Health insurance coverage and modern contraceptive use among sexually active women in Nigeria: Further analysis of 2018 Nigeria Demographic Health Survey

Obasanjo Afolabi Bolarinwa1,2*, Taiwo Oladapo Babalola3, Oladayo Abayomi Adebayo4 and Kobi V. Ajayi5,6

Abstract

Background  Studies have shown that affordable health insurance can influence healthcare visits and increase the choice of medication uptake in sub-Saharan Africa. However, there is a need to document the influence of health insurance coverage and modern contraceptive use in order to encourage its uptake. Thus, this study examined the influence of health insurance coverage on modern contraceptive use among sexually active women in Nigeria.

Methods  The secondary dataset utilised in this study were derived from the 2018 Nigeria Demographic and Health Survey (NDHS). Data analyses were restricted to 24,280 women of reproductive age 15–49 years who were sexually active in the survey dataset. Weighted bivariate and multivariable logistic regression models were used to examine the influence of health insurance coverage on modern contraceptive use while controlling for possible confounders. A Significant level of alpha was determined at p < 0.05 using STATA 16.0.

Results  The prevalence of health insurance coverage and modern contraceptive use among sexually active women in Nigeria were 25.47% and 13.82%, respectively. About 1 out of every 4 sexually active women covered by health insurance were using a modern contraceptive, while 86.50% of the women not covered by health insurance were not using any modern contraceptive method. After adjusting for socio-demographic characteristics, the odds of using any modern contraceptive were significantly higher for sexually active women who were covered by any health insurance [aOR = 1.28; 95% (CI = 1.01–1.62)] compared to sexually active women not covered by health insurance in Nigeria.

Conclusion  The study demonstrated that health insurance coverage is a significant driver of health service utilization, including modern contraceptive use. Health insurance benefits are recommended to be expanded to cover a broader spectrum of family planning services in Nigeria. More research is required to understand the influence of different health insurance schemes and the use of modern family planning methods in Nigeria.

Keywords  Health Insurance, Contraceptive methods, Family Planning, Sexually active women, Nigeria, DHS
Introduction
Modern contraceptive use has been identified as one of the biggest public health achievements in the past century [1, 2]. It is currently recognized as a significant element in reaching environmental, economic, and socially sustainable development [3] because it may help improve child and maternal health outcomes [4, 5]. Contraceptives also prevent unwanted pregnancies and risky abortions, while condom use reduces sexually transmitted infections [6–8]. The United Nations Development Programme (UNDP) report estimated that out of 1.9 billion sexually active women worldwide, about 1.1 billion require contraception to limit or delay childbirth. The report further estimated that between the years 2000 and 2020, contraceptive use among sexually active women increased by 188 million globally; however, this increment is not homogenous across different regions [9, 10].

The most reliable form of contraceptive is the modern contraceptive [11], and its use has been on the increase in the past few decades [12]. For instance, modern contraceptive use is associated with increased inter-pregnancy interval and reduced mortality of under-five children [11]. Additionally, modern contraceptive use can prevent an estimated 60 million years of population-health life and 2.7 million infant deaths. Based on this usefulness, the global use of modern methods is increased to 76.80% in 2020 from 73.60% to 2000 [13]. Despite this increase in the worldwide modern contraceptives use, disparities exist among resource-constrained countries. For example, sub-Saharan Africa (SSA) countries have a lower prevalence of modern contraceptive use compared to developed nations, and this has been reported in Nigeria (13%) and many African nations [2, 14–16].

The underutilisation of modern contraceptives in Nigeria stems from a myriad of factors but mainly finds its root in existing health system failures such as weak health policy formulation and poor motivation among health care workers, which has led to a massive brain drain of medical workers, weak health infrastructures, and poor health sector financing [17]. As a result, government initiatives that support access to sexual and reproductive health commodities, including family planning, remain elusive and suboptimal despite a few programs, such as the Nigerian Urban Reproductive Health Initiative, funded by Bill and Melinda Gates Foundation. Moreover, the issue of access to family planning services, in particular, continues to be a burgeoning problem in the country mainly due to funds [18]. The low prevalence of modern contraceptive use in the country is further compounded by a lack of universal health coverage (UHC), where the majority of Nigerians pay out-of-pocket for health expenditure and given that the country has an alarmingly high poverty rate, this does not present as a surprise [19].

Evidence has demonstrated that UHC is paramount to increased access to maternal health care utilization [20, 21]. One of the mandates of UHC is to ensure equal access to healthcare services irrespective of the geographical location or socioeconomic status [20]. For instance, the Abiye program piloted in one western state in Nigeria is an excellent example of how UHC can improve access and utilisation of modern contraception in the country [22]. Through the provision of free fully integrated maternal and child care facilities and referrals to all patients, the program reported a 69.6% increase in facility utilization, an increase of deliveries undertaken by skilled birth attendants from 43.3 to 69.6%, and an overall reduction of maternal mortality by 31% after two years of implementation in one site alone [4, 22]. However, due to the country’s health system challenges, there has been persistent inadequate national health insurance coverage in Nigeria compared to other developed countries [19]. For instance, since creating the National Health Insurance scheme in 1999, less than 5% of the overall population has health insurance coverage [19, 23]. While efforts to increase access to UHC in the country are underway and laudable, challenges still persist [24].

A 2018 report by health policy plus among seven low- and-middle income countries that committed to the global family planning 2020 initiative indicates that there is an association between health insurance coverage and family planning use [25] and that most sexually active women have inadequate access to health insurance [34]. However, studies conducted in Nigeria have yet to examine the interconnectedness of modern contraceptive use and health insurance coverage among sexually active women [26–28]. Rather, they have focused on influencing factors, diffusion effects, the behavior of users, inequalities, and the unmet need for modern contraceptives. Considering the benefits of health insurance coverage in increasing maternal health care services and the low use of modern contraceptives in Nigeria, it is important to understand the nexus between health insurance coverage and modern contraceptive use.

Thus, this study examines the relationship between health insurance coverage and modern contraceptive use among sexually active women in Nigeria using the most recent Nigeria Demographic Health Survey (NDHS). The research outcome is envisaged to help policymakers know if investment in health insurance could increase modern contraceptive use and enable stakeholders to make informed policy decisions that will increase modern contraceptives in Nigeria.

Data and methods
Design and setting of the study
We used data from the most recent Nigeria Demographic Health Survey (NDHS), which was conducted in 2018, to
examine the influence of health insurance coverage on modern contraceptive use among sexually active women in Nigeria [29]. The 2018 NDHS consists of a nationally representative sample of 41,821 women of reproductive age 15–49 years. The survey adopted a stratified two-stage sampling technique to provide valid and reliable estimates on key development indicators at national and sub-national levels. The NDHS captures data on modern contraceptive usage and health insurance coverage. The survey also captures information on respondents’ socio-demographic characteristics, which can be used to control the influence of health insurance coverage on modern contraceptive use among the target population in our study [29].

Sample characteristics
The NDHS dataset considers sexually active women as those who engaged in sexual intercourse within 30 days prior to the survey. Out of 41,821 women between the age of 15–49 years covered in the 2018 NDHS, a weighted sample of 24,280 women met the definition of sexually active women. Since our focus in this study is on sexually active women in Nigeria, the study sample size is restricted to the 24,280 sexually active women in the dataset.

Outcome variable
The dependent variable in this study is modern contraceptive use. Women were asked if they or their partners are ‘currently doing something or using any method to delay or avoid getting pregnant?’ Those who responded in the affirmative were asked to mention the type(s) of contraceptive methods currently in use which could either be any modern methods (i.e., pill, intrauterine device (IUD), injections, male condom, female sterilization, implants/ Norplant, lactational amenorrhea, female condom, emergency contraception, standard days method and/or other modern methods) or traditional methods (Period abstinance, withdrawal and/or other traditional methods). In this study, the survey responses to these questions were dichotomized as 1 = currently using any modern method and 0 = not currently using any method or currently using any traditional method. This categorization of modern contraceptive use as the dependent variable aligns with previous related studies [3, 26, 30].

Explanatory variables
The first explanatory variable used in this study was health insurance coverage and was used as a key independent variable, whilst the second domain of explanatory variable was the socio-demographic characteristics of the respondents, which were used as the covariates.

Key independent variable
In this study, the independent variable was health insurance coverage selected based on its association with maternal health service utilisation in previous studies [31, 32]. The study participants responded to the question, ‘Are you covered by any health insurance?’ We coded the health insurance coverage as “0= no” (reference category=RC) if the respondent is not covered by health insurance, whilst respondent is covered by health insurance was coded as “1= yes”.

Covariates
We identified the covariates based on similar studies on family planning [26, 30, 33, 34] and the availability of the variables in the 2018 NDHS dataset. The covariates constitute the second explanatory domain and are included in the analysis to control for possible confounders in the study analytical model. These include the main socio-demographic characteristics of survey respondents: age group, level of education, marital status, ethnicity, religion, employment status, wealth index, place of residence, geo-political regions, media, parity level, and desire for more children. The available media channels included and measured separately in the study are watching television, listening to the radio, and reading newspapers or magazines [29]. In the DHS, Principal Component Analysis (PCA) was used to generate a wealth index from a range of information collected on household assets, including type and volume of consumer goods owned, means of transportation, housing features, and ownership of animals [29].

Data analysis
The frequency distribution and cross-tabulation of sexually active women were first described by variables on health insurance coverage, socio-demographic characteristics, and modern contraceptives. This was followed by examining the associations between modern contraceptive use and each explanatory variable, such as health insurance coverage and socio-demographic characteristics, by using chi-square ($\chi^2$). Logistic regression models were used to examine unadjusted and adjusted odds ratios (AOR) of the effects of respondents’ health insurance coverage and their socio-demographic characteristics on uptake of modern contraceptive methods at 95% confidence intervals (CIs). All frequency distribution analyses were weighted using recommended DHS sampling weight of "V005/1000000" to account for the complex survey sampling design of DHS and ensure representativeness of the model estimates at the national level. All data were analyzed using STATA, version 16.0 and a significant alpha level was determined at $p<0.05$. 
Ethical approval
Since the authors of this manuscript did not collect the data, we sought permission from the MEASURE DHS website, and access to the data was provided after our intent for the request was assessed and approved on the 10th of January 2021. The DHS surveys are ethically accepted by the ORC Macro Inc. Ethics Committee and the Ethics Boards of partner organizations in different countries, such as the Ministries of Health. The women who were interviewed gave either written or verbal consent during each of the surveys.

Results
Table 1 presents results on the frequency distribution, percentage and cross-tabulation of women covered by health insurance, selected socio-demographic characteristics, and modern contraceptive usage among sexually active women in Nigeria. The prevalence of modern contraceptive use among sexually active women in Nigeria was 13.82%. Health insurance coverage shows that 25.47% of sexually active women in Nigeria covered by health insurance were using modern contraceptives, while 86.50% of those not covered by health insurance were not using modern contraceptives. Sexually active women with no desire for more children (21.26%) were currently using modern contraceptives, and 95.35% of sexually active women without educational backgrounds were not using modern contraceptives in Nigeria. All included explanatory variables were significantly associated with modern contraceptive use among sexually active women at p < 0.001.

Table 2 shows the results of health insurance coverage selected socio-demographic characteristics modern contraceptive use in Nigeria. There is a significant association between the key independent variable (Health insurance coverage) and modern contraceptives among sexually active women in Nigeria. The adjusted odds ratio (AOR) shows that Nigerian sexually active women who were covered by health insurance [aOR=1.28; 95%(CI=1.01–1.62)] had higher odds of using modern contraceptives compared to sexually active women who had no health insurance coverage in Nigeria.

In the same vein, the results of the socio-demographic characteristics and modern contraceptive use among sexually active women in Nigeria show that age of respondents, parity, level of education, marital status, children ever born (parity), desire for more children, ethnicity, religion, watching television, wealth index, place of residence, and region of residence were significantly associated with modern contraceptive use among sexually active women in Nigeria.

Higher odds ratio significant results show that those with higher education [aOR=2.69; 95%(CI=2.22–3.27)], women who were affiliated with the Yoruba ethnic group [aOR=1.86; 95%(CI=1.34–2.59)], women who watch television [aOR=1.22; 95%(CI=1.05–1.42)], and those within the richest wealth index [aOR=2.33; 95%(CI=1.80–3.01)] had higher odds of using modern contraceptive compared to those who had no educational background, women affiliated with Hausa ethnic group, those who do not watch television and women within poorest wealth index. On the other hand, sexually active women in the older age group of 35 years and above [aOR=0.73; 95%(CI=0.60–0.90)], those cohabiting [aOR=0.24; 95%(CI=0.16–0.36)], women residing in the rural area [aOR=0.79; 95%(CI=0.70–0.90)], and those residing in the South-East [aOR=0.45; 95%(CI=0.33–0.62)] had lower odds of using modern contraceptive in Nigeria compared to women who were within the younger age group (15–24), those that were single, women residing in the urban area, and those residing in the North-Central region of the country.

Discussion
This study examined the relationship between health insurance coverage and modern contraceptive use among sexually active women in Nigeria. Our results showed an overall low modern contraceptive use prevalence of 13.82%. Previous studies have found a comparable prevalence rate of modern contraceptive use in Nigeria, ranging from 12.60 to 18.70% [35, 36]. However, our result is lower than that of Ghana (21.00%) and Guinea (74.37%) but within the high percentile in SSA (17%) [37, 38]. In all, these results suggest that family planning service utilization is low in Nigeria. Therefore, our results show the need for effective public health interventions to increase modern contraceptive use in Nigeria.

Among sexually active women, only a small proportion (25.47%) with health insurance utilized a modern contraceptive. Although the result is higher than the 8.50% health insurance rate of women in SSA, Nigeria ranks 16 out of 24 SSA countries, with a prevalence rate of 2.80% vs. 62.40% in Ghana [23]. Still, Nigeria currently has significantly lower levels of health insurance access compared to Ghana (40.00%), Kenya (20.00%), and Ethiopia (14.00%) [25].

Several factors impact the health insurance scheme in Nigeria. First, as noted earlier, inadequate financing in the country’s health care sector continues to pose a significant barrier to health insurance access [39]. Furthermore, considering that the health insurance scheme is largely financed by the NHIS and covers only the formal sector, demands surpass available funds, thus leaving a huge number of the working population without access to health insurance coverage [25, 39]. Also, the health care system in Nigeria is heavily fragmented. These issues make it challenging to coordinate and distribute resources across the levels and hierarchy [23, 39]. Given
Table 1  Weighted frequency and percentage distribution of health insurance coverage, selected socio-demographic characteristics, and modern contraceptive use among sexually active women in Nigeria

| Variables                  | N = 24,280 | Modern contraceptive use |
|----------------------------|------------|--------------------------|
| Health Insurance Coverage  |            |                          |
| No                         | 23,648     | 97.39                    |
| Yes                        | 632        | 2.61                     |
| Age group                  |            |                          |
| 15–24                      | 5,888      | 24.17                    |
| 25–34                      | 9,598      | 39.53                    |
| 35 +                       | 8,814      | 36.30                    |
| Level of education         |            |                          |
| No education               | 10,872     | 44.78                    |
| Primary                    | 3,466      | 14.27                    |
| Secondary and above        | 9,942      | 40.95                    |
| Marital status             |            |                          |
| Single                     | 1,212      | 4.99                     |
| Currently Married          | 22,103     | 91.03                    |
| Cohabitation               | 666        | 2.74                     |
| Previously married         | 299        | 1.23                     |
| Currently working          |            |                          |
| No                         | 7,355      | 30.29                    |
| Yes                        | 16,925     | 69.71                    |
| Parity                     |            |                          |
| No child                   | 2,760      | 11.37                    |
| 1–3                        | 9,941      | 40.94                    |
| 4 and above                | 11,579     | 47.69                    |
| Desire for more children   |            |                          |
| Want more                  | 17,140     | 70.59                    |
| Undecided                  | 1,435      | 5.91                     |
| No desire                  | 5,705      | 23.50                    |
| Ethnicity                  |            |                          |
| Hausa                      | 10,647     | 43.85                    |
| Yoruba                     | 3,243      | 13.36                    |
| Igbo                       | 2,790      | 11.49                    |
| Others                     | 7,600      | 31.30                    |
| Religious                  |            |                          |
| Christianity               | 9,395      | 38.69                    |
| Islam                      | 14,765     | 60.81                    |
| Traditional & Others       | 120        | 0.49                     |
| Read Newspaper             |            |                          |
| No                         | 21,140     | 87.07                    |
| Yes                        | 3,140      | 12.93                    |
| Listening to radio         |            |                          |
| No                         | 11,176     | 46.03                    |
| Yes                        | 13,104     | 53.97                    |
| Watch television           |            |                          |
| No                         | 12,960     | 53.38                    |
| Yes                        | 11,320     | 46.62                    |
| Wealth Index               |            |                          |
| Poorest                    | 5,047      | 20.79                    |
| Poorer                     | 5,190      | 21.38                    |
| Middle                     | 4,541      | 18.70                    |
| Richer                     | 4,672      | 19.24                    |
| Richest                    | 4,830      | 19.89                    |
| Place of residence         |            |                          |

*p < 0.001*
Table 1 (continued)

| Variables | Modern contraceptive use |
|-----------|--------------------------|
|           | Urban | Rural | Region | South-West | South-East | South-Central | North-Central | North-East | North-West |
|           | 9,751 | 14,529 |       | 3,097 | 4,345 | 8,612 | 1,978 | 2,490 | 3,758 | 24,280 |
|           | 40.16 | 59.84 |       | 12.76 | 17.89 | 35.47 | 8.15 | 10.26 | 15.48 | 100% |
|           | 79.07 | 90.96 |       | 82.75 | 91.17 | 93.04 | 83.43 | 79.61 | 73.36 | 86.18 |
|           | 20.93 | 9.04 |       | 17.25 | 8.83 | 6.96 | 16.57 | 20.39 | 26.64 | 13.82 |
| p < 0.001 |       |       |       |       |       |       |       |       |       |       |

Weighted NDHS (2018)

these concerns, it is not surprising we found that an approximated 8 out of every 10 sexually active women do not have access to health insurance, resulting in sub-optimal contraceptive use as seen in previous studies [38, 39]. The relationship between health insurance coverage and contraceptive use in our study supports the theory that health insurance access is a significant predictor of health service utilization, such as preventive health screening and overall health outcomes [25]. Our analysis revealed that sexually active women in Nigeria with health insurance coverage were more likely to use modern contraceptives compared to their counterparts with no health insurance coverage. This is possible because access to health insurance coverage could encourage healthcare utilisation which could encourage the uptake of modern contraceptive in return [31]. The lack of health insurance coverage may explain the low levels of modern contraceptive use. Although health insurance coverage is a significant predictor of family planning services, evidence suggests that health insurance alone may not improve contraceptive use. Indeed, the knowledge of and willingness to utilize family planning services may also be barriers to contraceptive uptake [25, 40]. Other challenges from previous studies associated with using family planning services include poor supply chain, structural inequality and provider-patient poor communication [25].

This study also showed a significant association between some of the socio-demographic variables included in this study and modern contraceptive use. We found that educational level, parity, desire to have more children, watching television, ethnicity, and wealth index were significant predictors of modern contraceptives use. These findings, though significant, are mixed compared to previous studies. For example, findings from researchers in Ethiopia, Guinea, and Nigeria, support our results as they found higher odds of modern contraceptive use in people with secondary and tertiary education than in people without formal education [36, 38]. Similarly, our results align with Seidu et al., [38] findings suggesting that exposure to media, such as watching television, increases the likelihood of contraceptive use [27]. However, relating to the wealth index, our finding is contrary to a study conducted by Aviisah et al., [15]. We found that chances of utilizing contraceptives increased as women moved from poorest to richest. These inconsistencies notwithstanding, income level, which is a significant predictor of wealth by default influences health behaviors [35]. This is also in line with a study conducted by Seidu et al., [38] which suggests that rich women may have high health literacy, can partake in major family decisions, and are more knowledgeable of the benefits of family planning than women from poor households who may otherwise have low educational levels with poor knowledge of family planning services [38].

Furthermore, we found that marital status, area of residency, religion, region, and age, were associated with lower odds of contraceptive use. These findings are consistent with previous studies [17, 39]. For instance, these studies showed that the likelihood of modern contraceptive use was higher among younger-aged women (15–19 years) than their older-aged counterparts (45–49 years). Our results also suggest that several multifaceted factors may affect family planning services. For example, it is plausible that older-aged women (e.g., 35 years and above) may be menopausal as such chances of conception are unlikely than younger-aged women with higher chances of conception. In the same vein, those who are previously married may be of advanced age than single women; thus, family planning use might be lower among these subgroups [36]. A consistent and important finding is the rural-urban variations in modern contraceptive use. It appears that women in rural areas have lower levels of education, low income, and may have less decision-making powers which may negatively affect their contraceptive use [34, 38]. Rural areas may also have poorly equipped healthcare centers and providers, which may explain our results [41]. These findings suggest that a
Table 2  Results of bivariate and multivariate logistics regression of health insurance coverage, selected socio-demographic variables on modern contraceptive use among sexually active women in Nigeria

| Variables N = 24,280 | Modern contraceptive use |  |  |
|---------------------|--------------------------|------------------|------------------|
|                     | Unadjusted cOR [95% CI]  | Adjusted aOR [95% CI] |
| Health Insurance Coverage | No | RC | RC |
| | Yes | 2.19***[1.73–2.77] | 1.28*[1.01–1.62] |
| Age group | 15–24 | RC | RC |
| | 25–34 | 1.82***[1.61–2.07] | 1.07[0.92–1.25] |
| | 35 + | 1.89***[1.63–2.18] | 0.73**[0.60–0.90] |
| Level of education | No education | RC | RC |
| Primary | 4.03***[3.42–4.74] | 2.17***[1.82–2.59] |
| Secondary and above | 6.11***[5.24–7.12] | 2.69***[2.22–3.27] |
| Marital status | Single | RC | RC |
| | Currently Married | 0.38***[0.31–0.48] | 0.25***[0.18–0.34] |
| | Cohabitation | 0.56**[0.42–0.79] | 0.24***[0.16–0.36] |
| | Previously married | 0.98[0.70–1.38] | 0.38**[0.25–0.59] |
| Currently working | No | RC | RC |
| | Yes | 1.98***[1.75–2.24] | 1.10[0.95–1.26] |
| Parity | No children | RC | RC |
| | 1–3 | 1.36**[1.13–1.63] | 3.09***[2.47–3.87] |
| | 4 and above | 1.42***[1.19–1.69] | 5.00***[3.81–6.57] |
| Desire for more children | Want more | RC | RC |
| | No desire | 2.16***[1.97–2.42] | 1.81***[1.58–2.06] |
| Ethnicity | Hausa | RC | RC |
| | Yoruba | 6.06***[4.85–7.57] | 1.86***[1.34–2.59] |
| | Igbo | 3.71***[2.93–4.71] | 1.25[0.82–1.91] |
| | Others | 3.03***[2.44–3.76] | 1.33[0.97–1.81] |
| Religious | Christianity | RC | RC |
| | Islam | 0.31***[0.27–0.35] | 0.55***[0.44–0.70] |
| | Traditional & Others | 0.18***[0.08–0.39] | 0.28**[0.14–0.57] |
| Read Newspaper | No | RC | RC |
| | Yes | 2.31***[2.02–2.64] | 1.06[0.92–1.22] |
| Listening to radio | No | RC | RC |
| | Yes | 2.05***[1.82–2.30] | 1.03[0.90–1.17] |
| Watch television | No | RC | RC |
| | Yes | 3.59***[3.16–4.09] | 1.22**[1.05–1.42] |
| Wealth Index | Poorest | RC | RC |
| | Poorer | 1.92***[1.46–2.52] | 1.42***[1.10–1.84] |
| | Middle | 3.56***[2.85–4.44] | 1.76***[1.40–2.22] |
| | Richer | 6.47***[5.21–8.03] | 2.34***[1.82–3.01] |
| | Richest | 7.94***[6.41–9.83] | 2.33***[1.80–3.01] |
holistic approach to improving modern contraceptive use is important [25].

**Strengths and limitations**

There are several strengths to our study. The results of this study can inform public health efforts and policy. Secondly, we applied the NDHS weighting strategy to obtain precise population estimates, making our inferences generalizable and replicable. Lastly, to the best of our knowledge, our study is the first to analyze the health insurance coverage on contraceptive use among sexually active women vs. the general female population. Although our analysis is timely and contributes significantly to the literature, there are noteworthy limitations. Firstly, our outcome variable, modern contraceptives, is a combined variable of all types of contraceptives (e.g., injectables, condoms, or IUD); thus, our results may not show the true differentials among which types of contraceptives are preferred or more utilized and why. This may also impact knowledge about which of the contraceptive types are covered by health insurance. Secondly, our key independent variable was dichotomized; hence we did not analyze if the women in our sample had a public or private insurer. Information about insurance types may be important to provide an in-depth understanding of the health insurance scheme in Nigeria related to family planning services. Another inherent limitation of our study is that we utilized a cross-sectional design, which is self-reported and prone to misclassification and recall bias. We did not include other variables (e.g., provider’s perspective) that may explain our results. In the same vein, the survey was conducted 4 years ago, and the coverage of insurance and modern contraceptive use may have improved. Lastly, service availability and accessibility variables are important in explaining the outcome variable of the study but are not included in the NDHS. However, the DHS is a highly cited medical dataset used to draw inferences. Despite these limitations, our findings are comparable with previous studies suggesting that the underlying factors impacting family planning services are pervasive and consistent.

**Policy implications**

This study has important implications for policy, public health professionals, and researchers. The relationship between health insurance and modern contraceptive use demonstrated in this study suggests that lack of health insurance access is a significant barrier to utilizing family planning services in Nigeria. Stakeholders should consider expanding health insurance benefits to cover more choices of family planning services. Policymakers should also consider continuous and targeted health education messages to dispel misinformation or myths held about family planning services [42].

**Conclusions and recommendations**

Our study examined the relationship between health insurance and modern contraceptive use among sexually active women. The study concluded that health insurance coverage influenced modern contraceptive use among sexually active women in Nigeria. The study further showed that selected socio-demographic variables such as educational level, parity, desire to have more children, watching television, ethnicity, and wealth index were significantly associated with modern contraceptive use among sexually active women in Nigeria. We recommend that subscription to health insurance coverage should be made affordable or free in Nigeria to attract subscriptions from sexually active women within low-socioeconomic status such as lower education and poorest wealth index. Future research is needed to understand which contraceptive type is most preferred among sexually active women who subscribed to health insurance coverage in Nigeria.

Table 2 (continued)

| Variables N = 24,280                                      | Modern contraceptive use |
|----------------------------------------------------------|--------------------------|
| **Place of residence**                                    |                          |
| Urban                                                    | RC                       | RC                        |
| Rural                                                    | 0.37*** [0.33–0.43]      | 0.79*** [0.70–0.90]       |
| **Region**                                               |                          |                           |
| North-Central                                           | RC                       | RC                        |
| North-East                                              | 0.46*** [0.38–0.56]      | 1.05 [0.87–1.26]          |
| North-West                                              | 0.36*** [0.28–0.46]      | 0.99 [0.78–1.26]          |
| South-East                                              | 0.95 [0.79–1.15]         | 0.45*** [0.33–0.62]       |
| South-South                                             | 1.23 [1.04–1.44]         | 0.60*** [0.50–0.72]       |
| South-West                                              | 1.74*** [1.48–2.04]      | 0.74*** [0.60–0.92]       |

Weighted NDHS, 2018

RC = Reference category; CI = confidence interval; cOR = unadjusted odds ratios; aOR = adjusted odds ratios

* p < 0.05; ** p < 0.01; *** p < 0.001
Acknowledgements
We acknowledged and thanked Measure DHS for providing us with the data upon which this study’s findings were based.

Authors’ contributions
Conceptualization, Data Curation, Formal Analysis, Writing – original draft and review and editing: OAB. Writing- original draft and review and editing: TOB. Writing- original draft and review and editing: OAA. All authors revised the first draft of the manuscript for intellectual content and approved the final manuscript draft for publication.

Funding
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability
The DHS dataset is freely available for use upon request at https://dhsprogram.com/data/available-datasets.cfm. After the request has been approved, a de-identified dataset will be made available.

Declarations
Consent for publication
Not applicable.

Conflict of interest
We declare no conflict of interest.

Authors’ details
OAB 1Department of Global Public Health, Canterbury Christ Church University, Canterbury, United Kingdom; 2Department of Public Health Medicine, School of Nursing and Public Health, University of KwaZulu-Natal, Durban, South Africa. bolarinwaoba@gmail.com. TOB 3Institute of Governance, Humanities, and Social Sciences [PAUGHSS], PAN African University, Yaoundé, Cameroon. babalolataowo@gmail.com. OAA 4&DATS Consulting, Abuja, Nigeria. dayoadebayo@r-datsconsulting.org. KVA 5Education, Direction, Empowerment, & Nurturing (EDEN) Foundation, Abuja Nigeria; 6Department of Health and Kinesiology, Texas A&M University, College Station, TX, 77843, USA. kobajayi@gmail.com.

Received: 13 May 2022 / Accepted: 16 September 2022

References
1. US Public Health Service. Centers for Disease Control and Prevention: Ten great public health achievements: United States 1900–1999. MMWR. 1999;48:241–3.
2. Ahmed S, Choi Y, Rimon JG, Albuoma S, Gichangi P, Guellia G, et al. Trends in contraceptive prevalence rates in sub-Saharan Africa since the 2012 London Summit on Family Planning: results from repeated cross-sectional surveys. The Lancet Global Health. 2019;7(7)e004–e11.
3. Starbuck E, Norton M, Marcus R. Investing in family planning: key to achieving the sustainable development goals. Global health: science and practice. 2016;4(2):191–210.
4. Ajayi AI, Akpan W. Maternal health care services utilisation in the context of ‘Abuye’(safe motherhood) programme in Ondo State, Nigeria. BMC public health. 2020;20(1):1–9.
5. Aryanty Ri, Romadlona N, Besral B, Pangabean EDP, Utomo B, Makalew R, et al. Contraceptive use and maternal mortality in Indonesia: a community-level ecological analysis. Reproductive Health. 2021;18(1):1–9.
6. Bishwajit G, Tang S, Yaya S, Feng Z. Unmet need for contraception and its association with unintended pregnancy in Bangladesh. BMC pregnancy and childbirth. 2017;17(1):1–9.
7. Bolarinwa OA, Ajayi KV, Sah RK. Association between knowledge of Human Immunodeficiency Virus transmission and consistent condom use among sexually active men in Nigeria. An analysis of 2018 Nigeria Demographic Health Survey. PLOS Global Public Health. 2022;2(3):e000223.
8. Bishwajit G, Yaya S. Domestic violence: a hidden barrier to contraceptive use among women in Nigeria. Open access journal of contraception. 2018;9:21.
9. Kantorová V, Wheldon MC, Ufing P, Dasgupta AN. Estimating progression towards meeting women’s contraceptive needs in 185 countries: A Bayesian hierarchical modelling study. PLoS medicine. 2020;17(2):e1003026.
10. United Nations Department of Economic and Social Affairs. World Family Planning 2020 Highlights. 2020.
11. Bolarinwa OA, Tessensma ZT, Firimpong JG, Seidu A-A, Ahinkorah BO. Spatial distribution and factors associated with modern contraceptive use among women of reproductive age in Nigeria: A multilevel analysis. Plos one. 2021;16(12):e0258944.
12. Bolarinwa OA, Nwaqbara UI, Koyere J, Ahinkorah BO, Seidu A-A, Ameyaw EK, et al. Prevalence and predictors of long-acting reversible contraceptive use among sexually active women in 26 sub-Saharan African countries. International health. 2022.
13. United Nations Department of Economic and Social Affairs. World Family Planning 2020 Highlights: United Nations, 2020 [Available from: https://www.un.org/development/desa/pd/news/world-family-planning-2020-highlights.
14. Emina JB, Chiriva T, Kandalu N-B. Trend in the use of modern contraception in sub-Saharan Africa: does women’s education matter? Contraception. 2014;90(2):154–61.
15. Avisah PA, Deny S, Ato PK, Yawson A, Alotaibi RM, Remor HR, et al. Modern contraceptive use among women of reproductive age in Ghana: analysis of the 2003–2014 Ghana Demographic and Health Surveys. BMC women’s health. 2018;18(1):1–10.
16. Apanpa PA, Kumberi MT, Ayamga EA, Ullanka MB, Akpanboro R. Prevalence and factors associated with modern contraceptive use among women of reproductive age in 20 African countries: a large population-based study. BMJ open. 2020;10(9):e041103.
17. Omorele I, Talea B. Contemporary issues and challenges of health sector in Nigeria. Research Journal of Health Sciences. 2017;5(4):210-6.
18. Speizer IS, Guileck DK, Escamilla V, Lance PM, Calhoun LM, Ojogun OT, et al. On the sustainability of a family planning program in Nigeria when funding ends. Plos one. 2019;14(9):e0222790.
19. Uzochukwu B, Lighnasoro M, Etahle E, Okwuso C, Enuludah E, Omwujekwe O. Health care financing in Nigeria: Implications for achieving universal health coverage. Nigerian journal of clinical practice. 2015;18(4):457–44.
20. Sacks E, Schleff M, Were M, Chowdhury AM, Perry HB. Communities, universal health coverage and primary health care. Bulletin of the World Health Organization. 2020;98(1):773.
21. Jansen C, Coddia L, Cometto G, Yansané ML, Deleman M. Realizing universal health coverage for maternal health services in the Republic of Guinea: the use of workforce projections to design health labor market interventions. Risk management and healthcare policy. 2014;7:219.
22. Mimiko O. Experiences with universal health coverage of maternal health care in Ondo state, Nigeria, 2009–2017. African journal of reproductive health. 2017;21(3):9–26.
23. Arum H, Dickson KS, Kumi-Kyereme A, Darch EKM. Understanding variations in health insurance coverage in Ghana, Kenya, Nigeria, and Tanzania: evidence from demographic and health surveys. Plos one. 2018;13(8):e0201833.
24. Oxford Business Group. Nigeria set to reform health care system: Economic News; 2016 [Available from: https://oxfordbusinessgroup.com/news/nigeria-set-reform-health-care-system.
25. Ross R, Fagan T, Dutta A. Is health insurance coverage associated with improved family planning access? A review of household survey data from seven FP2020 countries, palladium. Health Policy Plus. 2018.
26. Alabi O, Omidewu CO, De-We H, Akinyemidi JO. Does female autonomy affect contraceptive use among women in northern Nigeria? African Journal of Reproductive Health. 2019;23(2):192–100.
27. Olagunju OS, Obasanjo BA, Temitope EE, Salu O, Taiwo I, Musa Z, et al. Does family planning messages exposure in the preceding 12 months period predict the current use of a modern family planning method among...
women of reproductive age in Nigeria. American journal of public health. 2020;8(3):100–4.

28. Bolarinwa OA, Olaniyan AT, Saeed BQ, Olagunju OS. Family planning use among young mothers in the peri-urban area of Osun State, Nigeria: the influence of spousal communication and attitude. Journal of Health Research. 2021(ahead-of-print).

29. Survey NDH. Nigeria Demographic Health Survey. National Population Commission (NPC)(Nigeria) and ICF International. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International 2019.

30. Oronokpo DO, Odimegwu CO, Usoro NA. Contraceptive use in Nigeria: does social context matter? African Journal of Reproductive Health. 2020;24(1):133–42.

31. Browne JL, Kayode GA, Arhinful D, Fidder SA, Grobbee DE, Klipstein-Grobusch K. Health insurance determines antenatal, delivery and postnatal care utilisation: evidence from the Ghana Demographic and Health Surveillance data. BMJ open. 2016;6(3):e008175.

32. Odeyemi IA, Nixon J. The role and uptake of private health insurance in different health care systems: are there lessons for developing countries? ClinicoEconomics and outcomes research: CEOR. 2013;5:109.

33. Bolarinwa OA. Factors associated with access to condoms and sources of condoms during the COVID-19 pandemic in South Africa. Archives of Public Health. 2021;79(1):1–9.

34. Bolarinwa OA, Olagunju OS, Olaniyan AT. Factors associated with low contraceptive use amongst vulnerable mothers in South West State, Nigeria. African Journal of Primary Health Care and Family Medicine. 2020;12(1):1–4.

35. Solanke BL. Factors influencing contraceptive use and non-use among women of advanced reproductive age in Nigeria. Journal of Health, Population and Nutrition. 2017;36(1):1–14.

36. OlaOlorun FM, Hindin MJ. Having a say matters: influence of decision-making power on contraceptive use among Nigerian women ages 35–49 years. PloS one. 2014;9(6):e98702.

37. Beson P, Appiah R, Adomah-Afari A. Modern contraceptive use among reproductive-aged women in Ghana: prevalence, predictors, and policy implications. BMC women's health. 2018;18(1):1–8.

38. Seidu A-A, Agbaglo E, Dadzie LK, Ahinkorah BO, Ameyaw EK, Tetteh JK, et al. Modern contraceptive utilization and associated factors among married and cohabiting women in Papua New Guinea: a population-based cross-sectional study. Contraception and Reproductive Medicine. 2020;5(1):1–11.

39. Okpani AJ, Abimbola S. Operationalizing universal health coverage in Nigeria through social health insurance. Nigerian medical journal journal of the Nigeria Medical Association. 2015;56(5):305.

40. Pazol K, Zapata LB, Dehlendorf C, Malcolm NM, Rosmarin RB, Frederiksen BN. Impact of Contraceptive Education on Knowledge and Decision Making: An Updated Systematic Review. American Journal of Preventive Medicine. 2016;55(5):703–15.

41. Bolarinwa OA, Fortune E, Abaagye RG, Seidu A-A, Olagunju OS, Nwagbara UI, et al. Health facility delivery among women of reproductive age in Nigeria: Does age at first birth matter? Plos one. 2021;16(11):e0259250.

42. Afolabi BM, Ezedinachi EN, Arikpo I, Ogunwale A, Ganiyu DF, Abu RA, et al. Knowledge, non-use, use and source of information on contraceptive methods among women in various stages of reproductive age in rural Lagos, Southwest Nigeria. Open access journal of contraception. 2015;6:65.

Publisher's note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.