

Utilization of Maternity Services and Its Relationship with Postpartum Use of Modern Contraceptives Among Women of Reproductive Age Group in Nigeria

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Background: Utilization of maternity services (UMS) exposes mothers to family planning (FP) counseling and other FP promotional activities. Uptake of postpartum modern contraceptives (PPMC) reduces both infant and maternal mortalities by reducing unwanted pregnancies and promoting good child spacing. Understanding the relationship between UMS and uptake of PPMC was therefore very important.

Purpose: To determine the association between UMS and uptake of PPMC among women of the reproductive age group in Nigeria taking into consideration the influence of the place of access to the maternity services.

Patients and Methods: This study was a descriptive epidemiological study design. Secondary data obtained from the 2013 Nigerian Demographic Health Survey (NDHS) was analyzed to achieve the above aim. The uptake of PPMC was the dependent variable (DV). The independent variables (IDV) selected were the number of antenatal care (ANC) visits, place of access of ANC, place of delivery, timing of postnatal care (PNC) and place of access of PNC. Other control variables include socio-demographic factors. Descriptive statistics, chi-square testing, and logistic regression analyses were conducted to determine the association between the PPMC uptake and the IDV/other control variables. Statistical significance was claimed at $p < 0.05$.

Results: Utilization of maternity services was associated with higher uptake of PPMC among the women (≥ 4 ANC visits OR = 2.08, 95% CI=1.65–2.62, $P < 0.001$; public facility delivery OR= 1.80, 95% CI= 1.54–2.10, $P < 0.001$; private facility delivery OR =1.54, 95% CI 1.28–1.85, $P < 0.001$; PNC OR=1.21, 95% CI= 1.02–1.43, $P=0.029$). Accessing postnatal care in private health facilities was associated with increased uptake of PPMC (OR= 1.46, 95% CI =1.05–2.02, $P= 0.024$). The number of children alive, educational attainment, wealth index and having information about FP remained significant predictors of PPMC uptake.

Conclusion: The utilization of maternity services was positively associated with postpartum use of modern contraceptives among women of reproductive age in Nigeria. There was increased uptake of PPMC among women who utilized maternity service compared to their counterparts who did not. Regarding the place of access, accessing antenatal care as well as delivering in either private or public health facilities was not a significant predictor of PPMC use. However, accessing postnatal care in private facilities was associated with higher uptake of PPMC.

Keywords: maternity services, postpartum contraception, family planning, Nigeria

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Introduction

Family planning (FP) offers people the opportunity to space their pregnancies and have their preferred number of children and this is accomplished through the utilization of various methods of contraception.¹ Control of fertility through effective contraceptive use offers social and health benefits to individuals, the families as well as society.² It prevents pregnancy-associated health problems, reduces abortions, unintended/unwanted pregnancies, and infants' death, slows rapid growth in population, improves women's economic and social status and enables their full participation in the society.³

Postpartum contraception/FP is the commencement of the use of contraceptives within 12 months after childbirth.⁴ The use of contraception during the period after delivery has since been demonstrated as a vital element of reproductive health care (RHC).⁵ Health care workers through their contact with mothers during pregnancy and delivery have been noted as an important information source on postpartum contraceptive use.⁶

Justification for the need for postpartum contraceptive uptake is that increased use of modern FP methods in the period after delivery reduces both infant and maternal mortalities by reducing unwanted pregnancies and by promoting adequate child spacing in between births.⁷ It has been noted that women are more inspired to prevent pregnancies and most "receptive to" the discussions on contraception during pregnancy and after childbirth – thus they are more likely to adopt a contraceptive method postpartum.⁸

Theoretical reasons exist to anticipate an association between maternity and "child health" (MCH) services utilization and uptake of contraception.⁹ First, utilization of maternity services (UMS) exposes mothers to family planning (FP) counseling and other FP promotional activities. Second, integration of MCH with FP services as is often done in the majority of settings may decrease the time-associated cost of uptake of contraception.⁹

Making FP services and information more available increases the acceptability and the desirability of the use of contraceptives by the members of a community, thereby stimulating further uptake of contraception.¹⁰ It has been shown that use of contraception by women is really shaped by the presence and accessibility of family planning services as well as by the perceived service quality.¹¹ Investigators have also shown that after controlling for women's household and individual characteristics, increased uptake of postpartum contraception is related to the availability of a close-by public health

care center and the quality of contraceptive services rendered in that community.¹²

Health care services including FP services could be delivered through private and public providers. Public health care service is typically delivered by governments through their national health systems. The private health care is delivered via private practitioners and "for profit" institutions/hospitals and other nongovernmental nonprofit providers including the "faith-based" institutions.¹³ Where a woman access maternity services (public or private health facility) is likely to have an impact on subsequent use of contraceptives.

Nigeria remains Africa's most populous nation with a population of 177,155,754 and contraceptive prevalence rate (CPR) of 14% in 2014.¹⁴ This is low when compared with the worldwide CPR of 63.3% in 2010.¹⁵ However, Adeyemi et al revealed an unmet need for contraception as high as 59.4% at 10 months after delivery in Nigeria.¹⁶ The result of this high level of unmet need for contraception and low prevalence for modern contraceptive methods after the delivery period include increased rate of unintended and/or unwanted pregnancies, abortions, short interval between pregnancies and resultant high child (128/1000 live births) and maternal (576/100,000 live birth) mortalities.¹⁷ These pregnancy-associated complications and mortalities constitute massive "public health" challenges to stakeholders and policymakers at every level in Nigeria.¹⁸

Studies have shown that there is a positive relationship between the utilization of maternity services and subsequent uptake of modern contraceptives.^{5,9,19,20} Despite this body of evidence, in Nigeria, most studies are local ones that investigated contraceptive use among young people, adolescents, and undergraduates and women in general. Only one, using the 2008 NDHS data examined the postpartum modern contraceptive (PPMC) determinants and use in the contexts of contacts of women with other reproductive health care delivery system⁵ but none examined the influence of place of access (government or private) of the maternity services on the uptake of PPMC. This study, therefore, aimed to determine whether there is an association between utilization of maternity services and postpartum use of modern contraceptives among women of reproductive age between 2009 and 2013 in Nigeria taking into consideration the influence of the place of access of the maternity services in the country.

Materials and Methods

Study Design

This was a descriptive epidemiological study that involved the analysis of secondary data from the 2013 Nigerian Demographic Health Survey (NDHS).

Study Setting

Nigeria remains the most populous country in the African continent with a population of 177,155,754.¹⁴ Presently Nigeria is geopolitically grouped into six zones with a total of thirty-six states, 774 local government areas (LGA) and a Federal Capital Territory.

Sample Size

This study involved secondary analyses of an already existing set of data from the 2013 NDHS in which a study sample of 38,948 women aged 15–49 years were interviewed all over the country. A total of 13,066 data was analyzed after applying the exclusion and inclusion criteria.

Inclusion and Exclusion Criteria

All women within the age group 15–49 who had at least one delivery within the past 5 years were included. Women whose most recent birth did not fall within 5 years prior to the survey were excluded from the sample (use of contraception after most recent birth was considered, and this must be between 2009–2013). Also, all the women who delivered less than 12 months prior to the date of the 2013 NDHS were also excluded – so as to make sure that all women analyzed completed a one-year post-delivery period.

Ethics

The data for this study were made readily available by request from the ICF macro USA and the details of the proposed use of the data made known to them. Permission was granted for use of the data. Also, data were in aggregated form, the initial participants were not individually recognizable or identifiable in any form. Therefore, the issue of anonymity, confidentiality, and informed consent never arose.

Data Source

The source of data for this study was the women's questionnaire of the 2013 NDHS. It provided recent information on health indicators including family planning as well as other demographic characteristics of women of

reproductive age group 15–49 years. It also provided information on health indicators for Federal Capital Territory (FCT), the thirty-six states, the six geopolitical divisions of the country as well as national estimates. The 2013 NDHS sample was a national representative sample that covered the whole population living in residential units in Nigeria. The sampling frame of the survey was the enumeration area (EA) list which was put together during the 2006 national population census. The sample for the survey was obtained using a stratified three-stage cluster design. Stratification was done by splitting every state in the country into rural and urban areas.

Postpartum modern contraceptive (PPMC) use was the dependent variable (DV). This was defined as the use of any of the following modern contraceptives from at least 12 months after the last delivery.⁵ The methods included sterilization (female or male), intrauterine device (IUD), injectables, implants, pills, condoms, female condoms, diaphragm, and foam/Jelly. The independent variables (IDV) selected that depict utilization of maternity services included; the number of antenatal care (ANC) visits, place of access of ANC, place of delivery, timing of postnatal care (PNC) and place of access of PNC.

Other control variables selected based on the literature review findings and on the factors associated with utilization of contraception were; age group of mother at last delivery, educational status of the woman, wealth index, place of residence (urban or rural), region of residence, marital status, religion, exposure to FP information in health facility, and number of children alive.

Data Analysis

A set of data (13,066) which was needed to address the research question of this study was extracted from the above-mentioned source after applying the inclusion and exclusion criteria. Statistical analysis was done using Statistical Package for Social Science (SPSS) version 21. There was some missing data for ANC, PNC, and place of delivery. For this analysis, only those respondents with responses for the variables of interest were included in cross-tabulation (chi-square test) and in logistic regression. Hence, all cases with missing data were excluded using a complete case analysis method.²¹ Also in order to address the “differences in the probability of selection” and produce appropriate representation; weighting was applied in the tabulation. The “weight cases” option in SPSS was selected for all the cross-tabulations and logistic regression analyses.

Descriptive analysis was used to present the socio-demographic characteristics (SDC) of the participants. Frequency tables were used to show the percentages of SDC, the percentage utilization of the selected maternity services as well as the percentage uptake of postpartum modern contraceptive. Furthermore, the Chi-square test was used to test for the association between the selected independent variables indicating maternity services utilization (ANC, place of delivery, PNC, place of access of the maternity services) and the dependent (outcome) variable (uptake of PPMC).

Finally, the relationship existing between the dependent and the independent variables as well as other socio-demographic variables was tested using multiple logistic regression (MLR) models to address confounders. The MLR analysis was applied in situations where there existed a single variable with dichotomous outcomes (use or no use of PPMC) and greater than one independent or control variables.²² It permitted the estimation of the odds ratio “for a putative factor” independent of the influence of confounders and other existing explanatory variables.²³ Statistical significance was claimed at $p < 0.05$ for all the analyses.

Result

The final data of women aged 15–49 years analyzed were 13,066. Figure 1 depicted how the final data were obtained.

Descriptive Statistics

Socio-Demographic Characteristics (SDC) of the Respondents

Table 1 shows the frequency distribution of the SDC of women. About two-thirds (63.4%) of the women were aged



Figure 1 The flow chart showing the data selection procedure.

Table 1 Frequency Distribution of the Socio-Demographic Characteristics of Women in the Study

Variables	Number of Women	Percentage (%)
Age of mother at last delivery (years)		
<20	608	4.7
20–34	8280	63.4
35+	4178	32.0
Number of children alive		
0	158	1.2
1–2	4807	36.8
3–4	4207	32.2
5+	3894	29.8
Type of place of residence		
Urban	4437	34.0
Rural	8629	66.0
Region		
North Central	2082	15.9
North East	2580	19.7
North West	3949	30.2
South East	1067	8.2
South-South	1629	12.5
South West	1759	13.5
Educational status		
No education	5990	45.8
Primary	2747	21.0
Secondary	3445	26.4
Higher	884	6.8
Wealth index		
Poorest	2825	21.6
Poorer	2945	22.5
Middle	2633	20.2
Richer	2469	18.9
Richest	2194	16.8
Religion		
Catholic	1052	8.1
Other Christian	4387	33.6
Islam	7416	56.8
Other	155	1.2
Missing	56	0.4
Marital status		
“Never married”	329	2.5
Presently married	12,215	93.5
Formerly married	522	4.0
Total	13,066	100.0

20–34 years at the time of the last delivery. This was followed by those aged 35 years and above (32%). Women less than 20 years of age constituted (4.7%) of

the respondents. Concerning the number of children alive, slightly above one-third of the women had 1–2 children (36.8%), while those that had 3–4 children alive were about 32.2%. There were more women from rural areas (66%), and a greater proportion of the participants was from the northwest part of the country. The majority of women (45.8%) had no formal education. Islam was the most commonly reported religion (56.8%) while the majority of the women were married (93.5%).

Utilization and Place of Access of Maternity Services

Table 2 shows the frequency distribution of utilization of various maternity services and the place of access to the services. Percentages with and without missing data were presented but the latter reported as the result was not significantly affected by the missing data. The majority of the women (53.2%) attended more than four antenatal care (ANC) visits; however, slightly above one-third (35.4%) did not attend any ANC. Antenatal care was most commonly received in public/government facilities (50.4%) compared with private facilities (14.5%). Most women delivered at home (61.4%), however a higher proportion of the women delivered in public/government sector facilities (25.3%) compared to (13.3%) that delivered in private sector facilities. Similar proportions of women attended postnatal care (PNC) at day 2 or less (14.7%) and between 3 and 6 weeks (14.2%); however, the majority did not attend PNC (71.2%). Among those that attended PNC, a higher proportion of women accessed care in public sector facilities (19.0%) compared with private sector facilities (6.2%).

Prevalence of Postpartum Modern Contraceptive (PPMC) Use, Methods, and Information About Family Planning (FP)

A total of 1499 women used PPMC out of 13,066, giving a prevalence rate of 11.5%. The commonest PPMC/FP method used by the women was injectables (4.3%) followed by a condom (2.7%) and pills (2.6%). Diaphragm was not used while the least used method was female sterilization. Concerning information about FP, only about one-tenth of the women (11.3%) were informed about FP in health facilities while a greater percentage of the women (88.3%) were not informed.

Bivariate Result

Relationship Between the Socio-Demographic Variables and PPMC Uptake Using the Chi-Square Test
The association between the socio-demographic variables and postpartum modern contraceptive (PPMC) uptake is presented

Table 2 Frequency Distribution of Utilization of Various Maternity Services (ANC, Place of Delivery, and PNC) and the Place of Access of the Services

Variables	Number of Women	Percentage (%) (with Missing)	Percentage (%) (Without Missing)
Number of ANC visits			
None	4518	34.6	35.4
1–3	1451	11.1	11.4
4+	6782	51.9	53.2
Missing	315	2.4	
ANC received at home			
Yes	278		2.1
No	8270		63.3
No ANC	4518		34.6
ANC in Public sector			
Yes	6589		50.4
No	1959		15.0
No ANC	4518		34.6
ANC in private sector			
Yes	1890		14.5
No	6658		51.0
No ANC	4518		34.6
Place of delivery			
Home	8008	61.3	61.4
Public sector	3300	25.3	25.3
Private sector	1712	13.1	13.1
Other	18	0.1	0.1
Missing	28	0.2	
Timing of PNC			
≤ 2 days	1907	14.6	14.7
3 days to 6 weeks	1844	14.1	14.2
No PHC	9264	70.9	71.2
Missing	51	0.4	
Place of PNC access			
Home	512		3.9
Public sector	2477		19.0
Private sector	810		6.2
Other	3		0
No PNC	9264		70.9

Abbreviations: ANC, Antenatal care; PNC, Postnatal care.

in Table 3. The uptake of PPMC was significantly higher among the women of older age group ($X^2=58.34$, $P < 0.001$) those that have higher number of children alive ($X^2 = 41.52$,

Table 3 Association Between the Socio-Demographic Variables and Post-Partum Modern Contraceptive (PPMC) Uptake

Variable	Number Using PPMC/(%)	Total	Chi-Square	P-value
Age of mother at last delivery (years)				
<20	29 (4.4)	653	58.34	0.000
20–34	891 (10.5)	8514		
35+	566 (13.6)	4172		
Number of children alive				
0	2 (1.1)	174	41.52	0.000
1–2	473 (9.6)	4922		
3–4	556 (12.7)	4374		
5+	454 (11.7)	3867		
Type of place of residence				
Urban	909 (19.1)	4760	474.30	0.000
Rural	576 (6.7)	8578		
Region				
North Central	278 (14.3)	1944	1080.00	0.000
North East	64 (2.9)	2235		
North West	200 (4.2)	4796		
South East	130 (12.4)	1049		
South South	251 (18.9)	1326		
South West	561 (28.2)	1987		
Highest education				
No education	112 (1.7)	6444	1200.00	0.000
Primary	408 (15.5)	2635		
Secondary	762 (22.3)	3418		
Higher	203 (24.2)	840		
Wealth index				
Poorest	32 (1.0)	3054	1158.30	0.000
Poorer	142 (4.8)	2973		
Middle	263 (10.3)	2543		
Richer	388 (16.3)	2378		
Richest	660 (27.6)	2390		
Religion				
Catholic	212 (18.7)	1136	854.6	0.000
Other Christian	866 (22.0)	3928		
Islam	397 (4.9)	8055		
Other	8 (5.1)	157		
Marital status				
Never married	74 (28.0)	264	78.08	0.000
Presently married	1362 (10.8)	12,580		
Formerly married	49 (9.9)	493		
Informed about FP at health facility				
Yes	446 (28.1)	1587	522.50	0.000
No	1035 (8.9)	11,690		

Note: The total did not add to 13,066 because of the weighting of data in cross-tabulations.

$P < 0.001$) urban dwellers ($X^2 = 474.30$, $P < 0.001$) and women from the Southwestern part of the nation ($X^2 = 1080.00$, $P < 0.001$). Similarly, significantly higher proportion of

women in the postpartum period reporting PPMC use was noted among those with higher education ($X^2 = 1200.00$, $P < 0.001$) the richest in the society ($X^2 = 1158.30$, $P < 0.001$)

Christians ($X^2=854.60$, $P < 0.001$) those not married ($X^2=78.08$, $P < 0.001$) and women who were informed about family planning in health facilities ($X^2=522.50$, $P < 0.001$). This infers that the higher use of PPMC by subgroups of those women in each category was not by chance.

The Relationship Between the Utilization of Maternity Services/Place of Access of Services and Postpartum Modern Contraceptive (PPMC) Use

Table 4 shows the relationship between utilization of maternity services/place of access to services and PPMC use. It was noted that the proportion of women using PPMC increases with an increase in the number of ANC visits. There was a higher use of PPMC among women who had 1–3 visits (6.5%) but the highest use of PPMC was noted among women who had 4 or greater than 4 visits (17.9%). Only 2.3% of women who had no ANC visit prior to their last delivery used PPMC. There was a significant association between the number of ANC visits and the use of PPMC ($X^2=734.5$, $P < 0.001$).

Concerning the place of access of ANC, uptake of PPMC was significantly associated with access to ANC care in a health facility (private or public sector facility) ($P < 0.001$). More women (23.5%) who accessed ANC in private facilities used PPMC compared to those who had care in public facilities (13.9%). The use of PPMC was significantly associated with health facility delivery ($X^2=917.4$, $P < 0.001$). Women who delivered in the private health facility had higher use of PPMC (23.8%) compared to those who delivered in a public health facility (20.6%).

The utilization and timing of PNC was also significantly associated with uptake of PPMC ($X^2=711.6$, $P < 0.001$). Only 6.6% of the women who did not attend PNC after the last childbirth used PPMC. More women (24.9%) who had their PNC within 48 hrs used PPMC compared to those who had their PNC visits between 3 days and 6 weeks post-delivery (19.5%).

Use of PPMC was also significantly associated with place of PNC access ($X^2=784.6$, $P < 0.001$). More women (27.6%) who accessed PNC in private health facilities used PPMC methods after their childbirth compared to those who accessed care in public health facilities (22.9%). Those who attended PNC in a health facility (Public or private) used modern family planning method compared to use by women who had no PNC (6.6%) and use by those who had PNC at home (10.6%).

Table 4 Relationship Between the Utilization of Maternity Services/Place of Access of Services and PPMC Uptake

Variables	Number Using PPMC/(%)	Total	Chi-Square	P-value
Number of ANC visits				
None	112 (2.3)	4801	734.5	0.000
1–3	95 (6.5)	1453		
4+	1212 (17.9)	6763		
ANC received at home				
Yes	44 (14.1)	313	588.5	0.000
No	1327 (16.2)	8224		
No ANC	112 (2.3)	4801		
ANC received in Public sector				
Yes	897 (13.9)	6434	709.8	0.000
No	447 (22.7)	2104		
No ANC	112 (2.3)	4801		
ANC received in private sector				
Yes	477 (23.5)	2028	736.0	0.000
No	897 (13.8)	6509		
No ANC	112 (2.3)	4801		
Place of delivery				
Home	400 (4.8)	8318	917.4	0.000
Public sector	647 (20.6)	3146		
Private sector	436 (23.8)	1833		
Other	0 (0)	16		
Timing of PNC				
≤ 2 days	502 (24.9)	2018	711.6	0.000
3 days to 6 weeks	347 (19.5)	1775		
No PNC	626 (6.6)	9492		
Place of access of PNC				
Home	54 (10.6)	511	784.6	0.000
Public sector	553 (22.9)	2418		
Private sector	252 (27.6)	913		
No PNC	626 (6.6)	9492		

Abbreviations: PPMC, post-partum modern contraceptive; ANC, antenatal care; PNC, postnatal care.

Logistic Regression

Univariate logistic regression analysis (presented in prose) was done for PPMC use and each of the main independent variables to generate unadjusted odds ratios (OR) and 95% confidence intervals (CI). This was followed by multivariable logistic. All control variables were included in the model producing the adjusted odds ratio (Table 5).

Table 5 The Odds of Use of Postpartum Modern Contraception (PPMC) by Number of ANC Visits, Place of Delivery, Timing of Postnatal Care (PNC) Visit, Place of Access of PNC Visit, and Other Control Variables

Variables	Adjusted OR	95% Confidence Interval (CI)	P value
Number of ANC visits			
None	1		
1–3	1.29	0.96–1.75	0.093
4+	2.08	1.65–2.62	0.000
Place of delivery			
Home	1		
Public sector	1.80	1.54–2.10	0.000
Private sector	1.54	1.28–1.85	0.000
Timing of PNC			
≤ 2 days	1.21	1.02–1.43	0.029
3 days to 6 weeks	1		
No PNC	0.71	0.60–0.83	0.000
Place of PNC access			
Home	1		
Public sector	0.85	0.62–1.17	0.323
Private sector	1.46	1.05–2.02	0.024
No PNC	1.24	0.87–1.76	0.236
Age of mother, at last, deliver (years)			
<20	1	0.77–1.87	0.434
20–34	1.20	0.74–1.90	0.475
35+	1.19		
Number of children alive			
0	1		
1–2	5.91	1.49–23.53	0.012
3–4	9.99	2.51–39.85	0.001
5+	16.66	4.16–66.68	0.000
Type of place of residence			
Urban	1.01	0.86–1.19	0.911
Rural	1		
Region			
North Central	1.00	0.82–1.21	0.991
North East	0.39	0.29–0.52	0.000
North West	0.63	0.51–0.77	0.000
South East	0.31	0.24–0.39	0.000
South-South	0.53	0.43–0.65	0.000
South West	1		
Highest education			
No education	1		
Primary	3.73	2.92–4.76	0.000
Secondary	4.27	3.31–5.51	0.000
Higher	3.22	0.24–0.39	0.000
Wealth index			
Poorest	1		
Poorer	2.02	1.34–3.03	0.001
Middle	2.52	1.69–3.77	0.000

(Continued)

Table 5 (Continued).

Variables	Adjusted OR	95% Confidence Interval (CI)	P value
Richer	2.97	1.97–4.50	0.000
Richest	4.95	3.23–7.59	0.000
Religion			
Catholic	1		
Other Christian	0.88	0.73–1.07	0.203
Islam	0.41	0.33–0.52	0.000
Other	0.45	0.21–0.96	0.039
Marital status			
Never married	1		
Currently in union	0.33	0.24–0.46	0.000
Formerly in union	0.28	0.18–0.43	0.000
Informed about FP at health facility			
Yes	1.72	1.49–1.98	0.000
No	1		

Note: Bold values indicate statistical significance.

Abbreviations: PPMC, post-partum modern contraceptive; ANC, antenatal care; PNC, postnatal care.

Number of Antenatal Care Visits

The crude odds ratio from the regression of PPMC use on the number of ANC visits showed significant associations. The odds of using PPMC among women who had 1–3 visits was 2.94 (95% CI 2.22–3.89, $P < 0.001$) while the odds of use increased to 9.16 (95% CI 7.51–11.16, $P < 0.001$) for women who had four or more ANC visits. This signified that women who had at least a visit and those that had four or more visits were 3 times and 9 times more likely to have used PPMC, respectively, when compared to women who did not attend ANC. However, after adjusting for the control variables (Table 5), only the comparison between 4 or more visits remained significant (OR = 2.08, 95% CI 1.65–2.62, $P < 0.001$).

Place of Delivery

The unadjusted OR of use of PPMC was statistically significant among women who delivered in public/government facilities (OR=5.13, 95% CI=4.49–5.85, $P < 0.001$) and private health facilities (OR= 6.18, 95% CI=5.34–7.16, $P < 0.001$) compared to home delivery. Delivering in public/private facility (institutional delivery) remained statistically significant after adjusting for other control variables (Table 5).

Timing of Postnatal Care

The use of PPMC was significantly higher among women accessing PNC within 2 days of childbirth (Unadjusted

OR=1.36, 95% CI= 1.17–1.59, $P < 0.001$). This remained statistically significant after adjusting for other variables (OR= 1.21, 95% CI=1.02–1.43, $P = 0.029$). Note that significance was set at ($P < 0.05$). Use of PPMC is significantly lower in women who did not attend PNC (OR = 0.71, 95% CI= 0.60–0.83, $P < 0.001$).

Place of Access of Postnatal Care

The unadjusted OR for use of PPMC was statistically significant for accessing postnatal care (PNC) in public (OR=2.49, 95% CI=1.85–3.36, $P < 0.001$) as well as private (OR= 3.21, 95% CI 2.34–4.40, $P < 0.001$) health facilities. However, after adjusting for other variables, accessing PNC in private facility remained statistically significant (OR= 1.46, 95% CI =1.05–2.02, $P = 0.024$). Therefore, having postnatal care in the private health sector facility was an independent predictor of the use of postpartum modern contraceptives.

Other Variables

The number of children significantly predicted the use of postpartum modern contraceptive (PPMC). As the number of living children increased, the odds of use of contraception in the period after delivery also increased. Women who had 5 or more children were sixteen times more likely to have used postpartum modern contraception (OR= 16.66, 95% CI = 4.16–66.8, $P < 0.001$) compared to the reference group who had no child alive. Similarly,

education remained a significant predictor of PPMC use. Odd of use increased with an increase in educational attainment up to secondary education. Women who had secondary education were 4 times more likely to have used modern family planning (FP) method after delivery (OR = 4.27, 95% CI= 3.31–5.51, $P < 0.001$) compared to the women who had no education. The use of PPMC also increased with an increase in the wealth index. The richest women were 5 times more likely to have used PPMC (OR=4.95, 95% CI= 3.23–7.59, $P < 0.001$) compared to the reference group (poorest women). Finally, having information about FP in health facility significantly predicted use of PPMC (OR=1.72, 95% CI= 1.49–1.98, $P < 0.001$).

Discussion

Integrating contraceptive services with maternity and other reproductive health services (RHS) could be one of the approaches needed in order to expand access to contraceptive services and enable women to space or limit their number of children.²⁴ In order to provide further evidence for integration, this analysis investigated the utilization of maternity services and its relationship with postpartum use of modern contraceptives among women of the reproductive age group in Nigeria. It also investigated the influence of place of access of these maternity services (private or public) on the uptake of the postpartum modern contraceptive (PPMC). The implications of the result were discussed under the following headings.

Utilization of Maternity Services and Postpartum Modern Contraceptive (PPMC) Use

The findings showed that utilization of maternity services (attending four or more ANC visits, health facility delivery, and timing of PNC) were significantly associated with increased uptake of PPMC among women of the reproductive age group in Nigeria. This significance remained after controlling for confounders. The findings were in keeping with the results of other related studies that found a significant positive relationship between the utilization of maternity services and the uptake of PPMC.^{5,19,20} Another important finding of this study was that having information about FP remained a significant predictor of PPMC uptake and there was more uptake of PPMC among women who had FP information. Other studies have also shown similar results.^{5,25,26} These findings have some vital

policy implications apart from its theoretical significance. It suggests that the availability of contraceptive counseling during antenatal care (ANC) visits, delivery, and postnatal care visits provides women with more opportunity and knowledge to make an informed choice about contraception. Offering the contraceptive service during the PNC visit has an additional advantage of allowing women to have postnatal care and contraceptive services in the same visit thereby reducing both financial and time costs. This indicates that promoting and providing counseling on family planning during the ANC attendance may possibly enhance service quality as well as client satisfaction.

Contrary to the findings of the current study, Do and Hotchkiss noted that there was no significant relationship between postnatal care utilization and uptake of contraception during the postpartum period.¹⁹ Though the study was a secondary data analysis from the primary DHS survey, the difference in findings might be due to smaller sample sizes they used (3667 and 3587 participants in Zambia and Kenya, respectively) compared to 13,066 participants in this present study. Again, women analyzed in this study included those who had used any form of modern contraception from at least 12 months after last delivery compared to their study that analyzed women who had only 2 months.

Place of Access of Maternity Services and Postpartum Modern Contraceptive (PPMC) Use

The result of this study showed that accessing antenatal care as well as delivering in either private or public health facilities was not a significant predictor of PPMC use. However, it showed that accessing postnatal care in private facilities significantly predicted the use of PPMC. Women who accessed postnatal care in private facilities had a higher uptake of PPMC than those who accessed care in the public/government health facility, and this was still significant after addressing confounders. It is worth to note that contraception becomes an essential need during the postnatal care period and not during antenatal or delivery. This finding was in keeping with the findings of other similar studies in Nigeria where the private health facilities were noted as the commonest source of modern contraception during the postnatal period.^{27,28} The Nigerian government approved the delivery of free contraceptives in the public/government health facilities without much interest in the private sector.²⁹ The policy implication of this finding is that there

is a need for more recognition of the private health sector in the delivery of modern contraceptive methods. It has been noted that the collaboration of the government with the private health sectors in the delivery of contraceptive services would lead to decreased cost, improved affordability, and accessibility of contraceptives.³⁰

Other Socio-Demographic Factors and PPMC Use

This study found that other significant independent predictors of postpartum modern contraceptive (PPMC) use include the number of children alive, educational attainment, and wealth index and having information about family planning. These findings are not new and are similar to the findings of other studies.^{19,31} The use of PPMC increased with an increase in educational attainment. Also, the wealthy women and those that heard about FP messages used PPMC more than other less privileged counterparts.

Study Strengths

The data for this study were from the Nigerian demographic health survey which used multistage probability sampling techniques in selecting clusters as well as households from a sampling frame that covered the Nigerian territory. Again, the large sample size used for this analysis, the high rate of response and participation, the standard method of collection of data as well as the trained interviewers used in primary survey ensured the reliability of the data and also showed that the estimates from the survey data truly represent national estimate. The span of the data collected (social, demographic, health, wealth, contraception, maternity services, fertility, etc.) allowed a deep analysis that went beyond counting prevalence but enabled the determination of a complex relationship between maternity services and uptake of contraception. Therefore, the result of this study truly reflects how maternity services relate to postpartum modern contraceptive use in the nation as a whole and can be generalized to populations that have the same characteristics as the population studied.

Again, during analysis, the weighting of data was applied to correct for the effect of non-proportional sample allocation to different states and their rural and urban areas and to correct the differences in the response rate in the different states. This also ensured representativeness. This research work has also added to the currently limited evidence on the relationship

between utilization of maternity services and postpartum modern contraceptive uptake especially with respect to the influence of place of access of the services among women of the reproductive age group in Nigeria.

Study Limitations

Causality could not be determined as this was a secondary analysis of a primary survey. One of the limitations of survey data is that it measures associations but not very reliable in determining causality.³² The utilization of maternity in this study was significantly associated with the use of PPMC. However, it was impossible to make a conclusion of a cause–effect relationship.

Again, the place of PNC visit was not specifically asked in the DHS and was assumed to be the place where the last baby's check was done. This may have introduced bias as the woman may have taken the baby for a checkup in other places apart from where she had ANC or where she delivered. However, a postnatal visit to the pediatricians provides another opportunity for mothers to have referrals for babies' vaccination as well as other services which include family planning.³³ Only the respondents with responses for the variables of interest were included in the cross-tabulations chi-square test and multiple logistic regression (MLR). Hence, all cases with missing data were excluded using the "complete cases analysis method".²¹ Though an acceptable method during analysis, this method may lead to loss of power and bias and questions the reliability of the result obtained. However, bias often is very minimal when using this method most especially during MLR models.

Conclusion

Utilization of maternity services (ANC, health facility delivery and attending PNC) was positively associated with postpartum use of modern contraceptives among women of reproductive age in Nigeria. There was increased uptake of PPMC among women who utilized maternity service compared to their counterparts who did not. Accessing antenatal care as well as delivering in either private or public health facilities was not a significant predictor of PPMC use. However, accessing postnatal care in private facilities was associated with higher uptake of PPMC.

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