Sex of preceding child and birth spacing among Nigerian ethnic groups

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Abstract

In seeking for more effective ways of fertility control and improvement of maternal and child health through birth spacing in a predominantly patrilineal society like Nigeria, this study explores how the sex of a previous child affects birth interval among ethnic groups, controlling for demographic and socioeconomic variables. The study utilized birth history data from the 2008 Nigeria Demographic and Health Survey. The findings showed that the effect of sex of prior births on the birth interval is slightly significant among the Igbo and the Southern minorities, who tend to desire to have a male child sooner if preceding births were female. Among all the ethnic groups, women who are yet to meet their ideal sex preference have a shorter birth interval than those who have. Apart from the evident sex preferences, these results suggest that Nigerian parents also undertake sex balancing among their children. There is a consistent and strong relationship between the survival of a child and subsequent birth interval, which suggest that women have a short birth interval, and hence a large family size, because they are not certain that their children would survive.

Résumé

Tout en recherchant des moyens du contrôle de fertilité et l'amélioration de la santé maternelle et infantile à travers l'espacement des naissances dans un pays qui est essentiellement patrilinéal comme le Nigéria, cette étude explore la façon dont le sexe de l'enfant précédent affecte l'intervalle des naissances chez les groupes ethniques, en contrôlant pour des variables démographiques et sociaux. L'étude s'est servie des données sur l'histoire de naissances tirées de l'Enquete Nigériane sur la Démographie et la Santé de 2008. Les résultats ont montré que l'effet du sexe des enfants précédents sur l'intervalle des naissances est significatif chez les Igbo et les minorités du sud qui ont la tendance à vouloir un enfant male plus tot si les enfants précédents était des femelles. Parmi tous les groupes ethniques, les femmes qui n'ont pas encore eu le sexe désiré ont un plus court intervalle des naissances que celles qui l'ont. A part les préférences de sexe évidentes, les résultats indiquent que les parents nigérians entreprennent également l'équilibre de sexes parmi leurs enfants.. Il y a un rapport consistent et fort entre la survie d'un enfant et l'intervalle éventuel qui suggère que les femmes ont un court intervalle des naissances et en conséquence, beaucoup d'enfants parce qu'elles ne sont pas sûres si leurs enfants vont survivre.

Key words: Ethnic group, birth order, birth spacing, sex preference, parity

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Introduction

Birth spacing, the length of the interval between births, has an important bearing on maternal and child health1. Out of the three aspects of the childbearing that influence child survival: birth spacing, maternal age and birth order, birth spacing is believed to be the most powerful factor[2]. This is because a short birth interval probably harms the older child of the pair before the younger is born since the mother may wean the other child too early because she is pregnant again. It has been estimated that if the expressed wish by women on timing or limiting the future birth could be satisfied every year, it would be possible to avoid 100,000 mothers' death and death of one out of every five babies[3].

The concern with birth spacing has acquired added importance in recent years because of its relationship with fertility; the mean duration of successive birth spacing has been related to fertility levels- the longer the spacing, the lower the fertility levels[4,5]. Consequently, several studies have also been carried out in developing countries on birth spacing and different risk factors contributing to the length of interval between two consecutive births. Socioeconomic factors such as maternal education, residence, occupation and income; and demographic factors such as maternal age at first birth, current age of mothers, survival status of previous child and maternal age at marriage, among others have been identified as factors affecting interval between births[1,5,6,7].

Proper birth spacing has also been noted as one of the strategies through which good maternal and child health can be achieved; hence the introduction of various intervening programs such as Family Planning and Safe Motherhood programs to enhance longer spacing of birth for maternal and child health. Family planning programs emphasize the use of modern contraceptives in spacing of births, although there were (and still are) some traditional methods of spacing of births, such as prolonged breastfeeding and taboos that frowned at sexual intercourse before the new baby is weaned, prior to the introduction of modern contraceptives[8,9].

In Nigeria, there are regional disparities in birth intervals among women of reproductive age; there is a seven-month difference between women in the South West, who have the longest birth interval, and those in the South East, who have the shortest birth interval (34.7 months and 27.7 months respectively)[10]. Furthermore, awareness of the use of contraceptive to space births and reduce the number of children is high, but Nigeria Demographic and Health Survey reports showed that the level of contraceptives uses among currently married women is still low; 6 percent in 1990 and 13 percent in 2003 to 15 percent in 2008. Total fertility rate is 5.7; infant and maternal mortality rates are still high and substantial proportion of children are stunted (39%) while about 20% of mothers are malnourished. Irrespective of the contraceptive method used in Nigeria, the intervals between births are still relatively short hence its harmful consequences on maternal and child health10; the median birth interval in 2008 is 31.4, an insignificant increase from 31.2 in 2003[10].

The shortcomings arising from short birth spacing may be due to the fact that the causes of suboptimal performance of the family welfare programme are multivaried and deeply embedded in the socio-cultural matrix of the society[11]. One area where societal and cultural factors influence birth spacing is the ethnic perception and value placed on the sex of a child. An individual's beliefs and attitudes on reproduction are initially acquired within ethnic and family settings. Nigerian ethnic groups are largely regional based and have been differentially impacted by the development processes. Spatial disparities in development place certain ethnic groups in disadvantageous positions with respect to modernization in general. Ethnic groups can be identified on the basis of language and similarities in social systems and cultural practices, which also result in different values placed on sex of a child. Ethnicity as a factor revealed cultural beliefs and behavioral practices that have not been adequately integrated into health intervention programs.

Among various factors noted to affect birth intervals in developing countries, the effect of sex composition of previous child has been found to vary greatly from one society to another. This is because societal norms, values and beliefs that tend to shape the preferences of individual members differ within and across countries. In societies where preference for sons is a powerful tradition, it is another motive for having large families and short spacing between births. In particular, if a

previous livebirth is a daughter, the birth interval is expected to be shorter in a bid by parents to have a son sooner. The subordination of women in some societies means that economically and socially the female child is not valued as highly as a male child [6,12]. Although, conscious preference for sons in sub-Saharan Africa countries is not as pronounced as in Asian countries, some studies in the region allude to son preference[11,13,14,15,16,17,18].

This study therefore, seeks to understand the pattern of birth spacing among ethnic groups in Nigeria and how the sex of the preceding child affects this pattern. In seeking for more effective ways of fertility control and good maternal and child health in Nigeria, it is important to see if desire for a particular sex has affected reproduction among the different ethnic groups. The study also seeks to examine the effects of demographic, socioeconomic and socio-cultural factors on birth spacing among Nigerian ethnic groups.

Methods

Data from the 2008 Nigeria Demographic and Health Survey (NDHS 2008) were used for this study. NDHS surveys are designed to collect data on marriage, fertility, family planning, reproductive health, child health, and HIV/AIDS. The 2008 NDHS is the fourth National Demographic and Health Survey in a series under the worldwide Demographic and Health Surveys Programme. The survey is a nationally representative, stratified, self -weighting probability sample of women in the reproductive ages of 15 to 49 years and consisted of the household and individual questionnaire. It has expanded scope and sample size as well as captured information on rural-urban residence, six geopolitical zones, the 36 states of the country and Federal capital territory, making the findings to be more comprehensive than the three previous surveys (1990, 1999 and 2003) in Nigeria. The total sample included 33,385 women whose birth history, household and health information was collected10. In order to correct for over and under sampling of respondents, appropriate sampling weights were applied in this analysis.

The first step in the analysis was to isolate the number and category of births considered suitable for the study. The women reported 28,647 births between 2003 and 2008. Similarly, only non-first births between 2003 and 2008 were included in the study. In essence, only multiple parity births of five years preceding the survey were considered in this analysis, giving a total of 22,752 weighted births.

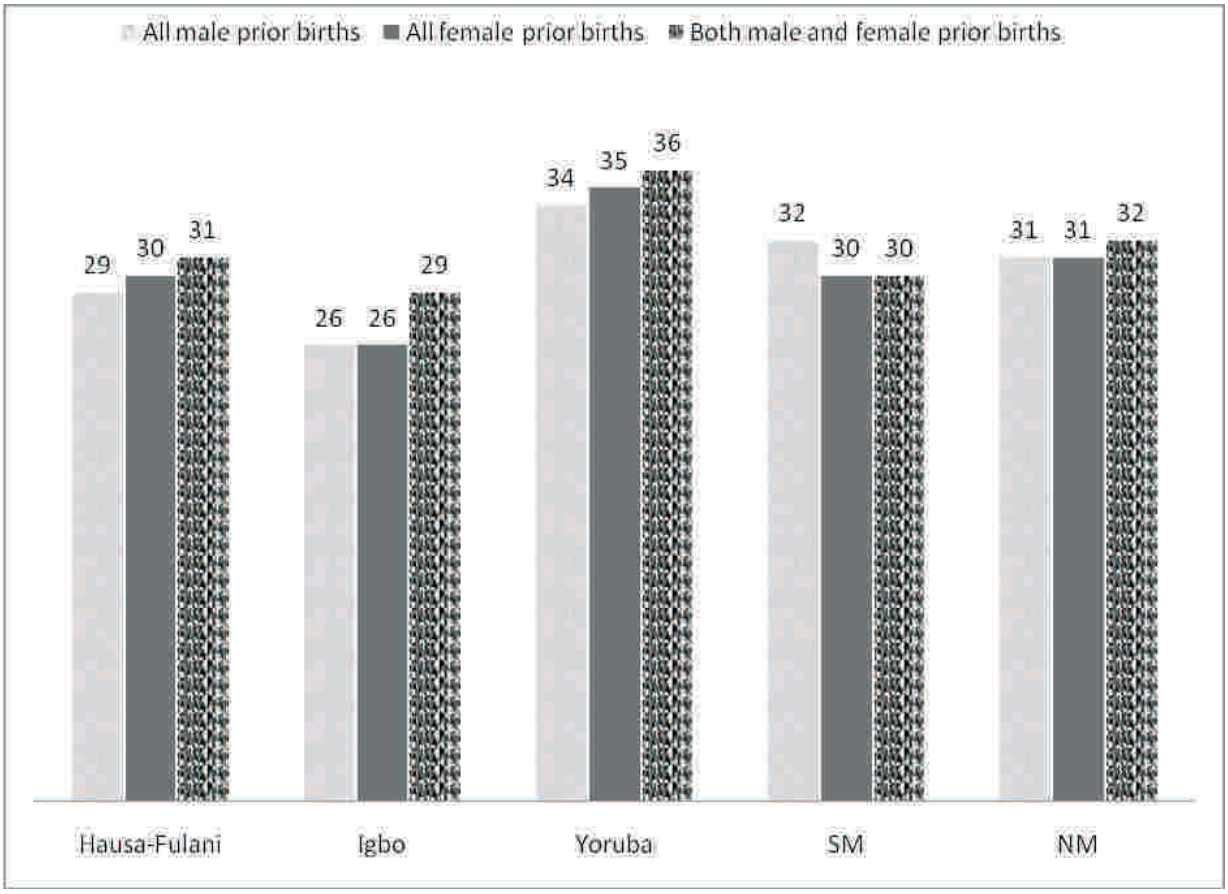
The second step was to re-categorized all ethnic groups reported in the data, which numbered more than 100. The three dominant ethnic groups in Nigeria: Hausa-Fulani in the north, the Igbo in the south-east, and Yoruba in the south-west; and two omnibus minority groups based on the geo-political zoning of the country were considered in this study. The northern-minority ethnic groups comprise some 78 ethnic groups from the northern part of Nigeria apart from the Hausa-Fulani. The Southern-minorities ethnic groups comprise all ethnic groups in the Southern part of Nigeria apart from the Igbo and Yoruba. The distribution of non-first births by ethnicity is shown on Table 1.

The patterns of birth spacing by the sex of a preceding child were explored using the median birth intervals plotted as bar graphs for comparative analysis among the ethnic groups. Further analysis showed median

Table 1: Distribution of non-first births by between 2003 and 2008 ethnicity

Ethnic groups	Number of births	Proportion
Hausa-fulani	9031	0.397
Igbo	2705	0.119
Yoruba	2920	0.128
Southern minorities	2966	0.130
Northern minorities	5131	0.226
Total Number	**22729**	**1.000**

Figure 1: Median Birth Intervals (in months) among Nigerian Ethnic Groups by sex of all prior births



birth interval and gender of all previous births, as well as the differences between the ideal sex preference and actual gender births. Consequently, logistic regression model technique was used to test the effect of sex of preceding child on birth intervals in Nigeria. The dependent variable, preceding birth intervals, was categorized into a dichotomy variable of short (less than 24 months) and long birth intervals (24 months and above).

It is hypothesized that the sex of prior births could affect the spacing of births among Nigeria ethnic groups. To test for this, several regression models were examined. The first model examines the ethnic groups and the odds of longer birth intervals. This is the baseline model and largely interpreted as the control variable. The Hausa-Fulani ethnic group is the reference category because it is the major ethnic group in the Northern part of Nigeria, a region reported in the 2008 NDHS as having poor fertility behaviour.

The second model includes the first model and sex composition of all previous births. This is aimed at explaining or reducing the variation on pattern of birth spacing among different ethnic groups in Nigeria. The value placed on child is a cultural phenomenon, which varies from one society to another. Because of the male preference that exists in predominantly patrilineal Nigeria, the reference category is male.

Demographic variables such as the current age of women, survival status of previous child, age at first marriage and parity were introduced in the third model. The current age used in this study is an indicator of cultural, social-economic and political contexts that shape the life course experiences of individual women. Prevailing socio-economic and cultural context may lead them to similar life experiences; therefore, the current age groups for this study consist of women aged 15- 19, 20 – 29, 30-39 and above 39 years. Women aged 15- 19 reflect adolescent motherhood while those of 20-29 years are in their early and mid reproductive years. These two age groups grew up in a period of more efficient contraceptives, higher enrollment in formal education

Table 2: Median Birth Intervals (in months) among Nigerian Ethnic Groups by sex of all prior births

Region	Birth order	Median of preceding birth interval		
		Male prior births	Female prior births	Both Male and Female prior births
Hausa-fulani	1st and 2nd birth		29	
			30	29
	2nd and 3rd birth	29	31	31
		30		
	3rd and 4th birth	30		
Igbo	1st and 2nd birth		26	
			25.18	26
	2nd and 3rd birth	25	26.0	29
		28.9		
	3rd and 4th birth	29		
Yoruba	1st and 2nd birth		35	
			36.22	36
	2nd and 3rd birth	34	35.56	36
		35		
	3rd and 4th birth	34		
Southern minorities	1st and 2nd birth		29	
			31.1	29
	2nd and 3rd birth	30.45	30	31
		33		
	3rd and 4th birth	34		
Northern minorities	1st and 2nd birth		31	
			30	32
	2nd and 3rd birth	30.76	31.9	32
		31		
	3rd and 4th birth	35		

and higher participation of women in the labor force, factors which are expected to affect attitudes toward value placed on child and intervals between births. The last two groups are those nearing the end of their reproductive years. Age cohort 15-19 is used as the reference category.

The survival status of previous child has been noted to have a significant association with a higher risk of subsequent births; this is because the cessation of breastfeeding, which triggers the resumption of menses and ovulation thereby exposing the mother to the risks of pregnancy more quickly than if the child had survived. Age at first marriage is important in fertility studies because of its inverse relation to the exposure to the risk of conception. Women of higher parity are also expected to have shorter birth intervals than those of lower parity, women of parity two and above are considered in this study.

Socioeconomic variables such as residence, educational level, occupation, wealth index and type of marital union were included in the fourth model. Although the 2008 NDHS reported very little difference in the birth interval between urban (31.2) and rural women (31.4), variations are expected when sex of preceeding child and birth intervals are considered because of differing values placed on children between rural and urban residents. This is expected to shed light on the differential influence of environmental, socioeconomic and cultural factors on birth intervals. Maternal education is strongly related to fertility and maternal and child health. Maternal education variable has four categories: no education,

Table 3: Median birth interval by sex preference among Nigerian ethnic groups

Ethnicity	Male preference		Female preference	
	Sex preference met	Unmet preference	Sex preference met	Unmet preference
Hausa-Fulani	31	30	31	30
Igbo	30	27	27	28
Yoruba	35	36	37	35
Southern minorities	31	30	30	30
Northern minorities	32	32	31	32
Nigeria	**32**	**31**	**31**	**31**

Table 4: Estimated odds ratio of longer birth intervals for Nigerian ethnic groups by sex of prior births

Variables	Hausa-Fulani	Igbo	Yoruba	SM	NM
Male preference					
Sex preference met	0.982	1.335*	1.009	1.152	0.917
Unmet sex preference	1.000	1.000	1.000	1.000	1.000
Female preference					
Sex preference met	0.988	0.832	0.806	1.153	0.986
Unmet sex preference	1.000	1.000	1.000	1.000	1.000
Sex of prior births					
Male (ref.)	1.000	1.000	1.000	1.000	1.000
Female	0.910	1.071	1.069	0.915	1.002
Both	1.064	1.258	0.925	1.023	1.025
Sex of preceding child					
Male	1.000	1.000	1.000	1.000	1.000
Female	1.182	1.578*	1.037	0.942	0.977

primary, secondary and higher education. The wealth quintile given in the 2008 NDHS was regrouped into low (lowest and second quintiles), middle and high (fourth and highest quintiles) to evaluate the influence of social class on birth spacing. The type of marital union is a significant factor with respect to fertility behaviour; it is grouped into monogamy and polygyny. Apart from the overall effect of these aforementioned variables on birth spacing, further analysis was carried out to see the variations among the ethnic groups. Factors affecting birth intervals were also examined for each of the ethnic groups.

Results

The Figure 1 below shows the median birth interval in months by sex of all prior births among Nigerian ethnic groups. Apart from the Southern minorities, there is higher birth interval if the prior births are both sexes than single sex in Nigeria. Irrespective of the sex of prior births, women of Yoruba ethnic groups have significant higher birth intervals than all the other ethnic groups; the spacing between births if the prior child is male or female is 34 months and 35 months respectively.

The Hausa-Fulani has a similar pattern as the Yoruba, though the latter has higher median birth intervals; mothers in the two groups are likely to have a longer birth interval if their prior births are females. On the contrary, there is no difference in the median birth interval for the Igbo and Northern minorities regardless of whether the prior births are all males or all females.

Further breakdown of preceding birth intervals by order of births in Table 2 shows that the Yoruba, Igbo and northern minorities, have longer birth intervals when the sex of 1st child is female than when it is

male. Conversely, the southern-minorities ethnic groups have shorter birth intervals when the sex of 1st child is female than male, while there is no difference in the birth interval if prior sex is male or female among the Hausa-Fulani.

For the third and fourth birth order, birth intervals are shorter for the Igbo and the Northern minorities when prior births are females. Conversely, among the Yoruba, spacing is longer when the prior births are female than when it is male. Among the Southern minorities, spacing is shorter when the prior births are of both sexes at the third and fourth birth order respectively. The Hausa-Fulani demonstrated a different pattern for the third and fourth birth orders; the preceding birth intervals are similar in male and female at the third birth order while the birth interval is shorter at the fourth birth order if all prior births are males.

The differences between the reported ideal number of boys and girls and actual sex of prior births were further examined by creating a new variable called 'sex preference need'. The sex preference need is met if the prior births have the mother's ideal number of boys and girls, while it is not met if it is otherwise. The median birth interval by mother's sex preference need among the Nigerian ethnic group is shown in Table 3.

Women who have met their sex preference for male children tend to have longer birth intervals among the Hausa-Fulani, Igbo, and the Southern minorities. Those who have achieved their preferred number of female children tend to have longer birth interval among the Hausa-Fulani and the Yoruba. The pattern of the birth interval is the same among the Hausa-Fulani, Southern minorities and Northern minorities for both male and female unmet sex preference. Although the Igbo have a lower birth interval than other groups, the spacing between births if the mother has not yet given birth to a male child is lower when compared to the need for a female child. Among the Yoruba the preceding birth interval is shorter if the unmet sex preference is female than when it is male.

The odd ratio of a longer birth interval for Nigerian ethnic groups by sex of prior births in Table 4 revealed a similar pattern as the aforementioned descriptive. There is a distinct effect of preference for male child on birth spacing among the Igbo. On factors affecting birth spacing among Nigerian ethnic groups, estimated odd ratio of longer birth intervals for Nigerian is shown in Table 5. The result from the multivariate model showed that ethnic groupings, current age of mother at the time of the survey, the survival status of preceding child, age at first marriage, parity, wealth index and type of marital union are significantly associated with birth spacing among Nigerian women. However, sex of preceding child, residence, place of work and educational level did not show any significant relationship with birth spacing in Nigeria.

The ethnicity variable is significant, particularly among the Yoruba, Igbo and Northern minorities. The Southern Minorities groups did not show any significant difference from the reference category. Although there are disparities among the ethnic groups in relation to the birth interval, sex of prior births have significant effect on birth spacing among Nigerian ethnic groups.

All the demographic variables, current age of mothers, the survival status of preceding child, age at first marriage and parity, introduced in the third model are significant. There is a slight variation in ethnic birth interval disparities in the third model, the odds of a longer birth interval decreased for Yoruba and Igbo significantly when compared to Hausa-Fulani (1.585 and 0.678 respectively). Women above age 30 have significantly longer birth intervals than women of lower age cohorts. Unlike current age of mothers at the time of the survey, age at first marriage shows a different pattern; older women of age 30 and above have the shortest birth interval. The result in model 3 confirms previous studies that have demonstrated that women who marry at older ages, 30 and above, tend to have shorter birth intervals. This is probably because of a shorter period of fecundability consequent upon the need to achieve the desired family size. Women of higher parity have shorter spacing between births than those of lower parity as shown in Model 3 and 4.

The inclusion of socioeconomic variables in model 4 showed that while educational level, residence and place of work have no significant effects on birth spacing, wealth index and type of marital union are slightly significant. Overall, the demographic,

Table 5: Estimated odds ratio of longer birth intervals in Nigeria

Variables	Model 1	Model 2	Model 3	Model 4
Ethnic groups				
Hausa-Fulani (ref.)	1.000	1.000	1.000	1.000
Igbo	0.663**	0.674**	0.676**	0.715**
Yoruba	2.021**	2.066**	1.832**	1.901**
Southern-minorities	1.028	1.037	1.028	1.035
Northern-minorities	1.164**	1.168**	1.165**	1.156*
Male preference				
Preference met		1.000	1.000	1.000
Unmet reference (ref.)		1.043	1.005	1.015
Female preference				
Preference met		1.000	1.000	1.000
Unmet preference (ref.)		0.941	0.940	0.946
Sex of prior births				
Male (ref.)		1.000	1.000	1.000
Female		1.090	1.088	1.087
Both		1.157*	1.042	1.038
Sex of preceding child				
Male (ref.)		1.000	1.000	1.000
Female		0.971	0.953	0.955
Current age				
15-19 (ref.)			1.000	1.000
20-29			1.761**	1.794**
30-35			3.473**	3.550**
above 35			6.596**	6.659**
Age at first marriage				
below 20 (ref.)			1.000	1.000
20-24			0.740**	0.765**
25-29			0.487**	0.521**
30 and above			0.491**	0.530**
Survival status of previous child				
Dead (ref.)			1.000	1.000
Alive			2.748**	2.796**
Parity				
2-3			1.913**	2.014**
4-6			1.627**	1.673**
7 and above (ref.)			1.000	1.000
Residence				
Urban				0.916
Rural (ref.)				1.000
Highest e ducational level				
No education (ref.)				1.000
Primary				1.091
Secondary				0.939
Higher				0.846
Wealth Index				
Low (ref.)				1.000
Middle				1.061*
High				1.000
Type of marital union				
Monogamy				0.915
Polygyny (ref.)				1.000

** - Significant at 0.01 level * – Significant at 0.05 level

socioeconomic and socio-cultural variables affect the odds of longer birth interval among the ethnic groups. These variables tend to lower the interval between births among Nigerian ethnic groups as shown in model 4, when compared with the reference category. For instance, the percentage change in risk in timing of subsequent births among the Yoruba decreased by 6% between the values in model 1, where ethnicity alone is considered and model 4, where all other variables were included.

Discussion

The finding of a significantly higher birth interval among the Yoruba is not surprising, as this ethnic group traditionally has been known to observe exceptionally high birth interval achieved through long period of lactation and postpartum abstinence[20]. The Yoruba, Igbo and northern minorities have longer birth intervals when the sex of 1st child is female than when it is male. Conversely, the southern-minorities ethnic groups have shorter birth intervals when the sex of 1st child is female, an indication of a strong son preference. However, the Igbo and the Southern minorities have shorter birth intervals if the second and third birth were female; in other words, they desire to have a male child sooner if preceding births were female. This finding is in consonance with the expectation in a patrilineal society where the birth of a female child would engender a more urgent desire to have another child sooner with the hope that it would be a son.

Furthermore, women who have met their preference for male children tend to have longer birth intervals among the Hausa-Fulani, Igbo, and the Southern minorities. Those who have achieved their preferred number of female children also tend to have longer birth interval among the Hausa-Fulani and the Yoruba. Apart from the evident sex preferences, these results suggest that Nigerian parents also undertake sex balancing among their children. Although the Igbo have a lower birth interval than other groups, the spacing between births if the mother has not yet given birth to a male child is lower when compared to the need for a female child; among the Yoruba the preceding birth interval is shorter if the unmet sex preference is female than when it is male. A tentative inference from these findings is that of son preference among the Igbo and daughter preference among the Yoruba. However, sex preference and sex of previous birth are not significantly related to birth interval in the multivariate analyses, an indication perhaps of spurious results in the bivariate analysis.

Among the socio-demographic variables, current age of women has a significant direct relationship with birth interval, whereas age at first marriage has inverse relations; these are rather intuitive in a pronatalist society as Nigeria 1. When the previous child is alive, birth interval is significantly longer than when the previous child is dead. This is expected given that parents tend to replace dead children by having their subsequent birth sooner, and hence shorter birth interval,[5,6,7]. The overall picture in this study is that parity is inversely related to birth interval, indicating that women of high parity have their births within a shorter birth interval than those of low parity[4,5]. Living in a rural or an urban area did not make any significant difference on spacing of births, neither did educational level, although those with higher education tend to have shorter birth interval. Women's wealth index and type of marriage do not have significant effect on birth interval.

Disaggregating the analysis by ethnicity in the multivariate analysis reveals some similarities and dissimilarities among the five ethnic groupings. Generally, sex preference need and sex of prior births have a weak non-consistent relationship with birth interval among the ethnic groups. But the sex of the preceding child shows in four of the five ethnicity regressions that having a preceding female child shortens the birth interval, although the relationship is not significant. Among all ethnic groups, older women are more likely to have longer birth interval and late-marrying women are more likely to have shorter birth intervals. These results are consistent and in the expected direction[1,5,6,7].. The survival status of the previous child is a significant predictor of birth interval, in the direction of longer birth interval where the previous survived relative to where it died. This means that when a child dies the parents would attempt to have another child sooner, thereby having a shorter birth interval. The results show that lower parity women are more likely to have longer birth interval among all the ethnic groups; higher parity women are self selected, and desiring a high family size invariably results in a shorter birth interval. The socio-

demographic factors have little effect on birth spacing across the ethnic groups, except the southern minorities among whom educational attainment, wealth index and type of marriage are significantly related with birth spacing.

Conclusion

The study addresses the question of how the sex of a previous child affects the subsequent birth interval among five ethnic groupings in Nigeria. To a certain extent, this relationship is found. For instance, the Igbo and the Southern minorities have shorter birth intervals if the second and third births were daughters; in other words, they desire to have a male child sooner if preceding births were female. This finding is consistent with the expectation in a predominantly patrilineal society where the birth of a female child would engender a more urgent desire to have another child sooner with the hope that it would be a son. Furthermore, women who have met their preference for male children tend to have longer birth intervals among the Hausa-Fulani, Igbo, and the Southern minorities. Apart from the evident sex preferences, these results suggest that Nigerian parents also undertake sex balancing among their children. A consistent and strong relationship is that between the survival of a child and subsequent birth interval, which suggest that reduction of infant and child mortality would lead to longer birth interval among Nigerian women. It also suggests that women have short birth interval, and hence a large family size, because they are not certain that their children would survive.

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