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ABSTRACT

Background: Inequitable financial access to maternal health services (MHS) has contributed to maternal deaths, especially in low- and middle-income countries. Evidence in the literature on women's health insurance status and access to MHS in Nigeria is sparse. This study examined the association between health insurance coverage and access to MHS among Nigerian women of reproductive age.

Methods: This is a cross-sectional study that used the 2018 Nigeria Demographic Health Survey (NDHS). A total of 12,935 women who had their last delivery within 2 years of the NDHS were included in the study. Access to MHS was assessed by using the number of antenatal clinic (ANC) visits and health facility delivery. Adjusted logistic regression models were fit to control for individual, household, and community level factors.

Results: Only 18.5% and 40.6% of the women in the study attended ≥8 ANC visits and delivered in a health facility, respectively. About 40.0% of women who had ≥8 ANC visits and 71.8% of those who delivered in health facilities had health insurance coverage. There were statistically significant associations between having health insurance and attendance of ≥8 ANC visits (*aOR* = 1.9, 95% CI [1.26 – 2.95]) and women delivering at a health facility (*aOR* = 2.0, 95% CI [1.39 – 2.82]).

Conclusion: There was a low uptake of health insurance programs among the Nigerian women in this study. Having health insurance coverage was significantly associated with ≥8 ANC visits and women delivering in health facilities. Thus, providing health insurance may be an important way to improve women's access to MHS in Nigeria.

Key words: maternal health services, health insurance, health care financing, maternal mortality

1   BACKGROUND

Access to affordable, high-quality maternal health services (MHS) is a fundamental human right of all women irrespective of their age, residence, and socioeconomic status.[1] Unfortunately, inequitable access to MHS has been reported globally, especially among the rural poor in low- income and lower- and middle-income countries (LMICs).[2,3] The United Nations reported in 2019 that an estimated 1.9 million families in Africa spend more than 40% of their non-food, out-of-pocket expenses on MHS each year, which makes the cost of childbirth services catastrophic.[4] A systematic review of 36 publications on MHS costs in LMICs showed that the median cost for antenatal care (ANC) could be as high as US$30 and US$78 in public and private health facilities, respectively, in India, which is a LMIC. The median cost for normal delivery in public health facilities ranged from US$50 to US$350 in Nepal and it was as high as US$580 in private hospitals in India. These costs would be catastrophic for women and their households considering that 46.0% and 49.0% of the extremely poor people in the world reside in LMICs.[5] For example, in Myanmar, a LMIC, the poverty ratio among women increased to 4.3%, 1.3%, and 6.1% after the women made out-of-pocket payments to access ANC care services, delivery services, and both antenatal and delivery services, respectively.[6]

In a rural community in Southwestern Nigeria, the cost of at least four ANC visits was US$9.5 with a range from US$6.5 to US$9.6 for delivery in 2013, when the exchange rate was 1US$ to ₦155 (naira). The total cost of accessing both services along with other related services was US$22, which translates to 2% of their annual household income.[7] The current exchange rate of 1US$ to ₦455, along with worsening poverty indices in Nigeria, are expected to result in greater impoverishment in such households.

In 2021, one publication that reviewed the cost of MHS in LMICs reported 39,000 (US$246.30) as the mean expenditure for delivery in Nigeria, which was greater than the monthly income for 94.6% of the respondents.[5] There are also other indirect costs incurred by the women such as non-medical transportation costs, guardian costs, and provider-induced fines that all worsen the impact of these costs on women and their households.[8] The high cost of MHS deters women from accessing quality MHS, and drives them toward unsafe birth practices and home deliveries. According to the former executive director of the United Nations Children's Fund, "When families cut corners to reduce maternal health care costs, both mothers and their babies suffer."[4]

The inability to afford safe childbirth delivery services has contributed to numerous maternal and neonatal deaths globally, in Africa, and in Nigeria. In 2019, the World Health Organization (WHO) reported that 94% of all maternal deaths occur in LMICs.[9] Africa was reported to have a maternal mortality ratio (MMR) of 545/100,000 live births in 2020, which accounted for 70% of all global maternal deaths.[10] Similarly, with Nigeria's MMR reported as 512/100,000 in its 2018 National Demographic Health Survey (NDHS),[11] Nigeria was ranked fourth among countries with the highest MMR according to modelled global estimates.[1] The WHO attributed the high prevalence of maternal deaths in Nigeria to inequalities in access to health services.[12] The highest proportion of maternal deaths of the poorest of women was 68% in 1990, which then increased to 80% in 2015.[1,13] This disproportionately high prevalence of maternal deaths among the poorest of women can be reduced by increasing the uptake of health insurance programs. The mean direct cost of accessing ANC services at a tertiary health facility in Southwest Nigeria by women with health insurance coverage was statistically and significantly lower when compared with the cost incurred by women who paid out-of-pocket.[14]

Unfortunately, countries with poor financing mechanisms for health service utilization rely heavily on out-of-pocket payments and then suffer from catastrophic health expenditures, which leads to a vicious cycle that makes the poor poorer and in need of more critical health services. According to the 2018 NDHS, only about 3% of women had health insurance coverage.[11] To strengthen the Nigerian health care financing system, the Nigerian Health Insurance Authority (NHIA) Act was enacted in 2021.[15] The NHIA Act mandates that every Nigerian register for a health insurance package which should make the attainment of the universal health coverage more possible in Nigeria.[15] By the Act, the NHIA provides health insurance packages for employees in formal settings and individuals in informal settings, and coordinates all the public and private health insurance programs in the country. The NHIA also implements the Vulnerable Group Fund and 50% of the Basic Health Care Provision Fund to ensure the free provision of the basic minimum health care packages to the populace, especially indigents.[16] These basic minimum health services include, but are not limited to, ANC, delivery, and postnatal services. As the NHIA implements its strategic plan for assuring that all Nigerians are insured within the shortest possible time, it is critical to provide evidence that would guide the prioritization of the populations to be insured during the early implementation of the NHIA Act.[17] New global targets for ending preventable maternal deaths have been established, and Nigeria must meet these targets.[18] At the time of this research, the Nigerian government had established a target in which 80% of pregnant women would attend at least 8 ANC visits during an individual pregnancy, and 54% would deliver in a health facility by 2021.[19]

Previous studies have reported the inequitable access to MHS by using the 2008 and 2013 National Demographic Health Survey (DHS) datasets,[13,20] although only a few compared women's access to MHS with their health insurance status.[21,22] Nigeria was included in one publication that reported the effect of health insurance on women's access to MHS in 28 African countries,[23] although none provided country specific narratives on the effect of health insurance coverage on access to MHS. Previous research focused on MHS *utilization*, while the current study focused on women's *access* to MHS. This is based on the agreement at a consultative forum, which included participants from the WHO, the United Nation Population Fund (UNPF), and other technical and international partners. The partners agreed that indicators of MHS utilization could serve as proxy for indicators of access to MHS.[24] Therefore, this study aims to determine the association between health insurance coverage and access to MHS among women of reproductive age in Nigeria, after controlling for other individual, household, and community-level factors related to MHS utilization.

Conceptual Framework

The study was guided by the conceptual framework as shown below. The framework identifies individual, household, and community-level factors that could influence the number of ANC visits attended by the women, as well as their decision to deliver at the health facility. Central to the effect of these individual, household, and community-level factors is the women's financial ability to access MHS. Accessibility can be physical, social, and financial. We have used broken lines to show the forms of accessibility that we did not explore in this study. There is a bi-directional relationship between the individual and household factors, while ANC visits are believed to also influence a women's choice to deliver at the health facility. There are other possible relationships between physical and social access and the ANC and health facility delivery outcomes, although these are not the focus of this paper.

Figure 1   Conceptual framework
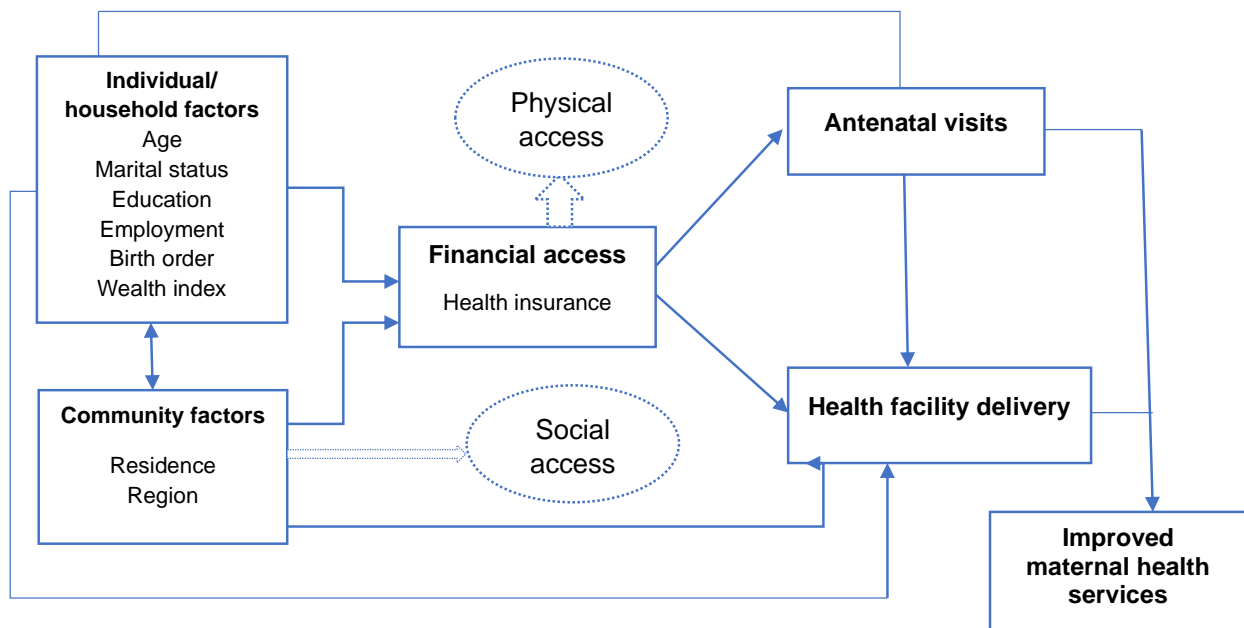
2 MATERIALS AND METHODS

Study Design and Location: This is a cross-sectional study that uses a nationally representative sample obtained from the 2018 Nigeria Demographic Health Survey (NDHS).[25] The DHS survey used a two-stage cluster design that stratified the 36 Nigerian states into urban and rural areas.

Study Population and Size: These were a total of 41,821 women of reproductive age (15–49) who participated in the 2018 NDHS. This study was limited to the 12,935 women who had their last birth within the two years before the 2018 NDHS.

Data Source/Method of Data Collection: The raw dataset from the NDHS was sourced from the DHS program at ICF in Rockville, Maryland. This dataset was collected during the 2018 NDHS with the Woman's Questionnaire. The questionnaires were initially translated into Yoruba, Igbo, and Hausa and then translated back into English to ensure that the original content was preserved. The individual women recode (IR) was used for this study.

Dependent variables: There were two dependent variables in this study: the number of ANC visits and health facility delivery. Those women who had at least 8 ANC visits for their most recent birth in the 2 years before the survey were considered to have adequate ANC visits and were coded as 1, while others were coded as 0. This is based on the WHO 2016 ANC model,[26] which Nigeria has adopted.[27] Similarly, those who reported delivering in a health facility (both public and private health facilities) during their last pregnancy in the two years before the survey were considered to have delivered in a health facility and were coded as 1, while others were coded 0. The health facilities included government or private hospitals as well as health centers.

The main independent variable is health insurance coverage. Possible confounding variables at the individual, household, and community levels were controlled and were measured as shown in Table 1 below.

Table 1   Definitions for independent variables

Independent variables	Description
Financial access	
Health insurance coverage	Categorized as (1) covered (0) not covered
Individual/household	
Age of woman at the time of birth	Categorized as <20 following by 5-year age group from 20–24 to 45–49
Education	Categorized as (0) none (1) primary (2) secondary (3) higher
Marital status	Categorized as (0) never in union (1) currently in union (2) formerly in union
Employment status in the last 12 months	Categorized as (0) not employed (1) employed
Birth order	Categorized as (1) 1 (2) 2–4 (3) >4
Household wealth index	Categorized as (1) poorest (2) poorer (3) middle (4) richer (5) richest
Community level factors	
Residence	Categorized as (1) urban (2) rural
Region	Categorized as (1) North Central (2) North East (3) North West (4) South East (5) South South (6) South West

Data Analysis: Data were analyzed with the Stata 17 statistical package. Appropriate weighting was done to correct for sampling probability and non-response. Similarly, bivariate and multivariate level analysis were conducted after incorporating the *svyset* command for survey data in Stata. The frequency distributions of all variables were described, and were cross-tabulated with health insurance coverage, and then the

outcome variables. Two binary logistic regression models were fit for each of the dependent variables. The first model (Model 0) was the crude model with the unadjusted rates, while the second model adjusted for all independent variables. The hierarchical model or multi-level analysis was not considered because the emphasis of this paper is the relationship between health insurance, ANC visits, and facility delivery, and not the contextual units that influence health insurance. The level of significance was set at $p < .05$.

3   RESULTS

Table 2 shows the individual and community-level factors of Nigerian women age 15–49 with a birth in the previous two years before the survey. The mean age of respondents when giving birth was 27.4 ± 6.7. The majority of the respondents were within the age group of 20–34 (71.2%), were in union or living with a man at the time of the study (95.5%), and were employed in the last year before the survey (8,971; 69.4%). Fewer than half of the respondents (40.8%) had completed a secondary level education or more. Only 264 (2.0%) of the women age 15–49 who had a delivery within two years of the survey had any form of health insurance coverage. With the community level factors, the highest proportion of respondents in our analytical sample (35.9%) were residents in the North West Region of Nigeria and were predominantly rural (61.5%).

Table 2   Individual, household, and community-level characteristics of Nigerian women aged 15–49 years with a birth in the last 2 years preceding the survey

Predictor variables	Frequency N = 12,935	Percentage
Health insurance		
No	12,671	98
Yes	264	2
Age of woman at the time of birth		
<20	1,662	12.9
20–24	3,209	24.8
25–29	3,553	27.5
30–34	2,445	18.9
35–39	1,472	11.4
40–44	479	3.7
45–49	115	0.9
Mean age	27.4 ± 6.7	
Marital status		
Never in union	297	2.3
Currently in union	12,353	95.5
Formerly in union	285	2.2
Education		
None	5,786	44.7
Primary	1,877	14.5
Secondary	4,186	32.4
Higher	1,086	8.4
Wealth index		
Poorest	2,775	21.5
Poorer	2,955	22.8
Middle	2,666	20.6
Richer	2,416	18.7
Richest	2,123	16.4
Employment status		
Not employed	3,964	30.6
Employed	8,971	69.4
Birth order		
1	2,453	18.9
2–4	5,996	46.4
>4	4,486	34.7
Region		
North Central	1,787	13.8
North East	2,350	18.2
North West	4,649	35.9
South East	1,304	10.1
South South	1,160	9.0
South West	1,685	13.0
Residence		
Urban	4,979	38.5
Rural	7,956	61.5

Figures 2a and 2b show the distribution of the outcome variables, which were women who had 8 or more ANC visits and those who delivered their most recent birth in the last 2 years in a health facility. Only 18.5% had ≥8 ANC visits, while 40.6% delivered in a health facility.

Figure 2a   Proportion with ≥8 ANC visits   **Figure 2b   Proportion with facility delivery**
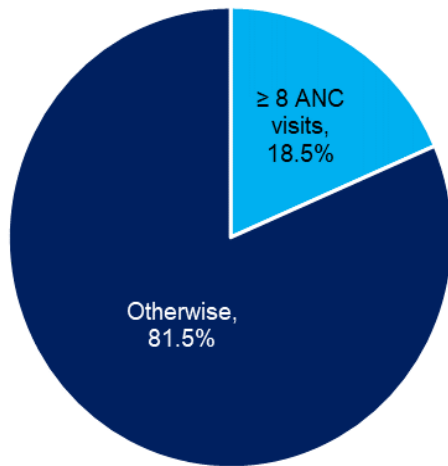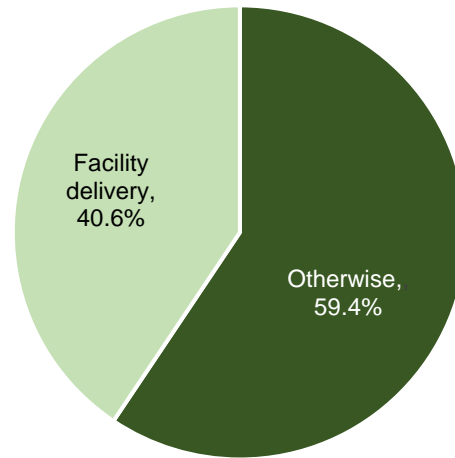
Source: *Authors, 2023*

Table 3 presents the sociodemographic characteristics and community-level factors of women with health insurance coverage. A higher proportion of women with higher level of education (12.8%) and from the richest quintile (7.7%) had a health insurance coverage, compared to less than 2% among women with less education and from the lower wealth quintiles, respectfully. Women with health insurance coverage who were residents in urban areas had more than three times the health insurance coverage compared to women who lived in rural areas (3.6% versus 1.1%).

Table 3   Individual, household and community characteristics by the health insurance coverage among women of reproductive age in Nigeria

Variable	%	95% CI	*p* value
Age of woman at the time of birth			<.001
<20	0.7	[0.4, 1.2]	
20–24	1.3	[0.9, 2.0]	
25–29	2	[1.5, 2.6]	
30–34	3.4	[2.5, 4.6]	
35–39	3.1	[2.0, 4.7]	
40–44	1.7	[0.9, 3.4]	
45–49	1.2	[0.2, 8.2]	
Marital status			.145
Never in union	0.7	[0.1, 3.2]	
Currently in union	2.1	[1.7, 2.6]	
Formerly in union	1.1	[0.4, 3.0]	
Education			<.001
None	0.7	[0.4, 1.4]	
Primary	0.4	[0.2, 0.8]	
Secondary	1.8	[1.4, 2.4]	
Higher	12.8	[10.1, 16.0]	
Wealth index			<.001
Poorest	0.5	[0.2, 1.6]	
Poorer	0.6	[0.2, 1.8]	
Middle	0.9	[0.6, 1.5]	
Richer	1.8	[1.2, 2.6]	
Richest	7.7	[6.1, 9.6]	
Employment status			.847
Not employed	2.1	[1.5, 2.8]	
Employed	2	[1.6, 2.5]	
Birth order			.002
1	1.8	[1.3, 2.5]	
2–4	2.7	[2.2, 3.3]	
>4	1.3	[0.9, 2.1]	
Region			.015
North Central	1.7	[1.0, 2.8]	
North East	0.8	[0.4, 1.4]	
North West	2.3	[1.6, 3.3]	
South East	2.7	[1.8, 4.2]	
South South	2	[1.2, 3.3]	
South West	2.9	[1.8, 4.5]	
Residence			<.001
Urban	3.6	[2.9, 4.6]	
Rural	1.1	[0.7, 1.5]	

The distribution of the women's individual and community-level factors across the two outcome variables are shown in Table 4. Having ≥8 ANC visits had statistically significant associations with all independent variables (age, educational status, household wealth index, work status, birth order, geo-political zone, and residence), except for marital status. Health facility delivery had statistically significant associations with all independent variables. The distribution showed that those with health insurance coverage, with increasing wealth quintile, current employment, higher education, urban residence, and residence in the southern part of the country had higher percentages of having at least 8 ANC visits and a delivery in a health facility.

Table 4   Background characteristics by adequacy of antenatal care visits and place of delivery

Predictor variables	N	≥8 ANC visits (%)			Health facility delivery (%)		
		%	95% CI	p value	%	95% CI	p value
Health insurance				<.001			<.001
No	12,671	18.0	[16.9, 19.2]		39.9	[38.2, 41.7]	
Yes	264	39.5	[32.2, 47.4]		71.8	[61.7, 80.1]	
Age of woman at the time of birth				<.001			<.001
<20	1,662	10.4	[8.7, 12.5]		30.4	[27.6, 33.4]	
20–24	3,209	16.1	[14.5, 17.8]		39.2	[36.8, 41.6]	
25–29	3,553	19.7	[17.8, 21.7]		43.2	[40.6, 45.9]	
30–34	2,445	24.5	[22.2, 26.8]		46.0	[43.4, 48.6]	
35–39	1,472	19.9	[17.4, 22.6]		43.0	[39.7, 46.4]	
40–44	479	18.6	[13.3, 25.4]		31.8	[26.8, 37.1]	
45–49	115	16.4	[9.6, 26.5]		35.3	[25.7, 46.2]	
Marital status				.130			<.001
Never in union	297	23.7	[18.5, 29.9]		54.0	[46.8, 61.1]	
Currently in union	12,353	18.4	[17.3, 19.6]		40.1	[38.3, 41.9]	
Formerly in union	285	16.4	[11.5, 22.8]		48.1	[39.9, 56.3]	
Education				<.001			<.001
None	5,786	3.9	[3.3, 4.7]		15.3	[13.8, 16.8]	
Primary	1,877	18.0	[15.3, 21.0]		42.2	[39.3, 45.2]	
Secondary	4,186	30.8	[28.8, 32.9]		62.7	[60.3, 65.0]	
Higher	1,086	49.2	[45.2, 53.2]		87.3	[84.5, 89.7]	
Wealth index				<.001			<.001
Poorest	2,775	4.0	[3.1, 5.2]		12.8	[11.1, 14.7]	
Poor	2,955	7.0	[6.0, 8.2]		22.6	[20.3, 25.1]	
Middle	2,666	15.7	[13.7, 17.9]		40.8	[37.7, 44.0]	
Richer	2,416	28.4	[25.7, 31.2]		60.0	[57.0, 63.0]	
Richest	2,123	45.4	[42.3, 48.7]		79.5	[76.5, 82.1]	
Employment status				<.001			<.001
Not employed	3,964	10.6	[9.2, 12.0]		28.9	[26.6, 31.3]	
Employed	8,971	21.9	[20.6, 23.3]		45.7	[43.9, 47.6]	
Birth order				<.001			<.001
1	2,453	25.2	[22.9, 27.5]		52.7	[50.0, 55.4]	
2–4	5,996	21.5	[20.0, 23.1]		44.6	[42.4, 46.8]	
>4	4,486	10.7	[9.5, 12.1]		28.6	[26.6, 30.6]	
Region				<.001			<.001
North Central	1,787	14.0	[11.8, 16.5]		51.0	[47.1, 55.0]	
North East	2,350	3.5	[2.7, 4.5]		29.0	[25.6, 32.6]	
North West	4,649	4.1	[3.3, 5.1]		16.2	[14.0, 18.6]	
South East	1,304	35.5	[32.1, 39.1]		81.0	[77.1, 84.4]	
South South	1,160	36.1	[32.6, 39.7]		48.9	[44.3, 53.5]	
South West	1,685	58.4	[53.8, 62.8]		76.0	[72.5, 79.1]	
Residence				<.001			<.001
Urban	4,979	32.3	[30.1, 34.5]		62.0	[59.1, 64.7]	
Rural	7,956	9.8	[8.9, 10.8]		27.2	[25.4, 29.1]	

Table 5 shows the role of having health insurance coverage for women who had ≥8 ANC visits and a health facility delivery. In the unadjusted model, health insurance coverage had a statistically significant association with attending ≥8 ANC visits, so that women with health insurance had 3 times greater odds of ≥ 8 ANC visits compared to those with no health insurance coverage (*OR* = 3.0, 95% CI [2.15–4.12]). The statistically significant association persisted after controlling for the possible confounding factors in the full model (*aOR* = 1.9, 95% CI [1.26–2.95]).

As with the number of ANC visits, the unadjusted model showed a statistically significant association with facility delivery, which also persisted after controlling for confounding factors. In the full model, those with health insurance coverage had 2.0 times greater odds of delivering in health facilities compared to those without health insurance coverage. (*aOR* = 2.0, 95% CI [1.38–2.81])

Table 5   Association between health insurance and outcome variables (≥8 ANC visits and health facility delivery) controlling for individual, household and community factors

| | ≥ 8 Antenatal care visits | | | | Health facility delivery | | | |
| | Unadjusted | | Adjusted | | Unadjusted | | Adjusted | |
Variables	OR	95 CI	OR	95 CI	OR	95 CI	OR	95 CI
Health insurance								
Health insurance (Ref)	1		1		1		1	
Health insurance Yes	**3.0*****	[2.15, 4.12]	**1.9****	[1.26, 2.95]	**3.8*****	[2.42, 6.07]	**2.0*****	[1.39, 2.82]
Age of woman at the time of birth	**1.0*****	[1.02, 1.04]	**1.0*****	[1.01, 1.04]	**1.0*****	[1.01, 1.02]	**1.0*****	[1.01, 1.03]
Education								
Less than secondary (Ref)	1				1		1	
Secondary and above	**6.7*****	[5.58, 7.96]	**1.6*****	[1.35, 1.91]	**7.5*****	[6.59, 8.57]	**2.2*****	[1.91, 2.62]
Wealth index								
Poorest (Ref)	1		1		1		1	
Poorer	**1.8*****	[1.31, 2.47]	1.2	[0.91, 1.70]	**2.0*****	[1.65, 2.40]	**1.7*****	[1.39, 2.03]
Middle	**4.5*****	[3.3, 6.12]	**1.7*****	[1.28, 2.37]	**4.7*****	[3.82, 5.79]	**2.8*****	[2.27, 3.48]
Richer	**9.5*****	[6.95, 13.00]	**1.9*****	[1.38, 2.62]	**10.2*****	[8.29, 12.66]	**3.9*****	[3.08, 4.88]
Richest	**20.0*****	[14.62, 27.26]	**2.4*****	[1.70, 3.37]	**26.4*****	[20.80, 33.49]	**7.1*****	[5.35, 9.42]
Employment status								
Unemployed (Ref)	1		1		1		1	
Employed	**2.38*****	[2.04, 2.77]	**1.24***	[1.04, 1.48]	**2.1*****	[1.86, 2.32]	**1.4*****	[1.21, 1.57]
Marital status								
Never in union (Ref)	1		1		1		1	
Currently in union	0.7	[0.52, 1.00]	**1.8****	[1.25, 2.67]	**0.6*****	[0.42, 0.76]	1.4	[1.00, 2.04]
Formerly in union	0.63	[0.38, 1.03]	1.6	[0.89, 2.80]	0.8	[0.52, 1.19]	**1.9***	[1.15, 3.04]
Birth order								
1 (Ref)	1		1		1		1	
2–4	**0.8****	[0.71, 0.94]	**0.7*****	[0.59, 0.83]	**0.7*****	[0.64, 0.81]	**0.6*****	[0.51, 0.72]
>4	**0.4*****	[0.30, 0.43]	**0.5*****	[0.39, 0.65]	**0.4*****	[0.32, 0.41]	**0.5*****	[0.39, 0.59]
Region								
North Central (Ref)	1		1		1		1	
North East	**0.2*****	[0.16, 0.31]	**0.3*****	[0.23, 0.45]	**0.4*****	[0.31, 0.49]	**0.6*****	[0.51, 0.80]
North West	**0.3****	[0.19, 0.36]	**0.4*****	[0.28, 0.50]	**0.2*****	[0.15, 0.23]	**0.3*****	[0.21, 0.32]
South East	**3.4*****	[2.65, 4.35]	**2.2*****	[1.69, 2.88]	**4.1*****	[3.07, 5.44]	**2.1*****	[1.65, 2.78]
South South	**3.5*****	[2.71, 4.46]	**2.5*****	[1.93, 3.16]	**0.9*****	[0.72, 1.17]	**0.4*****	[0.32, 0.53]
South West	**8.6*****	[6.60, 11.30]	**5.2*****	[3.97, 6.79]	**3.0*****	[2.39, 3.86]	1.2	[0.96, 1.61]
Place of residence								
Urban (Ref)	1		1		1		1	
Rural	**0.2*****	[0.20, 0.26]	**0.7*****	[0.64, 0.87]	**0.2*****	[0.20, 0.27]	**0.8***	[0.69, 0.95]

Ref = reference value
*p < .05; **p < .01; ***p < .001

The southern regions had greater odds, while the northern regions had lower odds for ANC visits compared to the North Central Region. However, for facility delivery, only the South East Region had greater odds compared to the North Central Region. In addition, ANC visits and facility delivery were significantly higher among urban dwellers, the employed, the more highly educated, and those with increasing wealth.

4   DISCUSSION

Having health insurance coverage is expected to provide financial risk protection, and to reduce disparities in access by facilitating greater uptake of MHS.[21,28] In this study, we explored the influence of having health insurance coverage on access to MHS (defined as attending ≥8 ANC visits and health facility delivery) among reproductive aged women who delivered within 2 years of the survey using the latest 2018 NDHS. Having health insurance coverage was significantly associated with attending ≥8 ANC visits and delivering at a health facility after controlling for individual- and community-level factors.

These findings reveal the critical role that health insurance coverage plays in increasing the uptake of ANC and health facility delivery, and in improving women's access to the skilled birth attendants who work in health facilities. This is expected to reduce the incidence of maternal morbidities and mortalities. This also shows the pivotal role that having health insurance coverage has on Nigeria's prospects of meeting the maternal health targets of Sustainable Development Goal (SDG) 3, which includes Targets 3.1 (reduced maternal mortality), 3.2 (neonatal and child mortality) and 3.7 (improved access to sexual and reproductive health services).[29] The findings also strongly contribute to Nigeria's meeting the Target 3.8 of SDG 3, which addresses financial risk protection and access to quality essential health care services, including MHS. In addition, women who choose to deliver at a health facility because they have health insurance coverage will be encouraged to attend ANC visits during their subsequent pregnancies.

The current abysmally low uptake of health insurance coverage (2.0%) among Nigerian women of reproductive age who delivered in the last 2 years before the survey is worrisome. This is similar to findings across Africa. Of the 36 sub-Saharan African countries assessed in 2021, only four African countries had ≥20% of their population with health insurance coverage—Rwanda (79%), Ghana (58%), Gabon (41%), and Burundi (22%).[30] With a mean average of <10% health insurance coverage, Nigeria ranked 26th of the 36 countries assessed. In Nigeria, with a 44.5% poverty rate and 5.5% employment rate in 2021, a low health insurance uptake may lead to catastrophic health spending, preventable deaths, and worsening maternal health indices.[30]

There were significant disparities in the uptake of health insurance coverage across the different categories in the individual characteristics of the women in the current study. The prevalence of health insurance coverage was least among the adolescent mothers and peaked in the 30–34 age group, although it declined afterwards. There is the need to investigate the reasons for this low uptake of health insurance among adolescents with many of them within the age limit (<18 years) that is usually covered under their parents' insurance.[16] Having health insurance coverage was highest among the most educated women and the women in the highest wealth quintile. This is similar to the findings from a meta-analysis of 48 studies across 17 countries, which showed greater odds of health insurance enrollment in the most-educated and wealthiest households.[31] Older age, better educational levels, and wealth status also consistently significantly predicted health insurance ownership among reproductive-aged women across five Sub-Saharan African countries.[32] Our findings also showed significant inequalities in health insurance coverage with the worst among the rural dwellers and women residents in the northern regions in Nigeria. This suggests that the more vulnerable populations such as the poor, rural dwellers, and least educated are not being reached with government interventions such as having health insurance coverage.

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Since the formal launch of the Nigerian Health Insurance Scheme (NHIS) in 2005, the scheme had yet to enroll up to 10% of the population in 2022.[33] In 2022, the National Health Insurance Authority (NHIA) Act was promulgated, which now makes a health insurance coverage mandatory for all in the country.[15] Several packages had been introduced to improve the coverage of health insurance uptake. These targeted the general population irrespective of their gender, with some focus on the disabled, the vulnerable, and students.[34] However, many of these efforts have not been focused on women.

Universal health coverage may thus not be universal in access to care, when the needs and demands of women's health are yet to be met.[35] In the past, some state governments had offered free MHS as an attempt to meet the needs of women, but many have been unsustainable because of changes in the government and a worsening economy. There is a need for affordable health insurance packages that would cover women's reproductive years and address all their MHS care needs.

Having health insurance coverage was significantly associated with women attending ≥8 ANC visits and delivering in a health facility after controlling for both the individual- and community-level factors. Health insurance removes the financial barrier to accessing MHS caused by out-of-pocket payments and its catastrophic effects that makes the poor poorer. The resultant effect is a more equitable access to care with the potential for improved maternal health outcomes. Ownership of health insurance was a predictor of ≥4 ANC visits and skilled birth attendance during childbirth in Ethiopia and 28 countries in Sub-Saharan African reported in 2021 and 2022 by reusing the countries' most recent DHS data.[22,23] The WHO has since raised the minimum standard for ANC visits during pregnancy from at least four to eight visits.[26] This stresses the need for greater health insurance coverage among reproductive aged women to increase their likelihood of complying with the WHO minimum standards. Eighty percent of 63,266 reproductive aged women who had given birth 5 years before the 2018 and 2020 DHS surveys conducted in eight countries, Nigeria inclusive, were not compliant with the WHO recommended ≥8 ANC visits.[36] However, women enrolled in health insurance had lower odds of non-compliance.[36] The findings measured women's ANC practice in periods preceding the release of the new guideline in 2016. Our study is more representative since we included women who delivered only two years before the 2018 NDHS and presented our findings based on the new WHO recommendation.

5   CONCLUSION

After controlling for confounders, access to health insurance was a strong predictor of women attending at least 8 ANC visits and delivering in a health facility. Irrespective of the other determinants of women's access to maternal health services, there is a need to pay close attention to improving uptake of health insurance among women of reproductive age, especially targeting the rural dwellers and women who reside in the northern regions of Nigeria. Authorities may need to prioritize women of reproductive age in the design and implementation of health insurance programs in order to increase their uptake. This would provide financial risk protection and facilitate access to MHS and possible attainment of Nigeria's SDG 3 targets.

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