The Effect of Fertility on Female Education in Nigeria

L. T. Kwache
Department of Stats. & O.R Modibbo Adama University of Technology, Yola, Nigeria.

U. M. Modibbo
Department of Stats. & O.R Modibbo Adama University of Technology, Yola, Nigeria.
ORCID:https://orcid.org/0000-0002-9242-4948.

M. Mijinyawa
Department of Stats. & O.R Modibbo Adama University of Technology, Yola, Nigeria.

A. M. Yami
Department of Stats. & O.R Modibbo Adama University of Technology, Yola, Nigeria.

Abstract: Fertility regarding childbearing depends on many factors and social circumstances such as culture, traditions, education, and the overall level of development of a particular society or community. Also, the ages of entry into a union and contraception availability are two critical proximate determinants of fertility. However, the commonly used measure of fertility is the total fertility rate (T.F.R.). The factors affecting fertility are classified into two groups: background variables and intermediate or proximate variables. The former includes cultural, psychological, economic, social, health, and environmental factors. The proximate variables are the factors that have a direct effect on fertility. This paper examines the impact of the mentioned factors as a result of education on fertility in Nigeria. We carried out a retrospective analysis of data from the Nigeria Demographic and Health Survey [19]. Samples of 33,385 women in the age bracket of 15 – 45 years were interviewed to obtain the number of children ever born. Factors influencing fertility were identified using ordinal logistic regression at a 5% significance level. The result revealed that unemployment lowers fertility in Nigeria; education, age at first marriage, marital status, urban-rural residence, wealth index, and contraception were the main factors influencing high fertility. Education influences fertility by changing the belief and norms of a tradition for large family size. Also, education leads to postponement of marriage, childbearing and an increase in contraceptive use because of several years devoted to attaining school

Keywords: Age, Education, Fertility, Logistic Regression, Odd Ratio, Proximate Determinants.

I. Introduction

Demographic studies of fertility are dependent on many factors and social circumstances such as culture, traditions, education, and the overall level of development of a particular society or community. The ages of entry into a union and contraception availability are two critical proximate determinates of fertility. However, the commonly used measure of fertility is the total fertility rate (T.F.R.). As outlined [1], the factors affecting fertility can be classified into two: background variables and intermediate or proximate variables. The background factors operate through the proximate determinants to influence fertility directly. The state of fertility in Nigeria has been a matter of great concern to international organizations such as the United Nations (U.N.), the United Nations Children Fund Emergency Fund (UNICEF), and the United Nations Development Programme (UNDP).

In Africa, many countries, such as Niger, Somalia, Mali, and Chad, still have high fertility [2]. The high rates have potentially significant implications on the health status of women and children and the economic development of those nations. The rapid growth rate of the Nigerian population has adverse effects on its economic development. Responding to these effects, the federal government in 1998 has approved the national policy on population [3]. The guidelines provide that a woman should give birth to four children before reaching menopause. Some overall goals of the systems are to ensure the quality of life and improve the living standard of Nigerians for sustainable development [4]

In Nigeria today, poor and less privileged parents tend to give birth to more children leaving them with minimum or no educational qualifications. Therefore, it could create different inequalities because of education and fertility interdependency [5]. If the fertility differentials in the affluent and low-income families are large, more weight is on children with little education, which lowers average knowledge. According to [6], many multivariate studies have been conducted to engage the causal factors linked to fertility. Some of these factors are marriage, contraception, or exposure to the risk of contraception, education, and breastfeeding. Sociocultural and economic determinants of fertility differentials in rural and urban areas of Cross Rivers State Nigeria has been studied and documented in [7]. The study revealed that differences in age entry into marital unions are significantly related to rural/urban fertility differentials. They also observed that education plays a significant role in the determination of rural and urban fertility differences.

The economic theory of fertility suggests that more educated women have a higher opportunity to bear children in terms of lost income. Household bargaining in terms of the model means that more educated women can better support themselves and have more bargaining power on family size. More educated women know about prenatal care and child health. Therefore, they might have lower fertility because of greater confidence that their children will survive. Female education has a more significant impact on age at marriage. It delays fertility than male education, although fertility falls substantially when both males and females rise together. Women's education level could affect fertility by impacting women's health and their physical capacity to give birth. Children's health, the number of children desired, and women's ability to control childbearing and knowledge of different birth control methods.

The mechanisms which influence the fertility decision of educated woman are: (1) the relatively higher incomes and (2) higher income has forgone due to childbearing leads to wanting of fewer children. The better care these women get, give the more increases their children's human capital and reduce the economic need for more children. The positive health impact of education means that women can better give birth and, children's higher survival rate minimizes the desire for more. The knowledge impact of teaching means that women are better at using contraceptives. Women's education may have different effects on fertility through various mechanisms. Improving a woman's education affects fertility through the number of children a couple has and the number of children the woman wants. Also, the ability to control birth through available modern contraceptives and how to use them have a direct bearing on their education. The influencing factors are age, wealth index, residence, education and contraceptive, number of unions, religions, and employment.

Female education is presumed to affect fertility through its influence on the proximate determinants of fertility. It includes exposure to intercourse, contraceptive use, and proportion of the population married, which reflect an individual's reproductive health behaviours. The potential endogeneity of female education has less studied in public health, and the estimated effect of education on health has been prone to bias and inconsistency. The persistently lower educational attainment among girls than boys until the early 1990s is likely to reflect demand and supply [8]. The conditions include the mentality of parental perception of the returns on investment in daughter's education, maybe low where girls expected to marry and subsequently belong to their husband's household.

Moreover, the dowry systems augment directly to the cost of raising daughters and may consume financial resources for their schooling. Widespread poverty and limited job opportunities suitable for educated women also discourage parents from investing in a daughter's education [9]. Educational differentials are among the best established and most widely studied socioeconomic differentials of fertility [10-13].

II. Education and Fertility

We can study fertility differentials in terms of economic and social characteristics at all aggregation [14-15]. The influence of socioeconomic classes on fertility can be measured by several indices, such as occupation, income, and education. Comprehensive formal education is one of the main reasons for the postponement of marriage among educated women. Women's education, particularly, has a significant interaction effect on fertility. There is a belief that lower education leads to higher fertility, and likewise, early fertility means lower education. School attendance should be more normative for urban women due to their wider spread and better access to education. Studies have shown that the influence of education on fertility varies significantly between countries with different schooling [11].

In Nigeria, studies have consistently indicated lower fertility among women with secondary and higher levels of education. The implication is that a decline in fertility will accompany a significant increase in women's education at

these levels. As the level of education increases, the number of children required decreases. In societies with a high level of knowledge and socioeconomic status, marriage, pregnancy, and childbearing age occur at a later stage, and therefore, the need for contraceptive methods increases [16-18].

III. Methodology

The variables used in this study are from the Nigerian Demographic and Health Surveys [19]. They are children ever born (C.E.B.), which is the dependent variable (y). Education is represented by (x_1). Place of residence (x_2), current use of contraceptive (x_3), age at first marriage (x_4), employment (x_5), religion (x_6) and the number of unions (x_7) are the factors that affect fertility and are the independent variables. However, our interest is on the effect of female education on fertility. The impact of education on fertility may be due to other factors contributing to it because of educated women's characteristics. The binary logistic regression model was used for current contraceptive use to determine everyday contraceptive use by background characteristics. To explain the role of socioeconomic factors on fertility, we used logistic regression in analyzing the above variables because the dependent variable is dichotomous. The logistic regression model is given by

$$\log\{(p(x))/(1-p(x))\} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i \quad (1)$$

Where β_0 is the model constant, β_i is the parameter estimate of the independent variables, and solving for p, this gives

$$p(x) = (e^{(\beta_0)} + e^{(\beta_1 x_1)})/(1 + e^{\{\beta_0 + \beta_1 x_1\}}) = 1/(1 + e^{\{\beta_0 + \beta_1 x_1\}}) \quad (2)$$

For the binary response variable y, this represents the success and the failure outcome 1 and 0. If it is a success, y is 1 and 0 if failure and $P(y = 1) = \pi x$. If px is the probability of a given event occurring, then $1 - \pi x$ is the likelihood of the event not occurring. Then the odd of the event be defined as

$$\text{Odds} = \pi x/(1 - \pi x) \quad (3)$$

To fit a binary logistic regression model, a set of regression coefficients predict the probability of the outcome of interest estimated. The values of β_i parameters estimated from the independent variables used to calculate the odds ratio for each of the model's independent variables.

IV. Discussion

This section summarizes and discusses the result in tabular form. Table 1 presents the logistic regression model summary, while Table 2 describes the estimates' odds ratio accordingly.

Table 1. Logistic Regression Model for Fertility

High fertility	Coeff.	Std. Error	Z	P>[Z]
Age	0.1293659	0.0016949	76.33	0.000
Contraceptive				
No method	RC			
Modern	0.0729341	0.0360259	2.02	0.043
Folk	-0.487862	0.01357892	-3.59	0.000
Traditional	-0.072934	0.0510841	-2.41	0.016

Wealth index

Poorest	RC			
Poorer	-0.0929175	0.0343043	-2.71	0.0007
Middle	-0.4319962	0.0393307	-10.98	0.000
Richer	-0.6331095	0.0450558	-14.05	0.000
Richest	-0.024732	0.0532239	-19.25	0.000

Religion

Islam	RC			
Traditionalist	-3.3002577	0.1073247	-2.80	0.005
Catholic	-0.4295367	0.049609	-8.66	0.000
Others	-0.3887413	0.0342263	-11.36	0.000

Education level

No education	RC			
Primary	0.8663872	0.0292236	-4.25	0.000
Secondary	0.6227346	0.0240297	-12.27	0.000
Tertiary	0.3234291	0.0182736	-19.98	0.000

Residence

Rural	RC			
Urban	0.8383516	0.0.0240297	-5.95	0.000

Region

Region 3 (NW)	RC			
Region 1 (NC)	0.4596917	0.0183420	-19.48	0.000
Region 2 (NE)	0.858652	0.0281601	-4.65	0.000
Region 4 (SE)	0.6626546	0.0364311	-7.48	0.000
Region 5 (SS)	0.4766609	0.0238743	-14.79	0.000
Region 6 (SW)	0.3799662	0.0172153	-21.36	0.000
Children living	5.007881	0.0589364	136.89	0.000
Constant	0.0001449	0.0000106	-120.43	0.000

Table 2. The Odds Ratio of the Estimates

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High fertility	Odds ratio	Std. Err.	Z	P>|Z|
Age	1.138106	0.001928	76.33	0.000
Contraceptive				
No method	RC			
Modern	1.07566	0.387516	2.02	0.043
Folk	0.6139373	0.033661	-3.59	0.000
Traditional	0.8839674	0.0451567	-2.41	0.016
Wealth index				
Poorest	RC			
Poorer	0.9112687	0.312604	-2.71	0.0071
Middle	0.6492119	0.0255339	-10.98	0.000
Richer	0.5309383	0.0239218	-14.05	0.000
Richest	0.3588926	0.0191017	-19.25	0.000
Region				
Islam	RC			
Traditionalist	0.7406273	0.0794876	-2.80	0.000
Catholic	0.6508105	0.0322861	-8.66	0.000
Others	0.6779096	0.0191017	-11.36	0.000
Educational level				
No education	RC			
Primary	0.8663872	0.0292236	-4.25	0.000
Secondary	0.6227346	0.0240297	-12.27	0.000
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Children living 5.007881	0.0589364	136.89	0.000
Constant	0.0001449	0.0000106	-120.45	0.000

The respondents' age with an odds ratio of 1.138 implies that the chance of experiencing high fertility increases by 1.138 times for every 1 unit change in the respondent's age. This variable is significant in the study of fertility rate with a p-value of 0.000. Fertility is higher among rural women compared to their urban counterparts, with an odds ratio of 0.838. Women in Urban areas restrain themselves from having many children due to the cost of living, therefore lowering the fertility rate with a p-value of 0.000; also, the residence has a significant effect on fertility. The fertility rate decreases with an increasing level of education. Those without knowledge have the highest fertility with an odds ratio of 0.8663 times higher among women with primary education than those in secondary education (0.6627). Fertility is 0.3234 times lower among women with higher education; cursory observation shows that fertility decreases as women's education increases. Hence women's education is adjudging to significantly affect fertility with a p-value of 0.000, implying that we can link the education of women with fertility.

In terms of religion, the Islam population has the highest rate of fertility compared to their counterpart Catholic (0.6508), Traditionalist (0.7406), and others (0.6779). Therefore religion has a significant effect in the study of fertility with a p-value of 0.000. The wealth index is a vital differential factor of fertility. Women with a low standard of living index that is poorer and most impoverished experience the highest fertility compare to those with a very high standard of living index. The women in the highest wealth index have three to fewer children than in the lowest wealth index; that is, the wealthier the woman, the lower the fertility.

Fertility in South-East and South-South are 0.3799 times and 0.4767 times less likely to experience high fertility. North West has the highest fertility rate due to early marriage. The current use of contraceptives varies with residence, zone, education, and wealth index. The Southern Zone has the highest proportion of women currently using the contraceptive, followed by the South East. The lowest proportion of women using contraceptives is in the North East. Education influences fertility by changing the belief and norms of the tradition for large family sizes. It can lead to postponement of marriages and childbearing because of several years devoted to attaining higher education. We can attribute high fertility rates among rural women in Nigeria to early marriage, early exposure to sexual intercourse, and polygamy. The prevalence of these practices is higher in rural areas and more common among women with low education levels.

V. Conclusion

The study utilized the national representative data from the Nigeria demographic and health survey 2013 to investigate the predictors of fertility in Nigeria. The findings suggested that education has been identified as the most important predictor of fertility. Increased income and human development are generally associated with decreased fertility rates. It has theorized that people earning more have a higher opportunity cost if they focus on childbirth and parenting rather than their continued careers. It has also theorized that women who can economically sustain themselves have less incentive to become married. As suggested by economic theories, education is one of several mechanisms that might influence fertility choices. Knowledge increases the return to labour market participation, which increases the opportunity cost of time activities [20]. Women may substitute time – incentive activities like childbearing and child-rearing to devote more time to the labour market participation. Education may affect fertility preferences because educated women may prefer fewer and healthier children. The age of women, education, occupation, and unions are significant and robust predictors that affect fertility.

VI. Acknowledgments

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