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## **Determinants of Desired and Actual Number of Children and the Risk of having more than Two Children in Ghana and Nigeria**

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**Abstract.** This paper investigates the levels and determinants of desired and actual number of children, and the risk of having more than two children in Ghana and Nigeria using 2013 and 2014 Demographic Health Survey (DHS) conducted in the two countries, respectively. The question is whether the rate of childbearing in sub-Saharan African countries can be slowed down by changes in fertility demand-driven factors such as economic, socio-cultural and family planning programs. Our analysis results showed that these two countries are yet to adopt replacement level policy. Thus, putting every socio-demographic conditions that support fertility in place, these sub-Saharan African countries will continue to increase average childbearing per household, particularly in the case of Nigeria.

**Key words:** Ideal number of children; fertility; Ghana; Nigeria; Replacement level.

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**Résumé.** Cet article étudie les niveaux et les déterminants du nombre désiré et réel des enfants, et le risque d'avoir plus de deux enfants au Ghana et au Nigeria à l'aide de 2013 et 2014 enquêtes démographiques Health Survey (DHS) menées dans les deux pays, respectivement. La question est de savoir si le taux de fécondité dans les pays d'Afrique subsaharienne peut être ralenti par des changements dans les facteurs de fertilité demande telles que les programmes de planification économiques, socio-culturelle et familiales. Nos résultats d'analyse ont montré que ces deux pays sont encore à adopter la stratégie de niveau de remplacement. Ainsi, mettre toutes les conditions socio-démographiques qui prennent en charge la fertilité en place, ces pays d'Afrique subsaharienne continuera à augmenter la fécondité moyenne par ménage, en particulier dans le cas du Nigeria. Ainsi, le gouvernement pourrait intervenir dans le domaine de l'éducation des mères puisque cela retardera l'âge à la première naissance et servir comme moyen d'orienter les femmes sur les mesures de planification familiale.

## 1. Introduction

The pattern of demographic developments in sub-Saharan African region has been a concern to population experts, particularly after the millennium period when many countries of the world experienced stall in fertility decline (Bongaarts (2006), Bongaarts (2008), Westoff and Cross (2006), and Shapiro and Gebreselassie (2008)). Also, about two thirds of these countries are at/or below the replacement level due to the fact that African women still bear five children on average (Garenne (2008) and Harper (2015)). The current level of fertility in Africa is likened to the modernization process as stated in (Garenne (2008)) and the unfinished family planning agenda (Bernstein et al. (2004)). The modernization process is as a result of the levels of income, industrialization and urbanizations, for example, in the regions where women's health improved before they adopt contraception, there is the tendency that these women will increase the number of child birth (Dyson and Murphy (1986)).

Childbearing is central to the family formation process in many societies around the world, and it is an important factor of population change (CIA (2011), Feyisetan and Casterline (2000) and DeRose and Ezeh (2005)). Caldwell and Caldwell (2002) and Mekonnen and Worku (2011) are of the opinion that a country with controlled population can easily develop economically. As part of measures towards economic development in Ethiopia for example, a national policy was adopted in 1993 targeting towards the reduction of about eight children per woman in rural areas and six children per woman in urban areas to four children per woman in 2015 in both residence areas (Tadesse and Asefa (2001)). In a country where having as many as 24 children is considered as a blessing from God, to achieve economic goal may be very difficult. Other empirical works, such as Bongaarts (2008) and Muhoza, Broekhuis and Hooimijer (2014) found that macro consequence of population size depend on individual household socioeconomic behaviour, hence the success of any national policy targeting

population change will depend on the identification of these factors that determine the number of children desired and actual fertility dynamics in the household (Tadesse and Asefa (2001)).

The question is whether the rate of childbearing in sub-Saharan African countries can be slowed down by changes in fertility demand-driven factors such as economic, socio-cultural and family planning programs. These factors are: age at first birth, place of residence, level of education, religion, parents' occupation, contraceptives use, number of living children, possibility of having mixed sexes, exposure and childhood place of residence (Bongaarts (2010), Gunther and Harttgen (2016), Kravdal (2002), Martin (1995) and Pollard and Morgan (2002)).

This paper therefore investigates the levels and determinants of desired and actual number of children, and the risk of having more than two children in Ghana and Nigeria using the latest Demographic Health Survey (DHS) conducted in 2013 and 2014, respectively for the two countries. We have chosen a margin of two children as a result of the demographic transition theory which assumes that fertility will decline until replacement levels have been achieved. Many population scientists assume a total fertility rate of 2.1 children per women (Weeks (2008)). This assumption of the demography transition theory is also expressed by (UN (2008)) that fertility levels of countries that are in transition will continue to decline until fertility drops slightly below the replacement level. Engelman and Leah (2006) in their study on fertility levels within the countries revealed that the number of children a woman must have to perfectly replace herself and her partner in the next generation depends on how many of these children are female. Information on the number of children desired therefore lies at the heart of family planning and population policy concerns, therefore this information can identify group of populations with a demand for fertility control services.

## 2. Review of Literature

High fertility experience in sub-Saharan Africa is as a result of large desired number of children. According to Hoffman and Hoffman (1973), the value of children is considered as a major driver facilitating the study of fertility change. Hoffman and Hoffman (1973) therefore identified nine values of children in a family as: (i) adult status and social identity; (ii) expansion of the self-immortality; (iii) morality, that is, religion, altruism and virtue; (iv) primary group ties and affection; (v) stimulation; (vi) creativity and accomplishment; (vii) power and influence; (viii) social comparison and competition, and (ix) economic utility. Looking at these values, a family with only one child satisfied many of these values except the expansion of the self-immortality which is the second item. A father and a mother come together to produce children, and in order to maintain a stable population, they plan to have at least two children, which will replace them. In a case where the two children turn out to be girls, most couples in Africa try to give childbirth more chances until they have mixed sexes since male child determines

continuation of family line ([Hoffman and Hoffman \(1973\)](#)).

In DHSs conducted across some sub-Saharan African countries between 1998 and 2008, among women under 25 years of age who had not married as at the time of the survey, [Westoff \(2010\)](#) found that the mean desired number of children stated by women of reproductive ages in West and Central Africa ranges from 4.8 in Ghana to 9.2 in Chad, and 9.1 in Niger. Eastern and Southern African countries desire lower number of children as compared to Western and Central Africa. With the high desired number of children recorded in Chad and Ghana, about 8 to 9 percent of all married women intend to terminate childbearing, implying that the remaining 91 to 92 percent want to continue childbearing process despite having more children at home already. Cape Verde is at the extreme, reporting an average of 2.8 children as mean ideal number of children, and about 94 percent of the women, in this country, with four children want no more children. In Nigeria, it has been observed that fertility started declining as far as 1970s, and the total fertility rates in the country declined from 7.0 to 6.43 between 1978 and 1982 ([Feyisetan and Bankole \(2002\)](#)). The estimates were put at 6.01 and 5.7 for 1990 and 2003, respectively.

[Ezeh \(1997\)](#) considered Kenyan DHS data of ever married women living in both rural and urban areas and found a reduction of about 19 percent difference in the rate of childbearing between those women in rural and urban areas. [Ibisomi \(2008\)](#), in a twenty-four focus group discussion sessions conducted in Nigeria observed that the actual number of children in a family has reduced over the years, while the desired number of children remained high as at the time of the FGD. The author further found that religion and culture are the two key drivers of the desired number of children while socio-economic factors have influenced the actual number of children in the family.

[Martin \(1995\)](#) investigated the relationship between women's education and fertility in 26 countries using the DHS data from African and other developed countries. The author found that higher education was consistently related to low fertility of the women in those countries. [Kravdal \(2002\)](#) also considered the case of 22 countries in the sub-Saharan African region and found that the average fertility for these countries would be one child less if women's education were encouraged beyond the current level in the region to the relative current high level.

[Kravdal \(2002\)](#) further stated that a woman's childbearing experience is usually inversely related to the time she spent in school, that is, childbearing desires is weaker among the educated because they tend to face higher opportunity costs of childbearing. As these women advance in their education, their orientation changed and they encouraged the education of their children, and this makes children to become less available for agricultural or domestic work. Also, according to [Bongaarts \(2010\)](#), education changes the orientation of these women towards

the use of contraceptives since they have more knowledge about contraception.

On the influence of religion on childbearing, [Caldwell and Caldwell \(1987\)](#) is of the opinion that African woman tend to invoke the will of God when they say their desired number of children, that is, they believe God can allow them as many children as long as they are biologically capable of bearing the burden. The authors further stated that religious belief system assigns importance to high fertility as well as the power of successive generations.

[Pritchett \(1994\)](#) found that the effect of family planning and contraceptives use only have a minor effect on average fertility planning efforts by reducing the number of children born by only 0.22 to 0.37 births per woman in Matlab region of Bangladesh. [Bongaarts \(1994\)](#) then argued that Pritchett did not find a large independent effect of family planning programs on fertility outcomes because family planning efforts do not only provide access to contraceptives, but also affect fertility preferences through information dissemination. Many recent studies carried out on micro-level have supported Pritchett's findings on family planning effects on fertility ([Bongaarts \(2011\)](#), [Joshi, & Schultz \(2013\)](#) and [Molyneaux & Gertler \(2000\)](#)). [Bongaarts \(2011\)](#), among others, affirmed that high fertility could be addressed by full implementation of family planning programs by the provision of contraceptives and necessary information. He further stated that the level of unmet needs are high in Africa and this results in large number of unintended pregnancies. Family planning intervention in fertility control has led to two arguments: one, family planning advocates, that is, the demographers believe that unwanted childbearing which is the margin between actual and desired fertility is substantial among African countries and this margin can be closed up by family planning programs. The economists, that is, the sceptics are of the opinion that fertility can be reduced by introducing economic development that increases the opportunity costs of childbearing ([Gunther and Harttgen \(2016\)](#)).

Studies have shown that actual fertility and fertility preference is negatively associated with adverse economic crisis or personal hardship of women in the country ([Muhoza, Broekhuis and Hooimijer \(2014\)](#) and [Orbeta \(2005\)](#)), that is using wealth index as a measure of economic wellbeing of women may not justify the dynamics of fertility in the country studies. For example, in Asia, women from poorer households have reported lower desire for children relative to the women from the richest group ([Orbeta \(2005\)](#) and [Alonzo, Balisacan and Canlas \(2004\)](#)). Similarly, in Nigeria, a study conducted during period of economic crisis showed that women who stated that poverty had hindered their economic expectations had lower desire for more children ([Odusola \(2002\)](#)).

Another determinant of high childbirths in sub-Saharan African countries is the preference for a son. The term: "son preference" refers to the attitude that male children are more important and valuable than female children. Parents therefore prefer male child for economic, social and psychological reasons ([Lahiri \(1984\)](#), [Miller \(1981\)](#) and [Williamson \(1976\)](#)). In contrast, daughters may

represent a substantial economic burden in places where parents provide a dowry (Clark (2000)). For families with son preference, it means they are more likely to continue to bear children until they reach the desired numbers of sons. Sex composition of existing children is another factor that determine the overall number of births (Pollard and Morgan (2002) and Wood and Bean (2004)). In the Western societies, sex preference of children is generally not considered. In African countries where sex preference is found, son preference dominates (Arnold (1997)). Based on biological factors, recent research has shown that there is no genetic bias toward one sex or the other (Rodgers (1997)). Most empirical works have therefore focussed on the biological effects of age of parents, birth order, race and other socio-demographic characteristics to predict the chance of having a male child (Clark (2000)). The sex of any child may be considered a random event with a 0.513 probability of having a boy, and a sex ratio at birth of about 1.05 (Johansson and Nygren (1991)).

### **3. Materials and Methods**

#### *3.1. Data source*

Data for this study are obtained from latest DHS, carried out in Ghana and Nigeria in 2013 and 2014, respectively (NDHS (2013) and GDHS (2014)). These surveys collect information on fertility, fertility preferences, child mortality, and maternal and child health indicators from naturally representative samples of women of reproductive age (15-49 years old).

#### *3.2. Ethical clearance*

The demographic and health survey program has a standard way of protecting the privacy of respondents that participated in the survey. Before the start of each interview, each participant is made to read the informed consent statement with the information that he/she has right to terminate the interview at any stage. Furthermore, the DHS survey is certified by the ICF and this body complies with the United States Department of Health and Human Services rules for the protection of participants interviewed in their survey. However, the DHS data are secondary and users need to request free permission for the usage. Thus, ethical approval for the study is not needed.

#### *3.3. Data Description and Operationalization*

The DHS assessing women's childbearing preferences asked women a question on ideal/desired number of births and desire for more children: "if you could go back to the time when you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" (Bankole and Westoff (1995), Bongaarts (1990), Casterline and El-Zeini. (2007), Lightbourne (1987) and Westoff (2010)). This question gives the estimates of average ideal/desired family size (number of children) and this estimate is widely

used in most demographic analyses, even though potential biases result due to non-response and rationalization. For example, some of the women could answer “up to God” based on the experience of previous surveys (Bongaarts (2011), Bongaarts (1990), Olaleye (1993) and Olusanya (1971)), but non-numeric responses have declined over time, and this constitute fewer than 5 percent of responses in most DHSs (Bongaarts (2011)). On the women’s desire for more children, this is very straightforward and the answers provided by each of the respondent cannot be biased. Only that there will be a higher proportion of women wanting more children in a population with wide birth spacing than in a population of women with a short birth intervals, both with the same desired number of children. Actually, estimating the desired family size is less problematic to other proxies for fertility measurements. Therefore, to minimize bias due to rationalization and non-response, we will base the average desired family size on women between the ages 15 and 35 years (Bongaarts (2011)). Thus, a sample size of 7495 was considered in the case of Ghana DHS, while a sample size of 40617 was considered in the case of Nigeria DHS.

The total number of children and the desired number of children were then identified. To determine the dependent variable for the logistic regression models, we selected the women that have less than two children from the total number of children recorded and score this 0, whereas those that have more than two children are scored 1. This gives the childbearing experience of the women in the sample. The covariate considered in this work includes the place of residence, level of education, religion, age at first birth, occupation, wealth index, contraceptive use, number of living children, possibility of having a male child, possibility of having a female child, exposure and childhood place of residence. The operationalization and description of the variable levels is presented in Table 1 below.

#### 4. Data Analysis

Data analyses considered in this study are univariate, bivariate and multivariate types. The univariate analysis is the descriptive measurements as well as the frequency distribution of the responses, for variables, defined in Table 1. The results for univariate analysis are presented in Table 2. The median estimates for both actual and ideal number of children are recorded, while frequency distributions are generated for desire of women for more children and the results presented as part of bivariate analysis in Table 3. For the bivariate analysis, the Chi-square associativity test is considered. This is a non-parametric test, which allows the expected frequency, to be generated based on the row and column interactions of the observed frequencies, given in blocks of contingency tables (see Table 3). The Chi-square statistic is then computed as,

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Table 1: **Operationalization and Description of Socio-Demographic Variables**

Socio-Demographic Characteristics	Description and Operationalization
Ideal/Desired number of children	This is the perception of ever-married women on the number of children a family should have.
Desire for more children	This categorizes the desire of women for more children. The options are: wants no more children, wants more children and undecided
Number of living children	This is the total number of children ever born by a woman, excluding those that have died and present pregnancy.
Place of Residence	This is categorized into rural and urban categories.
Education of mothers	Highest educational attainment of mother grouped into no education (reference), primary; secondary and tertiary educations.
Religion	Religious affiliations of mothers coded into four categories: non-Catholic (reference), Catholic, Moslem and Traditional/Others
Age at first birth (years)	Age of mothers at their first birth categorized into three levels as < 20 years (reference), 20-30 years and >30 years.
Paternal Occupation	Father's occupation classified into: not working (reference), agricultural jobs and non-agricultural jobs.
Maternal Occupation	Mother's occupation classified into: not working (reference), agricultural jobs and non-agricultural jobs.
Wealth index	This index is re-classified into Poor, Average and Rich
Contraceptive use	This is categorized into: not using contraceptive and Using contraceptives
Sons at home	Based on the DHS data, women were asked the number of sons at home. For this variable, those women that indicated that they have sons are coded 1 (Yes) while those with no son are coded 0 (No).
Daughters at home	Based on the DHS data, women were asked the number of daughters at home. For this variable, those women that indicated that they have daughter are coded 1 (Yes) while those with no daughter are coded 0 (No).

where  $df = (r-1)(c-1)$ ,  $r$  and  $c$  are the number of rows and columns, respectively. Thus, the null hypothesis is that there is no significant relationship between the two variables (a dependent variable and a socio-demographic variable), as against the alternative hypothesis of significant relationship between the two variables, at a specified level of significant. For the multivariate analysis, we conducted logistic regression analyses. The logistic regression requires the dependent variable to be categorical and dichotomous. The childbearing experience of the women, with binary responses are coded 0 for those that have two children or less, and this

is coded 1 for those women that have three children or more. This was used as the dependent variable. This regression model also requires a set of covariates  $X = x_1, x_2, \dots, x_k$  with parameters  $\beta = \beta_1, \beta_2, \dots, \beta_k$  in the model. Thus, the model is specified as,

$$\log \left[ \frac{p_i}{1 - p_i} \right] = \beta_0 + X\beta$$

where  $p_i$  is the probability of having more than two children in a dichotomized variable setting with 0 “having two children or less” and 1 “having three or more children”. Then,  $1 - p_i$  is the probability of having less than three children. The log of the ratio  $\frac{p_i}{1 - p_i}$  is the logit, which serves as the dependent variable in this modelling framework. Taking the exponent of both sides of the equation, it is very straightforward to conduct a maximum likelihood estimation in determining the estimates  $\hat{\beta}_0$  and  $\hat{\beta} = (\hat{\beta}_1, \hat{\beta}_2, \dots, \hat{\beta}_k)$  of the model. Thus,  $\exp(\hat{\beta}_0)$  and  $\exp(\hat{\beta}_1), \exp(\hat{\beta}_2), \dots, \exp(\hat{\beta}_k)$  are estimates of risk (odd-ratio) of the logit model. The regression modelling results are presented in Table 4.

#### 4.1. Results and Discussion

In Table 2, the three dependent variables considered are the actual and ideal number of children, and the desire of women for more children. Estimates of median are given for actual and ideal number of children across the socio-demographic factors. It is observed that rural dwellers in Nigeria and Ghana indicated more actual and ideal number of children than those who live in urban areas. Also, as educational levels advance, the number of proposed ideal number of children and actual number of children reduces in both countries. In Nigeria, Muslim religion indicated highest ideal number of children, followed by traditionalist. Age at first birth of women is also inversely related to actual and ideal number of children, since those with younger age still have better chances of having more children, thus younger women proposed highest ideal number of children and they have highest number of children as at the time of the survey. Those parents that are not working or those whose occupation are agricultural have tendency to have more children. Looking at the index of wealth in both countries, poor people indicated highest ideal number of children (6, 10), while the actual number of children is 5 for this category of women in both countries. Both actual and proposed ideal number of children by the rich women reduced drastically. Based on son's and daughter's preferences, the median actual number of children for those that do not have either a son or a daughter at home is 3 in both countries. With either a son or a daughter at home, the respondents still preferred up to 5 children in the case of Ghana, and 8 children in the case of Nigeria. Generally, median estimates of ideal number of children across categories of socio-demographic characteristics are more than the actual number of children (Ibisomi (2008)).

Looking at their desire for more children as presented in Table 3, 51.6 percent of rural dwellers in Ghana wants no more children while 39.9 percent wants

**Table 2: Percentage distribution of the Desire of women for more children by Socio-Demographic Characteristics**

Socio-Demographic Characteristics	Variable level	Ghana		Nigeria	
Residence	Urban	4	4	4	6
	Rural	5	5	5	8
Education of mothers	No Education	5	6	5	10
	Primary	4	5	5	6
	Secondary	3	4	4	5
	Tertiary	2	4	4	4
Religion	Non-Catholic	4	4	4	6
	Catholic	4	5	5	6
	Moslem	4	6	5	10
	Traditional/Others	5	6	5	8
Age at first birth (years)	< 20 years	5	5	5	8
	20-30 years	4	5	4	6
	> 30 years	2	4	3	5
Paternal Occupation	Not working	5	5	5	6
	Agricultural	4	5	5	8
	Non-Agricultural	4	5	4	6
Maternal Occupation	Not working	3	4	4	8
	Agricultural	5	5	5	7
	Non-Agricultural	4	5	4	6
Wealth index	Poor	5	6	5	10
	Average	4	4	5	7
	Rich	3	4	4	5
Sons at home	No	3	4	3	6
	Yes	4	5	5	8
Daughters at home	No	3	4	3	6
	Yes	4	5	5	8

more children. In the case of Nigeria, 28.4 percent wants no more children, while 61.2 percent wants more children. Based on educational levels of respondents in Ghana, there is no clear margin on their desire for more children, while in the case of Nigeria, 45.6 percent of women with tertiary education only said they want more children, 51.5 percent (for secondary education class) want more children and 66.6 percent of those with no education want more children, as against 41.4 percent of those with no education that said they want more children in Ghana. In both countries, the Muslim religion indicated preference for more children (53.2%, 69.0%). The age at first birth is consistent with preference for more children, as those with younger years in Nigeria indicated preference for more children, while in Ghana, older years indicated preference for more children. In Nigeria and Ghana, mothers that are not working indicated preference for more children, while fathers that are not working indicated the least preference for more children. In Nigeria, those that are rich indicated the least preference for more children (46.5%), while

those that are poor indicated the highest preference for more children (67.1%). Based on son's and daughter's preferences, those that want a male child indicated preference for more children in both countries. This proportion is 55.1% and 61.8% for both Ghana and Nigeria, respectively. It is very clear to observe the results for desire for more children agree with the responses of women on the actual and proposed ideal number of children. Using the results for bivariate analysis to further explain the link between the desire of women to have more children and their socio-demographic status, with the observed frequencies (proportions) given in contingency tables in the main results table (Table 3), the results indicated significant association between women's desire to have more children and her socio-demographic status in the two countries. The only exception is the case of women's desire for more children in Ghana as it does not have significant relationship with the resident types in the country.

Table 4 presents the results of the logistic regression using actual childbearing experiences as the dependent variable on socio-demographic factors used as covariates. The socio-demographic characteristics such as education of mothers, religion, age at first birth, maternal occupation, wealth index, sons at home and daughters at home significantly contribute to the actual number of children a woman has in Ghana and Nigeria, while residence types, paternal occupation and contraceptive use significantly contribute to the actual number of children by a woman in Nigeria only.

Furthermore, we found that the odd of women in Nigeria living in urban area have higher risk of having more than 2 children than in rural area with ratio 1 to 0.842, and the odd of women in Ghana and Nigeria with no education have higher risk of having more than 2 children compared to women with primary education, secondary education and tertiary education with ratio (1 to 0.593 & 1 to 0.835, respectively); (1 to 0.432 & 1 to 0.322 respectively) and (1 to 0.223 & 1 to 0.343, respectively); respectively. The odd of women in Ghana which are non-Catholic have higher risk of having more than 2 children compared to women which are Catholic and Muslim with ratio (1 to 0.912 & 1 to 0.940, respectively) but have a lower risk of having more than 2 children compared to women whose religion are traditional with ratio (1 to 1.258) while the odd of women in Nigeria who are non-Catholic have lower risk of having more than 2 children compared to women who are catholic and traditional/ other types of religion with ratio (1 to 1.061 & 1 to 1.202, respectively) but have higher risk of having more than 2 children compared to women who are Muslim with ratio (1 to 0.840).

In Ghana and Nigeria, the odd of women who gave birth to their first child at the age less than 20 years have higher risk of having more than 2 children compared to those at the age between 20 - 30 years and age greater than 30 years with ratio (1 to 0.529 & 1 to 0.605, respectively) and (1 to 0.182 & 1 to 0.189, respectively), respectively. The odd of women in Nigeria whose paternal occupation are not working have lower risk of having more than 2 children compared to women with non-agricultural occupation with ratio (1 to 0.662) while the odd of women in Nigeria whose maternal occupation are not working have lower risk of having

**Table 3: Relationship between Desire of women for more children and Socio-Demographic characteristics. Abbreviations : Socio-Demographic Characteristics (SDC), Undecided (U), Wants more children (WMC), Wants no more Children**

SDC	Variable Level	Ghana				Nigeria			
		WNMC	WNC	U	$\chi^2$	WNMC	WMC	U	$\chi^2$
Residence	Urban	50.9	40.8	8.3	1.88	43.2	49.1	7.8	2203.2***
	Rural	51.6	39.9	8.5		28.4	61.2	10.4	
Education of mothers	No Education	51.1	41.4	7.5	68.84***	22.2	66.6	11.2	5535.6
	Primary	54.2	35.6	10.2		45.6	45.8	8.6	
	Secondary	50.1	41.2	8.7		41.1	51.5	7.4	
	Tertiary	49.5	44.9	5.7		47.9	45.6	6.5	
Religion	Non-Catholic	55.9	35.9	8.2	439.7***	49.4	42.2	8.4	10231***
	Catholic	53.6	38.7	7.7		53.9	41.3	4.8	
	Moslem	38	53.3	8.8		20.1	69	10.9	
	Traditional/Others	48.6	41.4	10		38.4	50.7	10.9	
Age at first birth (years)	< 20 years	54.2	37.1	8.6	121.0***	31.4	58.7	9.9	370.57***
	20-30 years	48.2	43.7	8.1		37.2	53.9	8.9	
	> 30 years	35.9	54.6	9.5		31.7	63.2	5.1	
Paternal Occupation	Not working	-	-	-	15.74***	56.6	38.7	4.7	427.28***
	Agricultural	60.2	36	3.8		31.6	57.6	10.8	
	Non-Agricultural	51.2	40.3	8.5		34.2	57.2	8.7	
Maternal Occupation	Not working	38.2	50.5	11.3	177.0***	17.7	72.6	9.7	3591.7***
	Agricultural	56.6	36.1	7.4		41.2	48.6	10.2	
	Non-Agricultural	52.9	39	8.1		35.1	56	8.9	
Wealth index	Poor	51.3	40.6	8	42.86***	21.9	67.1	10.9	5236.9***
	Average	55	36.5	8.6		38.8	52.4	8.8	
	Rich	48.6	42.3	9.1		45.5	46.5	8	
Sons at home	No	35.8	55.2	51.4	530.7***	30.5	61.8	7.7	214.49***
	Yes	55.1	36.6	8.2		34	56.1	9.9	
Daughters at home	No	41.6	49.2	9.2	261.3***	31.7	60.4	7.9	135.18***
	Yes	54.5	37.4	8.2		33.8	56.3	9.9	

more than 2 children compared to women with agricultural and non-agricultural occupation with ratio (1 to 2.770) & (1 to 1.903), respectively.

In Ghana, the odd of women who are poor have higher risk of having more than 2 children compared to women who are rich, with ratio 1 to 0.680, while the odd of women in Nigeria that are poor have lower risk of having more than 2 children compared to women who are average and rich with ratio (1 to 1.283) and (1 to 1.507), respectively. The odd of women in Ghana who do not use

contraceptives have higher risk of having more than 2 children than those that use contraceptives with ratio (1 to 0.97) while the odd of women in Nigeria who do not use contraceptives have lower risk of having more than 2 children than those that use contraceptive with ratio (1 to 1.720). Finally, the odd of women in Ghana who do not have sons and daughters at home have lower risk of having more than 2 children than those that have sons and daughters with ratio (1 to 5.103) and (1 to 4.598), respectively, while the odd of women in Nigeria who do not have sons and daughters at home have lower risk of having more than 2 children than those that have sons and daughters with ratio (1 to 5.221) and (1 to 4.857), respectively.

Thus, following from Table 4, the fitted logistic regression model for Ghana is given as

$$\left[ \frac{p_i}{1-p_i} \right] = 0.522D_{2,1} - 0.840D_{2,2} - 0.092D_{3,1} - 0.062D_{3,2} + 0.230D_{3,3} - 0.637D_{4,1} - 0.701D_{4,2} + 0.334D_{6,1} + 0.787D_{6,2} - 0.102D_{7,1} - 0.386D_{7,2} + 1.630D_{9,1} + 1.526D_{10,1} - 0.466$$

and the fitted logistic regression model for Nigeria is given as

$$\left[ \frac{p_i}{1-p_i} \right] = -0.172D_{1,1} - 0.181D_{2,1} - 1.135D_{2,2} - 1.070D_{2,3} + 0.059D_{3,1} - 0.175D_{3,2} + 0.184D_{3,3} - 0.503D_{4,1} - 1.668D_{4,2} - 0.092D_{5,1} - 0.413D_{5,2} + 1.019D_{6,1} + 0.643D_{6,2} + 0.248D_{7,1} + 0.410D_{7,2} + 0.542D_{8,1} + 1.653D_{9,1} + 1.580D_{10,1} - 0.466$$

where  $p_i$  is the probability of woman having more than 2 children.

## 5. Conclusion

In this paper, we aimed at investigating the levels and determinants of desired number of children, and the risk of having more than two children, that is, above the replacement level, in both Ghana and Nigeria. Using desired number of children and actual number of children as dependent variables on the key socio-demographic factors such as the place of residence, level of education, religion, age at first birth, occupation, wealth index, contraceptive use, number of living children, possibility of having a male child, possibility of having a female child, exposure and childhood place of residence, we found significant influence of these socio-demographic factors on actual number of children and proposed desired number of children in the two countries.

Survey results obtained in this paper showed that sub-Saharan African countries such as Ghana and Nigeria are not ready to adopt replacement level strategy (Garenne (2008) and Harper (2015)). The case is worse in Nigeria where these socio-demographic factor significantly acted as driver of fertility trend. Thus, putting every condition necessary for women's fertility in place in Nigeria, these women will still continue to give birth to more children. The family planning and urbanization seem not to have influence on fertility trend in Ghana, while education and age at first birth have been identified as probable targets for bringing stall to population increase in the two countries. Education actually delays age at first birth of these women and changes their perception of their interests on sex preference of their children. Thus, education should be given the priority measure

in slowing down population growth in sub-Saharan African region. Based on the findings in this paper, government and non-governmental organizations should embark on quick intervention programme to bring stall to population growth in the sub-Saharan African regions.

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**Table 4: Logistic regression estimates: Actual number of Children as dependent variable (2 children or less; more than 2 children). Abbreviations : Socio-Demographic Characteristics (SDC), using Contraceptives (UC), Not using Contraceptives (NUC)**

SDC	Variable Level	Ghana			Nigeria		
		B	Exp(B)	95% CI(B)	B	Exp(B)	95% CI(B)
Residence*** (N) X <sub>1</sub>	Urban (RC)	-	1	-	-	1	-
	Rural D <sub>11</sub>	0.056	1.058	(0.955, 1.172)	-0.172***	0.842***	(0.802, 0.884)
Education of mothers*** (G, N) X <sub>2</sub>	No Education (RC)	-	1.000***	-	-	1.000***	-
	Primary D <sub>21</sub>	-0.522***	0.593***	(0.529, 0.666)	-0.181***	0.835***	(0.785, 0.887)
	Secondary D <sub>22</sub>	-0.840***	0.432***	(0.388, 0.480)	-1.135***	0.322***	(0.301, 0.343)
	Tertiary D <sub>23</sub>	-1.500***	0.223***	(0.177, 0.281)	-1.070***	0.343***	(0.312, 0.377)
Religion*** (G, N) X <sub>3</sub>	Non-Catholic (RC)	-	1.000***	-	-	1.000***	-
	Catholic D <sub>31</sub>	-0.092	0.912	(0.813, 1.023)	0.059***	1.061***	(0.987, 1.139)
	Muslim D <sub>32</sub>	-0.062	0.94	(0.842, 1.049)	-0.175***	0.840***	(0.796, 0.885)
	Traditional/Others D <sub>33</sub>	0.230***	1.258***	(1.059, 1.495)	0.184***	1.202***	(0.986, 1.465)
Age at first birth (years)*** (G, N) X <sub>4</sub>	< 20 years (RC)	-	1.000***	-	-	1.000***	-
	20-30 years D <sub>41</sub>	-0.637***	0.529***	(0.488, 0.573)	-0.503***	0.605***	(0.580, 0.630)
	> 30 years D <sub>42</sub>	-1.701***	0.182***	(0.137, 0.242)	-1.668***	0.189***	(0.165, 0.216)
Paternal Occupation*** (N) X <sub>5</sub>	Not working (RC)	-	-	-	-	1.000***	-
	Agricultural D <sub>51</sub>	-	1	-	-0.092	0.912	(0.750, 1.110)
	Non-Agricultural D <sub>52</sub>	-0.139	0.87	(0.612, 1.238)	-0.413***	0.662***	(0.546, 0.803)
Maternal Occupation*** (G,N) X <sub>6</sub>	Not working (RC)	-	1	-	-	1.000***	-
	Agricultural D <sub>61</sub>	0.334	1.396	(0.930, 2.095)	1.019***	2.770***	(2.623, 2.925)
	Non-Agricultural D <sub>62</sub>	0.787***	2.197***	(1.970, 2.449)	0.643***	1.903***	(1.816, 1.993)
Wealth index*** (G, N) X <sub>7</sub>	Poor (RC)	-	1.000***	-	-	1.000***	-
	Average D <sub>71</sub>	-0.102	0.903	(0.809, 1.008)	0.248***	1.282***	(1.211, 1.357)
	Rich D <sub>72</sub>	-0.386***	0.680***	(0.599, 0.771)	0.410***	1.507***	(1.413, 1.608)
Contraceptive use*** ( N) X <sub>8</sub>	NUC (RC)	-	1	-	-	1	-
	UC D <sub>81</sub>	-0.024	0.97	(0.893, 1.068)	0.542***	1.720***	(1.621, 1.825)
Sons at home*** (G, N) X <sub>9</sub>	No (RC)	-	1	-	-	1	-
	Yes D <sub>91</sub>	1.630***	5.103***	(4.687, 5.555)	1.653***	5.221***	(5.015, 5.436)
Daughters at home*** (G, N) X <sub>10</sub>	No (RC)	-	1	-	-	1	-
	Yes D <sub>101</sub>	1.526***	4.598***	(4.240, 4.986)	1.580***	4.857***	(4.668, 5.053)
Intercept	Intercept	-0.466***	0.627***	-	-0.466***	0.628***	-