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Changes in demand for children between 2003 and 2013 in Nigeria: Evidence from survey data

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Abstract: Nigeria has one of the highest fertility rates in Africa. Data from 2013 Demographic and Health Surveys indicate a virtual stagnation of fertility rate since 2003. Low contraceptive use and pronatalist attitudes are among the factors contributing to the high fertility rate in Nigeria. In this manuscript, we pooled data from three most recent waves of Demographic and Health Surveys to examine trends in demand for children over time and identify the factors associated with change in demand for children. The data show that demand for children has declined since 2003 although not monotonically so. Variables that were positively associated with increased likelihood of desiring no additional children were residence in the South-West (as opposed to residence in the North-Central), exposure to family planning (FP) messages on the mass media, number of children ever born, educational level, and urban residence. In contrast, uncertainty about fertility desire was more widespread in 2008 compared to 2013 although less widespread in 2003 than in 2013. The likelihood of being undecided about fertility desire was positively associated with discrepancies in family size desires between husband and wife, parity and Islamic religious affiliation. Programs should aim to increase access to effective contraceptive methods and promote demand for contraceptives as a way of fostering a sustainable reduction in demand for children. Furthermore, strategies that address uncertainty by fostering women's understanding of the social and health implications of large family sizes are relevant.

Keywords: Demand for children; Pronatalism; Uncertain fertility desire; Decisional uncertainty; Nigeria

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Introduction

It is a demographic fact that sub-Saharan Africa (SSA) has one of the highest fertility levels among all regions in the world. Aside being a global front runner, the pace and pattern of fertility transition in SSA is different (Shapiro, 2015). For instance, in the 1960s, Asia and Latin America with Total Fertility Rate (TFR) about 5.8 had high fertility just like SSA (TFR about 6.5); however the former regions experienced faster declines since 1970s (Bongaarts and Casterline, 2013). More recent assessment even showed that the average TFR in SSA (5.0) exceeded those of these other regions by about 2.5 (Bongaarts, 2017). Variations in fertility trends exist between and within sub-regions in sub-Saharan Africa (SSA). Recent analysis of fertility trends between 1950 and 2015 (Gerland et al., 2017) showed that Southern Africa has a distinct pattern with total fertility rate (TFR) declining steadily to less than 3.0 in 2010-2015. In contrast, fertility in the other three sub-regions remained high till the late 1980s and early 1990s before decline commenced and continued at different rates. The average TFR in Western Africa for 2010-2015 was 5.5 (Gerland et al., 2017). Within this

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region, Nigeria is one of the six countries with TFR between 5.0 and 6.0. Clearly, there has been fertility decline in SSA and this has been attributed to factors such as increased contraceptive prevalence, female education, and reduction in infant and child mortality and children demand (Shapiro, 2012b, Bongaarts, 2014).

Apart from effective birth control, another factor that is very critical for substantial fertility decline is reduction in demand for children (Casterline, 2017). Demand for children is usually operationalized using fertility intention based on interview questions that asked women whether they want any more children. The response is one of the following: want more, want no more or undecided. Apart from its usefulness for population projection, fertility intentions are important for assessing the level of unmet need for contraception and understanding how couples pursue their fertility goals (Jones, 2017).

In Africa, there has been an upward trend in the desire to stop childbearing since year 2000, especially among higher parity (with three or more children) women. This family-limitation mentality is less visible in Middle and Western Africa compared to Southern Africa (Casterline and Agyei-Mensah, 2017). Out of the three responses to questions on children demand (wants more; wants no more and undecided), most of the available studies have focused on the first two, especially the desire to stop childbearing. There has been apparent neglect of the "undecided".

Decisional uncertainty about fertility intention is critical because it is unclear how to place such women in terms of contraceptive intentions. Data from DHS follow-up qualitative study in Ghana show that some women with uncertain fertility intentions were wrongly classified as having unmet need for family planning (Staveteig, 2016). The implication of this is that women with uncertain fertility intention may well represent another dimension of childbearing desires (Miller et al., 2016). Furthermore, decisional uncertainty about childbearing complicates the choice of long-acting reversible contraceptives (Sundstrom et al., 2017, Higgins, 2017). Studies have documented the effect of uncertain fertility intention and perception of partner's fertility desire on pregnancy risk among young women in the Unites States (Miller et al., 2013, Miller et al., 2017). Evidence from Britain also showed that nearly one-third of reproductive age women are uncertain about future fertility and the proportion decreased with age(Bhrolcháin and Beaujouan, 2015). Data from rural Mozambique shows that while the effect of marital stability was weak, adult and child mortality as well as economic conditions were associated with uncertainty in fertility desire (Hayford and Agadjanian, 2011).

In this study, we expand the existing knowledge by providing evidence from Nigeria, the most populous country in Africa. We estimated changes in the proportion of women desiring additional children, desiring no more children and undecided about future childbirth using nationally representative DHS data between 2003 and 2013. We also investigated the factors associated with desire for no more children and uncertainty in fertility intention.

Literature review

Though, the pace and course of fertility transition in SSA has been richly investigated in recent times, the uniqueness of the ensuing pattern from the sub-region is a near consensus (Bongaarts, 2017, Caldwell et al., 1992, Shapiro, 2012b). Persistently high fertility levels especially in middle and western Africa despite different family planning interventions (Shapiro, 2015) would continue to attract empirical and policy interests. Explanations of the fertility course in SSA have revolved around birth control among older parity women, birth postponement and increased/widened birth interval (Caldwell and Caldwell, 2002, Casterline and Odden, 2016, Moultrie et al., 2012). Another very important dimension to this discourse is the role of fertility desire which is evidently correlated with fertility levels (Casterline, 2017, Cleland et al., 2011, Feyisetan and Casterline, 2000). A common feature in these explanations is the desire to stop childbearing or demand for (or wanting) no more children. A woman who does not want children anymore would be more likely to take actions on birth control. As expected, previous studies on fertility preferences and transition have focused on this – desire to stop childbearing or proportion demanding no more children. Besides, methodological evidence also suggests that it is a more objective measure of fertility desire (Casterline and El-Zeini, 2007).

A classical exposition on fertility preference and contraceptive change in developing countries between late 1970s and mid 1990s (Feyisetan and Casterline, 2000) revealed two major findings for SSA. The range for proportions of women wanting no more children increased from about 3.1% - 17.1% to 14.5% - 40.7% with Kenya and Ghana leading seven

other SSA countries. However, decreased demand for children did not translate into higher contraceptive prevalence, although the contribution of the former to the latter was strongest in SSA than other regions such as Asia and Latin America (Feyisetan and Casterline, 2000). Similar analyses conducted about a decade later showed that the propensity to stop childbearing had stagnated at around 46% (Cleland et al., 2011). Further, though approval, access and actual use of contraceptive improved, Western Africa fared worst. The difference between Western Africa and other SSA regions was attributed to lower level of female education. A recent and more detailed analysis is quite revealing of the variations between countries in Eastern and Western Africa (Casterline and Agyei-Mensah, 2017). Throughout SSA, the desire to stop childbearing increased with parity. While the proportion has increased significantly in other regions, Middle and Western Africa has remained at about 30%. For instance, in Nigeria, at parity 4, the percentage ranged from 18% in 1990 to about 25% in 2010 whereas in Kenya, it changed from about 42% to 70%.

Fertility rates estimated from demographic models do not necessarily correlate with actual fertility intentions among African women (Johnson-Hanks, 2007). Women's fertility desires depend on several social, biological and psychological factors (Holton et al., 2011, Caldwell and Caldwell, 1987). Besides, the relationship between these factors and fertility intentions also depend on parity and women circumstances. This implies that demand for children is dynamic and multifactorial.

A cursory view of the literature on fertility preferences or desires showed that it has focused on those wanting to stop childbearing. Indirectly, the complement- continuation of childbearing can be implied. Looking again at the arguments proffered for fertility patterns (birth control among older parity women, birth postponement and increased/widened birth interval), some forms of uncertainty is inherent. A woman may use birth control if she is undecided about future fertility; similarly, birth could be postponed thereby resulting in lengthening of birth interval. This underscores why investigation of uncertainty in childbearing intentions is very important for understanding of fertility transition patterns in SSA. Very close to this is the issue of non-numeric response to questions on ideal number of children. It has been recently shown that this is declining globally and countries with high TFR also recorded higher proportions of non-numeric responses (Frye and Bachan, 2017). Decline in non-numeric response only starts at onset of fertility transition. For countries with no evidence of transition, the levels remain stagnated. Whether this pattern also applies to uncertainty in childbearing intention is a matter for further research.

Though a relatively neglected subject in SSA demographic research, fertility uncertainty has been investigated in Britain(Bhrolcháin and Beaujouan, 2011, Bhrolcháin and Beaujouan, 2015) and US (Miller et al., 2016, Miller et al., 2013). It is as high as 30% in Britain and has remained consistently so for close to two decades (Bhrolcháin and Beaujouan, 2015). Absence of similar evidence for SSA is one of the motivations for this study which aims to provide a SSA perspective to the issue of fertility uncertainty. Nigeria is selected as a case study because of its high fertility and very low contraceptive prevalence.

TFR estimated from three most recent rounds (2003, 2008 and 2013) of Demographic Health Survey (DHS) in Nigeria suggest that fertility level has virtually stalled between 5.5 and 5.7 births per woman although it appears that the country has experienced a stable but slow decline since the 1990s (United Nations, 2015). Within the country, there are fertility differentials in terms of residence, region and educational attainment. Generally, fertility levels are higher in rural areas and in the North west and North east (National Population Commission (NPC) [Nigeria], 2014). Factors underlying the slow fertility transition in Nigeria are not different from those that operate in several other SSA countries, including misconceptions about and negative attitudes towards contraception, poor progress in socio-economic development, early marriage and pronatalist norms that characterised the socio-cultural system in the region (Caldwell et al., 1992, Bongaarts, 2011, Bongaarts, 2017). Pronatalism is still very strong in Nigeria, especially in the Northern regions (Ibisomi and Mudege, 2014, Izugbara et al., 2010).

It is evident that fertility cannot decline sustainably without increased contraceptive use. Contraceptive prevalence remains among the lowest worldwide and has not shifted meaningfully since 2003 (National Population Commission (NPC) [Nigeria], 2014, Alkema et al., 2013). The effects of low contraceptive use are evident in different socio-economic and health indices for the country. For example, maternal mortality remained high because of high rates of unwanted/unplanned pregnancy and unsafe abortion (Stover and Ross, 2010). Short birth

spacing is a major contributor to childhood mortality, which has remained high despite a marginally faster decline since year 2000 (Akinyemi et al., 2015a, Akinyemi et al., 2015b). Multiple demand and supply factors contribute to the low contraceptive use in Nigeria (Adebowale et al., 2011, Lamidi, 2015). On the supply side, studies have identified factors such as distance to services, method availability, provider attitudes and skills, and type of facility (Stephenson et al., 2008, Blumenthal et al., 2011, RamaRao et al., 2003, Hong et al., 2006). Studies that have focused on demand side factors affecting contraceptive use have found significant predictors to include the woman's age, parity, education, religion, type of marriage, urban residence and household wealth (Ejembi et al., 2015, Okigbo et al., 2017, Oyediran et al., 2002, Sekoni and Oladoyin, 2016, Ankomah et al., 2011).

Other studies have looked at the role of ideational characteristics and found spousal communication about family size and contraceptive use, perceived self-efficacy to take actions related to contraceptive use, perceived social approval of contraception, ideal family size, and misconceptions about contraceptives and family planning to be important predictors (Okigbo et al., 2017, Babalola et al., 2015, Babalola, 2017, Tumlinson et al., 2013, Teye, 2013, Okigbo et al., 2015, Ankomah et al., 2011). Pertinent demand side factors also include the husband's or partner's socio-economic and ideational characteristics (Ejembi et al., 2015, Ibisomi, 2014) as well as women's autonomy and conjugal relationship dynamics (Do and Kurimoto, 2012, Nketiah-Amponsah et al., 2012, James-Hawkins et al., 2016, Blackstone, 2016).

Like other countries in Western Africa with similar fertility profile, Nigeria has policies directly and indirectly related to family planning. At the London summit of 2012, the country proposed a CPR target of 36% by the year 2018 (Federal Ministry of Health, 2014). Generally, policies are formulated by the Federal Ministry of Health and expected to be implemented across other tier of government with active support from development partners. Family planning in Nigeria is affected by myriads, of health system factors including inadequacies in staffing, financing supplies, availability of commodities, regulations and policies. On the part of consumers, there is poor knowledge of modern methods such as LARCs. Motivation to use FP is also poor (Federal Ministry of Health, 2014). These weaknesses are more severe in the northern regions. It is not a totally gloomy picture because recent intervention data showed that the country is recording progress in the uptake of modern methods of contraception even in the northern as well as southern regions (PMA2020, 2018).

Analysis of longitudinal data from peri-urban centres in Nigeria revealed that the percentage of women who wanted no more children increased slightly from 37.2% to 39.0% over a period of two years (OlaOlorun et al., 2016). Elsewhere from the West Africa sub-region, data from Ghana indicate that one out of every five women changed their fertility intention within a period of 5 years (Kodzi et al., 2010). Among women who have achieved their desired family sizes, fertility intention was stable and not influenced by life circumstances (Kodzi et al., 2010). Women who wanted no more children are more likely to be contraceptive users (Bankole and Audam, 2011, OlaOlorun et al., 2016). In Nigeria, desire to stop childbearing has remained relatively stable between 2003 (22.3%) and 2013 (19.1%) (Oginni et al., 2015).

Data and Methods

Data

The data analysed in this manuscript came from Demographic and Health Surveys conducted in Nigeria in 2003, 2008 and 2013. The sampling strategy was similar for the three surveys and involved selecting respondents following a stratified multi-stage approach. The sampling strategy has been described elsewhere (see for example, National Population Commission (NPC) [Nigeria] (2014) for the 2013 survey). The datasets included relevant information on 7,225 in 2003, 33,385 in 2008, and 38,948 in 2013. Of these women, 4,841 (67.0%) in 2003, 22,828 (68.4%) in 2008, and 26,089 (67.0%) in 2013 were currently married or cohabiting and did not declare themselves infecund or sterilised. These women were the basis for the analyses reported in this manuscript.

Variables

The dependent variable in this manuscript is desire for additional children assessed through a question that asked women if they desired to have another child. The possible response options were "Have another child", "No more", and "Undecided/Don't know"

The key independent variable in the analyses was the year of survey comparing 2003, 2008 and 2013.

The estimated regression models adjusted for the nine independent variables described below:

1. Number of children-ever-born: Defined as the number of live births that the woman has had;
2. Education: Defined as highest level of education attained and divided into four categories: none, primary, secondary and tertiary;
3. Age at first marriage: Measured in single years;
4. Type of marriage: Monogamous (husband/partner has only one wife/partner) or polygamous (husband/partner has only one wife/partner);
5. Pregnancy status: This variable distinguished women who reported that they were pregnant from their peers that reported that they were not pregnant;
6. Employment status and decision-making on personal earnings: For the main analytic method, the respondents were categorized into one of three groups depending on the employment status and decision-making on earnings: (1) working and participating in decisions about how to spend own earnings, (2) working but not participating in decisions about how to spend own earnings, and (3) not working.
7. Exposure to family planning on the media in the past year: We operationalized this variable using the number of media (radio, television, newspaper/magazine) through which the respondent received family planning information in the past year;
8. Religion: We distinguished between Muslims and Christians. A total of 400 (91 – 1.8% in 2003, 174 – 0.8% in 2008, 134 – 0.5% in 2013) respondents that were neither Muslim nor Christian were excluded from the analyses;
9. Family size desire of the husband compared to that of the wife as reported by the woman. The possible response options were "same number", "wife desires more that husband", husband desires more than wife", and "don't know";
10. Household wealth quintile: An asset-based construct derived from household possessions and divided into quintiles;
11. Type of place of residence: We compared urban and rural areas;
12. Region of residence: In the DHS data, the 36 states and the Federal Capital Territory were divided into six geo-political zones: north-central, north-west, north-east, south-east, south-west, and south-south. Each zone includes between five and seven states that are similar in terms of culture, ethnicity, and history.

Analytic Methods

The main analytic method used in this manuscript was multivariable multinomial logistic regression. The multinomial model included only those variables that bivariate analyses revealed to be significant predictors of change in demand for children. The model was estimated using *mlogit* command in Stata version 14. The multivariable multinomial model assessed the relative risk of desiring no more children versus desiring more and of being undecided about childbirth versus desiring more children while controlling for various socio-demographic, household, and community variables.

Results

Socio-demographic characteristics of the respondents

Table 1 provides summary statistics for selected socio-demographic variables for each survey. Among all married women, the data showed no significant difference in the number of children-ever-born over time: the mean number of children-ever-born was around 4.0 children for each survey year. There were significant differences in the proportion that was Muslim; the sample included a lower proportion of Muslims in 2008 compared to either 2003 or 2013. There were also significant differences in the distribution by urban residence with the 2013 sample including proportionally more urban residents than in 2003 or 2008. Exposure to family planning information on the media was significantly more widespread in 2003 and 2008 than in 2013. The mean age at first marriage was lower in 2003 compared to 2008 and 2013. There were no differences in the proportion of women that desired the same number of children as their husband and the proportion of female-headed households. The proportion with post-primary education has increased significantly since 2003. In contrast, the proportion of currently pregnant women has decreased significantly over time. The proportion in polygamous union was smaller in 2008 and 2013 compared to 2003. Proportionally fewer women were employed in 2013 compared to 2008 or 2003. Furthermore, among the women that were working, participation in decisions about how to spend one's earnings appeared to have decreased over time,

Table 1: Summary statistics (weighted) for socio-demographic and household characteristics of married women; Nigeria 2003, 2008 and 2013

Characteristics	2003	2008	2013
Mean parity	4.0 [3.9, 4.1]	4.0 [3.9, 4.1]	3.9 [3.8, 4.0]
Percent with Post-primary Education***	25.2 [21.3, 29.2]	31.5 [29.1, 33.9]	33.0 [30.4, 35.7]
Percent Muslim**	61.8 [55.6, 68.1]	54.3 [51.0, 57.3]	60.5 [56.9, 64.0]
Exposure to FP Information on any media***	41.8 [38.1, 45.6]	40.6 [38.4, 42.8]	34.1 [31.7, 36.5]
Mean Age at First Marriage in Years***	16.7 [16.4, 17.0]	17.8 [17.6, 18.1]	17.8 [17.5, 18.0]
Percent Desiring Same Family Size as Husband	35.1 [32.4, 38.0]	33.3 [31.7, 34.9]	34.2 [32.7, 35.8]
Percent in polygamous union*	35.6 [33.1, 38.8]	33.1 [31.5, 34.7]	32.6 [31.0, 34.3]
Percent currently regnant ***	16.5 [15.2, 17.8]	14.7 [14.1, 15.2]	12.0 [11.5, 12.6]
Percent of female-headed households	7.9 [6.6, 9.4]	9.4 [8.7, 10.2]	8.7 [8.0, 9.5]
Percent currently employed ***	64.0 [61.0, 66.9]	67.0 [65.2, 68.8]	60.3 [58.9, 61.7]
Percent of employed individuals participating in decisions about how to spend own earnings ***	78.3 [74.9, 81.4]	70.1 [67.9, 72.1]	68.3 [66.5, 70.1]
Percent Urban*	30.9 [24.9, 37.0]	31.5 [28.0, 34.9]	36.7 [32.8, 40.6]
Zone of residence*			
North-central	14.2 [10.2, 19.5]	13.7 [11.6, 16.1]	14.1 [11.6, 16.9]
North-east	21.0 [15.6, 27.6]	15.0 [12.7, 17.7]	16.5 [13.7, 19.8]
North-west	34.7 [27.7, 42.5]	30.3 [26.6, 34.2]	35.6 [31.5, 40.0]
South-east	6.9 [3.8, 12.0]	9.1 [7.5, 11.0]	8.5 [6.7, 10.6]
South-south	12.6 [8.7, 17.8]	12.8 [10.8, 15.2]	9.7 [7.9, 11.8]
South-west	10.6 [7.8, 14.2]	19.0 [16.2, 22.2]	15.5 [12.9, 18.6]

Notes: Significance of differences among groups: * p<0.05; ** p<0.01; *** p<0.001.

Table 2: Weighted percentage [95% Confidence Interval] of married women by desire for additional children and year; Nigeria; 2003, 2008, and 2013.

Year	Desires no more	Undecided	Desires more	N
2003	18.7 [16.7, 21.0]	2.4 [1.9, 3.0]	78.9 [76.5, 81.0]	4 841
2008	20.0 [19.0, 21.1]	11.1[a] [10.2, 12.1]	68.8[c] [67.6, 70.0]	22 828
2013	19.1 [17.9, 20.3]	7.8[a b] [7.0, 8.6]	73.1[c d] [71.8, 74.4]	26 089

Notes: [a] Significantly higher than in 2003 at p<0.001; [b] Significantly lower than in 2008 at p<0.001; [c] Significantly lower than in 2003 at p<0.001; [d] Significantly higher than in 2008 at p<0.001;

Variations in demand for children over time

Among all married women, the data showed no significant change in the proportion desiring no more children over time (Table 2). In 2003, the proportion of women that desired no more children was 18.7% compared to 20.0% in 2008 and 19.1% in 2013. In contrast, the proportion reporting that they were undecided about their future fertility desires has increased significantly over time although not monotonically so. Whereas the proportion that was undecided was higher in 2008 and 2013 compared to 2003, there were proportionally more undecided women in 2008 than in 2013. The proportion desiring more children has decreased significantly since 2003. Rather unexpectedly, desire for additional children was more prevalent in 2013 than in 2008.

Predictors of demand for children

Table 3 presents results of the multinomial logistic regression of the relationship of time and other covariates with demand for children among all married women. The results compare the relative risk of desiring no more children or being ambivalent (undecided) with desiring more children across selected socio-demographic groups and were adjusted

for clustering and confounding variables.

Desire for no more children versus desire for more

After adjusting for the confounding influence of other covariates included in the model, the data showed a significant increase in the likelihood of desire for no additional children in 2008 and 2013 compared to 2003. It is pertinent to note that there is no significant difference between the odds ratio associated with 2008 and the one associated with 2013 in the model (chi-square=2.13; p=0.144). Other variables that were positively associated with increased likelihood of desiring no additional children were residence in the South-West (as opposed to residence in the North-Central), exposure to family planning (FP) messages on the mass media, number of children ever born, post-secondary education, residence in a female-headed household, household wealth quintile, and urban residence. Specifically, residence in the South-West increased the likelihood of desiring no more children by 67% compared to residence in the North-Central. The data showed that the likelihood of desiring no more children increased monotonically with level of exposure to family planning messages on the mass media. Similarly, a unit increase in the number of children ever born increased the likelihood of desiring no more children by 81% while residence in a female-headed household increased the likelihood by 15% and urban residence increased the likelihood by 14% compared to rural residence. The data showed that only post-secondary education (compared to no education) made a difference for desiring no more children. Furthermore, women reporting any exposure to FP messages on the media were more likely to report desire for no additional children compared to their peers with no exposure. Finally, the data showed a graduated dose-response relationship between household wealth quintile and desire for no more children.

In contrast, the variables that were associated with reduced likelihood of desiring no additional children included Islamic religious affiliation, current employment status, current pregnancy status, wife's ignorance of husband's family size desires and residence in the North-East, North-West, South-East or South-South compared with the North-Central. The likelihood of desiring no more children was 56% lower for Muslims compared to Christian and 10% lower for women who were ignorant of their spouse's family size desire compared to those who desire same number of children as their spouse. Currently pregnant women were 13% less likely to report desire for no additional children compared to their non-pregnant peers. Similarly, current unemployed women were 10% less likely than their employed peers to report desire for no additional peers. Finally, the likelihood was 61%, 80%, 10%, and 16% lower for women resident in the North-East, North-West, South-South, and South-East, respectively, compared to their peers resident in the North-Central. Age at first marriage and polygamous marriage were not significantly associated with desire for no more children.

Undecided versus desire for more children

The data also showed that the likelihood of being undecided about fertility desires was almost five times higher in 2008 and more than three times higher in 2013 compared to 2003. A comparison of the odds ratio in 2008 and 2013 revealed that the likelihood of being undecided was comparatively less common in 2013 compared to 2008 (Chi-square=23.7; p<0.001). Exposure to mass media FP messages, religion, age at first marriage, residence in a female-headed household, decision-making power, and urban residence were not associated with the likelihood of being undecided about fertility desire. There was a positive association with discrepancies in family size desires between husband and wife, number of children-ever-born, current pregnancy status, and wealth quintile. Specifically, for every unit increase in the number of children-ever-born, the likelihood of being undecided increased by 31%. Compared to women who wanted the same number of children as their husband, the likelihood of being undecided about fertility desires was 46% and 60% higher among women who reported that their husband wanted more children and those who reported that their husband wanted fewer children, respectively. Currently pregnant women were 26% more likely to report indecision compared to their non-pregnant peers. The women from the highest wealth quintile households were 26% more likely to report indecision about their fertility desires. The variables negatively associated with the likelihood of being undecided about fertility desires were region of residence, polygamous marriage and education. Whereas the likelihood of being undecided was similar in the South-West and

Table 3: Results [relative risk ratio) of the multinomial logistic regression of demand for additional children on time and other correlates; Married women; Nigeria 2003 - 2013

Correlates	Relative Risk Ratio/[95% CI]	
	Wants No More vs. Wants More	**Undecided vs. Wants More**
Survey Year		
2003 [RC)	1.000	1.000
2008	1.278*** [1.128, 1.448]	4.832*** [3.822, 6.109]
2013	1.363*** [1.204, 1.543]	3.496*** [2.777, 4.402]
Spousal desire for children		
Both want same number [RC)	1.000	1.000
Husband wants more than wife	0.947 [0.876, 1.022]	1.464*** [1.289, 1.661]
Husband wants fewer than wife	1.075 [0.943, 1.227]	1.601*** [1.288, 1.989]
Wife does not know how many children husband wants	0.900** [0.832, 0.974]	1.852*** [1.659, 2.068]
Region of residence		
North Central [RC)	1.000	1.000
North East	0.387*** [0.329, 0.454]	0.746** [0.615, 0.906]
North West	0.199*** [0.164, 0.241]	0.611*** [0.492, 0.757]
South East	0.839* [0.727, 0.969]	0.901 [0.713, 1.138]
South South	0.804** [0.694, 0.931]	1.117 [0.929, 1.342]
South West	1.671*** [1.468, 1.902]	0.989 [0.826, 1.183]
Number of media sources FP messages heard from		
None [RC)	1.000	1.000
One	1.171*** [1.080, 1.271]	0.985 [0.854, 1.136]
Two	1.165*** [1.070, 1.269]	0.872 [0.752, 1.012]
Three	1.279*** [1.145, 1.428]	1.118 [0.926, 1.349]
Polygamous marriage [RC = monogamous marriage)	1.049 [0.980, 1.124]	0.914* [0.839, 0.996]
Number of children ever born	1.806*** [1.774, 1.838]	1.308*** [1.282, 1.334]
Education level		
None [RC)	1.000	1.000
Primary	1.041 [0.944, 1.149]	0.774*** [0.692, 0.865]
Secondary	1.002 [0.898, 1.118]	0.742*** [0.649, 0.848]
Higher	1.331*** [1.162, 1.525]	0.706* [0.574, 0.868]
Decision about own earnings		
Employed and decides on own earnings	1.000	1.000
Employed but does not decide on own earnings		
Not employed	0.943 [0.879, 1.012]	1.003 [0.899, 1.119]
	0.901** [0.841, 0.966]	1.025 [0.924, 1.137]
Age at first marriage	0.995 [0.988, 1.003]	1.005 [0.996, 1.014]
Muslim [RC = Christian)	0.445*** [0.396, 0.500]	1.123 [0.987, 1.277]
Pregnancy Status		
Not pregnant	1.000	1.000
Currently pregnant	0.872** [0.800, 0.950]	1.258*** [1.144, 1.385]
Sex of Head of Household		
Male	1.000	1.000
Female	1.164*** [1.064, 1.275]	1.114 [0.980, 1.266]

Correlates	Relative Risk Ratio/[95% CI]	
	Wants No More vs. Wants More	Undecided vs. Wants More
Household Wealth		
Lowest	1.000	1.000
Second	1.102 [0.977, 1.243)	0.900 [0.783, 1.034)
Middle	1.416*** [1.243, 1.612)	0.985 [0.840, 1.156)
Fourth	1.728*** [1.498, 1.992)	1.153 [0.964, 1.380)
Highest	2.393*** [2.043, 2.805)	1.259* [1.021, 1.554)
Urban residence [RC = Rural)	1.141** [1.037, 1.256]	0.986 [0.849, 1.145]
Pseudo-R^2	23.4%	
Number of observations	53 758	

Notes: * p<0.05; ** p<0.01; *** p<0.001. RC = reference category; CI = confidence interval

South-South as in the North-Central, the women in the North-East and North-West had a reduced likelihood of reporting indecision about fertility desires compared to their peers in the North-Central. Women in polygamous union were about 9% less likely to report indecision compared to their monogamously married peers. Finally, educated women were less likely than their uneducated to report indecision.

Socio-economic differentials in change in demand for children over time

Table 4 presents results of separate multinomial models of the relationship between demand for children and time for various socio-demographic groups. The reported models adjusted for education, religion, parity, region of residence, urban residence, desired family size of the spouses, polygamous marriage and exposure to FP information on the media, as appropriate.

Desire for no more children versus desire for more

The data showed that, for all socio-demographic groups, the likelihood of desiring no more children was significantly higher in 2013 compared to 2003. Test of equality of the parameters revealed evidence of a graduated increase in desire for no more children over time only for women with five or fewer children, those with post-primary education and those resident in the southern states. Indeed for the other groups of women, the odds ratio associated with desire for no more children was not significantly different in 2008 compared to 2013

Undecided versus desire for more children

The data consistently showed that the likelihood of reporting decisional uncertainty was significantly higher in 2013 compared to 2003. For example, the likelihood of being undecided was almost four times higher among women with six or more children and almost five times higher among women with five or fewer children in 2013 compared to 2003. Similarly, for women resident in rural areas, the likelihood of reporting indecision was about four times higher in 2013 compared to 2003. Similarly, women resident in the north were also about four times as likely to report indecision in 2013 compared to 2003. It is also pertinent to note that except for women with six or more children and those resident in the north, odds ratio associated with being undecided was significantly larger in magnitude in 2008 compared to 2013, indicating a steady decline in decisional uncertainty about fertility over time in most socio-demographic groups.

Discussion and Conclusion

This paper used multinomial logistic regression to explore change in demand for children among married women in Nigeria between 2003 and 2013. We pooled nationally representative data from the Demographic and Health Survey conducted in 2003, 2008 and 2013. The analyses looked at the likelihood of reporting desire for no more children and decisional uncertainty about fertility desires versus desire for more children. The hypothesis underlying the analyses was the following: desire to stop childbearing and uncertainty about fertility declined over time. The data partially confirmed this hypothesis .

Table 4: Results of multinomial logistic regression[1] of demand for children on time and other correlates showing effects of time for various socio-demographic groups; married women; Nigeria 2003-2013

Socio-demographic group and year (RC = 2003)	Desire no more vs. desire more	Undecided vs. desire more	N	Pseudo-R^2
Married women with six or more children				
2008	1.228* [1.041, 1.448]	4.419*** [3.334, 5.856]	15 043	15.8%
2013	1.234* [1.048, 1.453]	3.848*** [2.909, 5.089]		
Married women with five children or fewer				
2008	1.309** [1.105, 1.552]	4.947*** [3.638, 6.729]	38 665	20.2%
2013	1.457** [1.233, 1.721]	3.194*** [2.359, 4.324]		
Married women with primary education or lower				
2008	1.247** [1.077, 1.444]	4.745*** [3.665, 6.142]	37 132	21.6%
2013	1.257** [1.086, 1.454]	3.415*** [2.649, 4.400]		
Married women with post-primary education				
2008	1.363** [1.091, 1.703]	4.621*** [2.907, 7.345]	16 576	28.8%
2013	1.606*** [1.295, 1.991]	4.433*** [2.165, 5.447]		
Married women living in rural areas				
2008	1.191* [1.009, 1.404]	5.553*** [4.018, 7.676]	36 536	21.3%
2013	1.248 *[1.054, 1.476]	3.959*** [2.878, 5.445]		
Married women living in urban areas				
2008	1.459*** [1.203, 1.768]	3.724*** [2.652, 5.229]	17 172	26.1%
2013	1.616*** [1.341, 1.946]	2.843*** [1.658, 3.549]		
Married women resident in the south				
2008	1.243** [1.025, 1.508]	2.854*** 1.938, 4.201]	18 282	27.2%
2013	1.483*** [1.221, 1.802]	2.425*** [1.759, 3.589]		
Married women resident in the north				
2008	1.296* [1.093, 1.537]	5.754*** [4.321, 7.663]	35 426	18.9%
2013	1.262** [1.067, 1.494]	3.889*** [2.933, 5.157]		

[1] Each model adjusts for year of survey, education, religion, parity, region of residence, urban residence, desired family size of the spouses, polygynous marriage and exposure to FP information on the media, as appropriate.
‡ p<0.1; * p<0.05; ** p<0.01; *** p<0.001. RC = reference category; CI = confidence interval

The significant reduction in demand for children between 2003 and 2013 is consistent with recent findings that since year 2000, there has been an increase in the desire to stop childbearing (Casterline and Agyei-Mensah, 2017). There was also a general higher likelihood of uncertainty in 2013 compared to 2003. It is not clear if the lower demand for children in 2013 compared to 2003 is due to substantive changes in pronatalist attitudes, reflective of a temporary reaction to economic influences, or a combination of both factors. It is possible that the lower demand for children in 2008 and 2013 compared to 2003 is due to shifts in pronatalist attitudes fostered by increased prevalence of post-primary education as demonstrated in our descriptive results. Increased percentage of women with secondary and higher education has been shown to be associated with declining fertility trends in sub-Saharan Africa (Shapiro, 2012a, Adebowale and Palamuleni, 2014).

The stagnation in demand for children between 2008 and 2013, coupled with the finding that uncertainty was less common in 2003 compared to 2013 but more common in 2008 compared to 2013 suggest that economic influences may also be at work. There is evidence in literature that fertility preferences and desires fluctuate over time in the same women (Kodzi et al., 2010, Sennott and Yeatman, 2012). Johnson-Hanks (2005) argued that due to unstable economic environment in many SSA countries, most women take actions not necessarily in consonance with their prior intention, but merely take advantage of opportunities as they are presented. It is reasonable to argue that when economic outlook becomes more favourable, people in pronatalist settings tend to be

less motivated to limit their family size. Fluctuations in consumer price index show that inflation was generally in the double digits between 2000 and 2012 in Nigeria. Towards the end of 2013, aggressive monetary policy by the Central Bank of Nigeria has succeeded in bringing inflation to below 10% (Alexander et al., 2015, Otu et al., 2014, National Bureau of Statistics (NBS), 2014).

Consistent with evidence on the north-south disparities in fertility in Nigeria (Adebowale et al., 2016, Mberu and Reed, 2014), women in the North East and North West were among the least likely to desire no additional children. The reproductive practices among northern Nigerian women are often driven by the belief that they must continue childbearing in order to satisfy their husband and reduce his chances of marrying another woman (Izugbara et al., 2010). Furthermore, in northern Nigeria, there is widespread belief that a large family size is a religious obligation and a strategy for preserving the community; as such, contraceptive use is often perceived to be contrary to the teachings of Islam (Duze and Mohammed, 2006, Izugbara and Ezeh, 2010).

Between 2003 and 2013, the proportion of women with uncertain fertility desire increased although not monotonically so. The literature on fertility indecision in Nigeria and SSA is still emerging. Data from Britain showed that the level of uncertainty has remained consistent at about one-third of women aged 18-44 years. This is much higher than the less than one-tenth reported in this study. Given the huge demand for children in Nigeria, it is not surprising that the level of uncertainty is much lower compared to a developed country like Britain. In developed countries, fertility uncertainty is common, short-term and influenced by age, relationship status and number of living children (Bhrolch et al., 2011, Jones, 2017, McQuillan et al., 2011). Disagreement in fertility desire between a woman and her spouse is associated with uncertainty (Ibisomi, 2011). Many of these variables were also found significantly associated with uncertainty in this study.

Fluctuations in the level of uncertainty align closely with a recently proposed hypothesis for construction of fertility preference (Bhrolcháin and Beaujouan, 2015). Building on previous evidence, the authors argued that fertility preference is constructed based on prevailing situation of individual women. Although, this study is not intended as an empirical investigation of the preference construction hypothesis, the findings are keeping in tandem with many of the factual arguments amassed as building blocks.

The results in this manuscript have significant implications for programs and policy. For example, whereas literature has documented the strong link between fertility intentions and subsequent childbearing (Morgan and Rackin, 2010, Schoen et al., 1999), the relationship is by no means perfect (Abraham and Sheeran, 2003, Orbell and Sheeran, 1998, Johnson-Hanks, 2007, Miller et al., 2017). Sustained fertility decline can be achieved if women's desire to stop childbearing is effectively translated into action through uptake of contraceptives (Casterline, 2017). It is therefore important to help women who desire no more children achieve their reproductive goals through interventions that increase access to, and promote demand for modern contraceptive methods. Since contraceptive use is associated with improved child survival, it might also translate into reduction in demand for children (Cleland et al., 2012, Maïga et al., 2015). Therefore, a strengthened family planning program is likely to foster a reduction in demand for children.

Uncertain fertility desire is a major cause of unmet need for family planning (Higgins, 2017, Miller et al., 2013, Westoff and Bankole, 1995, Barden-O'Fallon and Speizer, 2010). Indecision complicates the choice of contraceptive methods (Sundstrom et al., 2017, Higgins, 2017), and has consequences for ultimate fertility decline. There is need to address decisional uncertainty by helping women understand the social and health implications of another pregnancy. Furthermore, evidence from the ideation literature suggests that a behavior change model that focuses on influencing psychosocial and normative factors associated with contraceptive use is relevant for addressing high demand for children in Nigeria (Babalola et al., 2015, Kincaid, 2000a, Kincaid, 2000b, Babalola, 2017). These interventions might also need to be extended to men given their roles in fertility decision-making.

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