

# Fertility Intentions Among High-Parity Women in Nigeria: How Satisfying Are Four Living Children?

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## Abstract

The efforts at reducing Nigerian rapid population growth are anchored in strategies to achieve fertility decline. These approaches have yielded negligible impact as fertility preference remains high among most Nigerian women of reproductive age who are still giving birth to more than an average of four children previously recommended by a national policy. Studies have focused on fertility preference among various groups of childbearing women, but knowledge of the issue among high-parity women needs to be further explored. Employing chi-square and binary logistic regression for analyses, the data on women who had at least four living children were extracted from the 2018 Nigeria Demographic and Health Survey (2018 NDHS) to examine the associated factors of fertility intentions. The results indicate significant relationships of fertility intentions with women's current age, region of residence, level of education, and husband's desire for more children. Other predictors of fertility intentions are ideal number of children, children ever born, and number of living children. The study concludes that having four children is not compatible with the desired level of fertility for women due to the influence of the identified predictors. The study recommends proper advocacy on socially and economically desirable fertility levels for women.

## Keywords

Childbearing women; fertility intentions; high-parity; husband's preference; overpopulation

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## Introduction

The decline in the Nigerian fertility rate is occurring at a very much slower pace than desired. According to the Nigeria Demographic and Health Survey (NDHS) reports in the last ten years, the total fertility rate declined from 5.7 in 2008 (National Population Commission [Nigeria] & ICF Macro, 2009) International, 2019 to 5.5 in 2013 (National Population Commission [Nigeria] & ICF Macro, 2014), and to 5.3 in 2018 (National Population Commission [Nigeria] & ICF. The total fertility rate (TFR) is the average number of children a woman would bear at the end of her childbearing years if she experienced the current age-specific fertility schedule. Over the ten years, only 0.4 points were shed off the TFR. This was very different from the targeted 0.6 point decline every five years as proposed by the 2004 Nigeria Population Policy for Sustainable Development (National Population Commission [Nigeria] & Health Policy Project, 2015). Ultimately, this fertility level was higher than the African average, which declined from 6.3 children in 1990 to 4.6 in 2018 (United Nations, 2020). The reports also indicate 38 per 1,000 live births for Nigerian crude birth rate, which was higher than the estimated average for the combined global low-income countries (34 per 1,000 live births) and the sub-Saharan African average (35 per 1,000 live births). With an estimated annual growth of 2.6 (United Nations, 2015), these fertility statistics indicate a rapid expansion of Nigeria, which will become the third-largest in the world by 2050 (United Nations, 2017).

Nigeria has reached the second stage of demographic transition since 2018, with a decline in mortality while fertility remains high. The country will crawl through five decades to the next transition stage in 2068 (Eririogu et al., 2020). Furthermore, Nigeria's population will continue to grow larger due to momentum till 2050, when the country becomes the world's third-largest country. It is, however, worrisome that despite all these unimpressive rapid population growth indications, contraceptive uptake remains very low in Nigeria. According to the 2018 NDHS report, the contraceptive prevalence rate for any method among currently married women is 17%, while modern contraceptive use is 12% among the same group (National Population Commission [Nigeria] & ICF International, 2019). Contraceptive devices are for effective planning and decision-making about individuals' fertility.

## Consequences of Nigerian rapid population situation

Nigeria's population realities indicate a sign of unhealthy situations for the country. Considering the assertion of Bongaarts et al. (2012) and Akinyemi and Isiugo-Abanihe (2014), rapid population expansion links underdevelopment. Currently, Nigeria is grappling with population-related issues such as infrastructure decay, high rate of unemployment, congestion of public facilities like schools and hospitals, food shortage, increasing crime rate and an alarming rate of banditry, high infant and maternal mortality and morbidity rates, homelessness, and an increasing number of vulnerable persons (Dimelu et al., 2017; United Kingdom: Home Office, 2006).

In addition, high fertility is one of the factors for the adverse climate change and ferocious competition for arable and grazing lands between farmers and herders that result in the carnage in many parts of the country (Nwakanma & Boroh, 2019). As a population expands, the competing needs to feed and house additions to the existing human figure become the unavoidable priorities. These necessitate unpreventable encroachment of marginal lands for housing construction while pushing farmland farther away from the consuming population.

The resultant effect is the increasing cost of transporting agricultural produce to the consumers, which brings about a rising cost of living.

The above suggests that the Nigerian situation already requires serious social, economic, and demographic interventions to salvage the country from the impending negative consequences of overpopulation by 2050 when the population becomes the world's third-largest country. The negative impacts of population explosion may become highly intolerable by then.

## **Nigerian population policy on fertility reduction**

The second attempt at formulating and implementing the strategies to achieve population control in Nigeria was developed in 2004 and adopted in 2005 with an end date of 2015. This was after the first national effort of 1988 failed to achieve any tangible result. The strategy document was tagged "National Policy on Population for Sustainable Development." Its overall aim was to improve "standards of living and quality of life for Nigeria's people by addressing the complex interrelationships between population and development" (National Population Commission [Nigeria], & Health Policy Project, 2015, p. vi). The policy targeted a 0.6 reduction in TFR every five years. This would have shrunk the TFR to 4.4 by 2015, while four children per woman as recommended in the 1988 version of the policy would have been almost achieved if strictly implemented. However, assessment has shown that the 2004 policy failed to achieve its intended goals due to poor implementation across the country (National Population Commission [Nigeria], & Health Policy Project, 2015; Shofoyeke, 2014). More than five years after the policy's end date, the Nigerian population growth has been tremendously rapid, and fertility is sustained at its high level, although with negligible decline. Against this backdrop, this study aims to assess Nigeria's post-policy implementation fertility situation. Particularly, it is worthwhile to understand the factors that sustained fertility intentions at a high level in the country.

## **Literature on factors influencing fertility and fertility intentions**

Chief among many factors that influence women's high fertility in Nigeria are individual characteristics such as women's ages at marriage and the onset of childbearing, level of education, exposure to media, religion, occupation, wealth status, sex preference, and husband's dictate. The relationships between age at marriage, age at first childbirth, and fertility are that when women marry at tender ages, they start childbearing early in life. Therefore, they have long years for childbearing (Avogo & Somefun, 2019; Marphatia et al., 2017; Yaya et al., 2019). As a result of this, they may end up giving birth to more than the reasonable number of children for which they can adequately cater. Based on empirical evidence, a higher proportion of women married or were betrothed in marriage at ages younger than legal marriage age in Nigeria, especially in the northern part of the country (Adedokun et al., 2016; Yaya et al., 2019). Making a trade-off in favor of marriage over schooling at this early stage of life means that the women have more years for childbirth than their counterparts who delay marriage due to education (Fenn et al., 2015; Loaiza & Wong, 2012). In addition, this affects the age at which women give birth to their first child. By implication, the younger the age at first childbirth for a woman, the higher the likelihood of having a high birth frequency in life (Oyefara, 2012). As already explained, the year spent for schooling is influenced by both ages at marriage and the onset of childbearing. There is a trade-off between education and the assumption of maternal function by a woman. Therefore, an event of transition to motherhood ultimately truncates the year of schooling for a woman,

especially at teen ages. Most women who either marry or give birth at younger ages have fewer years for education, but more years for childbearing (Cygan-Rehm & Maeder, 2013).

Information, including healthcare messages, is disseminated to the masses through the media. It is, therefore, pertinent to say that the level of a woman's media exposure determines the extent of the relevant information at her disposal for health-seeking decision-making. As the findings of Jacobs et al. (2017), Bajoga et al. (2015), and Ahmed and Seid (2020) suggested, the media are a veritable channel through which women become knowledgeable about family planning and contraceptive information. The media educate women about the negative consequences of large family size, the danger of having a high frequency of childbirth, and the ills of old maternal ages. Women who have a lower level of media exposure are more likely to be less knowledgeable about family planning and the advantages of small family size than those with a higher level of exposure (Bajoga et al., 2015). Therefore, having a low level of or no media exposure for women is associated with giving birth to a high number of children (Fazle Rabbi, 2012).

Ethnicity also shapes fertility in Nigeria. The Nigerian society constitutes more than two hundred and fifty ethnic groups located across the six geopolitical zones in the country. The major ethnic groups are Hausa/Fulani, Igbo, and Yoruba, while the remaining socio-ethnic groups comprise other groups that are not part of the main three. Each of the ethnic groups has a unique tradition, culture, norms, and social practices, which further define the social behavior of the people. Therefore, fertility is influenced by ethnically-defined social behaviors in Nigeria. Adebawale (2019) found ethnic differences in fertility indicators across the three major Nigerian ethnic groups. The findings showed that the TFR of Hausa/Fulani women was 8.02 and it was almost double that of a Yoruba woman, which was the lowest among the three with an estimated 4.43, while it was 4.91 for an Igbo woman. Also, the study reported the highest proportion of women with more than four children among the Hausa/Fulani; in contrast, the Yoruba had the lowest proportion of the category of high parity women.

The impact of religion on fertility in Nigeria is similar to that of ethnicity. Interestingly, each ethnic group in the country identifies with either of the two major religions with a striking feature such that there exists a north-south religious dichotomy. The north is predominantly Islamic, while Christianity is dominant in southern Nigeria (National Population Commission [Nigeria] & ICF International, 2019). This pattern also reflects across the ethnic groups, with Islam being the major religion among Hausa/Fulani/Kanuri and a host of other ethnic groups in the north. The Yoruba, Igbo, and other ethnic groups in the south are predominantly Christians. Through the religious leaders' influence on contraceptive uptake, religion has been noted to be one of the determinants of fertility in Nigeria (Adedini et al., 2018) and elsewhere in the world (Westoff & Bietsch, 2015). Adebawale et al. (2019) found a consistently higher likelihood of giving birth to more than five children among Muslim women than their Christian counterparts.

As patterned by ethnicity and religion, fertility also shows regional differences in Nigeria. According to a nationwide study, being in the northern region was associated with higher fertility than being in the south for childbearing women (Adebawale, 2019). This could be attributed to the ethnic and religious fertility patterns in which high fertility is favored among Hausa/Fulani/Kanuri and Islamic religious faith that is predominantly northern socio-demographic characteristics.

As found by many studies (Adhikari, 2010; Rai et al., 2014; Wang et al., 2020), Adebawale and Palamuleni (2015) also affirmed that sex-preference is a predictor of high fertility in a

population as it tends to make childbearing women overshoot their desire when they decide to give birth in the expectation of particular sex of a child. However, in another recent study in Nigeria, the likelihood of giving birth to at least five children was associated with having no preference for a child's sex among women (Adebawale et al., 2019).

In addition, knowledge, access, and the usage of family planning methods are predictors of fertility among women. A study in Nigeria found non-usage of contraceptives was associated with high fertility among women manifesting in a high prevalence of completed fertility (Adebawale et al., 2011). Husband's fertility desire is a determinant that plays a crucial role in the actual use and continuation of family planning to control fertility. Therefore, Adiri et al. (2010) found husbands' disapproval of family planning as the reason for the non-use of contraceptives among women in Nigeria and in some other developing countries with high fertility rates (Bongaarts et al., 2012; Prata et al., 2017). Similarly, a study of fertility preference among women who had experienced a previous marriage in Nigeria indicated that the preference to have an additional child was more of their husbands' in the new marital union (Olaseinde, 2020). The study found a strong link between differences in sexual bargaining and maintaining women's fertility desire. The highest proportion of those who wanted an additional child among the remarried women regardless of the age categories were those whose previous marriage outcome was a loss of a husband. In the patriarchal Nigerian society, widowhood may imply a lack of economic power in the subsequent union for women.

Previous studies found an inverse relationship between women's occupational status and fertility preference. Non-working women tend to desire higher fertility than their counterparts who are working. For instance, in a study of childbearing women's involvement in the labor force in Nigeria, Ojo and Adesina (2014) concluded that women who engaged in occupational activities tended to adopt smaller family sizes than their unemployed counterparts in Nigeria. Contrarily, Salami and Oladosu (2016) found a positive relationship between employment status and preference for more children among Nigerian women. Generally, however, it has been argued that there is a trade-off between the time for attending to pregnancy and childbearing issues and for economic activities engagement (Evan & Vozárová, 2018; Jaumotte, 2004; Pignatti, 2020).

Considering the foregoing, many studies have dealt more with the factors responsible for the high fertility among the general population of childbearing women and teenagers. Furthermore, ethnic differences in fertility intentions have been explored. However, more knowledge is required about fertility issues among high-parity women in Nigeria. This is more desirable as TFR is still higher than the level of fertility prescribed by the Nigerian population policy, suggesting that most women are still giving birth to more children than the policy benchmark of four children per woman. Therefore, the factors that determine the intention to have more children among women who have already attained high fertility level need to be examined.

The issue raised in this study is relevant to the understanding of the desire for more children among Nigerian women after giving birth to at least four children. In other words, this study was conducted to examine the predictors of intention to have more children among Nigerian women with at least four living children. It hypothesized that high-parity women are not different by characteristics in their intention to have more children.

# Methodology

## Data source

The study utilized secondary data from the 2018 Nigeria Demographic and Health Survey (2018 NDHS) conducted by ICF International, in collaboration with the Nigeria National Population Commission (National Population Commission [Nigeria] & ICF International, 2019). The survey is cross-sectional and nationally representative. The NDHS provides information every five years about demographic characteristics, sexuality, and other reproductive health indicators among men and women of reproductive age in the Low- and Middle-Income Countries (LMICs) globally to monitor key health and socio-demographic indicators for informed-policy direction. The 2018 NDHS was conducted through a two-stage stratified sampling method. In the first stage, a total of 1,400 enumeration areas (EAs) were selected with probability proportional to size in each of the 36 states and FCT in Nigeria. The household listing was done in all the selected EAs (National Population Commission [Nigeria] & ICF International, 2019). The list of households generated served as the sampling frame through which the selection of households interviewed was made using a systematic sampling procedure in the second stage. The procedure produced approximately 42,000 households as the sample size for the survey. All women who were aged 15–49 years and all men aged 15–59 years in the sample households who were either permanent residents or visitors who stayed in the households the night before the survey were eligible respondents. A total of 41,821 women and 13,422 men were interviewed.

The data collected in the states, local government areas (LGAs), and the EAs were affected by the non-proportional allocation of samples. For this reason, sampling weights were applied to all the analyzes performed in this study. Therefore, after applying the weighting factor, data from approximately 12,202 women who had at least four living children were extracted from the 2018 NDHS women's dataset. High parity was defined based on the prescription by the defunct 2004 Nigeria Population Policy, which gauged four children as the maximum number per woman. Therefore, the data on women of childbearing ages, who had at least four living children, and whose intention to have an additional child was either "have another" or "no more" were extracted from the 2018 NDHS.

## Variables

**Response Variable:** the response variable was the preference of the woman to have another child provided she had given birth to at least four children. This was measured as "intention to have more children" in the 2018 NDHS with five categories of response as "have another, undecided, no more, sterilized (respondent or partner), and declared infecund." The variable was recoded as binary by leaving the major two relevant responses to reflect dichotomous options (wanted more = 1 and wanted no more = 0).

**Explanatory Variable:** the explanatory variables reviewed in the relevant literature as the predictors of women's fertility behavior were adopted to test the significance of the factors responsible for fertility preference among high-parity women. These variables included: the current age of women, age at first and last births, highest level of education, place of residence, religion, ethnicity, wealth status, and region of residence. Others were media exposure,

occupation, children ever-born, ideal number of children, number of living children, sex preference, and husband's desire for more children.

More details about the definitions of the variables as measured in the 2018 NDHS and how they have been re-coded in this study are contained in the Appendix.

## Statistical method

Analyses were performed using descriptive statistics, chi-square test of relationships at the bivariate level, and binary logistic regression in Stata Version 15 (Stata Corp, Texas, USA). The characteristics of the respondents were disaggregated by fertility preferences using frequency and percentage distribution tables and charts. At the bivariate level, all variables identified to be significant at  $p < 0.05$  were included in the binary logistic regression for further analysis to indicate the adjusted odds ratios (AOR) of characteristics associated with the outcome variables.

The binary logistic regression model evaluates the maximum-likelihood estimates of the probability of success (Long & Freese, 2014). Generally, the Multiple Linear Regression gives the model for a response  $y_i$  and explanatory variables  $x_{1i}$  to  $x_{pi}$  as:

$$E(y_i | x_i) = \beta_0 + \beta_1 x_{1i} + \dots + \beta_p x_{pi}. \dots \dots \dots (1),$$

But binary responses in the binary logistic regression model are typically coded 1 for the event of interest, and 0 for the opposite event. Assuming that, in Equation 1 above, the probability that the event of interest occurs is given as the value,  $p_i$  which is computed as:

$$P(Y = 1) = \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n}} \dots \dots \dots (2),$$

In logistic regression, the log-likelihood is maximized numerically using an iterative algorithm. Binary logistic regression satisfies the conditions for analyzing non-metric outcome variables, which must have a dichotomous category such as "yes/no," "success/failure," etc.

## Results

### Description of characteristics and intention to have more children among women with at least four living children

Out of 12,202 women who had at least four children, 32.4% had exactly four living children, while 67.6% had more than four living children (Table 1 and Figure 2). Ultimately, only about a half of the women wanted no more children (52.3%), but about 12 in every 25 women wanted more children (47.7%) (Table 1 & Figure 1). About three-quarters of women aged 20 to 35 years (73.5%), more than half of those who had their first birth at teenage (52.6%), approximately three-fifths of poor women (59.9%), and more than a quarter of those who had their last birth at ages older than 35 years (27.3%) desired to have more children. Also, analysis across ethnic groups and regions in Nigeria shows stark differences in fertility preferences. The proportion

of women who wanted more children among Hausa/Kanuri/Fulani (66.2%) was more than quadrupled those who fell into this same fertility preference category among the Yoruba women (16.6%). Regionally, the two northern regions, North West (65.6) and North East (67.4), had the highest proportion of women who desired more children, with more than a half in each region reported to want more children (Table 1 & Figure 3). Further, women with no formal education (59.9%), women who were rural dwellers (54.4%), those who were Islamic faith adherents (61.3%), and women who had no media exposure (50.7%), those whose husbands preferred more children (58.1%), and those who were currently not working (61.2%) wanted more children than their counterparts in other categories.

**Table 1:** Classification of the Respondents by Demographic Characteristics

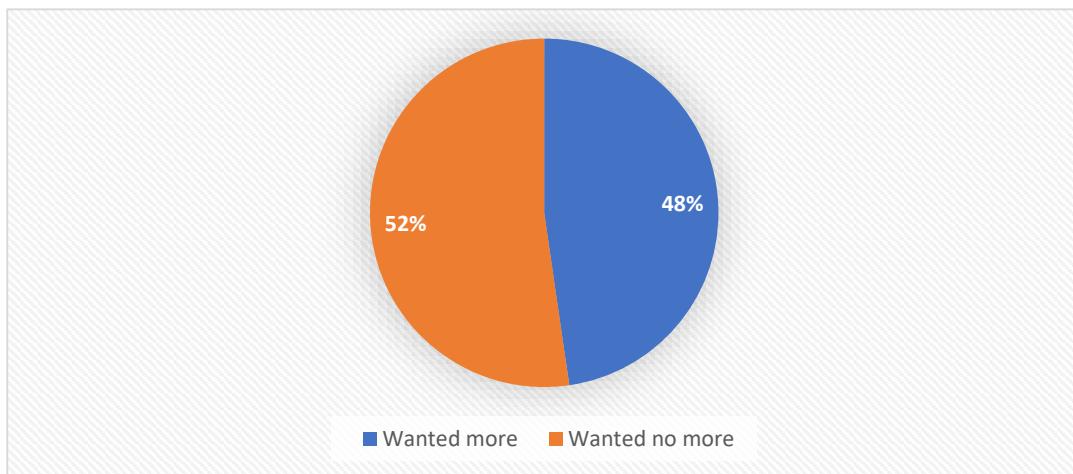
Demographic characteristics	Total	Percent
<b>Current age</b>		
20 to 35 years	5,537	45.4
Older than 35 years	6,665	54.6
<b>Age at first birth</b>		
19 years & younger	8,055	66.0
20 to 35 years	4,147	34.0
Older than 35 years	5	0.04
<b>Age at last birth</b>		
19 years & younger	33	0.3
20 to 35 years	8,074	66.1
Older than 35 years	4,095	33.6
<b>Wealth status</b>		
Poor	5,477	44.9
Average	2,611	21.4
Rich	4,114	33.7
<b>Ethnicity</b>		
Kanuri/Hausa/Fulani	5,706	59.9
Igbo	1,700	17.9
Yoruba	1,398	14.7
Others	714	7.5
<b>Region</b>		
North Central	1,636	13.4
North East	2,213	18.1
North West	4,336	35.5
South East	1,416	11.6
South-South	1,089	8.9
South Wests	1,513	12.4
<b>Highest level of education</b>		
No formal education	6,208	50.9
Primary school	2,576	21.1
Secondary school	2,770	22.7
Higher	648	5.3
<b>Residence</b>		
Urban	4,770	39.1
Rural	7,432	60.9
<b>Religion</b>		
Christianity	4,578	37.6
Islam	7,542	61.9
Traditional/others	60	0.5
<b>Media exposure</b>		
Not exposed	8,014	65.7

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Demographic characteristics	Total	Percent
Exposed	4,188	34.3
<b>Occupational status</b>		
Not currently working	2,863	23.5
Currently working	9,339	76.5
<b>Children ever-born</b>		
Four children	2,557	21.0
More than 4	9,645	79.0
<b>The ideal number of children</b>		
Being childless	523	13.1
Four and less	1,686	42.2
More than 4	1,791	44.7
<b>Number of living children</b>		
Four	3,948	32.4
More than 4	8,254	67.6
<b>Sex preference</b>		
Preferred male	6,280	51.5
Preferred female	5,922	48.5
<b>Husband's desire for more children</b>		
Wants more/same as husband	4,023	39.4
Husband wants more	6,188	60.6

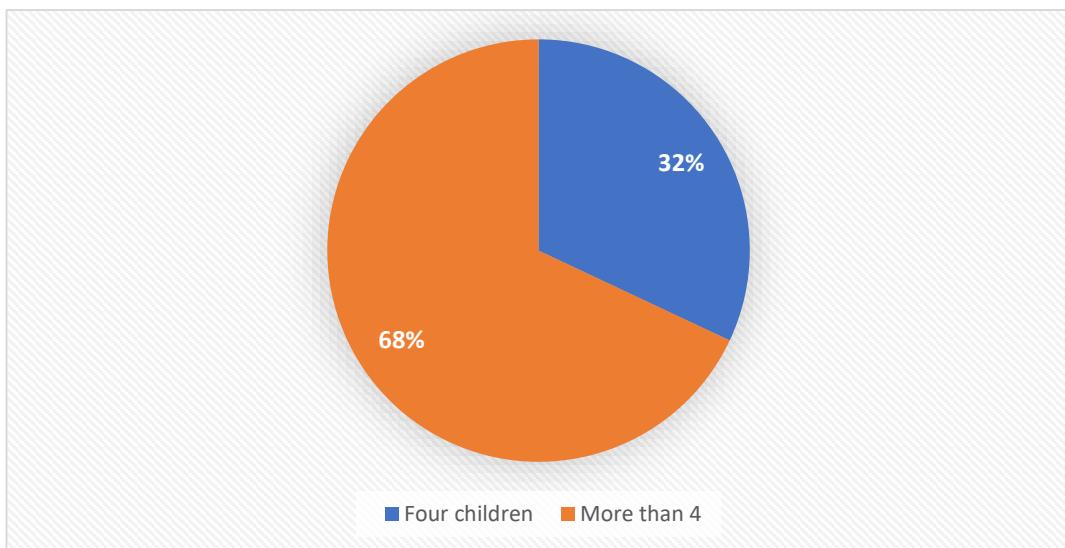
*Note: 2018 Nigeria Demographic and Health Survey*

**Figure 1:** Percentage Distribution According to Fertility Preference of Women Who Had at Least 4 Living Children in Nigeria



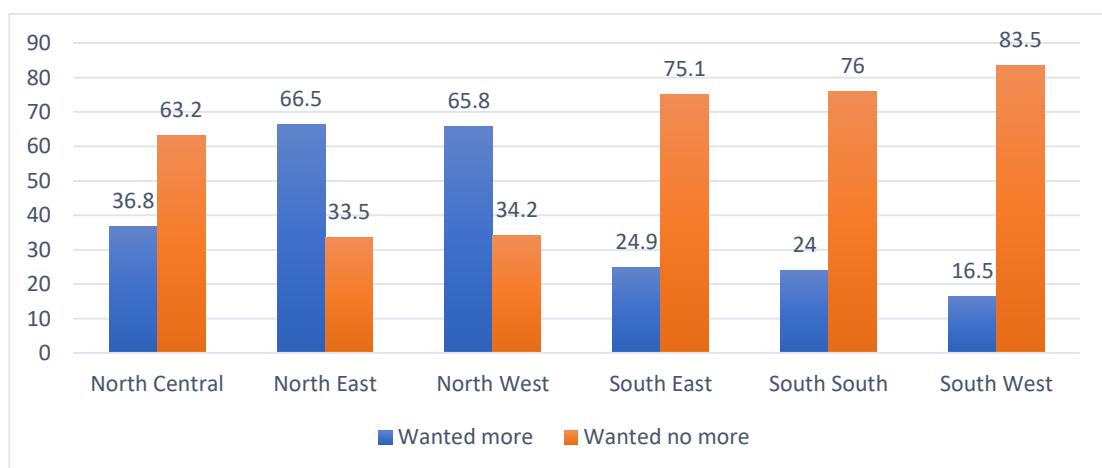
*Note: 2018 Nigeria Demographic and Health Survey*

**Figure 2:** Percentage Distribution of Women by Number of Living Children Among Women Who Had at Least 4 Living Children in Nigeria



*Note: 2018 Nigeria Demographic and Health Survey*

**Figure 3:** Percentage Distribution of the Intention to Have More Children Among Women Who Had at Least 4 Living Children Across the Geopolitical Zones in Nigeria



*Note: 2018 Nigeria Demographic and Health Survey*

## The relationship between women's socio-demographic characteristics and intentions to have more children

Further statistical analysis was performed to examine the relationship between the intention to have more children and women's characteristics by employing the chi-square test. Except for women's preference for a child's sex ( $p > 0.05$ ), the chi-square test of the relationship shows that all other explanatory factors considered were significantly ( $p < 0.001$ ) associated with the intention to have more children.

**Table 2:** Chi-Square Test of the Relationship Between Women's Socio-Demographic Characteristics and Intention to Have More Children and Chi-Square Analysis of the Relationship

Characteristics	Wanted no more 6,381 (52.3)	Wanted more 5,821 (47.7)	Chi-square	p value
<b>Current age</b>			2,749.15	< 0.001
20 to 35 years	1,468 (26.5)	4,069 (73.5)		
Older than 35 years	4,912 (73.7)	1,753 (26.3)		
<b>Age at first birth</b>			230.47	< 0.001
19 years & younger	3,819 (47.4)	4,236 (52.6)		
20 to 35 years	2,559 (61.8)	1,584 (38.2)		
Older than 35 years	3 (61.2)	2 (38.8)		
<b>Age at last birth</b>			1,048.78	< 0.001
19 years & younger	11 (32.6)	23 (67.4)		
20 to 35 years	3,393 (42.0)	4,681 (58.0)		
Older than 35 years	2,977 (72.7)	1,118 (27.3)		
<b>Wealth status</b>			722.50	< 0.001
Poor	2,194 (40.1)	3,282 (59.9)		
Average	1,412 (54.1)	1,199 (45.9)		
Rich	2,774 (67.4)	1,340 (32.6)		
<b>Ethnicity</b>			1,804.49	< 0.001
Kanuri/Hausa/Fulani	1,926 (33.8)	3,780 (66.2)		
Igbo	1,294 (76.1)	406 (23.9)		
Yoruba	1,166 (83.4)	232 (16.6)		
Others	540 (75.6)	174 (24.4)		
<b>Region</b>			2,166.74	< 0.001
North Central	987 (60.3)	649 (39.7)		
North East	722 (32.6)	1,491 (67.4)		
North West	1,491 (34.4)	2,844 (65.6)		
South East	1,075 (75.9)	341 (24.1)		
South-South	835 (76.7)	254 (23.3)		
South Wests	1,271 (84.0)	243 (16.0)		
<b>Highest level of education</b>			766.58	< 0.001
No formal education	2,490 (40.1)	3,718 (59.9)		
Primary school	1,681 (65.3)	894 (34.7)		
Secondary school	1,789 (64.6)	981 (35.4)		
Higher	420 (64.8)	228 (35.2)		
<b>Residence</b>			344.93	< 0.001
Urban	2,989 (62.7)	1,780 (37.3)		
Rural	3,391 (45.6)	4,041 (54.4)		
<b>Religion</b>			1,509.00	< 0.001
Christianity	3,420 (74.7)	1,158 (25.3)		
Islam	2,916 (38.7)	4,627 (61.3)		
Traditional/others	29 (47.6)	32 (52.4)		
<b>Media exposure</b>			84.56	< 0.001
Not exposed	3,952 (49.3)	4,062 (50.7)		
Exposed	2,428 (58.0)	1,759 (42.0)		
<b>Occupational status</b>			279.11	< 0.001
Not currently working	1,110 (38.8)	1,753 (61.2)		
Currently working	5,270 (56.4)	4,069 (43.6)		
<b>Children ever-born</b>			138.16	< 0.001
Four children	1,076 (42.1)	1,482 (57.9)		
More than 4	5,305 (55.0)	4,340 (45.0)		

Characteristics	Wanted no more	Wanted more	Chi-square	p value
	<b>6,381 (52.3)</b>	<b>5,821 (47.7)</b>		
<b>The ideal number of children</b>			326.41	< 0.001
Being childless	285 (54.5)	238 (45.5)		
Four and less	1,499 (88.9)	187 (11.1)		
More than 4	1,244 (69.5)	547 (30.5)		
<b>Number of living children</b>			362.25	< 0.001
Four	1,578 (40.0)	2,371 (60.0)		
More than 4	4,803 (58.2)	3,451 (41.8)		
<b>Sex preference</b>			0.00	> 0.05
Preferred male	3,285 (52.3)	2,996 (47.7)		
Preferred female	3,096 (52.3)	2,826 (47.7)		
<b>Husband's desire for more children</b>			366.21	< 0.001
Wants more/same as husband	2,457 (61.1) 2,591 (41.9)	1,566 (38.9) 3,597 (58.1)		
Husband wants more				

*Note: 2018 Nigeria Demographic and Health Survey*

## Factors predicting the likelihood of the intention to have more children among women with at least four living children

The binary logistic regression model was fitted for the analysis by running the multicollinearity test with the Stata command “collin” at the initial stage. The test results indicated the variance inflated factor (VIF) that ranges from 1.11 to 3.23, with the tolerance ranging from 0.31 to 0.89. Since none of the variables indicated no tolerance tending to zero and there is no large VIF, there is not much collinearity among the variables. In addition to the multicollinearity test, Pearson's goodness-of-fit test was conducted to ensure that the logistic regression model was appropriately fitted. The Stata command “estat gof” was used to conduct the test. The results indicated an F-adjusted test statistic of 1.42 with a *p* value of 0.1763 (*p* < 0.05). This is an indication that the model was appropriately fitted.

Binary logistic regression multivariate analysis of the determinants of intention to have more children among high parity childbearing women in Nigeria indicates that only current age of women, region, education, children ever-born (CEB), the ideal number of children, number of living children, and husband's desire for more children were the significant predictors. Women who were currently older than 35 years (aOR: 0.250, 95% CI: 0.174–0.359) were 75% less likely than those aged 20 to 35 years to desire more children. For high parity childbearing women, being in the North East (aOR: 2.540, CI: 1.097–5.883) and North West (aOR: 2.374, CI: 1.088–5.180) were 2.5 and 2.4 times more likely to want more children respectively than their counterparts in the South West of Nigeria. Compared to women who attained a higher level of education than secondary school, high parity women with no formal education (aOR: 0.351, CI: 0.188–0.656) and those who attained secondary school level of education (aOR: 0.536, CI: 0.334–0.862) were 65% and 46% less likely to desire for more children. Women who had ever given birth to more than four children (aOR: 0.561, CI: 0.336–0.939) were 44% less likely to desire more children than those who had ever given birth to exactly four living children. Other significant predictors of intention to have more children were women's ideal number of children, number of living children, and husband's desire to have more children. Having an ideal number of children of four and less was 86% less likely to desire more children than being childless, while having more than four children as an ideal was 51% less likely.

Similarly, having more than four living children was 62% less likely to desire more children than having less than four. The women whose husbands wanted more children were more than 700% more likely to have high fertility intention than those whose desire was the same with husbands (aOR: 1.772, CI: 1.307–2.402).

**Table 3:** Binary Logistics Analysis of the Relationship Between Demographic Characteristics and Intention to Have More Children

Intention to have more children	Adjusted Odds Ratio (AOR)	p value	95% confidence interval (95% CI)
<b>Current age</b>			
20 to 35 years	Reference		
Older than 35 years	0.250	< 0.001	0.174–0.359
<b>Age at first birth</b>			
20 to 35 years	Reference		
Younger than 20/Older than 35	0.880	> 0.05	0.636–1.218
<b>Age at last birth</b>			
20 to 35 years	Reference		
19 years and younger	2.308	> 0.05	0.276–19.298
Older than 35 years	0.791	> 0.05	0.519–1.205
<b>Wealth Status</b>			
Rich	Reference		
Poor	1.052	> 0.05	0.669–1.652
Middle class	1.045	> 0.05	0.700–1.561
<b>Ethnicity</b>			
Yoruba	Reference		
Kanuri/Hausa/Fulani	2.231	> 0.05	0.998–4.987
Igbo	0.716	> 0.05	0.309–1.658
Others	1.082	> 0.05	0.490–2.390
<b>Region</b>			
South West	Reference		
North Central	1.379	> 0.05	0.659–2.883
North East	2.540	< 0.05	1.097–5.883
North West	2.374	< 0.05	1.088–5.180
South East	1.949	> 0.05	0.857–4.433
South-South	0.925	> 0.05	0.402–2.127
<b>Education</b>			
Higher	Reference		
No formal education	0.351	< 0.001	0.188–0.656
Primary	0.566	> 0.05	0.316–1.013
Secondary	0.536	< 0.05	0.334–0.862
<b>Religion</b>			
Muslim/Traditionalist/Others	Reference		
Christianity	0.567	> 0.05	0.312–1.031
<b>Residence</b>			
Urban	Reference		
Rural	1.157	> 0.05	0.837–1.599
<b>Media Exposure</b>			
No Exposure	Reference		
Exposed	1.031	> 0.05	0.759–1.399
<b>Husband's desire for more children</b>			
Wants more/same as husband	Reference		
Husband wants more	1.772	< 0.001	1.307–2.402

Intention to have more children	Adjusted Odds Ratio (AOR)	p value	95% confidence interval (95% CI)
<b>Occupational Status</b>			
Not currently working	Reference		
Currently working	1.114	> 0.05	0.766–1.619
<b>Children ever born</b>			
Exactly four	Reference		
More than four	0.561	< 0.05	0.336–0.936
<b>The ideal number of children</b>			
Being childless	Reference		
1 to 4 children	0.137	< 0.001	0.079–0.237
More than 4 children	0.489	< 0.05	0.307–0.779
<b>Number of living children</b>			
Exactly four	Reference		
More than four	0.381	< 0.001	0.222–0.653

*Note: 2018 Nigeria Demographic and Health Survey*

## Discussion

This study analyzed the weighted data of the Nigerian women who had at least four living children as captured in the 2018 Nigeria Demographic and Health Survey (2018 NDHS) women's dataset to examine the factors associated with the intention to have more children despite having already attained a high fertility level. Analysis at the bivariate level indicates that only women's preference for a child's sex was not significant among selected factors tested. This finding is a clear departure from some previous finding, which established that women's behavior tends towards high fertility when they intend to give birth to achieve their predetermined child's sex. For instance, contrary to Adebawale et al. (2019), who found women's preference for child's sex a significant factor influencing fertility behavior among the general population of childbearing women, sex preference was not a significant predictor of fertility among high-parity women in Nigeria. The fact that a considerable proportion of women might have achieved their desired child's sex at such a level of high fertility might be a reason for this. Their fertility behavior was, therefore, being influenced by other factors.

The reported adjusted odds ratio (AOR) at the specified confidence interval (95% CI) in the binary logistic regression analysis showed that only the high-parity women's current age, their region of residence, educational level, children ever-born, the ideal number of children and their husbands' fertility desire were significant predictors of their intention to have more children. Specifically, the intention to have more children was higher among high-parity women who were younger than 35 years. In agreement with Olaseinde (2020), the fertility intentions of women who had at least four living children reflected their husbands' desires rather than their own.

Women in both the North East and the North West of Nigeria tended to have a higher intention to have more children than their counterparts in any other region of the country. This finding supports the position of Adebawale (2019) that high fertility was more a characteristic of the northern women than the women elsewhere in Nigeria.

Strangely, high-parity women's level of education as a predictor of fertility intention reflected a departure from previous studies conducted among the general population of childbearing

women. Contrary to the previous findings that indicated an inverse relationship between the level of education and fertility such that lower level of education was associated with higher fertility level for women and vice-versa (Fenn et al., 2015; Ferré, 2009; Loaiza & Wong, 2012), this study demonstrates that high-parity women who attained a higher level of education wanted more children more than their other counterparts.

Children ever-born and the number of living children showed the same pattern of influence on fertility intention of the high-parity women in Nigeria. Those who had ever given birth to exactly four children, just as those who had exactly four living children indicated an intention to have more children than those who had ever given birth to more than four and those who had more than four living children, respectively. This indicates that having four children is not considered a satisfying level of fertility by Nigerian women. Therefore, most women desire to overshoot this level, as suggested by their intention to have additional children. Contrary to the expectation, women whose ideal was to have at most four children and those with more than four children showed lower intention to have more children than those whose ideal was to be childless.

## Conclusion and recommendations

It is expected that most women in Nigeria should stop childbearing when they have four living children. However, having four living children seems not to mean fulfilling lifetime fertility intention for many women in Nigeria as a considerable proportion of them crave additional children at this fertility level. This study, therefore, concludes that women's age group 20 to 35 years, women's residence in both the Northeast and Northwest of Nigeria, higher educational level, and having a husband who wants more children are the drivers of high fertility among women who have at least four living children.

In addition to the efforts geared towards reducing fertility levels among childbearing women generally, more attention should be given to the fertility issues among the women who have already given birth to four children in Nigeria's population. Based on the identified associated drivers of high fertility among the high-parity women, the study recommends advocacy and proper education among women aged between 20 to 35 years, especially those who reside in the Northeast and Northwest of Nigeria. The advocacy should emphasize the need to reduce fertility while stressing the consequences of high childbirth frequency among women and the disadvantages inherent in large family size to the family and the country at large. The advocacy should also target childbearing women irrespective of educational level as the influence of higher educational attainment seems not to count in achieving fertility reduction among the high-parity women in Nigeria. Lastly, more economic empowerment opportunities should be given to women to address lopsidedness in family decision-making. This will enable women to have a say in the number of children to have in the family and avoid the dominance of the male partners whose fertility preference shapes the intention of women to have more children.

## Study strength and limitation

Due to the nature of selected explanatory variables captured by the secondary data, the analyses were limited to the measured variables in the 2018 NDHS. The study's strength lies in the fact that the sample from which the data were collected was nationally representative

of the Nigerian population because the DHS has been adjudged a scientifically robust source of data conducted using rigorously tested collection tools, procedures, and well-trained enumerators on questionnaires administration. Therefore, the findings of this study are generalizable.

## Ethical approval

This study employed the analysis of secondary survey data. The survey data was obtained through a project reviewed and approved by the Institutional Review Board (IRB) of ICF International and anchored by the MEASURE Demographic and Health Surveys Project Phase III. The 2010–2018 DHS's are categorized under that approval. The IRB of ICF International ensured compliance with the United States Department of Health and Human Services requirements for the "Protection of Human Subjects" (45 CFR 46). Without compulsion, all respondents gave their informed consent in writing before collecting information. No attempt was made to trace any of the respondents using any means of identifiers, and all information was kept under conditions of confidentiality. The full details of the ethical approvals can be found at [www.dhsprogram.com](http://www.dhsprogram.com). This study was granted data usage permission (Approval No: AuthLetter\_154835).

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## Appendix

Variable description	Original variable code	Variables recode description
Number of living children reported per a woman	v218	Those who had less than four living children were dropped, and those who remained were grouped into two based on the recommendation of Nigeria's population policy as: having exactly four and more than four
Fertility preference is the measure of the respondents' desire to have more children	v602	The variable was recoded to include only those who reported reflecting only two categories: those who desired more children and those who did not
Respondents' current age	v012	By definition, the sample removed the teenagers who were part of the survey as none of them had given birth to at least four children. The variable was then recoded to reflect two groups according to demographic findings of the healthy childbearing age, which has been established to be 35 years maximum, and the other group, which is women's age older than 35
Respondents' age at first birth	v212	This included teenage as reported as the age at first birth. The variable was recoded into three categories: teenage, 20 to 35 years, and older than 35 years
Wealth quintile places respondents on a 5-level ladder as: very poor, poor, average, rich, and very rich	v190	The variable was re-coded by combining the two upper and two lower levels adjacent to the average level as: poor, average, and rich
Highest educational level measures educational level attained by respondents as: no education, primary, secondary, and higher	v106	The variable was retained as measured
Residence is measured as the rural and urban place of respondents' residence	v025	The variable was retained as measured
Religion measures the religious affiliations as: Catholic, other Christians, Islam, Traditionalists, and others	v130	The variable was re-coded by combining catholic and other Christians, and traditionalists and others, while Islam remained unchanged: Christianity, Islam, Traditionalists/others
Respondent's exposure to family planning messages on television and magazines	v384a-c	The variables were generated as a new single variable by grouping those who were exposed to family planning messages at least on one of the mentioned sources and those who reported not being exposed at all as: exposed or not exposed
Husband's fertility desire measures the desire of the husbands relative to the respondents as: both	v621	The variable was re-coded by combining the first two categories while the third remained as: wanted more/same as husband, and husband wanted more

Variable description	Original variable code	Variables recode description
wanted same, husband wanted more, and husband wanted fewer	v717	The variable was retained as measured
Respondents' currently working	v201	The variable was recoded as: exactly 4 children, and more than 4
Ideal number of children was measured by asking women who had	v613	Based on Nigeria's population policy, the variable was categorized into three groups: no child, 1 to 4 children, and more than 4.
children how many children they would choose to have if they could go back to the time when they had not given birth to any child at all. It was reported and recorded as countable numbers		
The geographical region of the respondents' residence	V024	The variable was retained as measured
Respondents' general preference for the sex of a child	b4_01	The variable was retained as measured