

# Wealth index, empowerment and modern contraceptive use among married women in Nigeria: are they interrelated?

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## Abstract

**Background** Nigeria, a patriarchal society, is one of the more impoverished countries of the world and while its fertility and population growth rates are high, its modern contraceptive (MC) prevalence rate is low. The wealth status and decision-making power of a woman have implications on their use of MC. Studies that examined the relationship between women's empowerment, wealth index and MC use in Nigeria are scarce.

**Methods** A national representative cross-sectional data on women of reproductive age ( $n = 5,098$ ) was used. Data were analysed using Chi-square and interactive logistic regression models ( $\alpha = 0.05$ ).

**Results** Mean age of the women was 32.9 ( $\sigma = 8.0$ ) and 23.8 % were currently using MC. Current use of MC was found to be higher among the following: Yoruba (48.5 %) than Igbo (27.3 %) and Hausa women (2.9 %); highly (36.9 %) than poorly empowered women (12.1 %); upper class (35.0 %) than lower class (5.9 %); and Christians (35.5 %) than Muslims (12.6 %;  $p < 0.001$ ). Injectables and condoms were the most reported MC method currently used. In the interactive model, being in lower class and poorly empowered inhibits current use of MC. The predictors of current use of MC when wealth index and women empowerment were used either jointly or interactively in the controlled regression equation were wealth index, region, education, religion, ethnicity, family planning information access on media, receiving

family planning information at health facility and living children sex composition.

**Conclusion** Modern contraceptive prevalence rate among Nigerian women was low particularly among the lower class and poorly empowered. Strategies to improve the use of MC should target women in the lower class in Nigeria.

**Keywords** Modern contraceptive use · Women empowerment · Wealth index · Nigeria

## Introduction

Nigeria is among the top-ten high-fertility countries world wide. In 2013, the estimated maternal mortality ratio and infant mortality rate were 555/100,000 and 69/1,000 live births respectively (NPC and ICF International 2014). Nigeria faces challenges relating to the accelerated growth rate of its large human population of above 170 million (PRB 2014). In response to the unprecedented population growth and excruciating demographic parameters, the Nigerian government instituted a population policy in 1988 which was reviewed in 2004 (NPC and ICF International 2004). Central to the achievement of this policy's theme is family planning. At the micro and macro levels, family planning has played a central role in improving lives in the past five decades by indirectly contributing to reduction in maternal and under-five mortality, unwanted pregnancies, unsafe abortion and transmission of sexually transmitted infections including HIV (Maternal Health Initiative 2013).

Despite global efforts toward achieving low fertility in developing countries, progress on access to modern contraceptive has largely been hindered over the last two decades in Nigeria. Modern contraceptive prevalence rate (CPR = 10 %) in Nigeria is among the lowest world wide and the unmet needs for modern contraceptive is high (NPC and ICF International 2014; PRB

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2014); hence, the growing interest in family planning research in Nigeria among population policy makers. Many population health researchers are curious to know why the modern contraceptive prevalence rate is low in Nigeria despite numerous family planning programmes instituted by government and international agencies across the country. This curiosity has led to the awareness of the need for the current study.

Nigeria is signatory to international conventions on human rights, women's rights, and children's rights, as well as to the agreements on millennium development goals regarding; eradication of extreme poverty and hunger, reduction in childhood mortality and improving maternal health (United Nations Economic Commission for Africa 2013). Family-planning-related issues are important for implementation and accomplishment of these goals. Unfortunately, the weak health system, women's low socio-economic status and harmful traditional practices that influence the decision-making power of women continue to present barriers to the use of family planning in Nigeria (PRB 2014; Doctor et al. 2013). Socio-demographic factors have been established as determinants of contraceptive use in Nigeria (Igbodekwe et al. 2014; Adebowale et al. 2011, 2013; Olugbenga-Bello et al. 2011), but there is a knowledge gap regarding the relationship between women empowerment, wealth index and modern contraceptive use.

Women's empowerment "encompasses situations where women have a sense of self-worth, access to opportunities and resources, choices and the ability to exercise them, control over their own lives, and influence over the direction of social change" (United Nations Population Information Network 1995). The 1994 International Conference on Population and Development declared that "the empowerment of women and ensuring women's ability to control their own fertility are cornerstones of population and development-related programs" (United Nations 1994). Women empowerment is indispensable in reducing the poverty level of a nation like Nigeria where most of the poor population are women. Some of the barriers to women's empowerment and gender equality in Nigeria are entrenched in cultural norms in favour of men. Decision-making power within the household is seen as the sole responsibility of men even at times to the detriment of their female partners. Considerable research has examined the relationship between women's empowerment and the use of modern contraceptive (Mai and Nami 2012; Larsson and Stanfors 2014; Waqas et al. 2014). In most of these studies, women's empowerment is found to be significantly associated with increased utilization of modern contraceptive; thus, one can argue that highly empowered women stand the chance of enjoying overall economic and health benefits of family planning than less empowered.

Wealth index is an indication of inequalities in household characteristics relative to utilization of social and health services, and a function of health outcomes (Rutstein 1999), and it is an indicator of wealth that is consistent with expenditure and income measures (Rutstein 1999). The state of wealth of women

is an important determinant of modern contraceptive use—for example, in Nigeria, one in ten women of reproductive age uses modern contraceptives regularly (NPC and ICF International 2014). Consequently, planning of the timing and spacing of childbearing becomes a critical challenge to thousands of women in the country. Though, women have free access to contraceptives at the public health facility in Nigeria, stock-outs are common, and their method of choice may not be available, limiting women's ability to choose a method that best suits their requests. Those who insist on using their desired method often seek, based on their financial strength, an alternative from either a private health facility or pharmaceutical store, while others may have to wait till the public health facilities replenish their stock. This situation has implications regarding unintended pregnancies since an agreement of abstinence from their sexual partner may be practically impossible during the period.

Women of reproductive age constitutes approximately one-fifth of the human population in Nigeria (National Population Commission 2006), but their participation in household decisions including their own is low. Giving the attention due to women to access resources like modern contraceptive is a highly creditable goal and is pertinent to improving the reproductive health needs of Nigerian women. Despite the independent role that wealth and empowerment plays in the use of modern contraceptive methods among women, it is likely that a highly empowered woman who is in the lower class and vice-versa may inadequately utilize modern contraceptive. To investigate the influence of the interaction between the wealth and empowerment, we constructed all the possibilities such as low and lower class, low and middle class, low and upper class, high and lower class, high and middle class, high and upper class. Such an interaction is yet to be documented in Nigeria. Therefore, this study attempts to fill the gap by investigating the interactive and joint relationship between wealth index and women empowerment on current use of modern contraceptive among women of reproductive age in Nigeria. It also identifies the socio-demographic predictors of modern contraception and further examines the reasons for non-use of modern contraceptive by levels of wealth and empowerment among the non-users. The study outcomes were aimed at providing information that would assist family planning programmers in their strategies to increase the prevalence rate of contraceptive methods in Nigeria; additionally, the study has implications for fertility reduction in Nigeria.

## Methods

### Study area

The study was carried out in Nigeria, sub-Saharan Africa, which, with a population of more than 170 million and a growth rate of 2.5 %, makes it the most populous black African nation. The

female life expectancy is 53 years and GNI PPP per Capita is \$5,600, while the birth and death rate are 39 and 13 per 1,000 population respectively (PRB 2014). Nigeria is currently yet to begin the first stage of fertility transition as the total fertility rate remains high. Although fertility rates in the country have decreased from 6.8 in the early 1960s to 5.5 in 2013 (NPC and ICF International 2014), the pace of reduction is low despite the existing Nigerian-wide fertility reduction programmes. Additionally, there are differences in fertility level within the country.

**Study design**

The study utilized the 2013 Nigeria Demographic Health and Survey, which was cross-sectional in design and involved a nationally representative sample aimed at providing population and health indicator estimates. The sample was selected using a stratified three-stage cluster design consisting of 904 clusters: 372 in urban areas and 532 in rural areas. A fixed sample of 45 households was selected per cluster. In the original sample, 38,948 women aged 15–49 were interviewed. However, the current study focused on married women who are not currently pregnant, but had been sexually active and fecund in the last 4 weeks before the survey. Also, all women with missing information on contraceptive use and any of the variables used in generation of some important variables like women empowerment, wealth index, sex preference, sex composition of the surviving children were further excluded from the study, thus reducing the sample size to 5,098.

**Variable description**

**Dependent variable** The dependent variable was current use of contraceptive. In the original questionnaire used for data collection, women were asked about the type of contraceptive method currently used with the indicators being: none, traditional methods, modern methods. The variable was then re-categorized into two: any modern contraceptive method = 1 and 0 if otherwise.

**Independent variables** The major independent variables were wealth index and women empowerment. Wealth index was generated using household assets and disaggregated into three classes namely lower class, middle class and upper class. Women empowerment index was generated using questions regarding access to income, control over earnings, control over husband’s earnings, decisions on their own health care, decisions on making major household purchases, and decisions on visits to family or relatives. The overall maximum score for women empowerment was 19 and the least was 0. Women whose overall score was at least 10 ( $\geq 50\%$  of the overall score) were considered to be highly empowered and low if otherwise. A variable (women-empowerment§wealth-

index; § represents interaction) which combined wealth index and women empowerment indicators was also generated (Table 1).The variable was not provided in the original questionnaire used for the study but was later created during statistical analysis using the two variables women empowerment and wealth index. In this context, generated means created.

Thus, the indicators of women-empowerment§wealth-index were: low∩lower class, low∩middle class, low∩upper class, high∩lower class, high∩middle class and high∩upper class (∩ represents intersection). Other independent variables included demographic (age, residence, sex composition of the living children, number of union and partner age difference) and socio-cultural factors (region, education, religion, ethnicity, wealth index, access to family planning media information, visited health facility in the last 12 months with family planning information received, husband/partner level of education, gender preference, family type and women empowerment).

**Data analysis**

Data were analysed using Chi-square and binary logistic regression models ( $\alpha = 0.05$ ). However, before analysis, the sample was weighted to extrapolate the sample to the target population since cluster design was used for data collection.

The logistic regression model is defined as:

$$\log\left(\frac{\pi_j}{1-\pi_j}\right) = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k + \epsilon$$

where  $\pi$  is the proportion of women who are currently using modern contraceptive and  $\beta_1, \beta_2, \beta_3, \dots, \beta_k$ , are the regression coefficients to be estimated.  $x_1, x_2, x_3, \dots, x_k$  are covariates such as age, level of education, religion, residence etc.

Five models were generated to examine the relationship between wealth index, women empowerment and current use of modern contraceptive. In model 1, only one key independent variable was included at a time in the regression equation to examine their individual relationship with current use of modern contraceptive, i.e.

$$\log\left(\frac{\pi_{j=1}}{1-\pi_{j=1}}\right) = \gamma_1 + \xi_1x_{1i} + \epsilon_1; i = 1, 2, 3$$

where  $x_{11}$  = wealth index,  $x_{12}$  = women empowerment,  $x_{13}$  = women-empowerment§wealth-index).

In model 2, both wealth index and women empowerment were introduced into the regression equation simultaneously to examine their joint relationship with current use of modern contraceptive, i.e.

$$\log\left(\frac{\pi_{j=2}}{1-\pi_{j=2}}\right) = \gamma_2 + \xi_2x_1 + \eta_2x_2 + \epsilon_2$$

where  $x_1$  = wealth index,  $x_2$  = women empowerment.

In models 3 and 4, demographic and socio-cultural variables were introduced respectively into the regression

**Table 1** Two variables used to create the combined variable representing the two levels of women's empowerment (*low* and *high*) and the three levels of wealth index (*lower*, *middle* and *upper class*). *E* empowerment; *WI* wealth index

Empowerment	Wealth index		
	Lower class = 0 <sub>WI</sub>	Middle class = 1 <sub>WI</sub>	Upper class = 2 <sub>WI</sub>
Low = 0 <sub>E</sub>	0 <sub>E</sub> , 0 <sub>WI</sub>	0 <sub>E</sub> , 1 <sub>WI</sub>	0 <sub>E</sub> , 2 <sub>WI</sub>
High = 1 <sub>E</sub>	1 <sub>E</sub> , 0 <sub>WI</sub>	1 <sub>E</sub> , 1 <sub>WI</sub>	1 <sub>E</sub> , 2 <sub>WI</sub>

equation to examine their influence on the relationship between wealth index, women empowerment and modern contraceptive use. In model 5, all the independent variables were introduced into the regression equation to examine their influence on the relationship between wealth index, women empowerment and modern contraceptive use, i.e.

$$\log\left(\frac{\pi_{j=5}}{1-\pi_{j=5}}\right) = \gamma_5 + \sum_{t=1}^k \xi_t x_t + \epsilon_5$$

### Ethical approval

Ethical approval was obtained from Nigeria National Ethics Committee (RNEC) functioning under the Ministry of Health, Nigeria. The data originators obtained an informed consent from all the study participants at the point of data collection.

**Table 2** Demographic characteristics of the women by contraceptive use

Variables	Modern method	Total	Chi-square value	<i>p</i> -value
Total	23.8	5,098		
Age			102.884	<0.001
15–24	12.3	738		
25–29	18.6	1,012		
30–34	27.1	1,106		
35–39	29.6	1,029		
40+	27.3	1,213		
Mean ± $\sigma$	34.7 ± 6.9	32.9 ± 8.0		<0.001
Residence			245.19	<0.001
Urban	33.4	2,485		
Rural	14.7	2,611		
Sex composition of the living children			134.542	<0.001
Childless	2.5	396		
All males	20.2	709		
All females	20.5	561		
Gender mix	27.6	3,431		
Number of unions			44.715	<0.001
Once	25.3	4,489		
More than once	13.0	608		
Partner age difference			59.551	<0.001
0–4	29.8	1,043		
5–9	26.7	1,762		
10+	18.9	2,292		

Respondents were also assured of confidentiality of the information they supplied. The consented participants were made to sign an appropriate agreement form before the interview; further, approval was granted from the data originators before use.

### Results

In Table 2, the data show that the mean age of the women was 32.9 ± 8.0 and 23.8 % are currently using modern contraceptive. Current use of modern contraceptive was mostly least common among women in age groups 35–39 years (29.6 %) and 15–19 years (12.3 %) respectively and higher in the urban (33.4 %) as opposed to rural areas (14.7 %). Also, the current use of modern contraception was highest among women where the sex composition of living children was mixed

gender than women who have all their children as either all males or all females. The proportion of women who were 0–4 years (29.8 %) younger than their husbands/partners currently using modern contraceptive methods was higher than those

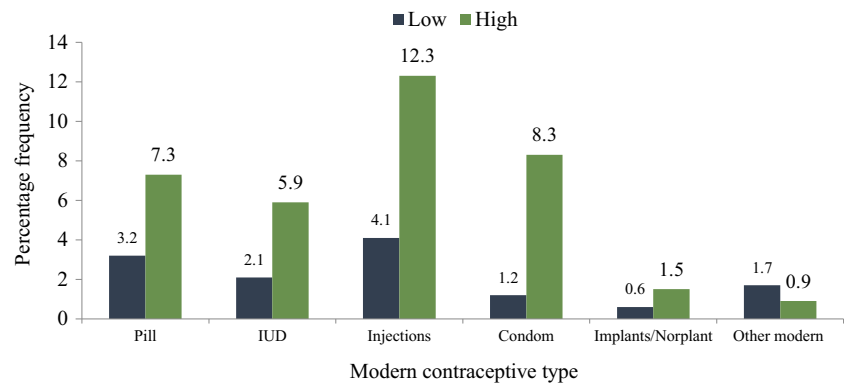
women who were at least 10 years younger (18.9 %) than their husbands/partners.

As shown in Table 3, usage of modern contraceptives was found to be the highest among women in the south west

**Table 3** Socio-economic characteristics of the women by contraceptive use

Variables	Modern methods	Total	Chi-square value	p-value
Total	23.8	5,098		
Region			526.12	<0.001
North central	28.4	680		
North east	7.8	449		
North west	10.9	1,636		
South east	18.6	469		
South south	27.0	604		
South west	44.4	1,259		
Education			530.769	<0.001
No education	4.9	1,740		
Primary	30.8	1,073		
Secondary	33.8	1,642		
Higher	38.0	640		
Religion			367.632	<0.001
Christian	35.5	2,498		
Islam	12.6	2,558		
Others	14.6	41		
Ethnicity			805.054	<0.001
Hausa	2.9	1,699		
Igbo	27.3	697		
Yoruba	48.5	1,134		
Others	27.1	1,566		
Wealth index			463.961	<0.001
Lower class	5.9	1,552		
Middle class	20.8	822		
Upper class	35.0	2,723		
Access to family planning media information			382.387	<0.001
None	12.7	2,471		
Low	31.3	2,130		
High	47.2	494		
Visited health facility in the last 12 months with FP information received			403.635	<0.001
No	18.8	4,345		
Yes	52.7	752		
Husband/partner level of education			385.340	<0.001
No education	5.6	1,366		
Primary	23.4	996		
Secondary	31.8	1,719		
Higher	35.4	1,015		
Gender preference			10.102	0.006
None	22.5	3,448		
Female	27.1	557		
Male	26.3	1,092		
Family type			96.995	<0.001
Monogamy	27.7	3,583		
Polygamy	14.8	1,514		
Women's empowerment level			432.78	<0.001
Low	12.1	2,690		
High	36.9	2,406		
Mean ± σ	10.9 ± 2.5	9.0 ± 3.3		<0.001
Women-empowerment\$wealth-index (interaction)			586.559	<0.001
Low∩lower class	3.7	1,385		
Low∩middle class	15.6	519		
Low∩upper class	24.6	786		
High∩lower class	24.6	167		
High∩middle class	29.7	303		
High∩upper class	39.2	1,937		

**Fig. 1** Contraceptive type by level of women empowerment



(44.4 %) and least among their counterparts in the north east (7.8 %). The study further shows that the percentage of women currently using modern contraceptives increases consistently with increase in wealth as well as the levels of education of the respondents and partners. For instance, only 5.9 % of women in the lower class as against 35.0 % of women in the upper class were currently using modern contraceptives. Current use of modern contraceptive was found to be higher among the Christians (35.5 %) than Muslims (12.6 %) and also highest among the Yoruba ethnic group (48.5 %) than Igbo (27.3 %) and Hausa (2.9 %). More access to family-planning media information and recently receiving family planning information from the hospital promotes current use of modern contraceptives. The proportion of women currently using modern contraceptives was higher among women in monogamous as opposed polygamous families (27.7 % vs 14.8 %) and among the highly rather than the poorly empowered (36.0 % vs 12.1 %).

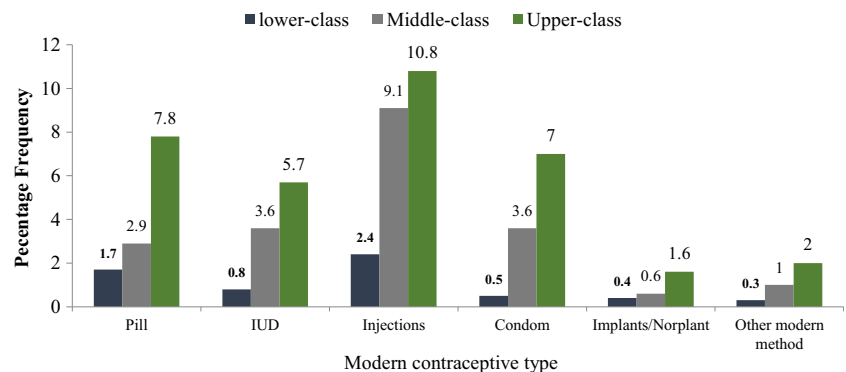
The distribution of modern contraceptive use type by level of women empowerment is as shown in Fig. 1. Injectable was the most reported modern contraceptive method currently used among the two classes (low = 4.1 %; high = 12.3 %) of women's empowerment. Condoms were reported by 8.3 % of the highly empowered women in contrast to 1.2 % of women in the low level of empowerment group. Slightly above 7.0 and 3.0 % of highly and poorly empowered women are currently using pills respectively.

Figure 2 shows the contraceptive type currently used according to wealth categories. The data show that the percentage of women currently using any modern contraceptive type increases with increasing level of wealth. The gap between the upper class and lower class was mostly prominent for current use of pills, injections and condoms. For instance, 10.8 % of women in the upper class are currently using injections as compared with only 2.4 % of the lower-class women. Also, a mere 0.5 % of women in the lower class are currently using condoms compared with 7.0 % of women in the upper class.

Figure 3 shows the percentage frequency distribution of the women according to women empowerment score by current use of modern contraceptives. The data show that empowerment scores were consistently higher for score 9–20 (mean =  $10.9 \pm 2.5$ ) among women who are currently using modern contraceptives as opposed to their counterparts who are not using them (mean =  $8.4 \pm 3.2$ ). The converse situation was observed at scores 0–8.

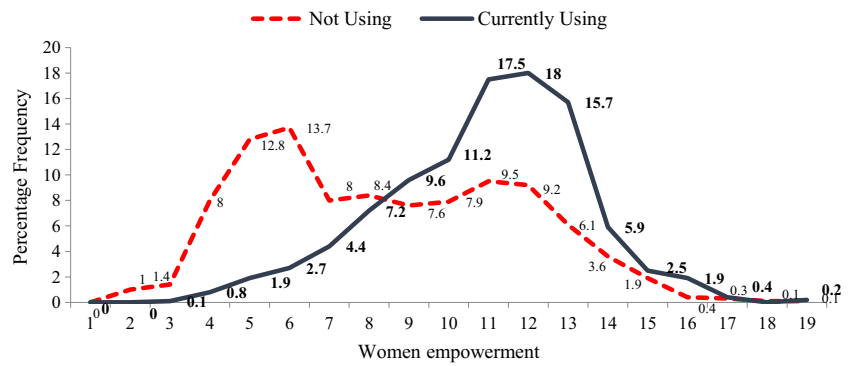
In Table 4, the data show the reasons reported by the studied women for non-use of modern contraceptive methods classified by women's empowerment level, wealth index and women-empowerment%wealth-index. The most reported reasons for non-use of modern contraceptive among poorly and highly empowered women were husband/partner opposed (14.5 %) and fear of side effects (33.9 %) respectively. About 4.0 % of women in the lower class complained of lack of access or health facility being too far away as compared to

**Fig. 2** Contraceptive type by wealth index





**Fig. 3** Women empowerment score by current use of modern contraceptives



only 0.8 % of women in the upper class. The proportion of women who did not use modern contraceptives and who gave the reasons as ‘costs too much’ reduced as the level of wealth reduced (2.8, 3.1 and 1.3 % among lower class, middle and upper class respectively). As for the interactive variable, highly empowered women who were in the lower class reported the highest proportion of women who mentioned ‘lack of access’/‘location too far’ (9.6 %) and ‘costs too much’ (7.8 %) as their reasons for not using modern contraceptives.

In Table 5, five models were generated and in each of the models, being in the upper class and highly empowered were indicators of current use of modern contraceptive methods.

For instance, women who were in the upper class and highly empowered category were 8.49 and 4.26 times more likely to currently using modern contraceptive than their counterparts who belong to the lower class and poorly empowered respectively. Also, in the interactive expression, being highly empowered played a domineering role in the relationship between women-empowerment\$wealth-index and current use of modern contraceptives. In the interactive model, the odds ratio of current use of modern contraceptive was higher when women are highly empowered rather than poorly empowered.

In model 2, the interaction of wealth index and women empowerment reduces the odds ratio generated in the model

**Table 4** Reasons for non-use of modern contraceptive

Reasons for non-use of modern contraceptive	Women’s empowerment level			Wealth index				Women-empowerment\$wealth-index (interactive)						
	Low	High	p-value	LC	MC	UC	p-value	LLC	LMC	LUC	HLC	HMC	HUC	p-value
Fatalistic	11.1	9.5	0.459	13.1	6.7	10.2	0.660	11.7	7.0	13.4	19.6	4.6	8.3	0.001**
Respondent opposed	16.3	17.9	0.535	11.4	17.0	22.3	<0.001*	12.0	17.1	24.1	5.9	16.7	20.8	0.040***
Husband/partner opposed	14.5	17.2	0.272	13.6	21.6	14.2	0.030***	12.3	19.5	14.8	21.2	25.8	13.9	0.053
Others opposed	1.1	0.6	0.450	1.4	0.5	0.5	0.369	1.3	0.8	0.7	0.00	0.00	0.4	0.773
Religious prohibition	9.5	2.3	<0.001*	9.9	5.7	4.3	0.008**	11.0	7.0	8.5	3.8	3.1	1.3	<0.001*
Knows no method	6.5	1.7	0.001**	7.4	5.7	1.6	0.001**	8.0	6.2	3.5	2.0	4.5	0.9	0.005**
Knows no source	4.4	1.1	0.007**	6.2	3.1	0.3	<0.001*	6.3	3.9	0.7	5.8	1.5	0.0	<0.001*
Fear of side effect	11.9	33.9	<0.001*	7.4	21.6	31.5	<0.001*	5.0	17.8	21.1	23.1	29.2	37.7	<0.001*
Lack of access/too far	2.5	2.0	0.665	4.0	1.5	0.8	0.011***	3.3	2.3	1.4	9.6	1.5	0.4	0.004**
Costs too much	1.6	3.2	0.111	2.8	3.1	1.3	0.284	1.7	2.3	0.0	7.8	3.1	2.2	0.035***
Inconvenient to use	1.8	5.2	0.003**	1.4	1.5	5.1	0.006**	1.0	0.8	3.5	3.9	3.1	6.1	0.014***
Interferes with body processes	7.4	7.2	0.917	4.8	9.8	8.3	0.062	5.3	10.9	9.2	2.0	7.6	8.2	0.207
Preferred method not available	1.4	1.2	0.746	2.8	1.0	0.3	0.012***	2.3	0.8	0.7	5.9	1.5	0.0	0.020***
No method available	0.4	0.0	0.270	0.6	0.0	0.0	0.189	0.7	0.0	0.0	0.0	0.0	0.0	0.530
Others	1.4	3.7	0.022***	1.7	2.1	2.7	0.662	1.7	1.6	1.4	2.0	4.5	3.9	0.387
Don’t know	0.4	1.1	0.145	1.4	0.0	0.3	0.072	0.3	0.0	0.0	5.9	0.0	0.0	0.076
Total women	570	347		352	194	373		300	129	142	52	66	231	

LC lower class, MC middle class, UC upper class, LLC low and lower class, LMC low and middle class, LUC low and upper class, HLC high and lower class, HMC high and middle class, HUC high and upper class

\*Significant at 0.1 %; \*\*Significant at 1 %; \*\*\*Significant at 5 %

**Table 5** Logistic regression of current use of modern contraceptives by background characteristics

Background variables	Model 1 OR	Model 2 AOR	Model 3a AOR	Model 3b AOR	Model 4a AOR	Model 4b AOR	Model 5a AOR	Model 5b AOR
<b>Wealth index<sup>a</sup></b>								
Lower class	1.00	1.00	1.00		1.00		1.00	
Middle class	4.14*	3.26*	3.01*		1.62**		1.97**	
Upper class	8.49*	5.08*	4.23*		1.63**		3.21**	
<b>Women's empowerment level</b>								
Low	1.00	1.00	1.00		1.00		1.00	
High	4.26*	2.38*	2.34*		1.09		1.07	
<b>Women-empowerment§wealth-index (interaction)<sup>a</sup></b>								
LLC	1.00			1.00		1.00		1.00
LMC	4.82*			4.26*		2.22*		1.97**
LUC	8.47*			6.85*		2.23*		2.01**
HLC	8.50*			7.26*		2.21**		1.91***
HMC	10.94*			9.79*		2.14**		1.96**
HUC	16.77*			13.32*		2.26*		2.00**
<b>Age</b>								
15–24			1.00	1.00			1.00	1.00
25–29			0.82	0.82			0.79	0.78
30–34			1.16	1.14			0.94	0.93
35–39			1.22	1.21			1.09	1.08
40+			1.14	1.13			1.04	1.02
<b>Region<sup>a</sup></b>								
North central					1.00	1.00	1.00	1.00
North east					0.65***	0.65***	0.68	0.65
North west					1.82*	1.86*	1.61**	1.61**
South east					0.30*	0.30*	0.29*	0.29*
South south					0.59*	0.60*	0.59*	0.59*
South west					0.73***	0.73***	0.72***	0.73***
<b>Residence</b>								
Urban			1.21***	1.20***			1.02	1.06
Rural			1.00	1.00			1.00	1.00
<b>Gender preference</b>								
None					1.00	1.00	1.00	1.00
Female					1.17	1.17	1.17	1.16
Male					1.11	1.11	1.17	1.18
<b>Education<sup>a</sup></b>								
No education					1.00	1.00	1.00	1.00
Primary					2.09*	1.97*	2.06*	2.01*
Secondary					1.66**	1.60**	1.81**	1.80**
Higher					1.40	1.37	1.54***	1.57***
<b>Religion<sup>a</sup></b>								
Christian					1.00	1.00	1.00	1.00
Islam					0.59*	0.59*	0.59*	0.59*
Others					0.72	0.67	0.65	0.58
<b>Family type</b>								
Monogamy					1.01	1.01	0.99	1.01
Polygamy					1.00	1.00	1.00	1.00
<b>Ethnicity<sup>a</sup></b>								
Hausa					1.00	1.00	1.00	1.00



**Table 5** (continued)

Background variables	Model 1 OR	Model 2 AOR	Model 3a AOR	Model 3b AOR	Model 4a AOR	Model 4b AOR	Model 5a AOR	Model 5b AOR
Igbo					10.93*	10.67*	9.19*	9.54*
Yoruba					16.98*	16.64*	15.46*	15.76*
Others					7.86*	7.66*	7.13*	7.30*
Access to family planning media information <sup>a</sup>								
None					1.00	1.00	1.00	1.00
Low					1.40*	1.40*	1.29**	1.30**
High					1.79*	1.79*	1.69*	1.71*
Visited health facility in the last 12 months with FP information received <sup>a</sup>								
No					1.00	1.00	1.00	1.00
Yes					2.53*	2.53*	2.44*	2.44*
Sex composition of the living children <sup>a</sup>								
Childless			1.00	1.00			1.00	1.00
All males			8.81*	8.68*			6.48*	6.42*
All females			10.46*	10.26*			6.60*	6.54*
Gender Mix			14.76*	14.32*			11.70*	11.56*
Husband/partner level of education								
No education					1.00	1.00	1.00	1.00
Primary					1.04	1.01	0.94	0.95
Secondary					1.02	0.99	0.99	1.01
Higher					1.17	1.13	1.11	1.14
Number of unions <sup>a</sup>								
Once			1.78*	1.78*			1.93*	1.96*
More than once			1.00	1.00			1.00	1.00
Partnership age difference								
0–4			1.22***	1.23***			0.84	0.83
5–9			1.14	1.15			0.93	0.93
10+			1.00	1.00			1.00	1.00
–2logLoglikelihood			4,720.9	4,694.8	4,284.5	4,275.8	4,100.8	4,102.6

LC lower class, MC middle class, UC upper class, LLC low and lower class, LMC low and middle class, LUC low and upper class, HLC high and lower class, HMC high and middle class

\*Significant at 0.1 %; \*\*Significant at 1 %; \*\*\*Significant at 5 %

<sup>a</sup>Modern contraceptive use predictors

for the individual variable categories and this further reduced when demographic (model 3), socioeconomic (model 4) and all factors (model 5) were introduced into the regression. In model 5, the data show that wealth index rather than women empowerment was an important determinant of current use of modern contraceptive. Other predictors of current use of modern contraceptives among the studied women were—region of residence, education, religion, ethnicity, access to family planning information on media, visited health facility in the last 12 months with family planning information received, sex composition of the living children and number of unions.

The data further show that either using wealth index and women empowerment jointly or interactively in the regression

equation generated the same predictors with similarity in their pattern of the odds ratio. The likelihood of current use of modern contraceptive was significantly lower among the poorly empowered lower class married women in Nigeria (model 5b). Having some level of empowerment and not belonging to the lower class have great influence on the use of modern contraceptives.

## Discussion

Modern contraceptives are known to be effective ways of preventing unwanted pregnancies, thus reducing cases of

abortion and maternal deaths. Rising contraceptive use results in reduced abortion incidence in settings where fertility itself is constant (Marston and Cleland 2004). The benefits of contraception among sexually active women of childbearing age is enormous, particularly regarding married women. Such gains include the prevention of health, social and psychological cost effect of unwanted pregnancies (Kavanaugh and Anderson 2013); therefore, the low modern contraceptive prevalence rate in Nigeria raises a concern despite the ongoing programmes and campaigns for family planning across the country. The anxiety prompted researchers' interest in exploring the reasons for low use of modern contraceptives in Nigeria (Monjok et al. 2010; Ezechi et al. 2013; Onwujekwe et al. 2013); however, studies that have addressed the influence of the interaction between the wealth index and level of women's empowerment, as evidenced in the current study, are scarce in Nigeria.

The mean age 32.9( $\sigma = 8.0$ ) estimated for women in this study is expected since they are married and they cover the spectrum of childbearing years (15–49 years). About a quarter of the women are currently using modern contraceptives. This finding is at variance with the level obtained in the 2013 DHS report for all married women of reproductive age (9.8 %) in Nigeria (NPC and ICF International 2014). The striking difference can be explained by the characteristics of women used in the current study, excluding women that were: not sexually active, infecund, lactating and pregnant. Exclusion of such women has the tendency to increase the modern contraceptive prevalence rate and vice versa. Also, the pattern for age and modern contraceptive use in this study is in agreement with the previous study outcomes where younger married women (15–24 years) had the least proportion of their members using modern contraceptive compared to other age segments (Anne 2015). This could be due to the fact that younger women have just begun childbearing and some of these women who started early are yet to reach their desired fertility goal.

Wealth is a measure of valuable materials and resources that a family or individual has. Being in an upper class or rich for instance can prevent the agonies that come with poverty including lack of access to modern contraceptives, modern contraceptive choices and family planning programmes (Adebowale et al. 2013). The state of wealth of a family can influence the family decisions regarding what to acquire with their resources and their way of life. In Nigeria, family planning is free at health facility but management of complications as a result of family planning is not free, so many families have opted out from contraception because of the fear and cost of complication management (Ijadunola et al. 2010). Condoms and pills, the most popular contraceptives among married women in Nigeria (NPC and ICF International 2014), are often acquired from patent medicine stores which require payment especially in case of emergency sexual needs of partners. In such circumstances, the poor who are striving to meet

their daily needs particularly feeding may find it worthier to acquire foodstuffs for the family rather than buying contraceptives. While wealth may be an important determinant of modern contraceptive use, another important reason is distance from the health facility (Ettarh and Kyobutungi 2012; Eliason et al. 2014). For instance, taking injectable contraceptives would require visiting the health facility every quarter, lack of transportation fare has implication for the continuing use of such a method. Nigeria is a poverty-stricken country; therefore, where family programmes are not easily accessible even though contraceptive services might be free, women could be hindered due to their inability to pay transportation fare. In this study, we found that being in lower class inhibits the use of modern contraceptives among married women in Nigeria. This outcome is consistent with previous studies in Nigeria and other parts of the world (Adebowale et al. 2011, 2013).

We further found that approximately one third of the highly empowered women were currently using modern contraceptive methods compared to only one out of every nine poorly empowered women. Deciding for one's self regarding health and other household issues remains a challenge for some African women. In Nigeria, virtually across all ethnic diversities, the man is regarded as the head of the family and they must be aware of any decisions regarding family issues including those that relate to women's health. Studies have found that the influence of male involvement on the use of family planning in some parts of Africa is large. However, this effect can be lessened if a woman is empowered. Although cultural barriers can limit the level of participation of women in household decision making, when a woman is empowered, there is tendency for her to be able to meet daily needs herself, thus reducing the level of the domineering role of the male partner. Therefore, the emerging finding from our study that highly empowered women use modern contraceptives as opposed to their counterparts who are poorly empowered, is expected and in accordance with studies from other settings in sub-Saharan Africa (Mekonnen et al. 2013; Mai and Nami 2012).

The socio-demographic predictors of current use of modern contraceptives in Nigeria when wealth index and women empowerment were used either jointly or interactively were: region of residence, education, religion, ethnicity, family planning information on media, visited health facility in the last 12 months with family planning information received, sex composition of the living children and number of unions. These factors have been identified in the past as important determinants of modern contraceptive use in Nigeria (Adebowale et al. 2011). The direction of relationship observed in some of the variables was similar to the pattern in this study. For instance, in the current study, being a Christian and married only once are protective factors regarding the use of modern contraceptives as opposed to being a Muslim and

married more than once, respectively, as well as receiving family planning information in the health facility and having access to family planning information via media promote the use of modern contraceptives.

The interactive model revealed that modern contraceptive use may be inhibited if a Nigerian woman is poorly empowered and at the same time in the lower class wealth category. Empowerment and health complement one another. For instance, if a woman is in the lower class but highly empowered, she stands a better chance of making some decisions regarding her own health, including decisions regarding access to and utilization of modern contraceptives and vice-versa. However, there is likelihood that poor utilization of modern contraceptives is feasible if she is poorly empowered and in the lower class, as found in our study; also variations existed in the reasons for non-use of modern contraceptive across the sub-groups of women studied.

Gaps in the demographic health survey data used for this study limit detailed understanding of the extent of inequalities in modern contraceptive use in Nigeria. Explaining the various dimensions of the roles of women empowerment and wealth index on modern contraceptive use in Nigeria will require further research.

## Conclusion

The states of wealth of a woman and her empowerment status have implications on modern contraceptive use in Nigeria. By making modern contraceptives more affordable and accessible in Nigeria, there is likely to be an improvement in the use of contraceptives, particularly among the poorly empowered and lower class women. Increasing women's economic independence should be included as part of intervention programmes aimed at improving the level of family planning usage in Nigeria. Strengthening of the existing family planning information in health facilities and communities is also recommended.

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## Compliance with ethical standards

**Competing interests** The authors declare that they have no competing interests.

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