

Expanding Access to Health Facility Delivery in Nigeria: Progress, Challenges and Opportunities

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Abstract

Background Nigeria has the highest maternal deaths counts globally, and this reflects poor access to quality maternal health care services. Previous research on access to health facility delivery has not sufficiently probed the within-country inequalities in access to and progress in expanding maternal health care services in Nigeria. Our study fills this gap by examining the progress, challenges, and opportunities in expanding access to health facility delivery in Nigeria.

Methods Data of 37,928 and 40,567 live births in the 2013 and 2018 Nigeria Demographic and Health surveys (NDHS) respectively were analysed in this study. NDHS employs a multistage sampling and is representative of both the country and each of the 36 states and Federal Capital Territory (FCT). We used descriptive statistics to examine the trend in health facility delivery in Nigerian states and presented the results using maps. Also, we used logistic regression analysis to examine progress in expanding access to health facility delivery across Nigerian states.

Results The proportion of births delivered in health facilities increased from 35.8% in 2013 to 39.4% in 2018, representing a 3.6% increment. After adjusting for relevant covariates, women were 17% more likely to deliver in health facilities in 2018 than in 2013 surveys. However, progress in expanding access to health facility delivery was uneven across the country. While the odds of delivering in a health facility significantly increased for women living in 13 of the 36 states and FCT, the odds reduced significantly in seven states and no progress was recorded in 17 states.

Conclusion There was a slight improvement in access to health facility delivery in Nigeria between 2013 and 2018. However, progress remains uneven across the states with only 13 states recording some progress. Four states stood out, recording over a three-fold relative increase in odds of health facility deliveries. These states implemented maternal health care policies that not only made services free but also improved infrastructure and human resources for health. Thus, providing examples of what works in improving access to services for other states to follow.

Introduction

Even though there was a 35% decline from the year 2000 to 2017, maternal mortality remains a significant public health problem (1). Approximately 810 women still die per day from pregnancy and childbirth-related complications globally in 2017 (1). What is concerning is that 94% of these deaths occurred in low and middle-income countries. Close to 66% of these deaths occurred in sub-Saharan Africa. Nigeria alone accounts for 23% of global maternal deaths (1). With one maternal death every eight minutes (1), Nigeria is one of the most dangerous places for a woman to give birth.

Most maternal deaths are preventable with the use of quality maternal health care services (2–4). However, access to quality services is beyond the reach of many women in SSA and particularly in Nigeria, with only 56% and 39% having access to health facility delivery in SSA and Nigeria, respectively (5). Childbirth complications are preventable and amenable to treatment, as such, death of women during

pregnancy or childbirth is due to social causes like poverty, poor quality of care, unavailability of services, inequality, and lack of political commitment (6–10). The wealth available globally is sufficient to end maternal deaths; however, inequality in income distribution and political corruption has led to weak and fragile health systems in low and middle-income countries, resulting in poor and inequitable access to quality health care services and tragic and avoidable deaths of many.

The death of a woman during pregnancy or childbirth has deleterious consequences on the family, children, and society. The tragic loss of the mother, who is the primary caregiver for the family, could devastate the health and economic wellbeing of the family, resulting in unbearable suffering of the husband and children left behind (11–16). Studies have shown that children whose mothers die are more likely to be undernourished, abandoned by their father, perform poorly in school, drop out of school, take on difficult household and farm tasks, and are the least likely to survive until adulthood (11–16). The society also grieves the loss of its essential member. As such, saving the lives of mothers from preventable and avoidable maternal deaths is an important national and global developmental goal, as highlighted in the Sustainable Development Goals.

Over the past decade, several policies and programmes have been enacted to improve access to maternal health care services by the federal and state governments in Nigeria to respond to the worrying maternal health indicators (17–22). Nigeria runs a federal system of government, allowing for the autonomy of the states and decentralisation of health systems. Under the health system governance structure in Nigeria, the federal ministry of health formulates policies and issues guidelines, while the state governments have the liberty to domesticate the policies fully or partially (23). As a result of the health system governance structure, maternal health care interventions remain unevenly implemented across states in Nigeria (4, 24–26). This could potentially result in uneven progress in addressing the dire maternal health outcomes of women across Nigeria states.

However, previous research has mostly focused on geographical and wealth inequalities in access to health facility delivery, neglecting the state-level inequality arising from the health system governance structures in the country. We address this gap by examining progress, challenges, and opportunities in expanding access to health facility delivery in Nigeria, focusing on the states and using the 2013 and 2018 demographic and health surveys. Through presenting the state-level analysis of progress and opportunities, policymakers in Nigeria, both at the federal and state level, will find our paper useful in supporting their policymaking processes. The civil society organisations advocating for improved access to maternal health care services in Nigeria will find our analysis useful to support their work. Also, our study aligns with Sustainable Development Goal three of good health and wellbeing for all and target 3.1 of reducing the global maternal mortality ratio to less than 70 per 100 000 live births by the year 2030. Nigeria contributes one-fifth of global maternal deaths. As such, significant improvement is required in Nigeria for the realisation of the Sustainable Development Goal three globally.

Methods

Sample and Population

The data analysed in the study were retrieved from the 2013 and 2018 Nigeria Demographic and Health Surveys (NDHS). The NDHS survey adopts a cross-sectional design, and the sample size is representative of the country, its thirty-six states and Federal Capital Territory. Detailed information were collected on individual and household characteristics, sexual activity, fertility levels and preferences, awareness and use of contraceptives, and related reproductive behaviours from men and women of reproductive age (15–49 years). Representative samples of 40,680 and 42,000 households were selected for the 2013 and 2018 NDHS, respectively, using multistage cluster random sampling. In the first stage, 904 and 1,400 enumeration areas (EA) were selected with probability proportional to the number of households in the EA in 2013 and 2018, respectively. In the second stage, a fixed number of 30 households were selected in every cluster by equal probability systematic sampling. For this study, we use the children recode dataset containing information on all children born over the period and women of reproductive age (15 to 49) who gave birth within the five years preceding the surveys. Overall, 37,928 and 40,567 women were interviewed in the survey; however, we included a weighted distribution of 31,828 and 34,193 women in 2013 and 2018, respectively, who met the inclusion criteria. Further details on sample size and design used by the NDHS can be found elsewhere (27).

Ethical consideration

National Health Research Ethics Committee of Nigeria (NHREC) and the ICF International Institutional Review Board approved the NDHS. Therefore, we do not need additional ethical approval, given that we used de-identified secondary data that is publicly available and obtained in line with the highest ethical standard for conducting human subject research.

Variables and Measurement

We illustrate the definition and coding of the variables used in the study in Table 1. The outcome variable was a binary measure of place of delivery. Women who delivered at a health facility, either government or private, were defined as having health facility delivery and given the value of "1", while those who delivered at the respondent's home or other homes, were classified as having home delivery and given the value of "0".

The explanatory variables include women's demographic characteristics (age, marital status, women and partner's education level and wealth status), geographical location (residential area and states), media exposure, parity, getting to health facility and health insurance coverage.

Table 1
variables used for analysis

Study Variables	Operational definition and coding
Place of delivery	0 = home delivery and 1 = health facility delivery
Age	According to the 5-year age category as provided by NDHS, 15–19 = 1, 20–24 = 2, 25–29 = 3, 30–34 = 4, 35–39 = 5, 40–44 = 6 and 45–49 = 7
Marital status	0 = never married (Ref), 1 = currently married, 2 = previously married and 3 = cohabiting
Womens' education	0 = no formal education (Ref), 1 = primary education, 2 = secondary education and 3 = higher education
Partner's education	Same as women's' education
Wealth status	According to the NDHS classification, 1 = poorest (Ref), 2 = poorer, 3 = middle, 4 = richer and 5 = richest
Residential area	0 = rural (Ref) and 1 = urban
States	The 36 states and the Federal Capital Territory (FCT) Abuja
Media exposure	Constructed from three variables on the frequency of exposure to three different media outlets, which are print media, radio, and television. 0 = "not at all" response, 1 = "less than once a week" and 2 = "at least once a week". The addition of these scores yielded an overall score of 0 to 6. 0 = low (Ref), 1–3 = moderate and 4–6 = high.
Parity	Number of children, 0 = 1–2 (Ref), 2 = 3–4 and 3 = 5–6+
Getting to health facility	0 = Big difficulty (Ref) and 1 = No difficulty
Health insurance coverage	0 = No (Ref) and 1 = Yes

Statistical Analysis

We carried out our analysis using STATA Version 16.0 and Microsoft Excel Version 2019. The NDHS guidelines were followed in applying women's sampling weights to obtain unbiased estimates. We used descriptive statistics, including frequencies and percentages, to describe respondents' sociodemographic and behavioural characteristics. We adopted spatial analysis to explore the state-level health facility delivery using percentile map. Pearson's chi-square test analysis was also used to examine the relationship between the outcome variable and the explanatory variables. We fitted multivariable regression models to examine the factors that are significantly associated with health facility delivery. Further, to examine the progress in health facility delivery over time, we pooled the DHS 2013 and 2019

datasets to investigate the effect of time trend on the dependent variable, adjusting for other factors. We estimated the 95% confidence interval (CI) for the odds ratios (OR), and adopted P-value a significance threshold of < 0.05 for all tests.

Results

Descriptive Findings

The characteristics of the women included in the study are presented in Table 2. Most of the respondents (in 2013 and 2018) were aged below 40 years (89.9% and 90.6%), currently married (93.3% and 92.6%), possessed secondary education or lower (94.2% and 91.8%), had less than five children (67.7% and 67.4%), lived in low to middle-income households (65.6% and 65.6%) and resided in rural areas (65% and 61.5%). Although the majority of women in 2013 and 2018 felt they did not have a problem getting to a health facility (68.2% and 71.9%), the vast majority of them had no health insurance coverage (98.5% and 97.9%).

Table 2
Univariable Analysis

Background Characteristics	2013 DHS		2018 DHS	
	N = 31,828	Percent	N = 34,193	Percent
Age in 5-year groups				
15–19	1,597	5.0	1,460	4.3
20–24	6,237	19.6	6,683	19.5
25–29	8,893	27.9	9,591	28.1
30–34	6,974	21.9	7,792	22.8
35–39	4,926	15.5	5,441	15.9
40–44	2,317	7.3	2,337	6.8
45–49	885	2.8	887	2.6
Marital Status				
Never married	500	1.6	584	1.7
Currently married	29,709	93.3	31,673	92.6
Previously married	837	2.6	1,003	2.9
Cohabiting	783	2.5	933	2.7
Woman's Education level				
No education	15,657	49.2	15,858	46.4
Primary	6,127	19.3	5,103	14.9
Secondary	8,211	25.8	10,413	30.5
Higher	1,834	5.8	2,817	8.2
Partner's Education level				
None	13,142	41.3	14,092	41.2
Primary	5,884	18.5	4,530	13.3
Secondary	9,035	28.4	10,839	31.7
Higher	3,767	11.8	4,732	13.8
Wealth Status				
Poorest	7,496	23.6	7,572	22.2

Background Characteristics	2013 DHS		2018 DHS	
Poorer	7,355	23.1	7,782	22.8
Middle	6,001	18.9	7,043	20.6
Richer	5,656	17.8	6,254	18.3
Richest	5,320	16.7	5,541	16.2
Residence				
Rural	20,702	65.0	21,023	61.5
Urban	11,126	35.0	13,170	38.5
Parity				
1–2 Children	10,263	32.2	11,218	32.8
3–4 Children	11,291	35.5	11,820	34.6
5–6 + Children	10,274	32.3	11,155	32.6
Health Insurance Cover				
No	31,353	98.5	33,466	97.9
Yes	475	1.5	727	2.1
Media Exposure				
Low media exposure	10,734	33.7	13,291	38.9
Moderate media exposure	13,604	42.7	14,677	42.9
High media exposure	7,490	23.5	6,225	18.2
Getting to Health Facility				
Big Problem	10,118	31.8	9,603	28.1
No problem	21,710	68.2	24,589	71.9

Spatial Analysis

The spatial analyses of the prevalence and trend of the health facility delivery among women across states in Nigeria were illustrated in Fig. 1, 2, and 3. In both 2013 and 2018, Imo state (90.9% and 94.5%) had the highest prevalence of health facility delivery, while Zamfara (4.7%) in 2013 and Kebbi (7.4%) in 2018 had the lowest prevalence of health facility delivery, respectively. The proportion of women delivering in health facilities increased from 35.8% in 2013 to 39.4% in 2018, representing a 3.6% increment. However, while there was an increase in the rate of health facility delivery in 18 states, the rate of utilisation remained stagnant or declined in 17 states over the two survey periods. We observe that

Ondo state (24.5%), Abia (19.2%), Cross River (12.2%), Benue (16.2%) and Jigawa (13.4%) achieved the largest increase in health facility delivery. On the contrary, states with the largest reduction in health facility delivery include Kwara (-21.6%), Kaduna (-14.8%), Ekiti (-14.5%), Akwa Ibom (-8.6%) and Kogi (-6.6%). Notably, all states in the North-East geopolitical zone had at least a five percentage point increase in health facility delivery between 2013 and 2018, except Gombe state. In the North-West geopolitical zone, Jigawa state had the highest (13.4%) improvement in health facility delivery, followed by Kastina (7.5%), Kano (6.3%), and Zamfara (5.8%) states. However, the rate of health facility delivery declined in Kaduna (-14.8%) and Kebbi (-1%) states. In the North Central geopolitical zone, only Benue (16.2%), Nasarawa (9.7%) and Plateau (8%) states had an increase in the rate of health facility delivery. The rate of health facility delivery declined in Kwara (-21.6%), Kogi (-6.6%) and Abuja (-5.9%). For the South-East geopolitical zone, while Abia (19.2%), Anambra (5.8%), and Imo (3.6%) states had an increase in the rate of health facility delivery, the rate declined in Enugu (-6%) and Ebonyi (-3.1%) states. Only Cross river (12.2%) and Edo (5.3%) states recorded an increase in the rate of health facility delivery in the South-South geopolitical zone; other states recorded a decline. In the South-West geopolitical zone, Ondo (24.5%) and Osun (2.4%) states had an increase in the rate of health facility delivery, while others recorded a decline.

Multivariable findings

To examine the rate of improvement in health facility delivery in Nigeria between 2013 and 2018 surveys, we fitted unadjusted and adjusted logistic regression models and presented the results in Table 3. After adjusting for relevant covariates, women were 17% more likely to deliver in health facilities in 2018 than in 2013 surveys.

The results of the improvement rate in health facility delivery stratified by states in Nigeria between 2013 and 2018 surveys are presented in Table 4. The odds of delivering in health facilities significantly increased in 2018 survey year for women living in Ondo [AOR: 3.06, 95% CI: 2.12,4.41] in South West, Edo [AOR: 1.51, 95% CI: 1.04,2.20] in the South-South; Abia [AOR: 3.44, 95% CI: 2.22,5.33] in the South East; Sokoto [AOR: 2.13, 95% CI: 1.44,3.14], Katsina [AOR: 1.58, 95% CI: 1.19,2.09], Kano [AOR: 1.34, 95% CI: 1.09,1.64] and Jigawa [AOR: 2.91, 95% CI: 2.23,3.79] in the North West; Gombe [AOR: 1.59, 95% CI: 1.27,1.99], Bauchi [AOR: 1.29, 95% CI: 1.04,1.60] and Adamawa [AOR: 3.33, 95% CI: 2.52,4.40] in the North East; and Plateau [AOR: 1.67, 95% CI: 1.28,2.18], Benue [AOR: 1.66, 95% CI: 1.29,2.15] and FCT-Abuja [AOR: 1.65, 95% CI: 1.20,2.27] in the North Central regions, compared to the 2013 survey. However, women living in Oyo [AOR: 0.52, 95% CI: 0.37,0.73] and Ekiti [AOR: 0.45, 95% CI: 0.32,0.64] in the South West; Bayelsa [AOR: 0.65, 95% CI: 0.46,0.91] and Akwa Ibom [AOR: 0.46, 95% CI: 0.33,0.62] in the South-South; Enugu [AOR: 0.57, 95% CI: 0.40,0.81] and Ebonyi [AOR: 0.78, 95% CI: 0.63,0.98] in the South East; Kaduna [AOR: 0.52, 95% CI: 0.41,0.67] in the North West; and Kwara [AOR: 0.49, 95% CI: 0.36,0.67] in the North Central regions, were significantly less likely to deliver in a health facility in 2018 survey year compared to the 2013 survey.

Table 3

Multivariable regression models showing the difference in health facility delivery between 2013 and 2018 surveys

DHS 2013 and 2018	Unadjusted Odds Ratios	95% CI	Adjusted odds Ratios	95% CI
Survey Year				
2013	Ref			
2018	1.14***	[1.11,1.18]	1.17***	[1.12,1.22]
Age in 5-year groups				
15–19	Ref			
20–24	1.33***	[1.21,1.45]	0.94	[0.84,1.05]
25–29	1.69***	[1.55,1.84]	0.97	[0.86,1.08]
30–34	1.94***	[1.78,2.12]	1.08	[0.96,1.22]
35–39	1.89***	[1.73,2.07]	1.25***	[1.10,1.43]
40–44	1.54***	[1.39,1.70]	1.34***	[1.16,1.55]
45–49	1.16*	[1.02,1.32]	1.36***	[1.14,1.62]
Marital Status				
Never married	Ref			
Currently married	0.63***	[0.56,0.70]	0.9	[0.77,1.04]
Previously married	0.86*	[0.74,0.99]	1.09	[0.91,1.29]
Cohabiting	1.05	[0.91,1.21]	0.68***	[0.57,0.81]
Woman's Education level				
None	Ref			
Primary	4.55***	[4.33,4.78]	1.46***	[1.37,1.56]
Secondary	11.98***	[11.46,12.53]	2.15***	[2.01,2.30]
Higher	54.20***	[49.09,59.84]	4.93***	[4.35,5.59]
Partner's Education level				
None	Ref			
Primary	3.57***	[3.39,3.76]	1.30***	[1.21,1.40]
Exponentiated coefficients; 95% confidence intervals in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

DHS 2013 and 2018	Unadjusted Odds Ratios	95% CI	Adjusted odds Ratios	95% CI
Secondary	7.13***	[6.82,7.45]	1.54***	[1.44,1.65]
Higher	12.66***	[11.96,13.41]	1.96***	[1.80,2.13]
Wealth Status				
Poorest	Ref			
Poorer	2.51***	[2.35,2.68]	1.47***	[1.36,1.58]
Middle	6.60***	[6.19,7.04]	2.07***	[1.91,2.24]
Richer	13.72***	[12.85,14.64]	2.58***	[2.35,2.82]
Richest	38.90***	[36.13,41.88]	4.51***	[4.04,5.03]
Residence				
Rural	Ref			
Urban	4.67***	[4.51,4.83]	1.33***	[1.26,1.41]
Media Exposure				
Low media exposure	Ref			
Moderate media exposure	3.18***	[3.05,3.31]	1.23***	[1.16,1.30]
High media exposure	10.63***	[10.12,11.17]	1.48***	[1.38,1.59]
Health Insurance Cover				
No	Ref			
Yes	5.22***	[4.58,5.94]	1.44***	[1.21,1.72]
Parity				
1–2 Children	Ref			
3–4 Children	0.80***	[0.77,0.83]	0.72***	[0.68,0.76]
5–6 + Children	0.48***	[0.46,0.50]	0.61***	[0.57,0.66]
Getting to Health Facility				
Big Problem	Ref			
No problem	2.41***	[2.32,2.50]	1.45***	[1.38,1.53]
Exponentiated coefficients; 95% confidence intervals in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Table 4

State stratified multivariable regression models showing the difference in health facility delivery between 2013 and 2018 surveys

States	Unadjusted Odds Ratios	95% CI	Adjusted odds Ratios	95% CI
North Central				
FCT-Abuja	0.85	[0.67,1.07]	1.65**	[1.20,2.27]
Benue	1.48***	[1.21,1.82]	1.66***	[1.29,2.15]
Kogi	0.65**	[0.49,0.86]	0.79	[0.55,1.12]
Kwara	0.36***	[0.29,0.45]	0.49***	[0.36,0.67]
Nasarawa	1.23*	[1.00,1.51]	0.96	[0.76,1.23]
Niger	0.89	[0.73,1.08]	0.97	[0.77,1.24]
Plateau	1.24*	[1.01,1.53]	1.67***	[1.28,2.18]
North East				
Adamawa	1.2	[0.99,1.44]	3.33***	[2.52,4.40]
Bauchi	1.36**	[1.13,1.64]	1.29*	[1.04,1.60]
Borno	0.99	[0.78,1.26]	1.34	[0.98,1.84]
Gombe	1.48***	[1.24,1.77]	1.59***	[1.27,1.99]
Taraba	1.37***	[1.14,1.65]	1.19	[0.96,1.47]
Yobe	1.44**	[1.09,1.90]	1.37	[0.96,1.96]
North West				
Jigawa	3.12***	[2.46,3.95]	2.91***	[2.23,3.79]
Kaduna	0.63***	[0.52,0.77]	0.52***	[0.41,0.67]
Kano	1.56***	[1.32,1.84]	1.34**	[1.09,1.64]
Katsina	1.80***	[1.44,2.24]	1.58**	[1.19,2.09]
Kebbi	1.11	[0.84,1.49]	0.99	[0.71,1.39]
Sokoto	1.78***	[1.32,2.40]	2.13***	[1.44,3.14]
Zamfara	1.35	[0.98,1.86]	1.05	[0.71,1.56]
South East				
Abia	3.46***	[2.48,4.83]	3.44***	[2.22,5.33]

Exponentiated coefficients; 95% confidence intervals in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

States	Unadjusted Odds Ratios	95% CI	Adjusted odds Ratios	95% CI
Anambra	1.68**	[1.21,2.33]	1.16	[0.74,1.82]
Ebonyi	0.92	[0.76,1.12]	0.78*	[0.63,0.98]
Enugu	0.62**	[0.45,0.85]	0.57**	[0.40,0.81]
Imo	1.03	[0.66,1.61]	1.14	[0.65,2.01]
South South				
Akwa Ibom	0.71**	[0.56,0.91]	0.46***	[0.33,0.62]
Bayelsa	0.85	[0.65,1.10]	0.65*	[0.46,0.91]
Cross River	1.54**	[1.19,1.99]	1.19	[0.87,1.63]
Delta	0.97	[0.77,1.21]	1.11	[0.80,1.54]
Edo	1.61**	[1.20,2.17]	1.51*	[1.04,2.20]
Rivers	0.94	[0.75,1.18]	0.84	[0.62,1.12]
South West				
Ekiti	0.42***	[0.31,0.58]	0.45***	[0.32,0.64]
Lagos	0.92	[0.74,1.15]	0.79	[0.61,1.03]
Ogun	0.96	[0.73,1.27]	0.9	[0.61,1.34]
Ondo	3.68***	[2.84,4.77]	3.06***	[2.12,4.41]
Osun	1.24	[0.81,1.88]	1.06	[0.64,1.75]
Oyo	0.95	[0.75,1.20]	0.52***	[0.37,0.73]
Exponentiated coefficients; 95% confidence intervals in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$				

Discussions

Nigeria has the highest maternal deaths counts globally (1), and this reflects poor access to quality maternal health care services. Only 36% of all deliveries occurred in health facility delivery in 2013 (27). To reverse this trend and improve the use of maternal health care services, and as a late push to achieve the Millennium Development Goal 5, the Nigerian government through the Ministry of Health and each state government implemented a range of maternal and child health care policies (3, 28, 29). However, the extent to which these policies have led to improved use of health facility delivery in Nigerian states have received limited research attention. We address this gap by examining the progress, challenges, and opportunities in expanding access to health facility delivery in Nigeria as well as across the states. Our analysis shows that facility delivery only increased by 3.6 percentage points between 2013 and 2018

surveys. Also, we found that progress in the use of health facilities for child delivery is uneven among Nigerian states. While some states recorded a substantial increase in health facility delivery, others stagnated, and several states recorded a decline.

The progress and lack thereof observed in our analysis reflects the differences in the maternal health policy landscape and existing inequality in health system infrastructure and resources across the Nigerian states (3, 28, 30–33). The health system governance structure of the country is devolved, allowing states to formulate and implement health policies in line with the guidelines issued by the federal ministry of health. Also, resources available to states vary (33), letting some states with larger resources to allocate significant budget to maternal health to fully implement policies as recommended by the Federal Ministry of health while others are only able to allocate meagre budget for partial implementation of policies. For example, while some states in Nigeria implemented free maternal health programme in all government-owned health facilities—as was the case in Ondo State (3, 4)—, several other states partially implemented the policy in selected primary healthcare facilities, as was done in Ekiti State (34). It is therefore not surprising that progress in expanding access to health facility delivery remained uneven across Nigerian states.

The five states (Ondo, Abia, Benue, Cross River, and Jigawa states) that made substantial progress in increasing access to health facility delivery invested substantially in their health systems since 2010 (3, 4, 29, 34–40). Ondo state expectedly recorded the highest percentage point (24.5%) improvement in health facility delivery of all the 36 states in Nigeria. Ondo state implemented the "Abiye" (Safe Motherhood) programme, which was evidence-based and directed resources to building primary and tertiary health facilities where needed while also removing user fees for health facility delivery in all government-owned facilities as well increasing the health workforce (3, 17, 19, 20). The "Abiye" programme was funded by the state government, the federal government through the subsidy reinvestment programme and grants from Bill and Melinda Gates, Department of International Development (DFID), Society for Family Health (SFH), World Health Organisation (WHO), and Ford Foundation (28). The programme gained the attention of public health experts and institutions both nationally and internationally, with UNICEF, World Bank, UNDP, and Center for Strategic and International studies touting the programme as a model for reducing maternal mortality (28).

Meanwhile, Abia state, the second-best performing state, embarked on massive health infrastructure development, ensuring that women have access to health facilities within five kilometres of their place of residence in line with WHO's and the Federal Ministry of Health's guidelines and recommendations (29, 41, 42). Through this initiative, 210 additional primary health care facilities were built, increasing the number of PHC facilities to 527 by 2012 (43). Similarly, in Benue state, massive health infrastructure and human resources for health were provided to tackle the health challenges in the state and particularly the burden of HIV. The state also benefitted from several HIV programmes implemented or being implemented in the state with grants from international donors to improve access to maternal care. Jigawa State government introduced the "successful delivery program" in 2007, which freely covers all the services rendered during pregnancy period to 6 weeks post-partum/delivery (37–39). Besides this

programme, Jigawa was among the 12 states to implement the national health insurance scheme (NHIS), and MDG's free maternal and child health programme were implemented (44). Finally, Cross River state's progress is attributable to its implementation of free maternal health care programme, backed by legislation in the state's parliament, under a programme titled "project hope"(29, 35). Besides this, the state embarked on improving its primary health care infrastructure, and 64 midwives were recruited for the state under the federal government's Midwives Service Scheme, being the first state to sign a memorandum of understanding (22). Besides, Cross River state was among the 12 states where the NHIS-MDG free maternal health programme was implemented, with the state providing counterpart funding (45). International non-government organisations like World Bank, UNICEF, USAID, Population Council, Pathfinder International Initiative, and Family Health International also contributed to the progress in the state through various maternal health interventions implemented in the state over the past decade (46–50).

The parallel in all these five states that recorded marked progress expanding access to maternal health services is striking. All these states focused on addressing both the demand and supply sides of maternal health care services. They all recognised that while removing user fees for maternal health care services is crucial, free health alone is not sufficient to increase access to services significantly, especially in settings where there is a shortage of health facilities and health workforce (4). It requires, as implemented in Ondo State, the strengthening of health systems, which include hiring additional health workers, building more primary and tertiary health care centres, re-training health workers and task shifting. The partnership and investment of global developmental partners are also important, given that most Nigerian states lack the fund to implement comprehensive interventions to address lack of access to maternal health care services. It is, however, worth noting that the progress recorded would be impossible without visionary and committed leadership from the state government and through the ministry of health in these states. As noted by Kuruvilla et al. (51), the key success factors in reducing maternal and child mortality include leadership and partnership, good governance, women's participation in politics and workforce, decision-making and accountability and approach to sustain progress.

What it takes to increase access to maternal health care services are well known (51, 52), yet approximately half of the Nigerian states are either stagnating or retrogressing in expanding access to services. The challenges in these states are the lack of leadership, insufficient partnership, inadequate budget allocation to maternal health, lack of sustainability and funding of existing maternal health programmes (4, 10, 34, 44, 45, 51). This is the case especially in Kwara and Ekiti States, where the use of health facilities for child delivery has declined by approximately 22 and 15 percentage points, respectively (3). While there is a strong case to be made on the paucity of funds in these states to expand access to maternal health care services, other key challenges hindering progress include lack of sustained effective leadership to mobilise resources, seek partnership, institute sustainability and accountability plans. The examples of the over five states that recorded a marked improvement in the proportion of women delivering in health facilities show that with leadership, progress is possible. Also, the fact that states in the northeast region managed to sustain progress despite being plagued with the Boko Haram conflict further buttress the point that progress is possible with effective and sustained leadership are needed to

address lack of access to maternal health care services. It is, however, important to accentuate the role of global developmental partners, Non-Governmental Organisations working in the conflict zones in ensuring progress made in expanding access to health facility delivery is sustained.

Policy recommendations

As a signatory to the SDG, Nigeria consistently lags behind in achieving the goal of reducing maternal mortality. Progress in expanding access to health facility delivery remains slow and uneven across the country. Since access to quality health facility delivery is critical to reducing maternal and child mortality, we hope that our paper will draw the attention of policymakers in underperforming states to draw lessons on what works in expanding access to maternal health care services from states that recorded marked improvement over the period in review. Specifically, these states need political will to institute effective policies, seek partnership, investment in health infrastructure and human resources by budgeting adequately and ensuring accountability. It is also critical to ensure interventions that work are sustained in the states that recorded some improvements for continued use of health facilities for child delivery.

Study Strengths And Limitations

The strength of this secondary data analysis is the use of large sample size, which makes the findings of representative of Nigerian states and allows for the generalisation of the results. The collection of several variables related to household characteristics, income, education level allows for the accurate measure of social determinants of health which are impacted by inequality. A common limitation of such study designs is the risk of recall bias by study participants. In this case, participants who participated in the primary data collection process were required to recall information from the previous 5 years. Memory recall may be limited in this sense.

Conclusions

There was a slight improvement in access to health facility delivery in Nigeria between 2013 and 2018. However, progress remains uneven across the states with only 13 states recording some progress. Four states stood out, recording over a three-fold relative increase in odds of health facility deliveries. These states implemented maternal health care policies that not only made services free but also improved infrastructure and human resources for health. Thus, providing examples of what works in improving access to services for other states to follow. Despite the challenges of funds, there are opportunities to improve maternal health care utilisation judging by the examples of states that managed to record progress through committed leadership and partnership with developmental partners. Sustaining progress in the states that recorded progress is critical and should be the focus of their policymakers.

Declarations

Ethics approval and consent to participate: The DHS dataset is publicly available and anonymised. This study, therefore, does not require another ethical approval since the study was previously approved by the ethical review board of Nigeria Ministry of Health and ICF Institutional Review Board (IRB).

Consent for publication: Not Applicable

Availability of data and materials: The data analysed in this study is available on DHS website via <https://dhsprogram.com/data/available-datasets.cfm>

Competing interests: AIA is an editorial board member of BMC Public Health

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Authors' contributions: AIA conceptualised the study. OEA conducted the analysis. All authors contributed to the draft, revised and approved the manuscript.

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Figures

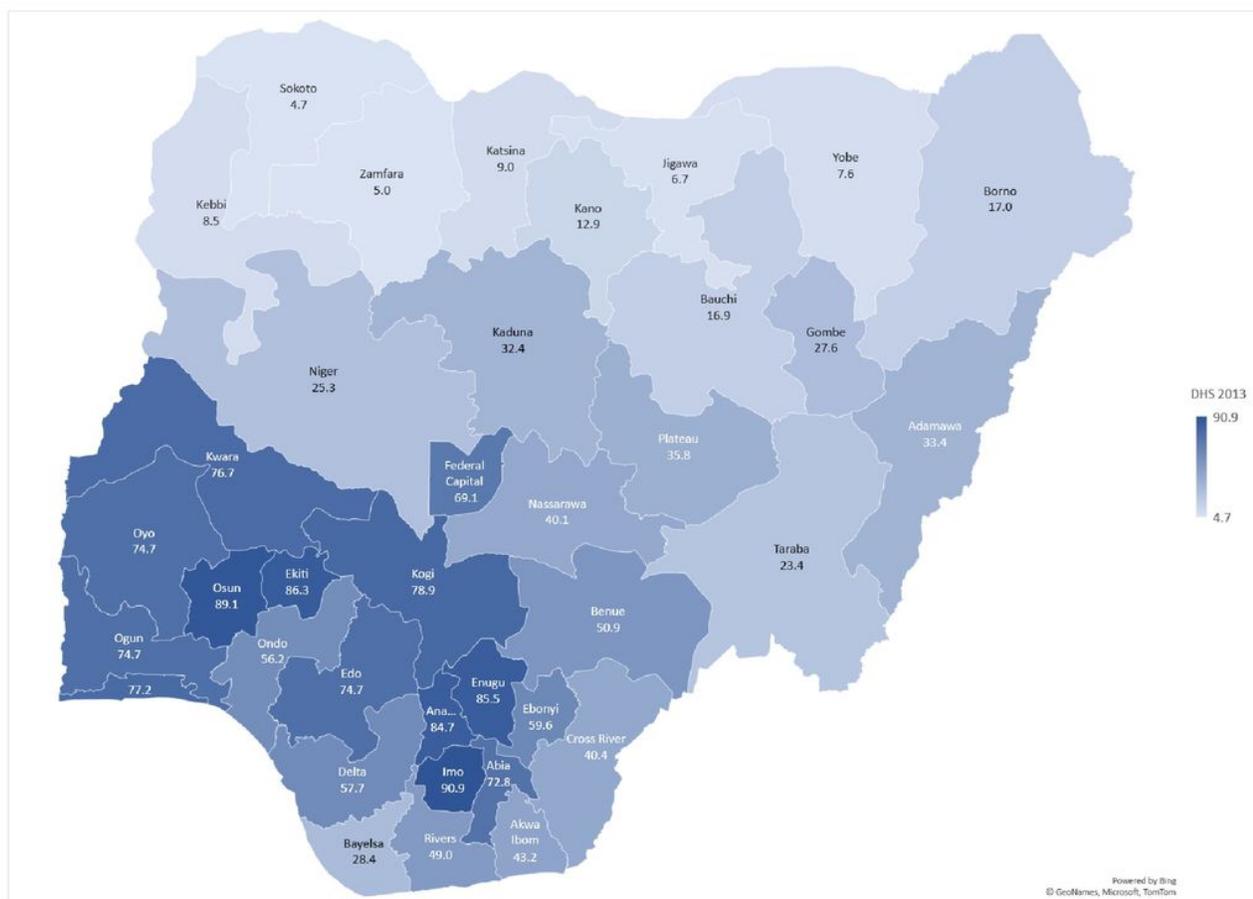


Figure 1

Proportion of women who gave birth in health facilities by states in Nigeria, 2013 Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.

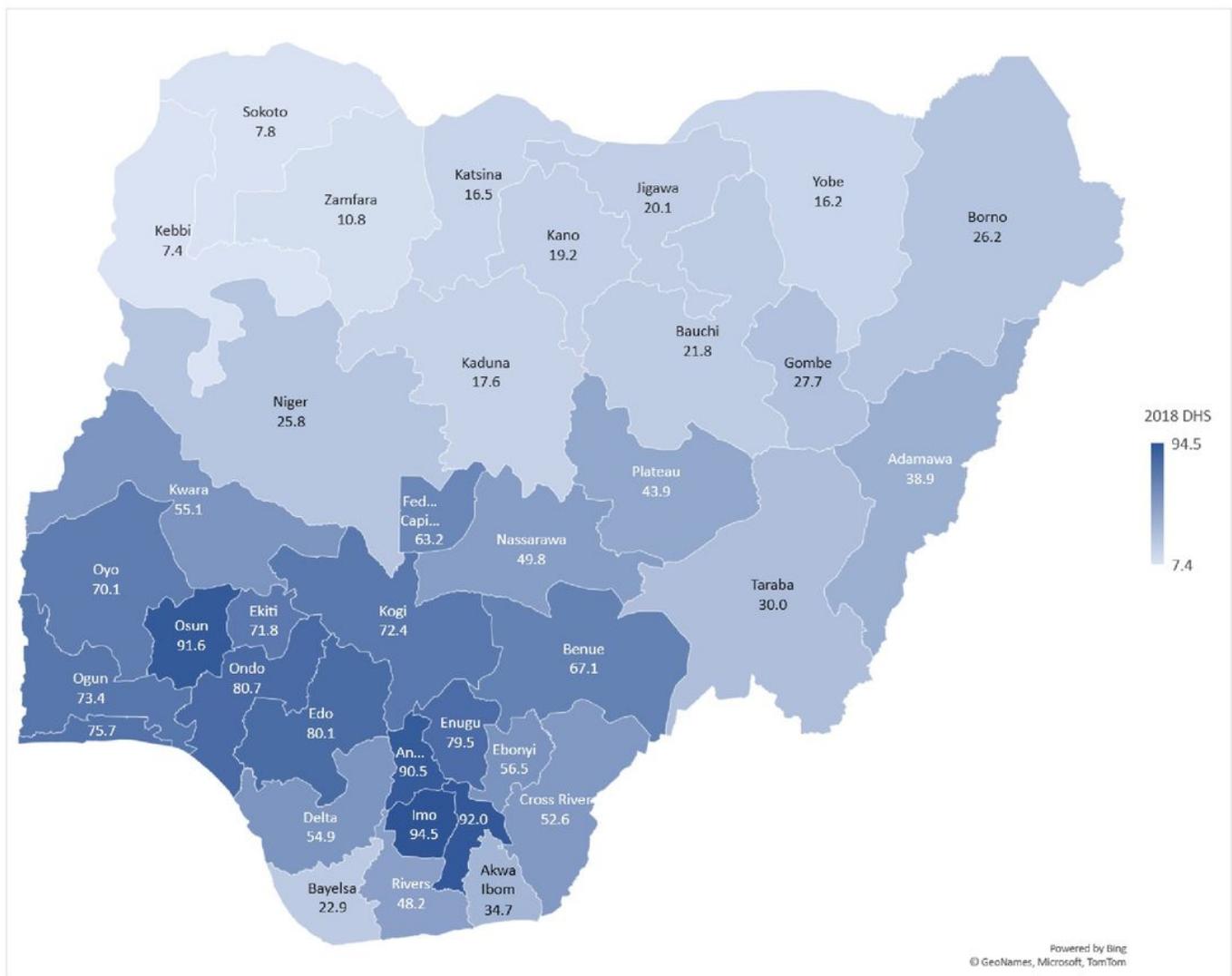


Figure 2

Proportion of women who gave birth in health facilities by states in Nigeria, 2018 Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.

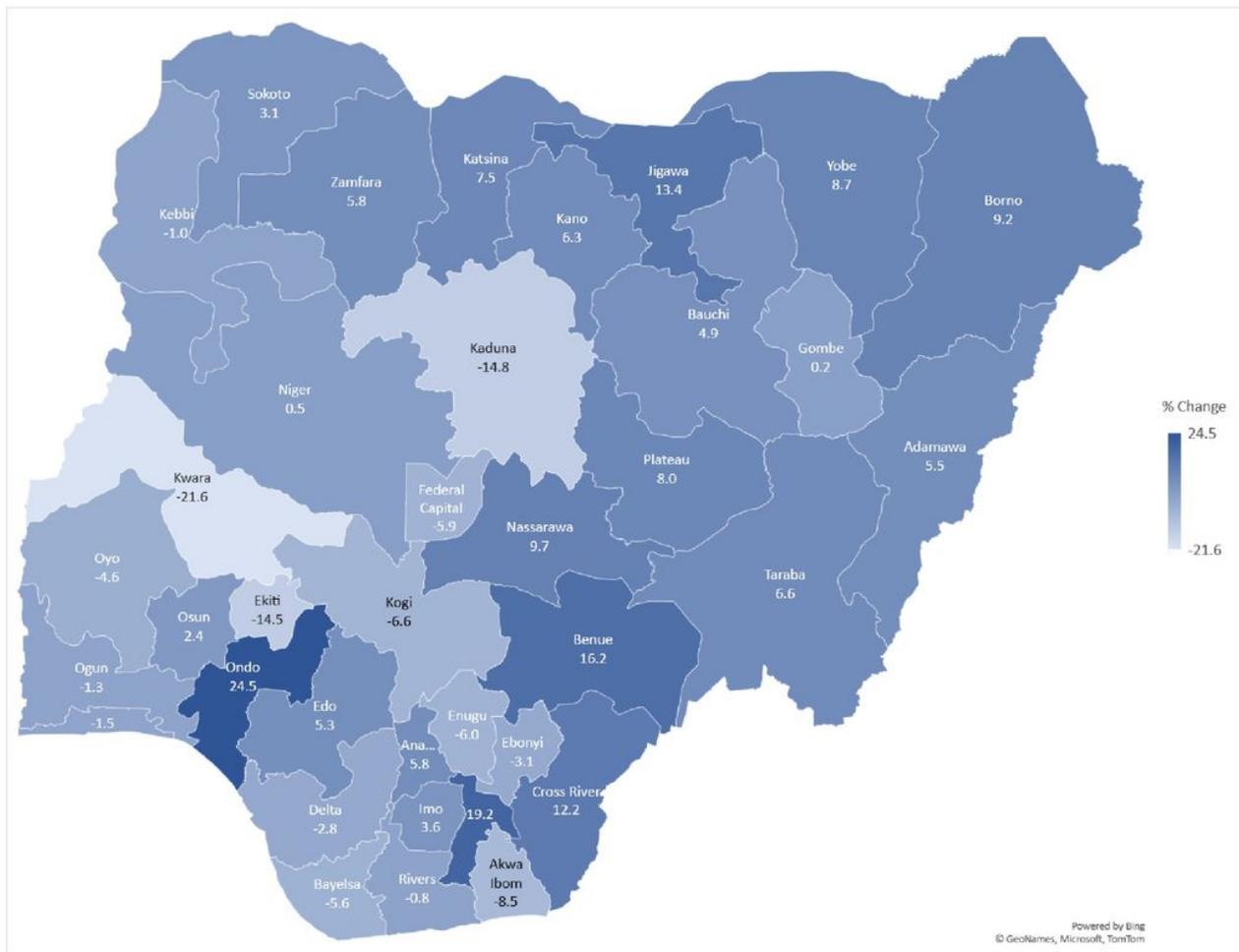


Figure 3

Percentage change in the proportion of women who gave birth in health facilities between 2013 and 2018
 Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.