Female Education: A Viable Contraceptive Tool For Reducing Fertility In Ghana

Abstract: There is a paucity of attention on how education affects fertility especially in developing countries where fertility is documented to be stalling. Using two separate indicators of education, this paper estimates the effect of female education on fertility in Ghana controlling for contraceptive usage and other socio-demographic factors among a nationally representative sample of women in their reproductive ages (15-49 years). We argue that each year spent in school by a Ghanaian woman reduces fertility by 23%. Also, every level of education completed reduces fertility significantly while the use of contraceptives rather increases fertility. There was an inverse relationship between women's wealth and their fertility and urban residency was associated with a 0.17 less births. The results suggest that female education is the single most significant contributing factor to fertility decline. Countries undergoing fertility transition could invest in female education as a means of attaining a reduction in their fertility.

Introduction

The aim of this paper is to investigate the role of female education in fertility reduction among Ghanaian women while controlling for demographic and socio-economic characteristics. The authors start off with a description of the fertility situation in Africa and narrow down to the situation in Ghana. Patterns in contraceptive use and female education as pertains to the Ghanaian situation are also discussed to set the context for this research.

For several decades Africa had the highest fertility levels in the world due to a myriad of reasons including high demand for children brought on by factors such as high child mortality and low female education (Ainsworth et al, 1996). According to the World Bank "women's education is the "single most influential investment that can be made in the developing world." (Population Reference Bereau, 2009 p1). The benefits developing countries can accrue from investing in female education include increased participation of women in the labour force

resulting in socio-economic development, increased use of modern contraception and improved maternal and child health.

The notion that education reduces fertility has been a long standing view until the mid-1970s where an extensive review of available empirical evidence did not show the expected inverse relationship but rather an inverted U-relationship between fertility and education. This pattern was observed across several developing countries (Martin, 1995). It is argued that increased female education leads to lower fertility through its influence on years spent in school, delay in marriage and childbearing, increased contraceptive use and desire for fewer children. However, behaviour change associated with education such as shorter duration of breastfeeding and post-partum sexual abstinence could erode the protective effects of the traditional practice of extended periods of breastfeeding and post-partum sexual abstinence which can result in higher fertility rates among educated women (Martin, 1995) .

Ghana saw a decline in fertility of two less births between 1988 (TFR=6.4) and 1998 (TFR=4.4) (GSS et al, 2004). There was no change in the fertility rate between 1998 and 2003, however between 2003 and 2008 Ghana's TFR decreased from 4.4 to 4.0 (GSS et al, 2009). Although the current fertility rate in Ghana is low compared to that of other countries in the sub-region, it is still high by Western standards. Ghana shows a mixed pattern with regards to contraceptive use. The prevalence of contraceptive use among married women increased substantially between the late 1980s and 1990s (Parr, 2003) from 13 percent to 22 percent among married women reaching a high of 25 percent in 2003 (GSS et al, 2009; Boadu, 2002). However, between 2003 and 2008 with the exception of traditional methods, use of any method or any modern method decreased by at least one percentage point.

Results of the 2008 Ghana Demographic and Health Survey indicate that there are more males at all levels of education than there are females. In spite of this general pattern, there has been an improvement in female education over the years. For example the proportion of females with no education has decreased from 28 percent in 2003 to 21 percent in 2008 while the proportion that has completed secondary education has increased from 8 percent to 10 percent over the same period.

There have been several interventions aimed at reducing fertility in Africa principal among this is the introduction of contraception especially modern forms of contraception (Gaisie, 1984; Stephen et al, 1988). In the same vein there have been several debates on the role of education in reducing fertility in Africa. There has however not been a consensus because of the mixed results obtained from different regions. Fertility in Ghana is seeing a steady decline but there has not been a corresponding steady increase in contraceptive prevalence. While the factors that account for this pattern are still been researched the role of female education as a potential contraceptive tool in reducing fertility in Ghana remain an under researched area. The authors in this paper investigate the contribution of female education to fertility reduction in the Ghanaian context.

Methodology

Data

The 2008 Ghana Demographic and Health Survey (GDHS) is the source of data for this study. The GDHS is a household-based survey implemented among a nationally representative probability sample which was drawn from across all the ten administrative regions of Ghana using a two-stage stratified sample design. A total of 412 clusters were selected at the first stage using systematic sampling with probability proportional to size while the second stage involved the systematic sampling of 30 households in each cluster. The survey solicited information on reproduction, family planning and health among others from 4,916 women in their reproductive age (15 – 49 years). For the analysis in this study, the sample was limited to 4,556 women (excluding 360 women who were pregnant at the time of the survey).

Variable definition and measurement

Dependent variable

Fertility measured as the total number of children ever born to the sampled women was used as the dependent variable. This measure gives a count of all children born to each individual woman in her reproductive lifetime as at the time of the survey.

Independent variables

The main independent variables used were education and contraceptive usage. Education was measured as (1) number of years of schooling completed and (2) the highest level of education attained which was categorised into; 1–No formal education, 2-Primary, 3-Middle/Junior High School (JHS), 4-Secondary/Senior High School and 5-Higher. Current use of contraceptives as measured in the survey was limited to only women who were not pregnant at the time of the survey. A woman was said to be using a contraceptive if she was currently using at least one of the following methods to prevent or delay pregnancy; pill, intrauterine devices (IUD), injections, diaphragm, male condom, female condom, female sterilization, periodic abstinence, withdrawal, norplant, foam or jelly and others. Contraceptive usage was measured as a dichotomous variable and had two categories of 0 = not using and 1 = using at least one method of contraception.

Other control variables used included current age of the respondent measured in completed years, type of place of residence (urban-rural), current marital status (never married, currently married (married and cohabiting) and formerly married (separated, divorced and widowed). The women were also grouped based on their ethnicity into Akans, Ga-Dangmes, Ewes, Mole-Dagbanis and "other" ethnic group made up of the Guans, Grussis, Grumas and Mandes. Religious groups categorisations was made up of Catholics, Orthodox Christians (Anglicans, Methodists and Presbyterians), Pentecostals/Charismatics, "other" Christians (the Seventh Day Adventists, Jehovah's witnesses, Latter Day Saints etc), Moslems, Traditionalists/Spiritualists and those who had no religion. The study also controlled for household wealth quintile which had five categories of poorest, poorer, middle, richer and richest.

Analysis

The socio-demographic characteristics of the respondents were explored using descriptive statistics (frequencies and percentages). Analysis of variance (ANOVA) was conducted using the main predictor variables (female educational attainment and contraceptive usage) to examine the differences in the mean number of children ever born. The effect of female education on total children ever born was estimated in a multivariate linear regression model where other socioeconomic and demographic characteristics were controlled for. Four different models were used to estimate the effect of the independent variables (socio-economic and demographic characteristics) on the dependent variable (total children ever born). Model 1 sort to estimate the effect of contraceptive use on total children ever born. Contraceptive usage with a dichotomous category of 0 (not using) and 1(using) was used as the main predictor variable with not using as the reference. In Model 2, the effect of education was estimated using years of schooling while in Model 3 the effects of both years of schooling and the use of contraceptives were accounted for. Model 4 was a fully constrained model which examined the effects of the main independent variable (female education) on the dependent variable (total children ever born) while controlling for contraceptive usage and the other socio-demographic variables. Female education in this model was treated as a categorical variable (no education, primary, middle/JHS, secondary/SHS, and higher) and no education was used as the reference category.

Results

The dependent variable (total children ever born) ranged from 0 to 14 children with a mean of 2.34 and a standard deviation of 2.49. Only about one in five (20.9%) of the women reported using at least one method of contraception. The average age of the women was 29 years and the mean years of school completed was about 6 years which is equivalent to having completed primary level of education. About one fifth of the women had no formal education and about another fifth had completed primary schooling. Only 3.8% of the respondents had higher than senior secondary education. There was an almost equal divide of rural and urban residents. Majority (56.0%) of the women were either married or cohabiting with their partners. Akans constituted a little more than half (51.0%) of the total sample and in terms of religious

groupings Pentecostals/charismatics formed the highest percentage (37.3%) while those who had no religious affiliation formed the least (0.2%). The proportion of respondents in the various wealth categories increased as the wealth quintile increased with the poorest being the least (15.7%) and the richest being the highest (23.3%).

Table 1: Summary and percentage distribution of respondents by socio-demographic characteristics

Socio-demographic characteristics	Frequency (%)
Mean age (SD) 29.1 (9.8)	
Mean total children ever born (SD) 2.3 (2.5)	
Mean years of schooling (SD) 6.6 (4.4)	
Educational attainment	
No formal education	952 (20.9)
Primary	914 (20.1)
Middle/Junior High School	1887 (41.4)
Secondary/Senior High School	630 (13.8)
Higher	172 (3.8)
Type of place of residence	
Urban	2234 (49.0)
Rural	2322 (51.0)
Marital status	
Never married	1565 (34.4)
Currently married	2550 (56.0)
Formerly married	441 (9.7)
Ethnicity	
Akan	2323 (51.0)
Ga/Dangme	322 (7.1)
Ewe	584 (12.8)
Mole-Dagbani	723 (15.9)
Other	604 (13.3)
Religion	
Catholic	574 (12.6)
Anglican/Methodist/Presbyterian	770 (16.9)
Pentecostal/Charismatic	1698 (37.3)
Other Christian	505 (11.1)
Moslem	675 (14.8)
Traditional/spiritualist	185 (4.1)
No religion	141 (3.1)
Other religion	8 (0.2)
Wealth quintile	
Poorest	716 (15.7)
Poorer	818 (18.0)
Middle	910 (20.0)
Richer	1053 (23.1)
Richest	1060 (23.3)
Total N	**4,556**

The results of the linear regression models revealed an interesting pattern between female education, contraceptive usage and fertility. In model 1 it was observed that using contraception increases fertility by approximately 0.5 births while in model 2 each year of schooling completed resulted in a 0.233 reduction in the number of births that occur to a woman (Table 3). The adjusted R^2 for model 1 indicates that contraceptive use explains less than 1% of the variation in fertility whereas that for model 2 indicates that the number of years spent in school by women explains 17% of the variation in their fertility. Combining years of schooling and contraceptive usage in one model (model 3) saw a marginal increase in the adjusted R^2. However, the magnitude of the reduction in fertility resulting from the number of years spent in school increased by 3.4 % while the contraceptive use increased fertility by 0.785 births representing a 60% increase over the effect observed in model 1. Controlling for other socio-demographic characteristics led to a substantial increase in the model adjusted R^2. Using contraceptives still maintained its effect on fertility in the phase of other variables (Model 4). In the fully constrained model using contraceptives increased fertility by 0.2 births. With regards to the levels of education attained by the women, completing primary education was associated with an approximate 0.4 less births while completing middle/junior secondary school was associated a 0.9 less births. Having up to senior secondary level education resulted in about one less birth while having higher than senior secondary education resulted in a reduction in fertility by almost two births. A unit increase in age leads to a corresponding increase in fertility by about 0.2 births and urban residency was also associated with a decrease in by almost 0.2 less births. Being married was associated with close to one birth increase in fertility. Increasing wealth quintile was associated with a corresponding increasing reduction in fertility.

Table 3: Education, contraceptive use and socio-demographic determinants of fertility (total children ever born)

	Model 1	Model 2	Model 3	Model 4
Control variables	B (std. error)	B (std. error)	B (std. error)	B (std. error)
Constant	2.240 (.041)***	3.888 (.061)***	3.777 (.061)***	-1.476 (.132)***
Contraception [(Not using)]				
Using contraceptives	.497 (.090)***		.785 (.083)***	.202 (.054)***
Years of schooling		-.233 (.008)***	-.241 (.008)***	
Educational attainment [(No education)]				
Primary				-.358 (.072)***
Middle/JHS				-.853 (.071)***
Secondary/SHS				-1.116 (.091)***
Higher				-1.677 (.132)***
Current Age				
Age in single years				.155 (.003)***
Type of place of residence [(Rural)]				
Urban				-.169 (.058)**
Marital status [(Never married)]				
Married				.826 (.064)***
Formerly married				.115 (.094)
Ethnicity [(Akan)]				
Ga/Dangme				-.111 (.086)
Ewe				-.381 (.067)***
Mole-Dagbani				-.309 (.080)***
Other ethnic groups				-.139 (.078)
Religion [(Catholic)]				
Anglican/Methodist/Presbyterian				-.044 (.082)
Pentecostal/Charismatic				.044 (.071)
Other Christian				.196 (.090)
Moslem				.110 (.087)
Traditional/spiritualist				.520 (.041)***
No religion				.126 (.137)
Wealth quintile [(Poorest)]				
Poorer				-.173 (.079)*
Middle				-.310 (.084)***
Richer				-.634 (.090)***
Richest				-.816 (.099)***
Adjusted R square	**.006**	**.170**	**.186**	**0.671**

Note: Reference category (superscript)   ***p<0.001 **p<0.010 *p<0.050

Discussion and conclusion

This paper sought to investigate the effect of female education on fertility taking into account the influence of contraceptive usage and the confounding effects of other socio-demographic variables. The analysis revealed that female education accounts for about 17% of the fertility of Ghanaian while contraceptive use accounts for only 0.6%. Also, it was expected that contraceptive use would decrease fertility. However, contrary to this expectation contraceptive use rather increased fertility and this effect remained throughout all the regression analysis. Boadu (2002) found a similar pattern between contraceptive usage and fertility using data from the 1988 Ghana Demographic and Health Survey. The results also reveal that not only the years of education but also the level of education attained contribute significantly to fertility decline.

From the analysis age was found to have a substantial and significant positive influence on fertility and this is consistent with the body of knowledge gathered on the relationship between age and fertility (Boadu, 2002). In spite of the direct and indirect influence of age on fertility it can also be argued that education and marriage are both dependent on age. Also, sexual maturity, the age at which sexual activity begins and the age at marriage which are all functions of age influence fertility behaviour. Education however, works through age to influence fertility. The longer a woman stays in school the higher the chances of her delaying marriage and the commencement of sexual activity and this will lead to a reduction in the years that she is at risk of getting pregnant and having children. More years of schooling and a higher level of educational attainment also means greater female autonomy and decision making power, improved nutrition for both the woman and her children and greater chances of child survival (Kravdal, 2002) which leads to a lesser desire for children (Bbaale and Mpuga, 2011).

This study provides empirical evidence which indicates that female education contributes significantly to fertility decline lends support to other research findings (Sackey, 2005; Ainsworth, 1996) on the relationship between female education and fertility. Given that fertility in sub-Saharan Africa has is still high in spite of ongoing family programs, there is the need for government of Ghana to invest in female education both in the short term and the long to help reduce fertility in the country. There is the need for more effective policies that will ensure that

the current free compulsory universal basic education program runs effectively. This will help increase female enrollment. There also the need for further policies that will encourage female education beyond just the basic or primary level.   Also, given the current level of contraceptive use in Ghana there is the need to increase contraceptive prevalence to the levels in other countries like Indonesia (52%) and Taiwan (74%) where fertility has reached replacement level (Gaisie, 2007). There is a need for further research into what accounts for the inverse relationship between contraceptive use and fertility as was observed in the current study and in another related study by Boadu (2002). Such studies will help in explaining the factors that influence the contraceptive usage fertility relationship.

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