Women's educational attainment, empowerment and contraceptive use in six regions of Nigeria

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Educational attainment and women empowerment play critical roles in contraceptive use and fertility outcomes. Nigeria has experienced progress in women's educational development but this has not improved prevalence of contraceptive use. This paper examines the linkages between education, empowerment and contraceptive use from the fifth wave Demographic and Health survey (DHS). The study uses path-analysis to examine the pathway from educational attainment, empowerment on contraceptive use among sexually active women aged 15-49 in the six regions. Control variables are religion, household wealth, employment place of residence and number of living children. Our results show that education has positive effects on contraceptive use in all the six regions after controlling for other variables. Furthermore, there is a positive gradient between education and empowerment in all the regions except South East region. Empowerment was important in determining contraceptive use, but weak in North Central and South West regions. Increase in contraceptive prevalence (CPR) in general requires investing in education for all women and enhances empowerment by regional specific strategies.

Introduction

Nigeria is one of the countries where fertility decline has shown little progress in Sub-Saharan Africa. Total fertility showed a modest decline from 6.3 in 1990 to 5.7 in 2008. Further decline of 3.5% was recorded between 2008 and 2013 (National Population Commission [Nigeria] and ICF International. 2014. Nigeria Demographic and Health Survey 2013. Rockville, Maryland, USA: National Population Commission and ICF International., 2014). This suggests that the average pace of fertility decline slowed significantly in Nigeria between two successive observations. While fertility decline has slowed, knowledge and current use of modern contraceptive method were estimated at 85% and 15% respectively. The low contraceptive use in Nigeria is signified in the high fertility rate which translates to high population growth rate. Currently the growth rate of Nigeria is at a staggering 3% (NPC and ICF International. 2014).

This mismatch between knowledge and current use of contraception has both demographic and public health concerns. However, national report on contraceptive use often conceals the regional differentials in contraceptive use. For instance, contraceptive use ranges from a low of 3% among married women in North East region to a high of 38% in South West region (NPC and ICF International. 2014). About 3% of currently married women of reproductive age use modern contraception in northern Nigeria (Goliber, Sanders, & Ross, 2009). In a study among 300 market women, 28.3% and 16.3% of the respondents were currently using any method and modern contraception respectively in South Eastern Nigeria (Egede et al., 2015). In a survey of 612 rural women of reproductive age group, 66.3% were currently using modern contraceptive in South Western, Nigeria (Olugbenga-Bello, Abodunrin, & Adeomi, 2011). The study further indicated that 75.8% of the rural women had good knowledge of modern contraception. In a study comprising 597 married women aged 15-49, 70% were currently using a modern contraceptive method in Ibadan, western Nigeria (Uzochukwu, Fawole, & Adebowale, 2016). Subsequently, fertility is lower in the southern regions compared to the Northern regions.

Several factors have been found to account for both contraceptive use and fertility dynamics in six geographical regions of Nigeria. Notably, women's educational attainment is documented as a key determinant of contraceptive use and fertility patterns in developing countries. On the premise of that formal education transformed individuals in many ways: women's attitude through knowledge, skills and self-confidence to make better reproductive choices (Malhotra, Schuler, & others, 2005). A Study on regional correlates of contraceptive method use attributed acceptance of family planning to high proportion of educated women and urban settings in Southern regions (Odimegwu, Ojo, & Siyagande, 1997). Socioeconomic status of women has been shown to play a decisive role on modern contraceptive uptake. Oye-Adeniran et al., (2005) found that women in need of modern contraceptives methods and family planning cannot afford the services despite sufficient availability in Lagos and Edo states hospitals.

The importance of religion, education and cultural differences in utilising reproductive health services between the Northern and Southern regions of Nigerian has been reiterated (British council 2012). Studies have shown that a substantive number of women and girls in the Northeast and Northwest were unable to read (Makama, 2013). These regions also had high rates of teenage pregnancy and child marriage (Makama, 2013). A positive association was revealed between contraceptive use and high socioeconomic status of women in Northern regions (Unumeri, Ishaku, Ahonsi, & Oginni, 2015). Religion has also been implicated in the

observed regional differences in contraceptive use in Nigeria (Osuafor & Mturi, 2013). Within the Northern regions, Christians were more likely to use modern contraception than the Muslim women (Unumeri et al., 2015).

Women empowerment defined by decision-making power and autonomy has been identified as an important causal factor in contraceptive use since the International conference on Population and Development in 1994. Studies have demonstrated women empowerment to be relevant in contraceptive uptake in different settings (Tadesse, Teklie, Yazew, & Gebreselassie, 2013). Irrespective of conceptualization of women's empowerment, its consistency in predicting contraceptive use have been documented in several studies (Do & Kurimoto, 2012; Hameed et al., 2014). However, the extent to which this evidence holds in a population based sample (Corroon et al., 2014; OlaOlorun & Hindin, 2014) and in non-instrumental empowerment measures (Larsson & Stanfors, 2014) is limited. A number of studies have examined women's empowerment on household decision-making in relation to contraceptive use (Asaolu, Okafor, Ehiri, Dreifuss, & Ehiri, 2017; Patrikar, Basannar, & Sharma, 2014). These studies concluded that highly empowered women were more prone to use health services than poorly empowered women. (Do & Kurimoto, (2012) examined health seeking behaviour, agreement on fertility preferences, negotiation regarding sex and attitudes to domestic violence dimensions of women empowerment in four African countries. They found positive associations with overall scores of women empowerment and contraceptive use. However, interpersonal and familial dimensions of women empowerment are more complex than economic and sociocultural aspects.

Women empowerment indicators are vast and may depend on the type of settings, individuals and their interests. An important indicator in familial and interpersonal dimension of women empowerment is the control over sexual activities (Malhotra et al., 2005). (Asiimwe, Ndugga, Mushomi, & Ntozi, (2014) accessed contraceptive use on women's refusal of sexual intercourse, household wealth and education and found geographical location, education and desire to have children predicted contraceptive use in Uganda. However, most relevant measure of empowerment should emerge from the environment and settings of the study. Studies in Nigeria that used women's education and employment as measure of empowerment found positive relationships with contraceptive use among married women (Uzochukwu et al., 2016). Larsson & Stanfors, (2014) examined determinants of contraceptive use focusing on women's and empowerment in Ghana, Kenya, Madagascar and Zambia. They found that women's education predicted contraceptive use but less relevant in choice of method effectiveness. Furthermore, empowerment was weak as a determinant of contraceptive use. Asaolu et al., (2017) in their recent study found significant improvement in all measures of empowerment and marginal increment in modern contraceptive use over a period of ten years in Nigeria. They concluded that apart from women's participation in household decision-making, the interaction between the former and cultural values needs further investigation for modern contraceptive use. Behaviour related to sexual act has effect on contraceptive use. Perceptions and the behaviour related to reproduction have been determined by cultural and religious values (Srikanthan & Reid, 2008).

Strong association between women's education and contraceptive use is in the recent time augmented with empowerment- an avenue through women acquire decision-making power (Malhotra et al., 2005). Research on women's education, reproductive empowerment and contraceptive use is still evolving in Sub-Sahara Africa because of inconsistent relationship

between education and contraceptive use. Jejeebhoy (1995) demonstrated that education-autonomy relationship is not universal across cultural context and there is no threshold of education that is ideal to change autonomy and reproductive behaviour. In societal setting, empowerment in all echelon is also not attainable. Economically independent women may not have legitimate control over sexual relationship on the ground of sociocultural context of the society. Hence, the nexus of women's education, empowerment and contraceptive use across sociocultural and geographical regions is an overarching issue. Therefore, this study examined the nexus of education, women empowerment and contraceptive use in six geographical regions of Nigeria.

Methods

Data from the recent Nigerian Demographic and health Surveys (DHS) 2013 was used to investigate linkages between education, empowerment and contraceptive use. The survey is a national representative sample with relevant measure for the study. DHS provide information on social aspects such as number of living children and religion which often impact on women's sexual behaviour and use of reproductive health service. Other covariates that may influence women's use of reproductive health services include wealth index, place of residence. The outcome variable of interest is vital for public health development in Nigerian regions. The target population is women of reproductive age who are sexually active in the six geographical regions. Pregnant women at the time of the survey and those with missing values were excluded. The total national sample size was 15992 which comprised 2116, 2166, 5682, 1097, 1908 and 2016 for North Central (NC), North East (NE), North West (NW), South East (SE), South-South (SS) and South West (SW) respectively.

Variables

Current contraceptive use is the outcome variable for regulating childbearing. Respondents were asked during the survey "Are you currently doing something or using any method to delay or avoid getting pregnant?" Respondents who answered yes were coded 1, whereas otherwise was coded 0.

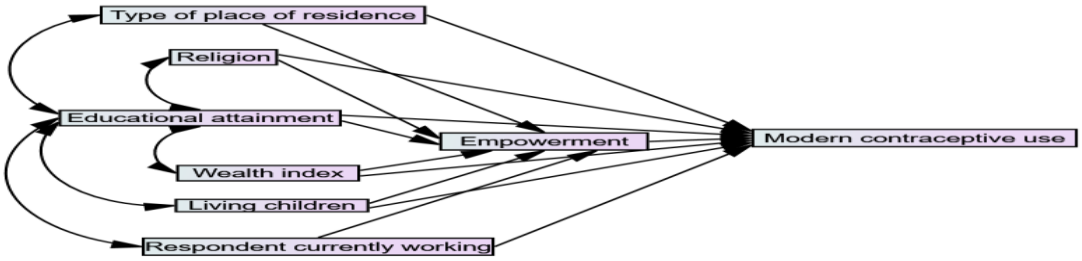
Independent variables are educational attainment and women's empowerment. Educational attainment is measured as years of schooling completed by women. Women's empowerment is measured as a latent variable derived from respondents responses to questions on whether they can refuse sex from their husband and refuse sex if the husband has other women. This index of empowerment directly related to use of family planning. Based on the responses, an aggregate score x was generated (maximum score = 3). The score x was split into two categories using a median. Women empowerment levels were low empowerment if $0 \leq x \leq 1$ and high empowerment if $2 \leq x \leq 3$. Control variables are religion, place of residence, respondent's employment and household wealth.

Data analysis

Logistic regressions analysis is presented (Education --> empowerment ----> contraceptive use) in model 1. In the model 2, (education, empowerment --> contraceptive) while controlling for selected background characteristics. The significance of each path through empowerment

to contraceptive use was examined using path analysis. Decomposition of direct effect and indirect effects of education on contraceptive use mediated by women's empowerment were quantified. Figure 1 below shows the hypothetical pathways from educational attainment, women's empowerment and contraceptive use with controlled variables.

Figure 1: Pathway of Education, women's Employment on Contraceptive use



Result

Table 1 presents the selected socio-demographic characteristics of the women. The key variables empowerment and educational level showed significant variation across the regions. High empowerment ranges from low as 41.1% in NC to a high of 61.6% in SW. The proportions of highly empowered women in the three northern regions were lower than the overall figure. In terms of education, the percentage of women without formal education varied from 6.0% in the SE to 79.0% in the NW. Less than a quarter of the women completed their secondary education in the northern regions compared to the Southern regions. NW had lowest percentage of women with tertiary education. The control variables also showed significant variations across the regions. Over three- quarter of the women in the NE and NW were residing is the rural area. Furthermore, four-fifth of the women in the region adhered to Islamic religion. In the Southern regions, over half of the women belong to other Christian religion. In terms of wealth index, over half of the women in NE and NW were below middle class. Whereas over half of the women were above middle class in each of the Southern regions. Furthermore, over four-fifth of the women in the southern region were employed. Over two-fifth of the women in all the regions had four or more children.

Contraceptive use ranges from low of 3.7% in North West to 37.1% in South West X^2 =1902.02, df= (5) P=0.000. Table 2 showed modern contraceptive use by selected demographic characteristics. Contraceptive use was associated with empowerment in the study population and in all the regions with the exception of SE. Proportion of women using modern

contraception who were highly empowered in NC, SS and SW were higher than the total figure. In general, modern contraceptive use showed increasing trend with higher educational level. However, within the regions use of modern contraception did not show consistent increasing trend with level education. Modern contraceptive use was highest among women with tertiary education in three northern regions, and SW. Women who had completed and had incomplete secondary education showed highest percentages of Modern contraceptive use in SE and SS respectively. Women with no education showed lowest percentage in modern contraceptive use in all the regions. Urban women were more likely to use modern contraception compared to their rural counterparts in the northern and South West regions. The proportion of women using modern contraception was highest among other Christians in the northern regions; whereas Catholic women had highest percentage in SS region. Apart from the SE and SS regions, modern contraceptive use increased with wealth index in the three northern and SW regions. This increasing pattern of contraceptive use with wealth index was observed in the general population under study. Employed women were more likely to use modern contraception compared to the unemployed women in all the regions. This association between employment status and modern contraceptive use was significant in NE, NW, SS regions and in overall population. Association between modern contraceptive use and number of living children was significant in two regions each in the north and south as well as at total population. Women who had four children showed highest percentage in using modern contraception in NC and SW; whereas highest proportions reporting modern contraceptive use were among women with five children in NE and SE.

Result of Path analysis

Table 3 presents the decomposition of the total effect of variables on contraceptive use into indirect and direct effect. The decomposition showed that apart from South East region, empowerment had positive effect on contraceptive use in all the regions. The largest effect of empowerment was observed in South-South region. Education had higher indirect effect in North Central and South-South region. It further had the largest total effect on North East, North West, South-South and South West regions. Total effect of Place of residence on contraceptive use was positive in South-South and South West and religion also had total positive effect only in the South West region. However, with the exception of place of residence, the total effect of all the control variables on contraceptive use was negative in South-South region.

Table 4 presents the odds ratio of contraceptive use in the six regions of Nigeria. In model 1 we examined the effect of empowerment and education on contraceptive use. The overall effect of empowerment on contraceptive use was positive. The association between empowerment and contraceptive use was significantly positive in all the regions with the exception of North Central and South East regions. Any level of formal education was significantly associated with contraceptive use in general and in all the Northern and South West regions. The effect of formal education on contraceptive use became strong than completed primary and complete secondary education in South East. In South-South region, the effect of education became strong from the level of incomplete secondary education to tertiary education.

In general, the odds of modern contraceptive use among women who were highly empowered were higher compared to those who were low empowered (Model 2). When controlling for residence, Religion, Wealth index, employment and number of living children, logistic regression analyses indicated that the effect of empowerment on modern contraceptive use remained robust overall and in NW, SS, SW regions. The effect of education remained strong

in predicting contraceptive use even after adjustment for other variables. Women who had some form of formal education were at least 3 times more likely to be using modern contraception compared to women with no formal education. Similarly, women with some formal education compared to those with no formal education were at least 2 times, 3 times and 2 times more likely to be using modern contraceptives in NC, NE and NW respectively. However, women with tertiary education were more likely to use modern contraceptive method but this was not significant in the NW. Similarly having some level of formal education showed higher likelihood of using modern contraception in SE region. Women with some formal education compared to those without formal education were more likely to be using modern contraceptive methods in SS and SW. However women with completed and incomplete primary education were not significantly associated with modern contraceptive use in SS and SW respectively.

The control variables showed some patterns in predicting modern contraceptive use. With exception of women employment status, the other entire control variables were significant while the effect of empowerment was weakened in NC region. Similarly, religion and socioeconomic status mattered more than empowerment in contraceptive use in NE region. Apart from SW region, the number of living children was associated with overall modern contraceptive use in all the regions and even mattered more than empowerment in NC, NE and SE geo-cultural zones. Similarly, socioeconomic status predicted modern contraceptive use with exception in the SE and SS regions. Control variables also improved contraceptive use in some educational categories in SE and SS regions.

Discussion

Education and empowerment have been shown to have extensive influence in reproductive outcomes. However, generalizing the effects of education and empowerment on reproductive behaviour and outcomes across cultural settings is a concern. On examining the link between education, empowerment and modern contraceptive use, our findings indicated positive association and consistent with a previous study (Uzochukwu et al., 2016). Furthermore, pervasiveness of empowerment dimensions makes the extrapolation of effects across different regions and background settings difficult. The uniqueness of the study is measuring empowerment on dimensions that are devoid of economic parlance on modern contraceptive use in six geo-cultural regions of Nigeria. The finding of the study is in agreement with previous reports that endorsed positive association between women empowerment and uptake of modern contraceptive use (Larsson & Stanfors, 2014; Patrikar et al., 2014). Empowerment produced direct positive effect on modern contraceptive use in all the regions. Thus it underscores the importance of women empowerment in modern contraceptive use. The poor effect of empowerment in the South East region could be attributed to the small sample size from the region.

The multivariate analysis indicated that although the measure of empowerment had general positive impact on modern contraceptive use among the study population, the influence was diverse across the regions. This could be attributed to the complex interaction between the competing background characteristics. Result of the study showed that empowerment was weak in accounting for modern contraceptive use in NE region when controlled for other background characteristics. This finding is similar to earlier report despite the numerous empowerment programmes in the area (Unumeri et al., 2015). In the same vein, the weakness of empowerment was also observed in NC and SE regions. Underlying these weaknesses of empowerment in predicting modern contraceptive use in some regions could suggest that

control variables either additively or multiplicatively mediated modern contraceptive use. These findings have been reported on empowerment and contraceptive use in selected sub Saharan African countries (Larsson & Stanfors, 2014). It may also follow that association between empowerment and contraceptive use is not always stronger in context of better economic status and high desire for children. This may imply that irrespective of measures of empowerment, other contextual variables play more significant role in modern contraceptive use. Thus emphasis in promoting modern contraceptive use should focus on the prevailing background variables in the specific regions.

Education had the largest effect on modern contraceptive use in five out of the six regions which support the findings of previous studies in Nigeria (Asaolu et al., 2017; Unumeri et al., 2015) and elsewhere (Gordon, Sabates, Bond, & Wubshet, 2011; Larsson & Stanfors, 2014). This suggests that education through its cognitive and psychological roles on individuals' behaviour influence their reasoning that modern contraceptive use regulates fertility process. In the present study, about 70% and over 70.0% of women in NE and NW region respectively had no formal education. The prevalence of modern contraceptive use was 4.6 and 3.7 in the study population, NE and NW regions respectively. Low contraceptive use in the Northern regions have also been document by previous studies (Doctor, Findley, Afenyadu, Uzondu, & Ashir, 2013; Unumeri et al., 2015). This therefore suggests that apart from education, other programme that aims at promoting contraceptive use is urgent. It is no doubt that several programme promoting modern contraceptive use in the Northern regions

Conclusion

On the premise of the results, we have shown that positive relationship among education, some aspects of empowerment and contraceptive use as a health outcome exist in the six geo-cultural regions while controlling for other variables. Thus the study has characterised the regional impact of education on contraceptive use while integrating women's empowerment on the pathways of contraceptive uptake. The study depicted that although empowerment impacted positively on contraceptive use, there are variations when background characteristics were controlled for. Education also plays a more important role in contraceptive use uptake in all the regions with or without empowerment. Programmes promoting contraceptive use uptake needs to consider differential in contextual background variables within the regions.

Table 1: The percentage distribution of respondents selected socio-demographic characteristics by region

Characteristics	Total N=(15992)	North Central (n= 2116)	North East (n=3173)	North West (n=5682)	South East (n=1097)	South South (n=1908)	South West (n=2016)	X2; P value
Empowerment								214.8; p= 0.000
Low Empowerment	52.4	58.9	54.8	54.2	48.9	52.6	38.4	
High Empowerment	47.6	41.1	45.2	45.8	51.1	47.4	61.6	
Educational level								7009.0; p=0.000
No Education	48.1	29.2	69.6	78.9	5.9	7.4	8.5	
Incomplete Primary	5.1	7.3	5.9	3.0	6.6	8.2	3.7	
Complete Primary	14.4	19.5	10.0	8.3	19.1	24.3	21.6	
Incomplete secondary	9.6	11.7	4.9	3.3	21.5	22.3	14.0	
Complete secondary	14.5	16.7	6.2	5.2	30.4	25.6	32.5	
Higher	8.3	15.6	3.4	1.4	16.5	12.1	19.6	
Residence								2647.0; p=0.000
Rural	65.7	63.6	77.8	79.6	36.0	66.6	24.5	
Urban	34.3	36.4	22.2	20.4	64.0	33.4	75.5	
Religion								10725.7; p=0.000
Catholic	7.3	14.5	2.1	1.5	44.2	7.4	4.4	
Other Christian	31.9	40.6	13.6	3.6	55.4	90.4	63.2	
Islam	60.8	44.9	84.3	94.9	0.4	2.2	32.3	
Wealth Index								6610.5; p=0.000
Poorest	22.9	6.0	39.3	38.9	3.6	0.4	1.8	
Poorer	21.5	18.4	28.3	31.3	8.9	9.1	5.4	
Middle	17.9	27.9	16.1	14.9	23.2	23.6	10.5	
Richer	18.1	21.5	10.0	9.5	31.9	35.1	28.0	
Richest	19.5	26.2	6.3	5.4	32.4	31.8	54.3	
Employment								1327.2; p=0.000
No	29.1	20.7	45.8	37.0	17.2	15.9	8.4	
Yes	70.9	79.3	54.2	63.0	82.8	84.1	91.6	
Number Living children								183.1; p=0.000
0-3	52.9	56.2	52.3	51.3	49.0	51.4	58.6	
4	15.0	16.1	12.8	13.7	15.8	15.7	19.9	
5+	32.1	27.7	34.9	35.0	35.2	33.0	21.5	

Calculated from Chi–square for measuring differences, significant p<05.

Table 2: Percentage distribution of modern contraceptive use by selected demographic characteristics

	National		North Central		North East		North West		South East		South-South		South West	
Variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Empowerment														
Low Empowerment	89.5	10.5	78.9	21.1	97.5	2.5	98.4	1.6	82.5	17.5	82.4	17.6	67.6	32.4
High Empowerment	83.1	16.9	73.3	26.7	92.8	7.2	93.9	6.1	84.5	15.5	76.6	23.4	60.1	39.6
X2; P value	140.9; p = 0.000		8.9; p = 0.003		39.6; p = 0.000		79.1; p = 0.000		0.8; p = 0.365		9.8; p = 0.002		11.5; p = 0.001	
Educational level														
No Education	97.5	2.5	89.5	10.5	98.5	1.5	99.0	1.0	95.4	4.6	89.4	10.6	83.7	16.3
Incomplete Primary	85.2	14.8	80.5	19.5	91.9	8.1	94.0	6.0	84.7	15.3	80.8	19.2	67.6	32.4
Complete Primary	80.1	19.9	73.1	26.9	91.2	8.8	91.1	8.9	81.9	18.1	84.1	15.9	61.6	38.4
Incomplete secondary	76.3	23.7	68.8	31.2	90.4	9.6	85.9	14.1	83.9	16.1	75.4	24.6	63.6	36.4
Complete secondary	72.9	27.1	71.8	28.2	86.2	13.8	77.4	22.6	80.2	19.8	77.5	22.5	60.5	39.5
Higher	69.5	30.5	66.2	33.8	75.0	25.0	75.6	24.4	86.2	13.8	76.2	23.8	58.1	41.9
X2; P value	1711.5; p = 0.000		65.1; p = 0.000		213.9; p = 0.000		582.8; p = 0.000		5.4; p = 0.020		21.9; p = 0.001		38.56; p = 0.000	
Residence														
Rural	91.7	8.3	82.2	17.8	96.7	3.3	98.1	1.9	81.3	18.7	80.8	19.2	69.4	30.6
Urban	76.5	23.5	66.8	33.2	90.9	9.1	89.3	10.7	84.8	15.2	77.2	22.8	60.8	39.2
X2; P value	711.2; p = 0.000		65.1; p = 0.000		41.5; p = 0.000		205.1; p = 0.000		2.2; p = 0.135		3.3; p = 0.068		11.81; p = 0.001	
Religion														
Catholic	79.4	20.6	77.8	22.2	91.0	9.0	63.5	36.5	85.8	14.2	69.5	30.5	71.9	28.1
Other Christian	73.4	26.6	69.5	30.5	84.7	15.3	51.7	48.3	81.7	18.3	80.5	19.5	62.0	38.0
Islam	94.2	5.8	82.6	17.4	97.2	2.8	98.6	1.4	75.0	25.0	76.2	23.8	63.7	36.3
X2; P value	1292.4; p = 0.000		43.5; p = 0.000		136.6; p = 0.000		1492.3; p =0.000		3.4; p = 0.184		10.1; p = 0.007		3.7; p = 0.154	
Wealth Index														
Poorest	98.7	1.3	92.1	7.9	98.3	1.7	99.5	0.5	89.7	10.3	71.4	28.6	97.3	2.7
Poorer	94.7	5.3	86.1	13.9	96.7	3.3	98.5	1.5	84.7	15.3	78.7	21.3	80.6	19.4
Middle	86.8	13.2	78.3	21.7	95.1	4.9	95.0	5.0	83.5	16.5	84.0	16.0	67.5	32.5
Richer	79.2	20.8	75.4	24.6	91.5	8.5	90.0	10.0	83.7	16.3	79.7	20.3	61.8	38.2
Richest	69.4	30.6	65.6	34.4	78.6	21.4	75.3	24.7	82.3	17.7	76.6	23.4	59.8	40.2
X2; P value	1574.4; p = 0.000		75.4; p = 0.000		167.8; p = 0.000		540.0; p = 0.000		1.6; p = 0.806		9.2; p = 0.055		39.9; p = 0.000	

Employment														
No	92.5	7.5	77.1	22.9	97.2	2.8	97.9	2.1	82.5	17.5	74.7	25.3	68.8	31.2
Yes	84.0	16.0	76.5	23.5	93.8	6.2	95.4	4.6	83.7	16.3	80.5	19.5	62.4	37.6
X2; P value	208.1; p = 0.000		0.1; p = 0.777		20.9; p = 0.000		23.2; p = 0.000		0.1; p = 0.696		5.4; p = 0.020		2.7; p = 0.097	
Number Living children														
0-3	88.3	11.7	81.1	18.9	96.8	3.2	96.7	3.3	87.7	12.3	81.3	18.7	69.0	31.0
4	81.6	18.4	68.0	32.0	95.6	4.4	95.1	4.9	86.1	13.9	77.6	22.4	53.6	46.4
5+	85.7	14.3	72.5	27.5	93.2	6.8	96.3	3.7	76.4	23.6	77.9	22.1	55.1	44.9
X2; P value	75.8; p = 0.000		32.7; p = 0.000		19.5; p = 0.000		4.2; p = 0.124		21.9; p = 0.000		3.7; p = 0.160		45.1; p = 0.000	
Total (N)	13826	2166	1621	495	3027	146	5474	208	916	181	1519	389	1269	747

Table 3: Direct and indirect effects of selected variables on contraceptive use in the six regions of Nigeria

Predictor Variables	**Indirect effect**						**Direct effect**						**Total effect**					
	NC	**NE**	**NW**	**SE**	**SS**	**SW**	**NC**	**NE**	**NW**	**SE**	**SS**	**SW**	**NC**	**NE**	**NW**	**SE**	**SS**	**SW**
Empowerment	-	-	-	-	-	-	.03	.03	.03	-.02	.06	.05						
Education	.07	.09	.09	.01	.10	.03	.03	.15	.11	.05	.07	.07	.10	.24	.20	.06	.17	.10
Residence	.03	.00	-.01	-.09	-.03	.02	-.10	-.01	.01	.04	-.02	.01	-.07	-.01	.00	-.05	.04	.03
Religion	-.19	-.21	-.22	-.07	-.07	-.01	-.07	-.11	-.12	.06	-.04	.03	-.26	-.32	-.34	-.01	-.11	.02
Wealth Index	.08	.08	.07	.03	-.01	.16	.07	.10	.13	.03	.00	.09	.15	.18	.20	.06	-.01	.08
Employment	.01	.04	.05	.05	-.03	.02	.01	.02	.01	-.01	-.05	.04	.02	.06	.06	.04	-.08	.06
Number of living children	.03	.03	.04	-.03	-.05	.01	.02	.06	.09	.13	.03	.02	.05	.09	.13	.10	-.02	.03

Table 4: Odds ratio of contraceptive use among sexually active women aged 15-49 six geopolitical regions of Nigeria

Model 1														
	All		**North Central**		**North East**		**North West**		**South East**		**South-South**		**South West**	
Variables	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Empowerment														
Low empowerment	**1.0**		1.0		1.0		1.0		1.0		1.0		1.0	
High Empowerment	**1.3*** **	1.2-1.5	1.2	0.9-1.5	2.0****	1.4-2.9	2.4****	1.7-2.4	0.8	0.6-1.2	1.3*	1.1-1.7	1.3***	1.1-1.6
Educational level														
No Education	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
Incomplete Primary	6.7****	5.3-8.6	1.9***	1.2-3.2	5.1****	2.7-9.6	6.1****	2.9-12.3	3.7	0.9-14.1	1.9	0.9-3.8	2.4***	1.3-4.5
Complete Primary	9.6****	8.1-11.5	3.1****	2.2-4.3	5.3****	3.1-8.9	9.3****	6.0-14.4	4.6*	1.4-15.4	1.6	0.9-2.8	3.1****	1.9-4.8
Incomplete Secondary	11.8****	9.8-14.3	3.7****	2.5-5.4	5.7****	2.9-10.7	14.6****	8.8-24.5	3.9*	1.2-13.4	2.6***	1.5-4.7	2.8****	1.7-4.4
Complete Secondary	14.0****	11.8-16.6	3.3****	2.3-4.6	8.8****	8.8-15.1	23.4****	15.5-35.3	5.2***	1.6-16.9	2.3***	1.3-4.1	3.2****	2.0-4.9
Tertiary	16.6****	13.8-20.0	4.2****	2.9-5.9	18.1****	10.3-31.7	24.8****	13.6-45.52	3.3	0.9-11.5	2.5***	1.3-4.6	3.5****	2.2-5.5
Model 2														
	All		**North Central**		**North East**		**North West**		**South East**		**South-South**		**South West**	
Variables	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Empowerment														
Low Empowerment	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
High Empowerment	1.3****	1.2-1.4	1.2	0.9-1.5	1.5	0.9-2.3	1.5*	1.0-2.2	0.9	0.7-1.3	1.3*	1.0-1.7	1.2*	1.0-1.5
Educational level														
No Education	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
Incomplete Primary	3.2****	2.5-4.1	1.7*	1.0-2.8	3.1***	1.5-6.0	3.2**	1.4-7.1	3.7*	1.0-14.3	2.0*	1.0-3.9	1.7	0.8-3.2
Complete Primary	3.7****	3.1-4.5	2.2****	1.6-3.2	2.9****	1.7-5.1	2.2***	1.3-3.8	4.9*	1.5-16.6	1.6	0.8-2.9	2.1***	1.3-3.4
Incomplete secondary	4.1****	3.4-5.2	2.9****	1.9-4.3	3.4***	1.7-6.7	2.4***	1.3-4.5	5.1***	1.5-17.3	2.9****	1.6-5.3	1.9*	1.2-3.2
Complete secondary	4.4****	3.5-5.4	2.2****	1.5-3.3	3.6****	1.9-6.9	2.3***	1.4-4.2	7.3***	2.1-24.3	2.6***	1.5-4.8	2.4****	1.5-4.0
Higher	4.3****	3.4-5.5	2.2****	1.4-3.4	4.2****	2.0-8.8	1.1	0.5-2.5	4.9*	1.4-17.2	2.9***	1.6-5.6	2.9****	1.7-4.9
Residence	1.0		1.0											
Rural	1.2****	1.1-1.5	1.7****	1.3-2.4										
Urban														
Religion														
Catholic	1.0		1.0		1.0		1.0				1.0			
Other Christian	1.4****	1.2-1.6	1.2	0.9-1.8	1.6	0.6-4.1	1.2	0.7-2.1			0.5**	0.4-0.9		
Islam	0.7****	0.6-0.8	0.07*	0.5-0.9	0.4*	0.2-1.0	0.1****	0.03-0.1			0.9	0.4-1.9		

Wealth Index														
Poorest	1.0		1.0		1.0		1.0						1.0	
Poorer	2.5****	1.8-3.5	1.3	0.6-2.8	1.4	0.8-2.5	2.1*	1.0-4.5					6.3	0.7-50.0
Middle	3.9****	2.8-5.4	2.3*	1.1-4.6	2.0*	1.1-3.8	4.3****	1.9-9.0					9.5*	1.2-73.8
Richer	4.6****	3.3-6.4	2.1*	1.0-4.4	3.4****	1.8-6.5	6.8****	3.2-14.6					11.7*	1.5-90.2
Richest	6.2****	4.4-8.7	2.6*	1.2-5.5	6.5****	3.2-13.2	11.6****	5.1-25.9					13.2*	1.7-102.7
Employment														
No	1.0						1.0				1.0			
Yes	1.2***	1.1-1.4					1.5*	1.0-2.3			0.7*	0.5-0.9		
Number Living children														
0-3	0.5****	0.4-.06	0.4****	0.3-0.6	0.4****	0.2-0.5			0.4****	0.2-0.6	0.9	0.6-1.3	0.4****	0.3-0.5
4	0.9	0.8-1.1	0.9	0.7-1.3	0.4*	0.3-0.8			0.5***	0.3-0.7	0.6****	0.5-0.8	0.9	0.6-1.1
5+	1.0		1.0		1.0				1.0		1.0		1.0	

* Significant at 0.05 level; ** significant at 0.01 level; *** significant at 0.001; **** significant at 0.0001; 1.0 reference category. OR= Odds ratio, CI= Confidence interval

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