

What Influences Modern Contraceptive Utilisation Among Single Mothers in Nigeria? Evidence from Pooled Cross-Sectional Surveys

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Abstract

Background: Existing studies in Nigeria and elsewhere have examined the associated factors of modern contraceptive utilisation among different segments of women such as adolescents, never married and women of advanced reproductive age. However, the associated factors of modern contraceptive utilisation among single mothers have been rarely explored. Though, some studies have examined the health and socio-economic conditions of single mothers but the associated factors of modern contraceptive uptake among them were largely ignored. This study therefore examines factors influencing modern contraceptive utilisation among single mothers in Nigeria.

Methods: Data were extracted from four consecutive Nigeria Demographic and Health Surveys (NDHSs) implemented between 2003 and 2018. A weighted sample size of 7,215 single mothers was analysed. The outcome variable was current modern contraceptive utilisation. The explanatory variables are sets of selected socio-economic and demographic characteristics such as education, household wealth quintile, place of residence, age, parity and fertility desire. Data analysis was carried out using Stata version 14. Two multivariable logistic regression models were fitted in the study.

Results: Findings reveal 11.7% current utilisation of modern contraceptives among single mothers. Improvements in educational attainment and household wealth quintile increases the odds of modern contraceptive use, Muslim single mothers had lower odds of modern contraceptive use (AOR=0.527, $p<0.05$; 95% CI: 0.366-0.759) and employed single mothers had higher odds of modern contraceptive use (AOR=1.449, $p<0.05$; 95% CI: 1.123-1.867). Findings further reveal that single mothers who had moderate exposure to the mass media (AOR=1.455, $p<0.05$; 95% CI: 1.049-1.807), single mothers who had high exposure to the mass media (AOR=1.442, $p<0.05$; 95% CI: 0.690-1.394) and younger single mothers (AOR=1.377, $p<0.05$; 95% CI: 1.049-1.807) had higher likelihood of modern contraceptive use.

Conclusion: Modern contraceptive utilisation is low among single mothers in Nigeria. A number of socio-demographic characteristics of single mothers exert significant influence on modern contraceptive use. The contraceptive need of women involved in single motherhood may be different from the needs of other groups of women. The development of a special strategy targeting single mothers is thus imperative in the country.

Plain English Summary

Existing studies in Nigeria and elsewhere have examined the associated factors of modern contraceptive utilisation among different segments of women such as adolescents, never married and women of advanced reproductive age. However, the associated factors of modern contraceptive utilisation among single mothers have been rarely explored. Though, some studies have examined the health and socio-economic conditions of single mothers but the associated factors of modern contraceptive uptake among them were largely ignored. This study therefore examines factors influencing modern contraceptive utilisation among single mothers in Nigeria. Data were extracted from four consecutive

Nigeria Demographic and Health Surveys. The outcome variable was current modern contraceptive utilisation. The explanatory variables are sets of selected socio-economic and demographic characteristics such as education, household wealth index, employment status, age, parity and fertility desire. Findings reveal slightly more than one-tenth prevalence of current utilisation of modern contraceptives among single mothers. Improvements in educational attainment and household wealth quintile increases the likelihood of modern contraceptive use, Muslim single mothers were less likely to use modern contraceptives. Also, employed single mothers were more likely to use modern contraceptives. Findings further reveal that single mothers who had moderate exposure to the mass media, single mothers who had high exposure to the mass media and younger single mothers were more likely to use modern contraceptives. The study concluded that modern contraceptive utilisation is low among single mothers in Nigeria and recommended the development of a special strategy targeting single mothers in the country.

Background

Modern contraceptives are health information, counselling, services and devices used for spacing or limiting pregnancies, preventing unintended pregnancies, and reducing incidences of sexually transmitted infections [1] Evidence abounds that modern contraceptive use particularly in high fertility countries has the potential not only to reduce maternal deaths, hunger and poverty but also to improve women's autonomy, access to education and enhanced socio-economic participation [2–3]. In addition, modern contraceptives are beneficial to all women and men of reproductive age irrespective of marital or social condition. This suggests that global and national initiatives to boost modern contraceptive use across the world should target all categories of women and men. But evidence indicate that single mothers (a woman who has a dependent child or dependent children but not currently married either by choice or involuntary) are rarely focused in family planning programming [4–5] in spite of sustained global efforts to meet worldwide demand for family planning with modern contraceptive methods.

Though, single motherhood is increasingly rising across the world [6–10] as an evolving family type but in many developing countries including Nigeria, single motherhood is rarely accepted in the community. Many single mothers experience discrimination, rejection and blackmail from members of their community [11–13] and children nurtured by single mothers are perceived to be poor trained in family values [14] in addition to having elevated risks of poor health outcomes [15–17]. These stigmas may encourage single mothers to desire avoiding or delaying another pregnancy which make them a key segment for contraceptive demand and use in the community. However, single mothers rarely feature in family planning programming in Nigeria. Most population and reproductive health policies and strategies in the country such as the National Population Policy for Sustainable Development, Family Planning Blue Print and 2017 National Reproductive Health Policy [18–20] rarely pay attention to generating more demand for modern contraceptives among single mothers. This necessitates further investigation of the prevalence and associated factors of contraceptive use among single mothers in the country.

Existing studies in Nigeria and elsewhere have examined the associated factors of modern contraceptive utilisation among different segments of women such as adolescents and young people [21–23], never married women [24–26], women of advanced reproductive age [27–30]. Other studies have focused the general population of childbearing women [31–34]. However, the associated factors of modern contraceptive utilisation among single mothers have been rarely explored. Though, some studies have examined the health and socio-economic conditions of single mothers [35–36, 15, 37] but the associated factors of modern contraceptive uptake are largely ignored in the studies. The objective of this study was thus to examine the factors influencing modern contraceptive utilisation among single mothers in Nigeria. This is important because single mothers like other groups of women are likely to experience unintended pregnancies, sexually transmitted diseases and unsafe abortion if they do not use modern contraceptives or if they use it inconsistently. In addition, the rising profile of single motherhood across the world [6–10] requires that more attention be paid to the determinants of modern contraceptive use among single mothers. Findings from the study may provide inputs for strengthening existing population policy and reproductive health strategies in the aspects of scaling up modern contraceptive demand and use among important segments of women in the society. The study was guided by the research question: what influences modern contraceptive utilisation among single mothers in Nigeria?

Methods

Data

Data were extracted from four consecutive Nigeria Demographic and Health Surveys (NDHSs) which were implemented between 2003 and 2018. The NDHS is a subset of Demographic and Health Survey (DHS) programme executed nationally in more than 90 countries with more than 300 surveys successfully conducted so far [38]. The quality of data emanating from the DHS Programme has been widely adjudged to be credible and of high quality [39–41]. The National Population Commission (NPC) is responsible for implementing the DHS programme in Nigeria while the financial and technical aspects are supported by ICF International through major international development partners [42]. The DHS programme seeks to make available reliable and accurate information on countries' demographic and health characteristics, which are mostly used by policymakers to assist countries to monitor improvement in health and family planning programme [42]. The NDHS as part of the DHS programmes provide reliable national information on fertility, nutrition, marriage, family planning, mortality, HIV/AIDS, female genital mutilation and anthropometrics information in all the six geo-political zones and the 36 states of Nigeria including the Federal Capital Territory [42].

The sampling procedures in the four rounds of the NDHS were based on the same methodology that employed a multi-stage sampling process. The 36 administrative units of the country and the Federal Capital Territory were stratified into urban and rural areas from which some urban and rural areas were randomly selected. In the selected urban and rural areas, localities used as Enumeration Areas (EAs) in the population census were randomly selected and used as the primary sampling unit (cluster). In the selected clusters, households were listed and selected randomly for the surveys. Eligible men and women

were then randomly selected in the households but different numbers of men and women were covered in each round of the surveys. Further details of the survey methodology of the NDHSs have been published elsewhere [43–45] In all the four rounds of the NDHS covered in the study, the numbers of single mothers were pooled for analysis. The inclusion criteria were being sexually active, never married, separated or divorced with at least one living child. The resulting sample size was thus a weighted sample of 7,215 women.

Data Pooling

Based on the inclusion criteria, the sample size of single mothers was relatively small across the four datasets. As a result, the four consecutive NDHS (2003–2018) were pooled in order to increase the observational cases, statistical power and representativeness of the results [46]. This pooled data could increase the ability of weak but scientifically important variables to predict the response variable [47]. This method has been extensively used by researchers to investigate rare issues affecting sub-grouped of population which might be practically difficult in individual data or studies [48–51]. The demerit attached to this approach is the difference in the sample size of each dataset which was technically addressed by applying the weighting factors with unique primary sampling unit [52–53]. Also, the fear of heterogeneity of the datasets and possibility of yielding spurious results were eliminated by the similarities of the datasets in terms of variable measurement, context, characteristics of respondents, sampling design, procedures and implementation and objectives [54–55].

Research Variables

The outcome variable was current modern contraceptive utilisation with two possible responses of yes or no. Single mothers who currently use any modern contraceptive were grouped as 'yes' and coded '1' while those who are not currently using a modern method were grouped as 'no' and coded '0'. The explanatory variables are sets of selected socio-economic and demographic characteristics. The socio-economic characteristics are maternal education (none, primary, secondary and higher), household wealth quintile (poorest, poorer, middle, richer and richest), religious affiliation (Christianity, Islam and tradition/others), employment status (employed or unemployed), place of residence (urban or rural), geographic region (northern or southern) and exposure to mass media (low, moderate and high). The three geo-political zones in the southern parts of the country, namely, southeast, south-south and southwest zones are combined as southern region while the zones in the northern parts of the country, namely, northcentral, northeast and northwest zones are combined as the northern region. Exposure to mass media was generated from three variables, namely, frequency of reading newspaper, listening to radio and watching television. Single mothers who do not access these outlets or accessed the outlets less than once a week were grouped as low exposure. Those who accessed the outlets at least once a week were grouped as moderate exposure. Other single mothers who accessed the outlets almost every day were grouped as high exposure.

The demographic characteristics are age group (15–24, 25–34 and 35–49 years), age at sexual debut (less than 18 years or 18 or older), parity (one child, two-four children, and five or more children) fertility desire (wanted more children or wanted no more), and child living arrangement (lives with mother or lives elsewhere). These variables are selected based on their significance in previous studies [33–34, 56–60]. The control variables are nature of singlehood (premarital or post marital singlehood), sexual activity (active or inactive) and most recent sexual partner (boy/man friend, commercial worker and casual friends).

Data Analysis

Data analysis was carried out using Stata version 14 [61]. Univariate analysis was carried out to assess the prevalence and use of modern contraceptives and to describe the sample characteristics. At the bivariate level, the relationship between each of the explanatory variables and the outcome variable was examined using the Unadjusted Odds Ratio (UOR) of binary logistic regression. Any variable that reveal no statistical significance at $p < 0.025$ was excluded from further analysis. The multivariable logistic regression analysis was used to examine the factors influencing the outcome variable using the Adjusted Odds Ratio (AOR) with 95% confidence interval. Statistical significance was set at $p < 0.05$.

Results

Descriptive Results

Table 1 presents the socio-demographic characteristics of the respondents. More than one-fifth (23.5%) of the single mothers had no education while more than a quarter (27.2%) attained primary education. Slightly more than two-fifths (41.0%) of the single mothers attained secondary education while less than one-tenth (8.3%) of them attained higher education. The distribution of single mothers by household wealth quartile shows that single mothers who were in the middle (26.3%) and richer (25.9) wealth categories constituted more than half of the distribution. Single mothers who are in the poorest (11.0%) and poorer (18.1%) wealth categories were less than a quarter of the distribution while 18.7% of the single mothers were in the richest household wealth category. Majority of the single mothers were Christian (71.2%). The majority of the respondents (79.9%) were employed. Most of the single mothers resided in rural areas (53.2%) compared to those who resided in urban areas (46.8%). The result shows that there were more single mothers in the southern region (62.0%) than in the northern region of the country (38.0%). The majority of the respondents (62.7%) had moderate exposure to mass media but slightly more than a quarter of the women (27.1%) had low exposure to mass media. Half of the respondents (50.7%) were aged 35-49 years. Nearly half of the respondents had their first sex before age 18. More than one third (33.8%) of the respondents had at least a child while 41.7% had two-four children. Nearly half of the respondents wanted more children (48.0%) while majority of the respondents (71.8%) had at least a child living with them. Most of the respondents (72%) were post marital single mothers while 28% were premarital single mothers. Though, all the single mothers included were sexually active but 17.9% were sexually active in the last one month preceding the survey. Slightly more than half of the

respondents (54.2%) had casual friends as their most recent sexual partner. The prevalence of modern contraceptive use among the single mothers was 11.7%.

Bivariate Results

Table 2 present the cross tabulation and multivariable results. Education and modern contraceptive use are significantly positively related. As education improves, the prevalence of modern contraceptive use increased consistently. For example while single mothers who attained primary education had 9.9% prevalence of contraceptive use, single mothers who attained higher education had 16.4% prevalence of modern contraceptive use. Similarly, household wealth quartile was positively associated with modern contraceptive use. For instance, prevalence of contraceptive use was 10.5% among single mothers in middle wealth group compared to 17.6% among single mothers in richest wealth group. Religion and modern contraceptive use revealed significant association with lower odds of contraceptive use among Muslim single mothers compared to Christians single mothers (UOR=0.307, $p<0.01$; 95% CI: 0.224–0.421). Employment status and modern contraceptive use are significantly positively related with higher use of modern contraceptive among employed single mothers compared to the unemployed (12.6% vs. 8.6%). Place of residence and modern contraceptive use are negatively related with lower odds of modern contraceptive use among single mothers who resided in rural areas (UOR=0.776, $p<0.05$; 95% CI: 0.639–0.943). The prevalence of modern contraceptive use was 7.6% among northern single mothers compared to 14.3% prevalence among southern single mothers indicating a significant positive relationship between geographic region and modern contraceptive use. Exposure to mass media and modern contraceptive use reveal significant positive relationship. The odds of modern contraceptive use are higher among single mothers who had moderate exposure to mass media (UOR=2.422, $p<0.01$; 95% CI: 1.927–3.044) and among single mothers who had high exposure to mass media (UOR=2.820, $p<0.01$; 95% CI: 2.040–3.899).

The relationship between age group and modern contraceptive use had a mixed relationship with modern contraceptive use. The relationship was positive at lower age group but negative at the upper age group. For instance, while single mothers aged 25-35 had higher odds of modern contraceptive use (UOR=1.542, $p<0.01$; 95% CI: 1.232–1.931), single mothers aged 35-49 had lower odds of modern contraceptive use (UOR=2.820, $p<0.01$; 95% CI: 2.040–3.899). Age at sexual debut and modern contraceptive use reveals significant negative association. The prevalence of modern contraceptive use was 13.6% among single mothers who had first sex before reaching age 18 compared to 10.1% among single mothers who had first sex at age 18 or older ages. Parity and modern contraceptive use are negatively associated. As parity increases prevalence of modern contraceptive use tends to reduce. Likewise, fertility desire and modern contraceptive use are negatively related with lower odds of modern contraceptive use among single mothers who not desire additional children (UOR=0.558, $p<0.01$; 95% CI: 0.468–0.665). The relationship between child living arrangement and modern contraceptive use was significantly positive with higher odds of modern contraceptive use among single mothers whose children live elsewhere (UOR=1.280, $p<0.01$; 95% CI: 1.065–1.537).

Multivariate Results

The multivariate result (Table 2) shows that more socioeconomic characteristics of single mothers had significant effect on modern contraceptive use compared to the demographic characteristics that reveals statistical significance. As education improved, the likelihood of modern contraceptive use increased consistently. For instance single mothers who attained secondary education were more than twice more likely to use modern contraceptives compared to uneducated single mothers (AOR=2.254, $p<0.01$; 95% CI: 1.431–3.551). With the exclusion of poorer wealth category, the odds of modern contraceptive use increased consistently as household wealth improved. For instance single mothers in richest wealth category were more than twice more likely to use modern contraceptives compared to single mothers in poorest wealth category (AOR=2.374, $p<0.01$; 95% CI: 1.446–3.897). Muslim single mothers were 47.3% less likely to use modern contraceptive compared to Christian single mothers (AOR= 0.527, $p<0.05$; 95% CI: 0.366–0.759). Employed single mothers were 44.9% more likely to use modern contraceptives compared to unemployed single mothers (AOR=1.449, $p<0.05$; 95% CI: 1.123–1.867). Exposure to mass media had positive effect on modern contraceptive use. While single mothers who had moderate exposure to mass media were 45.5% (AOR=1.455, $p<0.05$; 95% CI: 1.049–1.807) more likely to use modern contraceptives, single mother who had high exposure to mass media were 44.2% (AOR=1.442, $p<0.05$; 95% CI: 0.690–1.394) more likely to use modern contraceptive compared to single mothers who had low exposure. Single mothers in the 25-34 age group were 37.7% more likely to use contraceptive compared to younger single mothers (AOR=1.377, $p<0.05$; 95% CI: 1.049–1.807). Two of the control variables reveal significant effect on the odds of modern contraceptive use. Single mothers who are recently sexually inactive and single mothers whose most recent sexual partners were causal friends had lower odds of modern contraceptive use.

Discussion

This study investigated the factors influencing modern contraceptive utilisation among single mothers. The study differs from existing studies that focused on other segments of childbearing women such as adolescents [21-23], never married women [24-26] and women of advanced reproductive age [27-30] by focusing on single mothers. This group of women has received little attention in family planning programming in Nigeria. The study therefore attempts to bring to the fore of family planning programming in Nigeria, the case of single mothers. Single mothers in many parts of the country are victims of discrimination, rejection and blackmail in the community [11-13]. Their children also face higher risks of adverse health outcomes in the community [14-17]. This peculiar condition of single mothers may create more demand for modern contraceptive use to avoid repeated pregnancy that may aggravate the extent of the stigmas experience in the community. Two key findings emerged from the study.

Firstly, the study reveals 11.7% prevalence of modern contraceptive use among single mothers in Nigeria. This level of utilisation is rather low and further underscores poor contraceptive prevalence rate already observed in previous studies in the country [22, 24-25, 27, 29, 32]. It also point to the need to

reposition the existing Family Planning Blue Print in Nigeria [19] through increasing the tempo of family planning demand generation among special groups of women such as single mothers. The Family Planning Blue Print already noted that the economic and health benefits of spacing pregnancies or limiting child birth is not well appreciated by families and providers which resulted into low contraceptive use in the country. This challenge may be addressed by two measures. One, it is important to recognise that single motherhood not only represents an unconventional family structure in the community but is also increasing in the community [6]. The peculiar contraceptive need of this group of women may thus be different from the needs of other women. This has made the development of a special strategy targeting single mothers in Nigerian communities imperative. Two, family planning service delivery points in the community such as community health extension workers (CHEWs) and proprietary patent medicine vendors (PPMVs) should be trained to maintain contacts with single mothers patronising them for various health needs in the community. This will afford the providers the unique opportunity of providing needy single mothers with more contraceptive information, counselling and services particularly those relating to long term methods such as injectables and long-acting reversible contraceptives (LARCs).

Secondly, the socio-demographic characteristics of single mothers such as education, household wealth, religion, employment and mass media exposure are key drivers of modern contraceptive utilisation. As evident in the study, modern contraceptive use increased with improvement in educational level of single mothers. This finding is not only consistent with in existing studies [29-30] but also suggests that the role of educational attainment in boosting contraceptive use may not differ among single mothers and other groups of women in the country. Thus, it is important that population and health policies and programmes in the country continue to seek means of expanding women's access to improve educational opportunities. However, public health education programme should be designed for uneducated single mothers to ensure they are not disadvantaged. Such programme could be spread using the mass media outlets since most single mothers either had moderate or high access to the mass media, and should target younger single mothers who are found to have higher odds of contraceptive use in the study. The programme should also stress the dangers of unprotected intercourse with casual friends since this not only elevates the risk of unintended pregnancy but also elevate the risk of infection with sexually transmitted diseases. This aspect is important because the study observed that more than half of the single mothers had sexual contacts with casual friends. Also, the study reveal that modern contraceptive use increase with improvements in single mothers' household wealth quintile and employment in agreement with finding in previous studies [56-60] which provides support for the women empowerment strategies of the current national population policy [18]. It is expected that as women's economic power improves, their say in household decision-making may improve and more women may be able to access methods that are not covered by the free user fee initiative in public health facilities in the country.

Strength and Limitations

This study provided information on the drivers of modern contraceptive use which has been largely ignored in several existing studies. The precision of the inferences made in the study is greatly enhanced

by the use of the NDHS data which is not only potentially verifiable but is also based on internationally credible methodology. However, the study has some limitations. One, the usage of the term ‘factors influencing’ modern contraceptive use in the study do not necessarily mean the ‘cause’ of modern contraceptive use. The use is intended to connote the ‘associated factors’ of modern contraceptive use since the study was based on a cross-sectional data. Two, the associated factors examined in the study are selected among several other associated factors identified in previous studies. Other studies may examine other sets of variables that may change the pattern of result in the current study. Three, the responses analysed in the study are self-reported. It is not impossible that some of the responses may not reflect the true situation of single mothers covered in the study. We however, believed that the sound methodology of the DHS programme has greatly reduced respondents’ bias during data collection.

Conclusion

This study examined factors influencing modern contraceptive utilisation among single mothers in Nigeria. Data was pooled from four consecutive rounds of the NDHS due to small proportion of single mothers in each round of the NDHS. The study revealed low prevalence of modern contraceptive use among the studied women. The key drivers of modern contraceptive use among single mothers are education, household wealth, media exposure, religion, age and employment. Additional family planning strategy targeting single mothers in the country should be designed for implementation in the country.

Abbreviations

NDHS	Nigeria Demographic and Health Survey
DHS	Demographic and Health Survey
USAID	United States Agency for International Development
NPC	National Population Commission
FMoH	Federal Ministry of Health

Declarations

Ethical approval

In line with the DHS programme, each round of the NDHS was first approved in the United States by the International Review Board of ICF International and also approved in Nigeria by the National Health Research Ethics Committee (NHREC). Participants in the surveys provided verbal consent as a condition for commencement of interview. The datasets were formally requested and authorised. The datasets are available via <https://dhsprogram.com/data/>.

Ethics approval and consent to participate

Each round of the NDHS was first approved in the United States by the International Review Board of ICF International and in Nigeria by the National Health Research Ethics Committee (NHREC). All participants gave verbal consent to participate in the study.

Consent to publish

Not Applicable

Availability of data and materials

The analysed datasets are available via <https://dhsprogram.com/data/>.

Competing Interests

The authors declare no competing interests.

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Not Applicable

Authors' contributions

BBI developed the concept which was modified by BLS. All authors took part in literature review, data analysis and discussion of findings. All authors read through and approved the submitted version of the manuscript.

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Tables

Table 1
Percentage distribution of respondents by socio-economic and demographic characteristics

Characteristic	Frequency (n = 7,215)	Percentage (%)	Characteristic	Frequency (n = 7215)	Percentage (%)
Education			Age at sexual debut		
None	1,697	23.5	Less than 18 years	3,393	47.0
Primary	1,965	27.2	18 years or older	3,822	53.0
Secondary	2,954	41.0	Parity		
Higher	599	8.3	1 child	2,441	33.8
Household wealth quintile			2–4 children	3,006	41.7
Poorest	796	11.0	5 or more children	1,768	24.5
Poorer	1,303	18.1	Desire for more children		
Middle	1,895	26.3	Wanted more	3,467	48.0
Richer	1,872	25.9	Wanted no more	3,748	52.0
Richest	1,349	18.7	Child living arrangement		
Religion			Lives with mother	5,183	71.8
Christianity	5,139	71.2	Lives elsewhere	2,031	28.2
Islam	1,820	25.2	Nature of singlehood		
Traditional	256	3.6	Premarital	2,017	28.0
Employment status			Post marital	5,198	72.0
Unemployed	1,452	20.1	Sexual activity		
Employed	5,763	79.9	Active	1,290	17.9
Place of residence			Inactive	5,925	82.1
Urban	3,374	46.8	Most recent sexual partner		
Rural	3,841	53.2	Boy/Man friend	2,987	41.4
Geographic region			Commercial sex worker	318	4.4
Northern	2,743	38.0	Casual friends	3,909	54.2
Southern	4,472	62.0	Modern contraceptive use		
Age group			Not using	6,369	88.3

Characteristic	Frequency (n = 7,215)	Percentage (%)	Characteristic	Frequency (n = 7215)	Percentage (%)
15–24 years	1,555	21.6	Using	846	11.7
25–34 years	2,001	27.7			
35–49 years	3,659	50.7			
Exposure to mass media					
Low exposure	1,956	27.1			
Moderate exposure	4,520	62.7			
High exposure	739	10.2			

Table 2
Cross tabulation and multivariable results

Characteristic predicting modern contraceptive use	Prevalence (%)	Unadjusted Model			Adjusted Model		
		UOR	p-value	95% CI	AOR	p-value	95% CI
Education							
None ^{ref}	3.5	1.00	-	-	1.00	-	-
Primary	9.9	3.034**	p < 0.01	2.184–4.216	1.690**	p < 0.01	1.165–2.451
Secondary	16.8	5.576**	p < 0.01	4.128–7.556	2.146**	p < 0.01	1.524–3.072
Higher	16.4	5.440**	p < 0.01	3.681–8.041	2.254**	p < 0.05	1.431–3.551
Household wealth quintile							
Poorest ^{ref}	4.9	1.00	-	-	1.00	-	-
Poorer	8.0	1.684**	p < 0.01	1.139–2.487	1.494	0.0606	0.973–2.293
Middle	10.5	2.251**	p < 0.01	1.515–3.356	1.734*	p < 0.05	1.121–2.683
Richer	14.2	3.191**	p < 0.01	2.160–4.715	2.122**	p < 0.05	1.362–3.307
Richest	17.6	4.126**	p < 0.01	2.761–6.176	2.374**	p < 0.01	1.446–3.897
Religion							
Christianity ^{ref}	14.4	1.00	-	-	1.00	-	-
Islam	4.9	0.307**	p < 0.01	0.224–0.421	0.527**	p < 0.05	0.366–0.759
Traditional	7.0	0.450*	p < 0.05	0.259–0.780	0.600	0.079	0.339–1.061
Employment status							
Unemployed ^{ref}	8.6	1.00	-	-	1.00	-	-
Employed	12.6	1.530**	p < 0.01	1.219–1.919	1.449**	p < 0.05	1.123–1.867
Place of residence							
Notes: ref (reference category), *p < 0.05, **p < 0.01							

Characteristic predicting modern contraceptive use	Prevalence (%)	Unadjusted Model			Adjusted Model		
		UOR	p-value	95% CI	AOR	p-value	95% CI
Urban ^{ref}	13.1	1.00	-	-	1.00	-	-
Rural	10.5	0.776*	p < 0.05	0.639–0.943	0.957	0.691	0.768–1.191
Geographic region							
Northern ^{ref}	7.6	1.00	-	-	1.00	-	-
Southern	14.3	2.020**	p < 0.01	1.614–2.529	0.887	0.367	0.684–1.151
Exposure to mass media							
Low exposure ^{ref}	6.1	1.00	-	-	1.00	-	-
Moderate exposure	13.6	2.422**	p < 0.01	1.927–3.044	1.455*	p < 0.05	1.049–1.807
High exposure	15.5	2.820**	p < 0.01	2.040–3.899	1.442*	p < 0.05	0.690–1.394
Age group							
15–24 years ^{ref}	12.2	1.00	-	-	1.00	-	-
25–34 years	17.6	1.542	p < 0.01	1.232–1.931	1.377*	p < 0.05	1.049–1.807
35–49 years	8.3	0.652	p < 0.01	0.516–0.824	0.981	0.915	0.691–1.394
Age at sexual debut							
Less than 18 years ^{ref}	13.6	1.00	-	-	1.00	-	-
18 years or older	10.1	0.711**	p < 0.01	0.600–0.842	0.871	0.165	0.716–1.058
Parity							
1 child ^{ref}	15.8	1.00	-	-	1.00	-	-
2–4 children	11.4	0.641**	p < 0.01	0.535–0.768	0.903	0.433	0.702–1.164
5 or more children	8.3	0.453**	p < 0.01	0.357–0.576	1.084	0.649	0.764–1.537

Notes: ref (reference category), *p < 0.05, **p < 0.01

Characteristic predicting modern contraceptive use	Prevalence (%)	Unadjusted Model			Adjusted Model		
		UOR	p-value	95% CI	AOR	p-value	95% CI
Desire for more children							
Wanted more ^{ref}	14.8	1.00	-	-	1.00	-	-
Wanted no more	8.9	0.558**	p < 0.01	0.468–0.665	1.189	0.134	0.960–1.489
Child living arrangement							
Lives with mother ^{ref}	10.9	1.00	-	-	1.00	-	-
Lives elsewhere	13.6	1.280**	p < 0.01	1.065–1.537	1.189	0.112	0.960–1.471
Nature of singlehood							
Premarital					1.00	-	-
Post marital					0.930	0.582	0.717–1.205
Sexual activity							
Active ^{ref}					1.00	-	-
Inactive					0.406**	p < 0.01	0.327–0.505
Most recent sexual partner							
Boy/Man friend ^{ref}					1.00	-	-
Commercial sex worker					0.868	0.562	0.538–1.400
Casual friends					0.154**	p < 0.01	0.047–0.162
Notes: ref (reference category), *p < 0.05, **p < 0.01							