusion

One way to reduce fertility in Westpokot is therefore through promoting girl child education. It is not primary education that matters for reduction in fertility but secondary and tertiary levels of education. Focus therefore should be on these higher levels of education. Marital status is also a significant determinant of fertility. Married women are more likely to have more children than women who are not married. In Westpokot County, the cultural setup of the community puts women at a disadvantaged position over the men. The cultural practices tend to undermine women empowerment and promote male dominance. Cultural practices that contribute to girl child school dropout like female genital mutilation and early marriages should also be addressed through civic education. Harmful cultural practices that disadvantage the girl child should be banned from being practiced.

5.4 Policy Recommendations

Attention should be given to girl child education in Westpokot County. Policy makers should direct more funds to improving the girl child education in the county. There should be effort to ensure girls especially attain secondary and higher levels of education. The county government can invest in scholarship programmes for girls from disadvantaged backgrounds and those rescued from early marriages and female genital mutilation. The County can also invest in boarding facilities for girls. Civic education to the rural areas to teach the community on the importance of taking the girl child to school and be accorded same opportunities as the boy child should be promoted. The civic groups should also come out strongly to condemn and prosecute parents who withdraw their daughters from school to be married or undergo female genital mutilation. A population composed of learned women and girls is able to make informed decisions on family planning, child spacing and having manageable family size by embracing the use of modern family planning practices.

5.5 Areas for further research

Fertility is an area of interest that negatively impacts on economies of developing countries. Studies can be done on determinants of fertility in the 46 counties in Kenya. Further research can also be done on how civic education has helped reduce fertility in Kenya.

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