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Determinants of Fertility in Arid Regions of Kenya: A Case of Westpokot County

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Abstract
The world's population has continued to increase and is expected to reach 10.8 billion by 2025. Population growth has negative consequences, including unemployment, food insecurity, and poor quality of life. The Kenyan government has implemented programs over the years aimed at reducing fertility, leading to a reduction in total fertility from 8.2 in the 1970s to 3.9 in 2014. However, counties in the arid and semi-arid regions of Kenya have recorded instances of a rise in fertility, derailing the government's efforts to reduce population and improve quality of life. This study, therefore, investigated the determinants of fertility in West Pokot County and the sociodemographic drivers of fertility. The study used a Poisson regression to analyze the estimates and found that a woman's education had a significant impact on the fertility rate in West Pokot. Women with secondary and tertiary education were more likely to have fewer children than women with no formal education. These findings corroborate previous studies, such as those by Kwame (2002) [35] and Longwe *et al*. (2012) [37], which also observed that women with higher levels of education tend to have fewer children. The study's recommendations emphasize the continued advocacy for girl-child education as a means of reducing the fertility rate in Kenya. Investing in girls' education, particularly at the secondary and tertiary levels, can empower women, delay marriage and childbearing, and ultimately contribute to the government's efforts to manage population growth and improve the quality of life for its citizens. By addressing the educational disparities and promoting access to higher education for women in the arid and semi-arid regions of Kenya, policymakers can leverage this key determinant of fertility to achieve more sustainable population dynamics and development outcomes.

Keywords: Fertility, West Pokot, County

JEL Classification: I10, I11, I12, I18

1. Introduction

1.1 Background of the study

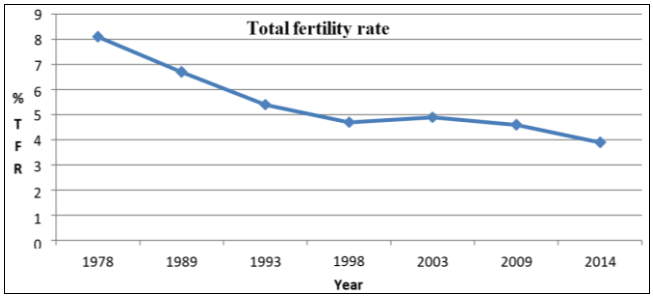
The human population in the world was about 1 billion in the 1800s, rose to about 2.5 billion in 1950, and 50 years later increased to 6.1 billion (United Nations, 2001) [63]. This meant the global population was growing by about 78 million a year. If fertility did not decline, the world's population was estimated to reach 10.8 billion by 2015 (Martin, 2009). Several theories have been used to explain population increase. The most famous is the theory of population by Thomas Robert Malthus. In his essay on principles of population, he argued that all animated life tends to increase beyond the means available for its subsistence. Malthus argued that while the human population increased exponentially food production increased arithmetically. Malthus further noted that the population could be reduced through preventive checks such as moral constraints and positive checks such as poverty and disease (Malthus, 1978) [42].

Ricardo (1809), in his theory of rent, argued that as population increases, more land will be required for cultivation and more cultivation will lead to diminishing returns on land eventually leading to less productivity and food shortages. Research has further found higher population growth rates in least developing countries and this pattern is expected to persist (United Nations, 2001) [63]. The share of the human population living in the most developed regions is anticipated to decrease from 32% to 13% in the period 1950–2050. In less developed nations human population is expected to increase from about 8% to about 20% (United Nations, 2001) [63]. The main concern therefore is the long-run effect of population change on the economy of developing nations (United Nations, 2001) [63].

Population growth has several negative consequences. These include lower per capita GDP growth, unemployment, and reduced public expenditure (Shelton, 2007) [58]. Large family sizes and low incomes also limit the opportunities parents have to educate their children (Population Reference Bureau, 2005). Other negative effects of high fertility include harm to the health of mothers and children, environmental degradation, and urban congestion. (Population Reference Bureau, 2005).

1.1.1 Fertility Trends in Kenya

The United Nations (2001) [63] defines fertility rate as the average number of live births per woman subjected throughout her life to some age-specific fertility rates. The calculation assumption is that no deaths will occur. The total fertility rate/fertility rate is expressed as number of children per woman. Kenya's fertility has been declining significantly since the late 1970s. The fertility rate in Kenya was recorded at 8.2 births per woman in 1977/78 and years later fertility rate had declined to 3.9 births per woman (KNBS, 2014).



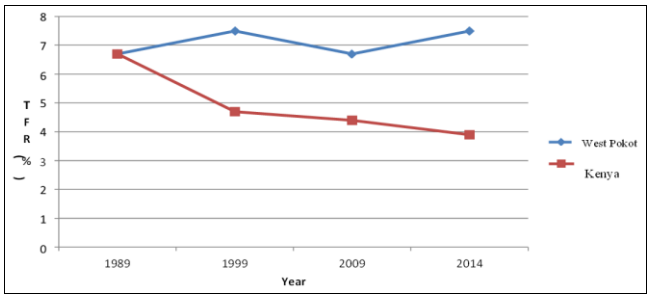
Source: KNBS 2014, CBS 1978 &NCPD 1994, 2015

Fig 1: Fertility trends in Kenya

Kenya recorded its highest TFR of 8.2 in the late 1970's but later dropped to 6.7 in the late 1980's. In the early 1990's TFR dropped to 5.4 and further dropped to 4.7 in the late 1990's. In the early 2000s, TFR increased to 4.9 but then dropped to 4.6 in the late 2000s. The lowest total fertility rate recorded was 3.9 in 2014. An increase in knowledge of modern methods of contraceptives allows women to plan the spacing and timing of births leading to better health outcomes. Knowledge of modern contraceptives in Kenya has increased from 88.4% in 1993 to 98.4% in 2014 (KNBS, 2015 & CBS, 1994). Modern contraceptive use among married women has also improved from 27.3% in 1993 to 53% in 2014 (KNBS, 2015 & CBS, 1994). An increase in age at first birth has also contributed to a drop in fertility in Kenya. In 1993 Kenya recorded a median age at first birth for women ages 15-49, and a 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 aged 25 to 49 improving to 20.2 years while the median age at first birth for women between 15-49 years was recorded at 20.3 years (NCPD, 2015).

1.1.2 Fertility trend in West Pokot County

While Kenya's total fertility rate keeps declining, fertility in arid and semi-arid counties such as West Pokot continues to rise. west Pokot was ranked highest in fertility in the year 2014 according to the Kenya Demographic and Health Survey reports (NCPD, 2015). It was noted that despite West Pokot County having the same fertility as Kenya in the 1970s, over time the gap in total fertility rate widened.



Source: KNBS, 2021&NCPD, 2015

Fig 2: Fertility trends in Kenya and West Pokot County

West Pokot County's total fertility rate has been fluctuating over the years. Total fertility in West Pokot County increased from 6.7 between the late 1980s and early years of the 1990s to 7.5 in the late 1990s then dropped marginally to 6.7 between the late 1990s and the late 2000s (KNBS, 2015). Between 2010 and 2014 there was a steady rise in total fertility of West Pokot to 7.5 making almost double Kenya's TFR.

Knowledge of modern contraceptives in West Pokot County was recorded to be significantly lower compared to the rest of the country. Little knowledge and use of modern contraceptives has led to an increase in the use of traditional methods of contraceptives which are ineffective leading to a higher TFR. In 2014 for example the percentage of women with knowledge of modern contraceptives in Kenya was 98.4% while in Westpokot only 75.0% of women knew modern contraceptives (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 39.1% modern contraceptive use among married women, Westpokot recorded 13.3% modern contraceptive usage among married women (KNBS, 2015).

Teenage pregnancy has also led to an increase in TFR in Westpokot. Countrywide statistics record that while 18.1% of teenagers in Kenya fell pregnant, 28.6% of teenagers in Westpokot County fell pregnant (NCPD, 2015).

1.1.3 Policies on Population Growth

Kenya has been strongly committed to reducing population growth through the adoption of policies and programs on family planning. In the early 1960s, the Family Planning Association of Kenya was established by private individuals and opened its first family planning clinics. However, it was not until the late 1960s that the official national family planning program was established making Kenya the first country in the sub-Saharan African country to adopt a nationwide family planning program. There was a need to adopt this program as the population was increasingly growing. The major objective of this program was to increase the use and knowledge of modern contraceptives in less developed countries (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 compelled the government to adopt a 5-year family planning program (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 the 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 was to formulate population policies and

strategies, coordinate family planning programs, and support increased disbursement of contraceptives through health facilities, extensive information, education, communication, and campaigns (Blacker, 2006; Ajayi and Kekovole, 1999).

Towards the 1990s The United Nations International Conference on Population and Development (ICPD)-Program of Action 1994 was adopted. At the ICPD, 179 Countries adopted a 20-year program of Action that was based on the success of population, maternal health, and family planning programs of previous decades while tackling the needs of the 21st century. Regarding family planning (POA) member countries were required to assess the extent of unmet need for quality family planning with more focus on the vulnerable groups. POA also advocated for the NGO's active involvement in increasing the acceptability of reproductive health services. Countries in attendance were also required to identify and tackle inhibitors of the utilization of family planning services. Community leaders were also urged to play a part in promoting the adoption and legitimization of family planning services (United Nations, 1995).

In the late 1990's the National Reproductive Health Strategy was adopted at the United Nations International Conference on Population and Development held in Cairo. The strategy's main goal was to promote the concept of reproductive health; family planning, and 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 1990s to the late 2000s to aid the use and knowledge of contraceptives. However, the program failed when funding from UNFPA was withdrawn in 2000. Some clinics suffered commodity stock out (Population Action International, 2006).

In the 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 a 'women's issue' by presenting it as non-radical and for the benefit of all Kenyans (NCPD,2000) [49]. NCPD further experienced significant changes when it became an agency that worked 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 NGOs and donors. This workshop helped lobby important officials to support family planning initiatives (NCAPD, 2005; NCAPD, 2006b).

In the late 2000s, the Ministry of Health adopted the country's first-ever National Reproductive Health Policy (2007) The policy emphasized reaching the underserved communities and those in greatest need as well as the most vulnerable through the 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 society, there was a need to strengthen reproductive health services across the country through the provision of modern contraceptives for users. The Kenya Health Policy 2014-2030 was thereafter adopted. The policy objectives aimed to increase the private sector and community involvement in the provision of health services (Ministry of Health, 2020).

2. Literature Review

2.1 Theoretical Review

2.1.1 The Proximate Determinants Theory

The proximate determinants theory, developed by Davis and Blake in 1956, provides a framework for understanding the factors that directly influence fertility. According to this theory, reproduction involves three key steps: Intercourse, conception, and gestation/parturition. The authors identified eleven intermediate variables that can positively or negatively affect fertility. These intermediate variables include the age of entry into unions, permanent celibacy, post-widowhood celibacy, voluntary abstinence, involuntary abstinence, frequency of coitus, involuntary sterility, contraception, sterilization, involuntary fetal death, and voluntary fetal deaths. The proximate determinants theory suggests that these eleven variables directly influence the likelihood of conception and childbearing, and thus serve as the primary drivers of fertility. For instance, factors such as delayed age of marriage, increased use of contraception, and voluntary childlessness can reduce fertility, while early marriage, high frequency of sexual activity, and lack of access to family planning can increase fertility.

This theoretical framework is particularly useful for policy interventions aimed at managing population growth. By understanding the specific proximate determinants that are most influential in a given context, policymakers can design targeted programs and policies to address the root causes of fertility. For example, investments in girls' education, family planning services, and women's empowerment can directly impact the proximate determinants and lead to reductions in fertility rates. Moreover, the proximate determinants theory also acknowledges the role of broader socioeconomic, cultural, and political factors that shape these intermediate variables. These distal, or background, determinants of fertility include gender norms, economic development, urbanization, and access to healthcare, among others. Addressing these underlying factors can further enhance the effectiveness of interventions targeting the proximate determinants.

2.1.2 Bongaarts Model

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 was 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 infecundability. A simple model with measurable and quantifiable variables based on these four variables was thereafter developed (Bongaarts, 1978) [10]. In this model, marriage is used as a variable measure of the 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 conception 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.

Becker in 1960 came up with a theory of fertility, where he modeled a household production function based on the assumption that parents were rational beings seeking to maximize utility from children. Becker noted that assuming fixed preferences and rationality of parents, fertility decisions will be based on household economic processes such as the need for labor force and consumption. Becker further noted that demand for children is derived from the expected utility parents hope to derive and the flow of services these children will bring over time.

2.2 Review of Empirical Literature

Studies have investigated the effect of various socio-demographic factors on fertility. The majority of studies done on the effect of income on fertility have found that income has a significant effect on fertility (Bbaale, 2011; Rutaremwa, *et al*., 2015; Adebowale *et al*., 2014) [5, 57, 1]. Rutaremwa *et al*., (2015) [57] observed that in Uganda fertility levels were higher among poor households than among the rich households. Bbaale (2011) [5] also found higher fertility rates among the poorest wealthy quintiles relative to the richest ones. Moreover, Adebowale *et al*., (2014) [1] in their study on fertility in Malawi observed that the adjusted total fertility rate among poor women was high at a TFR of 7.60 compared to the adjusted total fertility rate of the rich which was at 4.45. These studies point to a significant impact income has on fertility decisions.

Several studies have been done on the impact of education on fertility. Kwame (2002) [35] found a negative relationship between education and fertility in Ghana. Longwe *et al*. (2012) [37] found that districts with more highly educated populations recorded a reduction in birth rates. Rutaremwa *et al*. (2015) [57] 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) [43] found that in both Mbogoini areas in Mathira division, Nyeri District, and Hamisa division in Kakamega, Kenya, women who attained between grade 1-4 level of education had an average of 6.4 children while women with education attainment between grade 5-8 and above class 8 had 4.9 and 2.7 children respectively. Bbaale (2011) [5] found that women with no education, those with a primary school level of education, those with a secondary school level, and those with a 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 determinant of fertility. Gertler and Molyneaux (1994) [25] observed that 75% of fertility decline in Indonesia resulted from increased contraceptive use. Kwame (2002) [35] found that contraceptive use was negatively correlated to fertility. Ayoub (2004) [4] found that contraceptive usage significantly lowers the total number of children a woman can bear. Njenga (2010) [51] found that in Kenya the index of contraception in 2003 was at 0.70 which meant that the total natural marital fertility was reduced by 30% as a result of contraception use. Njenga further noted that 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) [37], found that an increase in modern contraception was associated with a standard deviation of 0.161, a reduction in the number of births.

Studies have found that being married is an important determinant of fertility. Rutaremwa *et al*. (2015) [57] found that the bigger the proportion of married women in a region, the higher the total fertility rate. In his study on fertility differences between married and cohabiting couples, Zhang and Song (2007) [67] 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) [50] found that in Rwanda 5% of ever-married women had no children, while 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% had 1-3 children and 2.1% had more than 3 children.

Studies on the impact of age at first birth on fertility found that in Tanzania, women with an age at first marriage lower than 15 years had a higher fertility rate compared to those with an age at first birth of 25 years (5.9 vs 3.2) (Ngalinda,1998) [26]. Kohler *et al*. (2001) [34] found that an additional year of delay in childbearing reduces fertility by 3% among women.

Previous studies have found age at first marriage reduces fertility. (Mahari *et al*, 2011 [40] and Handy *et al*., 2015). Mahari *et al*., (2011) [40] found that in India as the mean age at first union increased from 21.6 years to 25.1 years between 1970 and 2000, fertility also dropped from 4.9 in 1970 to 3.0 in 2000. Another research by Handy *et al*. (2015) on marriage, age, and schooling in Madagascar found that delaying marriage by 1 year reduces fertility by a TFR of 0.5.

3. Methodology

3.1 Theoretical Model

The theoretical model used in the study is drawn from the works of Becker (1960) [6] and works of Becker and Lewis (1973) [8]. Becker models children as consumer durables in an attempt to analyze the number of children demanded in a household. According to Becker 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 Becker (1960) [6] 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 increases and this results in 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 the 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) [6] 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 high. This is because society has put more pressure on families to maintain or improve the quality of children. Becker (1970) argues that knowledge of contraceptives can affect the number of children demanded by 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:

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

C- Child services
$\bar{Q}$- a constant
N- No of Children
S- Standard of living.

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

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

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

Where;

T_{ij} – Total input of person i into a unit commodity
ji = (male, female)
X_j = Market good input

Families maximize their utility subject to time and budget constraints

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

Budget constraints $= V + T_{ml}W_m T_{fl}W_f + = P(X_n + X_S)$ (5)

Where:

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 are thus limited by the total time of the husband and wife available, the average market wage earned by each family member, and non-labor income.

3.2 Empirical Model

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=*f (x1...xk) is* independently Poisson distributed with conditional density function of the count given *x*.

$$f\left(\frac{y_i}{x_i}\right) = \frac{e^{-\mu_i \beta y_i}}{y_i} \quad (6)$$

And the mean parameter;

$$\mu_i = \exp(x_i \beta) \quad (7)$$

Taking the exponential of $x_i \beta$ in equation 7 ensures that the parameter x_i is non negative.

This implies that the conditional mean i.e. the expected count is given by;

$$E\left(\frac{y_i}{x_i}\right) = \exp(x_i \beta) \quad (8)$$

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;

$$Var\left(\frac{y}{x}\right) = E\left(\frac{y}{x}\right) \quad (9)$$

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 (6) and 7) and assuming independent observations, the log-likelihood function is;

$$l(\beta)0 = \sum_{i=1}^{n} y_i x'_i \beta - \exp(x'_i \beta) - \ln y_i !) \quad (10)$$

The basic Poisson regression model assumes that *y* given X= (X1…XK) is an independent Poisson distribution with the 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, a negative binomial model will be used for estimation instead.

3.3 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, the Kenya Medical Research Institute, and the National Aids Control Council.

4. Results and Discussion

4.1 Descriptive statistics

Table 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

Source: Authors' computation

The descriptive statistics presented in the study provide a valuable overview of the key variables and their characteristics within the sample of women from the arid regions of Kenya. The mean fertility rate in the sample is 5, indicating that the average number of children ever born to a woman in this population is 5.

The data also reveals the relatively low levels of educational attainment among the women in the sample. Thirty percent of the women had no formal education, while fifty percent had attained primary education. Only seven percent of the women had attained secondary education, and a mere two percent had reached the tertiary level.

Marital status and family formation patterns are also noteworthy. The average age at which women in the sample got married was 18.4 years, and the mean age at which they had their first child was 19.3 years. Furthermore, the majority of the women, ninety percent, were married.

The descriptive statistics also reveal the limited use of contraceptives among the women in the sample, with only fourteen percent reporting the use of contraceptives. This finding, combined with the early marriage and childbearing patterns, likely contributes to the high fertility rate observed in this population.

These findings underscore the importance of targeted interventions to improve access to education, especially at the secondary and tertiary levels, and to promote the use of contraceptives among women in the arid regions of Kenya. Addressing the cultural and social norms that contribute to early marriage and limited educational opportunities for women will be crucial in driving down fertility rates and empowering women in these communities.

4.2 Results and Discussion

Table 2: Poisson regression outcomes

Variable	Coefficients	Marginal effects
Primary level	-0.060 (0.440)	-0.270 (0.210)
Secondary level	-0.240 (0.110)**	-1.150 (0.500)**
Tertiary level	-0.940 (0.230)***	-4.440 (1.070)***
Marital status	0.182 (0.100)*	0.860 (0.470) *
Age at the first marriage	-0.010 (0.010)	-0.030 (0.050)
Age at the first birth	-0.010 (0.010)	-0.030 (0.050)
Income	-0.010 (0.030)	-0.061 (0.110)
Contraceptive use	-0.050 (0.070)	-0.260 (0.322)
Constant	1.710 (0.160)	
No of Obs. 564		

Source: Authors' computation

The study presents a Poisson regression analysis to determine the factors driving fertility among women in the arid regions of Kenya, as shown in Table 2. The results provide insights into the relationship between various independent variables and the dependent variable of fertility. The key findings from the analysis are as follows; With regards to education level, the results indicate a negative relationship between education level and fertility. Specifically, the transition from primary to secondary education level reduced fertility by 24%, holding other factors constant. The study further found that transition from secondary to tertiary education level reduced fertility by 94%, holding other factors constant. These findings align with previous studies by Kwame (2002) [35] and Longwe *et al.* (2012) [37], which also observed that women with higher levels of education tend to have fewer children.

With regards to marital status, marital status was found to have a positive relationship with fertility. The study revealed that being married or in a union increased fertility by 18.20%. This corroborates the findings of Rutaremwa *et al.* (2015) [57], who reported that women in married unions had more children compared to those who were not married.

The results underscore the importance of promoting higher levels of education, particularly secondary and tertiary education, among women in the arid regions of Kenya as a strategy to reduce fertility rates. Additionally, the study highlights the need to address cultural norms and practices that may contribute to early marriages and limit women's educational opportunities, as these factors can have a significant impact on fertility outcomes.

Policymakers should prioritize investments in girl child education, such as scholarship programs and the establishment of rescue shelters and boarding facilities, to create an environment that fosters educational attainment and empowerment for women. Complementary efforts to raise community awareness through civic education campaigns can also play a crucial role in addressing the cultural barriers that hinder women's access to higher education and perpetuate high fertility rates in the arid regions of Kenya.

5. Conclusion and Policy Recommendations

The study highlights several key factors that contribute to high fertility rates in Westpokot County. One of the most significant findings is the impact of female education on fertility. While primary-level education does not substantially affect fertility, achieving secondary and tertiary levels of education has a notable impact in reducing the number of children women have.

Another crucial determinant of fertility is marital status. Married women in Westpokot are more likely to have more children compared to unmarried women. This is largely due to the cultural norms and practices within the community, which often disadvantage women and promote male dominance.

The study emphasizes that cultural practices, such as female genital mutilation and early marriages, contribute to high dropout rates among girls in the education system. These harmful practices should be addressed through comprehensive civic education campaigns to raise awareness and promote the empowerment of the girl child.

To address these challenges, policymakers are advised to prioritize investments in improving girl child education in Westpokot County. This can be achieved through scholarship programs that provide bursaries for girls from disadvantaged backgrounds or those who have been rescued from early marriages and female genital mutilation. Additionally, the county government can establish rescue shelters and boarding facilities to provide safe havens for girls fleeing these harmful practices.

Furthermore, the study recommends that the county government should conduct extensive civic education campaigns in rural regions to sensitize the community on the importance of girl child education. By addressing the cultural norms and practices that hinder female empowerment, policymakers can create an environment that fosters educational opportunities and ultimately leads to a reduction in fertility rates in Westpokot County.

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