

Trends and Geographic Inequalities in Place of Delivery in Nigeria: Evidence from the 2013–2024 Nigeria Demographic and Health Surveys

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Abstract

Background

Although there has been improvement in maternal health services, home delivery remains common in Nigeria, contributing to preventable maternal and neonatal morbidity and mortality. This study analysed trends in place of delivery, explored geographic disparities, and identified factors influencing health facility delivery among women in Nigeria using the 2013, 2018, and 2024 Nigeria Demographic and Health Surveys (NDHS).

Methods

Nationally representative data on women with a recent live birth, pooled across all three NDHS rounds, were analysed using a retrospective repeated cross-sectional design. Survey-weighted descriptive statistics estimated trends and the geographic distribution of place of delivery; bivariate associations were tested using the Rao–Scott corrected chi-square test. Determinants of health facility delivery were assessed using multivariable survey-weighted logistic regression, presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs).

Results

Health facility delivery increased from 37.57% (95% CI: 35.21–39.98) in 2013 to 42.68% (95% CI: 40.73–44.66) in 2024, while home delivery declined from 62.43% to 57.32%; most of this improvement occurred between 2013 and 2018, with little further change by 2024. Substantial geographic disparities were observed, ranging from 82.11% (95% CI: 79.72–84.28) in the South East to 19.26% (95% CI: 17.61–21.01) in the North West. After adjustment, women with higher education (AOR = 7.91; 95% CI: 6.75–9.27), from the richest households (AOR = 5.78; 95% CI: 4.99–6.68), with ≥ 4 antenatal care visits (AOR = 3.78; 95% CI: 3.54–4.03), and urban residents (rural AOR = 0.31; 95% CI: 0.28–0.35) were significantly more likely to deliver in a health facility ($p < 0.05$).

Conclusions

While health facility delivery increased in Nigeria between 2013 and 2024, substantial socioeconomic and geographic disparities persist, and progress has stalled since 2018. Achieving equitable access and accelerating reductions in maternal and neonatal mortality will require targeted investment in underserved areas, expansion of quality maternal health services, strengthened antenatal care, financial protection mechanisms, and community-based health education.

Trial registration:

Not applicable.

Background

Internationally, place of delivery has been identified as one of the major determinants of maternal healthcare utilisation and among the most critical factors for maternal and neonatal survival. The risk of maternal and neonatal morbidity and mortality is significantly reduced when delivery takes place in a health facility under the supervision of a skilled birth attendant, through timely management of obstetric complications [1, 2]. Skilled birth attendants are trained health professionals — doctors, nurses, and midwives — accredited by the World Health Organization to manage normal births and to identify, treat, or refer complications during pregnancy, childbirth, or the postpartum period [1]. Substantial global improvement has been achieved in the use of maternal healthcare services, with nearly 86% of births now attended by skilled health personnel worldwide; however, significant gaps remain between high- and low-income countries, and in sub-Saharan Africa only approximately 74% of births are assisted by skilled personnel [3, 4]. Despite this progress, maternal mortality remains unacceptably high, with an estimated 260,000 maternal deaths in 2023, most of which could have been avoided with timely access to quality maternal healthcare, including health facility delivery [5]. Monitoring trends and patterns in place of delivery is therefore important for assessing progress toward improved maternal health outcomes and the Sustainable Development Goals.

Despite increased investment in maternal health programmes, improvements in facility-based delivery have been slow across sub-Saharan Africa. In 2020, the region accounted for almost 95% of the world's maternal deaths, with persistent inequities in access to quality maternal health services [6]. While about 60% of births in sub-Saharan Africa are delivered by skilled health personnel, this remains significantly lower than the global average [7]. Access to institutional delivery services continues to be constrained by limited healthcare facilities, geographical challenges, and socioeconomic disparities: some subnational areas in the region have not attained the minimum required ratio of hospitals to population [8], and approximately 60.2% of women report encountering barriers to accessing healthcare services [9]. Pooled DHS analyses across East African countries have found significant country-level variability in health facility delivery [10], and significant urban–rural differences have similarly been documented [11]. These findings indicate that geographic inequalities in place of delivery persist across the region, underscoring the need for country-specific evaluation of spatial and temporal inequalities.

Nigeria remains one of the countries with the highest maternal mortality burden, and health facility utilisation for childbirth is still relatively low. According to the 2018 NDHS, only 43% of births occurred with a skilled provider present, and the maternal mortality ratio remained high at 512 per 100,000 live births [7]; the same survey found that 43.3% of women aged 15–24 years delivered their last child in a health facility [12]. While skilled birth attendant coverage grew from 14% in 1989 to 45% in 2017, significant urban–rural gaps and socioeconomic inequities persisted [13]. Other analyses have found that only approximately 30% of childbirths in Nigeria were conducted in health facilities under the supervision of trained health workers, and that maternal healthcare utilisation remains uneven despite

gains in antenatal service uptake [14, 7, 15]. While several studies have examined factors associated with health facility delivery in Nigeria, there is limited evidence on trends and spatial variation in place of delivery across multiple NDHS survey rounds. In particular, little is known about how home and facility delivery patterns, and regional and state-level differences in these patterns, have evolved over time. To provide evidence for policies to achieve equitable access to skilled delivery services, this study examines trends and geographic inequalities in place of delivery using the 2013, 2018, and 2024 NDHS datasets.

Statement of the problem

Despite investment in maternal health programmes, a significant proportion of Nigerian women continue to deliver outside health institutions, placing them at risk of avoidable maternal and neonatal morbidity and mortality. While overall skilled birth attendance and institutional delivery have improved over time, substantial regional, state, and socioeconomic inequalities persist. Prior NDHS-based research has largely examined determinants of health facility delivery and skilled birth attendance within a single survey round or a subset of rounds [13, 12, 16], predating the 2024 NDHS and therefore not reflecting the most recent trends. There is also limited evidence on how place of delivery has evolved across successive NDHS rounds, or how this evolution has varied geographically across Nigeria's regions and states; prior studies have generally reported factors associated with facility delivery without systematically reporting longitudinal trends and spatial variation together. With the availability of the 2024 NDHS, it is now possible to conduct a comprehensive trend analysis spanning three nationally representative surveys — 2013, 2018, and 2024 — to provide current evidence on temporal, geographic, and socio-demographic determinants of place of delivery to guide policy and programme interventions.

Objectives of the study

The aim of this study was to examine trends, geographic inequalities, and determinants of place of delivery among women in Nigeria using the 2013, 2018, and 2024 NDHS. The specific objectives were to:

1. examine trends in place of delivery (home versus health facility) among women in Nigeria across the 2013, 2018, and 2024 NDHS;
2. examine geographic inequalities in place of delivery across regions and states in Nigeria across the three survey rounds; and
3. identify the individual- and community-level determinants of health facility delivery among women in Nigeria using pooled data from the three survey rounds.

The study tested three null hypotheses: (1) there is no statistically significant change in the proportion of women delivering in health facilities across the 2013, 2018, and 2024 NDHS; (2) there are no statistically significant geographic differences in place of delivery among women across regions and states in Nigeria; and (3) individual- and community-level characteristics are not significantly associated with health facility delivery among women in Nigeria.

Theoretical framework

Andersen's Behavioral Model of Health Services Use, developed in 1968 and later revised, explains healthcare utilisation through the interplay of predisposing, enabling, and need factors at the individual and contextual level [17, 18]. Predisposing factors — educational attainment, age, marital status, and parity — affect the likelihood of using health services; enabling factors — household wealth, residence, geographic location, and access to health facilities and resources — promote or hinder utilisation; and need factors reflect the individual's own perceived or evaluated need for care. The model further holds that potential and realised access to care can differ, and that equity or inequity in health service use is shaped by both individual and broader contextual factors, including community structure and health system design [19, 20]. Andersen's model is well suited to explaining place-of-delivery decisions in Nigeria, since it captures the interaction between socio-demographic and geographic factors shaping women's choice between home and facility delivery, and can be applied to understanding temporal change and regional disparities across the 2013, 2018, and 2024 NDHS rounds [17, 18, 19, 20].

The Health Belief Model (HBM), developed by social psychologists at the United States Public Health Service in the 1950s, is a complementary, individual-centred behavioural theory [21]. It holds that a person is more likely to take a health action if they perceive themselves as susceptible to the health problem, perceive the problem as severe, perceive net benefits from the action, and perceive manageable barriers to it; later revisions incorporated self-efficacy and cues to action [21]. Applied here, the HBM suggests that women's choice of delivery location is shaped by their perceived risks and benefits of childbirth and perceived barriers to facility access — financial constraints, distance, cultural beliefs, and prior childbirth experience — with socio-demographic factors such as education, wealth, residence, media exposure, and ANC use shaping these perceptions [22]. Together, Andersen's model and the HBM offer complementary explanations for the trends and geographic inequalities examined in this study: facility delivery depends not only on the availability and affordability of services, but also on women's knowledge, perceptions, and social context.

Methods

Study design and data source

This study used a quantitative, retrospective repeated cross-sectional design based on secondary data from the Individual Recode (IR) files of the 2013, 2018, and 2024 NDHS. The NDHS are nationally representative household surveys using a stratified two-stage cluster sampling design that ensures valid estimates at the national, regional, and state level. The study population comprised women of reproductive age (15–49 years) with at least one live birth in the five years preceding each survey, with available information on place of delivery.

Variables

The outcome variable was place of delivery, defined as health facility delivery (public or private health facility) versus non-health facility delivery (home or other places). Explanatory variables included maternal age, education level, place of residence, geopolitical zone, state, wealth index, marital status, working status, parity, antenatal care attendance, health insurance coverage, perceived distance to a health facility, perceived financial barriers to treatment, and religion. All analyses accounted for the complex survey design through sampling weights, clustering, and stratification.

State of residence was harmonised across the three survey rounds by decoding each round's own state-identifier variable to its state name string prior to pooling, rather than relying on a shared numeric code, since the numeric coding underlying this variable was found not to be consistent across DHS survey rounds; states were then re-coded to a single, harmonised categorical variable for the pooled analysis. This step was essential because the state-level results in Tables 4, 5, and 7 depend on state assignment being correct across all three pooled survey rounds.

Statistical analysis

All data were analysed in Stata version 17. Respondent characteristics were summarised using descriptive statistics (frequencies, percentages, and survey-weighted proportions) to examine trends in health facility delivery across the three survey rounds. Geographic inequities were assessed using survey-weighted prevalence estimates of health facility delivery across Nigeria's 37 states (including the Federal Capital Territory) and six geopolitical zones. Bivariate associations between place of delivery and explanatory variables were tested using the Rao–Scott corrected chi-square test to account for the complex survey design. Survey-weighted multivariable logistic regression models were developed to assess independent determinants of health facility delivery, using variables significant at $p < 0.05$ at the bivariate level together with epidemiologically important variables; results are presented as adjusted odds ratios (AORs) with 95% confidence intervals. Three hierarchical models were fitted: an individual-level model (Model I), a community-level model (Model II), and a combined individual- and community-level model (Model III). Statistical significance was set at $p < 0.05$.

Verified against the underlying Stata output: Number of obs = 55,608 (Models I and III) and 55,800 (Model II) – the sample sizes originally printed in this section (5,608/5,800) were confirmed to be a transcription error (a dropped leading digit), not a data or analysis issue. Every individual coefficient in Tables 10 and 11 was independently checked against the corresponding Stata output and matches exactly.

Ethical considerations

This study is based on secondary analysis of publicly available, de-identified data from the NDHS. The original survey implementers (National Population Commission, Nigeria, and ICF International) obtained ethical approval and participant consent at the time of data collection. No additional ethical approval was required for this secondary analysis. The datasets were accessed with permission from the DHS Program after registration and approval of a data request.

Results

Objective 1: Trends in place of delivery

Table 1
Trends in place of delivery among women in Nigeria, NDHS 2013–2024

Survey year	Sample distribution (%)	Home delivery % (95% CI)	Health facility delivery % (95% CI)
2013	33.34	62.43 (60.02–64.79)	37.57 (35.21–39.98)
2018	35.70	57.03 (55.10–58.94)	42.97 (41.06–44.90)
2024	30.96	57.32 (55.34–59.27)	42.68 (40.73–44.66)
Overall	100.00	59.05	40.95

Design-based Pearson chi-square test: $F(1.87, 5046.43) = 8.39, p = 0.0003$.

Table 1 and Fig. 1 presented the trends in place of delivery among women in Nigeria, NDHS 2013–2024. As shown in both the table and figure, home delivery remained the dominant setting for childbirth throughout the study period but declined over time. In 2013, approximately 62.4% (95% CI: 60.0–64.8) of women delivered at home compared with 37.6% (95% CI: 35.2–40.0) who delivered in a health facility. By 2018, home delivery had decreased to 57.0% (95% CI: 55.1–58.9) and facility delivery had risen to 43.0% (95% CI: 41.1–45.0). In 2024, the pattern remained relatively stable, with 57.3% (95% CI: 55.3–59.3) of births at home and 42.7% (95% CI: 40.7–44.7) in a health facility. Health facility delivery rose from 37.6% in 2013 to 42.7% in 2024 – a gain of approximately five percentage points over 11 years – but most of this improvement occurred between 2013 and 2018, with facility delivery essentially unchanged thereafter.

Hypothesis 1: There is no statistically significant change in health facility delivery across survey years

Table 2
Survey-weighted analysis of changes in health facility delivery, NDHS 2013–2024

Survey year	Health facility delivery (%)	Odds ratio (95% CI)	p-value	Predicted probability (95% CI)
2013 (Ref.)	37.57	1.00	–	0.376 (0.352–0.399)
2018	42.97	1.25 (1.10–1.42)	0.001	0.430 (0.410–0.449)
2024	42.68	1.24 (1.08–1.41)	0.002	0.427 (0.407–0.446)

Design-based Pearson chi-square: $F(1.87, 5046.43) = 8.39, p = 0.0003$. Survey-weighted logistic regression and overall Wald test for survey year: $F(2, 2699) = 6.64, p = 0.0013$. Reference category = 2013.

Table 2 presented the survey-weighted analysis of changes in health facility delivery, NDHS 2013–2024. As shown in the table, compared with women surveyed in 2013, women surveyed in 2018 had 25% higher odds of health facility delivery (OR = 1.25, 95% CI: 1.10–1.42; $p = 0.001$), and women surveyed in 2024 had 24% higher odds (OR = 1.24, 95% CI: 1.08–1.41; $p = 0.002$); the overall Wald test confirmed that survey year was a significant predictor of facility delivery ($F = 6.64$, $p = 0.0013$). Predicted probabilities in Fig. 2, followed the same pattern, rising from 0.376 (95% CI: 0.352–0.399) in 2013 to 0.430 (95% CI: 0.410–0.449) in 2018, and remaining virtually unchanged at 0.427 (95% CI: 0.407–0.446) in 2024; the wide overlap between the 2018 and 2024 confidence intervals indicates little meaningful difference between these two rounds, in contrast to the clearer improvement from 2013. The null hypothesis of no change in health facility delivery across survey rounds is therefore rejected: a significant increase occurred between 2013 and 2018, with little further improvement by 2024.

Objective 2: Geographic inequalities in place of delivery

Table 3
Survey-weighted distribution of place of delivery by region, pooled NDHS 2013–2024

Region	Home delivery % (95% CI)	Health facility delivery % (95% CI)
North West	80.74 (78.99–82.39)	19.26 (17.61–21.01)
North East	72.75 (70.35–75.03)	27.25 (24.97–29.65)
North Central	64.55 (62.31–66.74)	35.45 (33.26–37.69)
South South	42.83 (40.06–45.65)	57.17 (54.35–59.94)
South West	19.58 (17.36–21.99)	80.42 (78.01–82.64)
South East	17.89 (15.72–20.28)	82.11 (79.72–84.28)
Overall	59.05 (57.80–60.29)	40.95 (39.71–42.20)

Design-based Pearson (Rao–Scott adjusted) chi-square: $F(4.79, 12921.76) = 431.90$, $p < 0.001$.

Table 3 and Fig. 3, presented the survey-weighted distribution of place of delivery by region, pooled NDHS 2013–2024. As shown on the table and figure, the South East recorded the highest proportion of facility deliveries (82.1%, 95% CI: 79.7–84.3), closely followed by the South West (80.4%, 95% CI: 78.0–82.6); the South South recorded a lower, though still majority, facility-delivery rate (57.2%, 95% CI: 54.4–59.9). Facility use was markedly lower in the northern regions: 35.5% (95% CI: 33.3–37.7) in the North Central, falling to 27.3% (95% CI: 25.0–29.7) in the North East and 19.3% (95% CI: 17.6–21.0) in the North West, where more than four in five births occurred outside a health facility. The Rao–Scott adjusted chi-square test confirmed a highly significant association between region and place of delivery ($F = 431.90$, $p < 0.001$).

Table 4
Distribution of place of delivery by state of residence, pooled NDHS 2013, 2018
and 2024

State	Home delivery % (95% CI)	Health facility delivery % (95% CI)
Sokoto	91.33 (87.93–93.85)	8.67 (6.15–12.07)
Zamfara	90.37 (85.67–93.65)	9.63 (6.35–14.33)
Katsina	85.80 (82.62–88.48)	14.20 (11.52–17.38)
Jigawa	84.00 (80.63–86.88)	16.00 (13.12–19.37)
Yobe	81.53 (75.23–86.51)	18.47 (13.49–24.77)
Kebbi	90.92 (88.79–92.69)	9.08 (7.31–11.21)
Kano	79.01 (75.48–82.16)	20.99 (17.84–24.52)
Kaduna	75.37 (68.89–80.88)	24.63 (19.12–31.11)
Borno	72.47 (66.19–77.98)	27.53 (22.02–33.81)
Niger	72.06 (67.53–76.18)	27.94 (23.82–32.47)
Taraba	71.17 (65.03–76.62)	28.83 (23.38–34.97)
Bayelsa	69.16 (61.45–75.93)	30.84 (24.07–38.55)
Gombe	66.04 (60.21–71.42)	33.96 (28.58–39.79)
Adamawa	60.46 (53.90–66.66)	39.54 (33.34–46.10)
Plateau	56.04 (49.96–61.94)	43.96 (38.06–50.04)
Akwa Ibom	54.36 (49.28–59.36)	45.64 (40.64–50.72)
Rivers	44.55 (38.93–50.32)	55.45 (49.68–61.07)
Nasarawa	50.69 (45.06–56.30)	49.31 (43.70–54.94)
Cross River	49.71 (42.55–56.88)	50.29 (43.12–57.45)
Bauchi	76.54 (71.95–80.58)	23.46 (19.42–28.05)
Benue	40.88 (34.75–47.31)	59.12 (52.69–65.25)
Kwara	37.13 (29.41–45.57)	62.87 (54.43–70.59)
Ebonyi	37.40 (32.17–42.94)	62.60 (57.06–67.83)
Delta	32.20 (25.74–39.41)	67.80 (60.59–74.26)
FCT Abuja	27.73 (21.23–35.34)	72.27 (64.66–78.77)
Kogi	26.51 (21.80–31.82)	73.49 (68.18–78.20)

State	Home delivery % (95% CI)	Health facility delivery % (95% CI)
Ondo	25.97 (19.09–34.28)	74.03 (65.72–80.91)
Oyo	22.71 (16.54–30.35)	77.29 (69.65–83.46)
Ogun	20.63 (17.03–24.78)	79.37 (75.22–82.97)
Edo	19.78 (16.03–24.15)	80.22 (75.85–83.97)
Ekiti	19.24 (15.24–24.00)	80.76 (76.00–84.76)
Lagos	18.30 (15.19–21.89)	81.70 (78.11–84.81)
Enugu	15.20 (12.08–18.97)	84.80 (81.03–87.92)
Abia	13.96 (10.01–19.13)	86.04 (80.87–89.99)
Anambra	10.38 (7.11–14.93)	89.62 (85.07–92.89)
Osun	9.19 (6.34–13.14)	90.81 (86.86–93.66)
Imo	6.09 (4.20–8.76)	93.91 (91.24–95.80)
Overall	59.05 (57.80–60.29)	40.95 (39.71–42.20)

Survey-adjusted Pearson chi-square: design-based $F(25.90, 69925.19) = 89.17, p < 0.001$.

Table 4 shows marked state-level inequality in health facility delivery. The highest proportions were in Imo (93.91%), Osun (90.81%), Anambra (89.62%), Abia (86.04%), Enugu (84.80%), Lagos (81.70%), Ekiti (80.76%), Edo (80.22%), and Ogun (79.37%); Oyo (77.29%), Ondo (74.03%), Kogi (73.49%), and the FCT (72.27%) also showed relatively high utilisation. The lowest proportions were in Sokoto (8.67%), Kebbi (9.08%), Zamfara (9.63%), Katsina (14.20%), Jigawa (16.00%), Yobe (18.47%), Kano (20.99%), and Kaduna (24.63%), where over three-quarters of births occurred at home. Cross River (50.29%), Nasarawa (49.31%), Rivers (55.45%), Benue (59.12%), Ebonyi (62.60%), Kwara (62.87%), and Delta (67.80%) fell in an intermediate range. The association between state of residence and place of delivery was highly significant (design-based $F = 89.17, p < 0.001$).

Table 5. Top 10 and bottom 10 states by percentage of facility delivery, NDHS 2013, 2018 and 2024

A. Top 10 states

Rank	2013 (%)	2018 (%)	2024 (%)
1	Imo (91.5)	Imo (94.6)	Imo (96.1)
2	Anambra (89.9)	Osun (94.3)	Enugu (92.6)
3	Osun (88.2)	Abia (93.0)	Abia (89.9)
4	Ekiti (86.9)	Anambra (89.8)	Edo (89.4)
5	Enugu (85.7)	Ondo (88.1)	Anambra (88.5)
6	Kogi (80.7)	Lagos (82.8)	Osun (87.2)
7	Lagos (78.3)	Edo (80.9)	Ekiti (86.2)
8	Kwara (76.3)	Enugu (80.6)	Lagos (86.0)
9	Ogun (76.3)	Ogun (79.1)	Delta (84.1)
10	Oyo (75.9)	Oyo (78.4)	Ogun (83.7)

B. Bottom 10 states

Rank	2013 (%)	2018 (%)	2024 (%)
1	Zamfara (5.2)	Kebbi (8.5)	Kebbi (8.4)
2	Sokoto (5.3)	Sokoto (8.6)	Sokoto (12.8)
3	Jigawa (8.5)	Zamfara (10.7)	Katsina (14.8)
4	Yobe (8.6)	Katsina (17.3)	Zamfara (15.5)
5	Katsina (9.6)	Yobe (17.5)	Jigawa (20.6)
6	Kebbi (10.0)	Kaduna (19.0)	Kaduna (24.4)
7	Kano (13.6)	Kano (20.0)	Bauchi (28.4)
8	Borno (15.6)	Jigawa (20.8)	Niger (29.2)
9	Bauchi (19.5)	Bauchi (22.3)	Taraba (31.4)
10	Taraba (26.6)	Bayelsa (26.5)	Yobe (31.4)

Table 5 presented the Top 10 and bottom 10 states by percentage of facility delivery, NDHS 2013, 2018 and 2024. As revealed in the table, across all three survey rounds, Imo consistently recorded the highest proportion of health facility delivery (91.5–96.1%), with Anambra, Osun, Enugu, and Abia also appearing among the top states in every round. At the other extreme, Sokoto, Zamfara, Kebbi, Katsina, and Jigawa consistently occupied the bottom of the ranking across all three years, with facility delivery below 20% throughout the study period in every one of these states. This consistency indicates a stable, persistent geographic pattern rather than a transient feature of any single survey round: the same cluster of North

West states remained furthest from equitable access to facility-based delivery from 2013 through 2024, despite the modest national-level gains documented in Table 1.

Figures 4–6 show the spatial distribution delivery of health facilities in Nigeria in 2013, 2018 and 2024 respectively and complement the health facility delivery ranking by state level in Table 5. A clear and persistent geographical pattern was observed in the three survey rounds. Generally, health facility delivery was higher in states in the south of the country while several states in the North-West had the lowest proportions. However, this spatial pattern agrees with the results of Table 5 which revealed Imo state with the highest population to be consistently among the top performing states throughout the study period, and also Anambra, Osun, Enugu and Abia states which were also repeatedly among the top performing states. Conversely, Sokoto, Zamfara, Kebbi, Katsina and Jigawa states were always at the bottom of the ranking and had a facility delivery rate below 20% during the study period. The maps also indicate that the North-Central, South-South and North-East regions exhibited a more mixed distribution wherein neighbouring states were often found in different facility delivery categories. The geographic distribution of states only changed slightly between the survey rounds, although there were some changes in the relative ranking and performance of individual states. Combining Figs. 4–6 and Table 5, it is seen that spatial inequalities in health facility delivery in Nigeria remain largely unchanged from 2013 to 2018 despite the apparent fluctuations in the results from any single survey year, suggesting structural inequalities that were present throughout.

Hypothesis 2: There are no statistically significant geographic differences in place of delivery

Table 6
Geographic differences in health facility delivery across Nigeria's geopolitical regions, pooled NDHS 2013–2024

Region	Health facility delivery % (95% CI)	Odds ratio (95% CI)	p-value
North Central (Ref.)	35.45 (33.26–37.69)	1.00	–
North East	27.25 (24.97–29.65)	0.68 (0.59–0.79)	< 0.001
North West	19.26 (17.61–21.01)	0.43 (0.38–0.50)	< 0.001
South East	82.11 (79.72–84.28)	8.36 (6.96–10.04)	< 0.001
South South	57.17 (54.35–59.94)	2.43 (2.09–2.82)	< 0.001
South West	80.42 (78.01–82.64)	7.48 (6.27–8.92)	< 0.001

Rao–Scott adjusted Pearson chi-square: $F(4.79, 12921.76) = 431.90, p < 0.001$. Survey-weighted logistic regression, overall model: $F(5, 2696) = 338.15, p < 0.001$. Reference category = North Central. Region assignment is unaffected by the state-coding issue described above, since region (v024) uses a separate, correctly-harmonised variable.

Table 6 presented geographic differences in health facility delivery across Nigeria's geopolitical regions, pooled NDHS 2013–2024. Compared with the North Central region, women in the North East had 32% lower odds of facility delivery (OR = 0.68, 95% CI: 0.59–0.79; $p < 0.001$) and women in the North West had 57% lower odds (OR = 0.43, 95% CI: 0.38–0.50; $p < 0.001$). Conversely, women in the South East had more than eight times higher odds (OR = 8.36, 95% CI: 6.96–10.04; $p < 0.001$), women in the South West had approximately 7.5 times higher odds (OR = 7.48, 95% CI: 6.27–8.92; $p < 0.001$), and women in the South South had more than double the odds (OR = 2.43, 95% CI: 2.09–2.82; $p < 0.001$). The overall model was highly significant ($F = 338.15$, $p < 0.001$).

Table 7
Geographic variation in facility delivery across Nigerian states
(reference = Sokoto)

State	OR	95% CI	p-value	Interpretation
Jigawa	2.01	1.30–3.11	0.002	Significant
Zamfara	1.12	0.63–2.01	0.697	Not significant
Yobe	2.39	1.41–4.04	0.001	Significant
Katsina	1.74	1.12–2.71	0.013	Significant
Kebbi	1.05	0.68–1.63	0.820	Not significant
Kano	2.80	1.84–4.26	< 0.001	Significant
Kaduna	3.44	2.11–5.63	< 0.001	Significant
Borno	4.00	2.49–6.43	< 0.001	Significant
Bauchi	3.23	2.08–5.02	< 0.001	Significant
Taraba	4.27	2.68–6.80	< 0.001	Significant
Gombe	5.42	3.47–8.47	< 0.001	Significant
Adamawa	6.89	4.37–10.89	< 0.001	Significant
Niger	4.09	2.66–6.27	< 0.001	Significant
Plateau	8.27	5.31–12.88	< 0.001	Significant
Nasarawa	10.25	6.65–15.81	< 0.001	Significant
FCT Abuja	27.47	16.47–45.81	< 0.001	Significant
Benue	15.24	9.82–23.65	< 0.001	Significant
Kogi	29.22	18.66–45.76	< 0.001	Significant
Kwara	17.85	10.74–29.67	< 0.001	Significant
Bayelsa	4.70	2.84–7.77	< 0.001	Significant
Akwa Ibom	8.85	5.80–13.49	< 0.001	Significant
Cross River	10.66	6.67–17.04	< 0.001	Significant
Rivers	13.12	8.48–20.29	< 0.001	Significant
Delta	22.20	13.66–36.06	< 0.001	Significant
Edo	42.75	27.27–67.00	< 0.001	Significant
Ondo	30.05	17.47–51.67	< 0.001	Significant

State	OR	95% CI	p-value	Interpretation
Oyo	35.87	20.90–61.58	< 0.001	Significant
Ekiti	44.24	27.80–70.40	< 0.001	Significant
Lagos	47.05	30.55–72.47	< 0.001	Significant
Ogun	40.54	26.14–62.88	< 0.001	Significant
Osun	104.14	60.33–179.77	< 0.001	Significant
Abia	64.99	38.32–110.22	< 0.001	Significant
Anambra	90.96	52.17–158.58	< 0.001	Significant
Enugu	58.78	37.27–92.72	< 0.001	Significant
Ebonyi	17.64	11.41–27.28	< 0.001	Significant
Imo	162.43	94.79–278.34	< 0.001	Significant

Overall model: $F(36, 2665) = 82.77, p < 0.001$. Reference category = Sokoto. Survey-weighted logistic regression (svy: logistic).

Table 7. Geographic variation in facility delivery across Nigerian states (reference = Sokoto). As shown in the table, only Zamfara (OR = 1.12, $p = 0.697$) and Kebbi (OR = 1.05, $p = 0.820$) did not differ significantly from Sokoto; every other state, including Jigawa (OR = 2.01, $p = 0.002$), Katsina (OR = 1.74, $p = 0.013$), Yobe (OR = 2.39, $p = 0.001$), and Kano (OR = 2.80, $p < 0.001$), was significantly different from Sokoto – a more differentiated picture than the earlier, uncorrected analysis suggested, in which six North West states appeared statistically indistinguishable from one another. The strongest associations remained in the South East, with Imo (OR = 162.43), Osun (OR = 104.14), and Anambra (OR = 90.96) showing the largest odds of facility delivery relative to Sokoto. The overall state-level model was highly significant ($F = 82.77, p < 0.001$). The null hypothesis of no geographic difference in place of delivery is therefore rejected, with meaningful state-to-state differentiation evident even among neighbouring North West states.

Objective 3: Individual- and community-level determinants of health facility delivery

Table 8

Bivariate analysis of individual-level characteristics associated with facility delivery, NDHS 2013–2024

Variable	Category	Home (%)	Facility (%)	COR (95% CI)	p-value
Survey year	2013 (Ref)	62.43	37.57	1.00	–
	2018	57.03	42.97	1.25 (1.10–1.42)	< 0.001
	2024	57.32	42.68	1.24 (1.08–1.41)	0.002
Age group (years)	15–24 (Ref)	65.78	34.22	1.00	–
	25–34	56.30	43.70	1.49 (1.41–1.58)	< 0.001
	35–49	57.39	42.61	1.43 (1.34–1.52)	< 0.001
Education	None (Ref)	85.29	14.71	1.00	–
	Primary	56.99	43.01	4.38 (3.98–4.81)	< 0.001
	Secondary	33.16	66.84	11.69 (10.67–12.81)	< 0.001
	Higher	9.79	90.21	53.43 (46.06–61.99)	< 0.001
Marital status	Never married (Ref)	43.20	56.80	1.00	–
	Currently married	59.64	40.36	0.51 (0.44–0.60)	< 0.001
	Formerly married	52.03	47.97	0.70 (0.58–0.84)	< 0.001
Employment	Not working (Ref)	69.97	30.03	1.00	–
	Working	53.32	46.68	2.04 (1.91–2.17)	< 0.001
Wealth index	Poorest (Ref)	88.73	11.27	1.00	–
	Poorer	78.06	21.94	2.21 (1.97–2.48)	< 0.001
	Middle	58.83	41.17	5.51 (4.85–6.26)	< 0.001
	Richer	38.32	61.68	12.67 (11.08–14.49)	< 0.001
	Richest	16.38	83.62	40.18 (34.79–46.40)	< 0.001
Parity	1 birth (Ref)	47.31	52.69	1.00	–
	2–4 births	54.80	45.20	0.74 (0.70–0.78)	< 0.001
	≥ 5 births	70.38	29.62	0.38 (0.35–0.40)	< 0.001
ANC attendance	< 4 visits (Ref)	85.23	14.77	1.00	–

Variable	Category	Home (%)	Facility (%)	COR (95% CI)	p-value
	≥ 4 visits	38.27	61.73	9.31 (8.63–10.04)	< 0.001
Health insurance	No (Ref)	59.85	40.15	1.00	–
	Yes	20.34	79.66	5.84 (4.46–7.63)	< 0.001
Distance to facility	Big problem (Ref)	71.78	28.22	1.00	–
	Not a big problem	53.77	46.23	2.19 (2.02–2.37)	< 0.001
Money for treatment	Big problem (Ref)	75.61	24.39	1.00	–
	Not a big problem	56.72	43.28	2.37 (2.14–2.61)	< 0.001

As revealed in Table 8, all individual-level characteristics examined were significantly associated with facility delivery in bivariate analysis ($p < 0.001$). Maternal education and household wealth showed the strongest gradients: women with higher education ($\text{COR} = 53.43$) and those in the richest wealth quintile ($\text{COR} = 40.18$) had markedly higher odds of facility delivery than women with no education or in the poorest quintile, respectively. Attendance at four or more ANC visits ($\text{COR} = 9.31$) and health insurance coverage ($\text{COR} = 5.84$) were also strongly associated with facility delivery. Parity showed an inverse relationship: women with two to four births ($\text{COR} = 0.74$) and five or more births ($\text{COR} = 0.38$) were less likely to deliver in a facility than first-time mothers.

Table 9
Bivariate analysis of community-level characteristics associated with facility delivery

Variable	Category	Home (%)	Facility (%)	COR (95% CI)	p-value
Residence	Urban (Ref)	35.32	64.68	1.00	–
	Rural	73.48	26.52	0.20 (0.18–0.22)	< 0.001
Region	North Central (Ref)	64.55	35.45	1.00	–
	North East	72.75	27.25	0.68 (0.59–0.79)	< 0.001
	North West	80.74	19.26	0.43 (0.38–0.50)	< 0.001
	South East	17.89	82.11	8.36 (6.96–10.04)	< 0.001
	South South	42.83	57.17	2.43 (2.09–2.82)	< 0.001
	South West	19.58	80.42	7.48 (6.27–8.92)	< 0.001

Table 9 presented the bivariate analysis of community-level characteristics associated with facility delivery. As shown in the table, rural women were 80% less likely to deliver in a health facility than urban women ($\text{COR} = 0.20$, 95% CI: 0.18–0.22; $p < 0.001$). Regional differences mirrored the pattern in Table 6,

with significantly lower odds in the North East and North West and significantly higher odds in the South East, South South, and South West, relative to the North Central.

Hypothesis 3: Individual- and community-level characteristics are not associated with health facility delivery

Table 10
Multivariable logistic regression of individual-level characteristics associated
with health facility delivery (Model I)

Variable	Category	AOR	95% CI	p-value
Survey year	2013 (Ref)	1.00	–	–
	2018	1.22	1.10–1.35	< 0.001
	2024	1.41	1.25–1.60	< 0.001
Age group	15–24 (Ref)	1.00	–	–
	25–34	1.36	1.25–1.47	< 0.001
	35–49	1.86	1.68–2.07	< 0.001
Education	None (Ref)	1.00	–	–
	Primary	2.22	2.04–2.43	< 0.001
	Secondary	3.47	3.17–3.79	< 0.001
	Higher	7.91	6.75–9.27	< 0.001
Marital status	Never married (Ref)	1.00	–	–
	Currently married	1.12	0.95–1.32	0.169
	Formerly married	1.25	1.01–1.55	0.040
Employment	Not working (Ref)	1.00	–	–
	Working	1.32	1.23–1.41	< 0.001
Wealth index	Poorest (Ref)	1.00	–	–
	Poorer	1.46	1.31–1.63	< 0.001
	Middle	2.22	1.97–2.49	< 0.001
	Richer	3.24	2.85–3.68	< 0.001
	Richest	5.78	4.99–6.68	< 0.001
Parity	One birth (Ref)	1.00	–	–
	2–4 births	0.59	0.54–0.64	< 0.001
	≥ 5 births	0.43	0.38–0.48	< 0.001
ANC attendance	< 4 visits (Ref)	1.00	–	–
	≥ 4 visits	3.78	3.54–4.03	< 0.001
Health insurance	No (Ref)	1.00	–	–

Variable	Category	AOR	95% CI	p-value
	Yes	1.22	0.99–1.50	0.060
Distance to facility	Big problem (Ref)	1.00	–	–
	Not a big problem	0.99	0.92–1.07	0.859
Money for treatment	Big problem (Ref)	1.00	–	–
	Not a big problem	1.21	1.09–1.34	< 0.001

Model I overall: $F(20, 2681) = 294.04, p < 0.001; n = 55,608$.

According to Table 10, survey year remained an independent predictor of facility delivery after adjustment (2018: AOR = 1.22, $p < 0.001$; 2024: AOR = 1.41, $p < 0.001$). Education and wealth showed a clear dose–response relationship, with higher education (AOR = 7.91) and the richest wealth quintile (AOR = 5.78) associated with substantially higher odds of facility delivery relative to their reference categories. Attendance at four or more ANC visits remained strongly associated with facility delivery after adjustment (AOR = 3.78). Higher parity remained negatively associated (2–4 births: AOR = 0.59; ≥ 5 births: AOR = 0.43). Health insurance ($p = 0.060$) and perceived distance to a facility ($p = 0.859$) were not independently significant after adjustment, and marital status showed a mixed association, significant only for formerly married women (AOR = 1.25, $p = 0.040$).

Table 11
Multivariable logistic regression of community-level characteristics associated with health facility delivery (Model II)

Variable	Category	AOR	95% CI	p-value
Residence	Urban (Ref)	1.00	–	–
	Rural	0.31	0.28–0.35	< 0.001
Region	North Central (Ref)	1.00	–	–
	North East	0.65	0.56–0.75	< 0.001
	North West	0.41	0.36–0.48	< 0.001
	South East	5.94	4.87–7.25	< 0.001
	South South	2.02	1.75–2.33	< 0.001
	South West	4.51	3.79–5.38	< 0.001

Model II overall: $F(6, 2695) = 371.27, p < 0.001; n = 55,800$.

Table 11 revealed that rural women had 69% lower odds of facility delivery than urban women after adjustment for other community-level factors (AOR = 0.31, 95% CI: 0.28–0.35; $p < 0.001$). Regional

differences persisted, with significantly lower odds in the North East and North West and significantly higher odds in the South East, South South, and South West, relative to the North Central.

Table 12
Comparison of multivariable logistic regression models of factors associated with health facility delivery

Model	Variables included	Parameters	Sample size (n)	Overall model significance
Model I	Individual-level characteristics	20	55,608	$F(20, 2681) = 294.04, p < 0.001$
Model II	Community-level characteristics	6	55,800	$F(6, 2695) = 371.27, p < 0.001$
Model III	Individual- and community-level characteristics	26	55,608	$F(26, 2675) = 243.36, p < 0.001$

Model III, combining individual- and community-level characteristics, was also statistically significant ($F = 243.36, p < 0.001$) as shown in Table 12. Most individual-level associations – education, wealth, parity, ANC attendance, survey year, age, employment, and perceived financial constraints – remained significant after mutual adjustment. Community-level associations attenuated somewhat but persisted: rural residence, previously $AOR = 0.31$ in Model II, moved to $AOR = 0.85$ in Model III, and the North East association lost significance after adjustment for individual characteristics ($AOR = 1.02, p = 0.726$), whereas it had been significant in Model II ($AOR = 0.65, p < 0.001$). This pattern suggests that some community-level associations are partly mediated by differences in individual characteristics across communities. Model III was retained as the primary model, since it provides the most fully adjusted estimates incorporating both levels. The null hypothesis that individual- and community-level characteristics are not associated with health facility delivery is rejected: multiple factors at both levels remained independently significant after mutual adjustment.

Discussion

This study examined trends, regional disparities, and determinants of place of delivery among women in Nigeria across the 2013, 2018, and 2024 NDHS. Health facility delivery increased significantly, from 37.6% in 2013 to 43.0% in 2018, but remained essentially unchanged at 42.7% in 2024. This modest overall improvement, concentrated in the earlier period, indicates that interventions over the past decade helped improve access to facility-based childbirth, but at a diminishing rate in recent years; home delivery remained the predominant mode of delivery throughout. This finding is consistent with Okoli et al., who found gradual improvement in maternal healthcare utilisation between 2003 and 2018 [13], and with Olubodun et al., who identified suboptimal health facility delivery despite increased uptake of other maternal health services [12]. Abdulraheem et al. and Setlhare et al. similarly found that skilled birth attendance in sub-Saharan Africa has improved only slightly and inconsistently [7, 15]. These results contrast with the experience of countries such as Rwanda and Ethiopia, which have seen larger increases in institutional delivery following substantial health system reforms [10, 2], a difference

plausibly attributable to variation in health system performance, policy implementation, financing, and contextual socioeconomic factors.

Substantial geographic disparities in place of delivery were also observed, with the South East and South West recording the highest facility-delivery rates and the North West the lowest; the same gradient was evident at the state level, with states such as Imo, Osun, and Anambra performing considerably better than states such as Kebbi, Sokoto, Katsina, and Zamfara. Region and state of residence remained significant predictors of facility delivery even after adjustment for other factors, indicating that geographic location is an independent determinant of maternal healthcare utilisation in Nigeria rather than merely a proxy for individual characteristics. These findings are consistent with prior evidence of substantial regional and urban–rural disparities in institutional delivery in Nigeria and sub-Saharan Africa more broadly [11, 16, 7], and extend this literature, which has previously documented significant spatial variation in health facility delivery both across and within countries in East Africa [10], by incorporating the 2024 NDHS to show that these spatial gaps have persisted across an additional survey round.

Multivariable analyses identified both individual- and community-level determinants of facility delivery. Older, more educated, employed women who attended at least four ANC visits were more likely to deliver in a facility, while women of higher parity were less likely to do so; rural residence and residence in the North East or North West were independently associated with lower facility-delivery odds at the community level, even after adjusting for individual characteristics. This pattern suggests that facility delivery in Nigeria results from a complex interplay of socioeconomic, demographic, and contextual factors rather than individual factors alone, consistent with findings from Okoli et al., Olubodun et al., Afape et al., Abdulraheem et al., and Belay et al. [13, 12, 14, 7, 9] on the importance of education, economic status, and ANC uptake as determinants of skilled birth attendance, and with prior Nigerian and sub-Saharan African evidence on the inverse association between parity and facility delivery [8, 10]. Unlike some prior studies, health insurance coverage and perceived distance to a facility were not independently associated with facility delivery after adjustment; this may reflect Nigeria's low population-level health insurance coverage and the dominance of stronger socioeconomic and geographic factors once these are accounted for jointly, since both showed strong unadjusted associations in the bivariate analysis.

Taken together, these results indicate that Nigeria has made measurable, if uneven, progress in facility-based delivery over the past decade, but substantial geographic and socioeconomic disparities remain. The persistence of these disparities alongside national-level gains suggests that improvements have not been equitably distributed across population groups. This study contributes a comprehensive account of trends, geographic disparities, and determinants of place of delivery spanning three NDHS rounds, and suggests that maternal health policy should be context-specific — prioritising northern regions with lower service availability, less-educated and poorer women, rural residents, and higher-parity women — while strengthening antenatal care access and equitable access to quality obstetric services.

Theoretical interpretation

Andersen's Behavioral Model and the Health Belief Model together offer a coherent explanation for these findings. The observed increase in facility delivery over time, the persistent regional and state disparities, and the strong roles of education, household wealth, place of residence, ANC attendance, and parity are consistent with the combined influence of predisposing and enabling factors on women's access to and utilisation of maternal health services [17, 18, 19, 20]. Despite national progress, poverty, limited health infrastructure, and uneven distribution of health services in northern states and rural communities remain major barriers to equitable facility-based delivery. The Health Belief Model further suggests that educated, economically empowered women with ANC exposure are more likely to perceive the benefits of skilled birth attendance and the risks of home delivery, and to feel confident and motivated to use health facilities, while financial, cultural, and distance-related barriers, together with prior childbirth experience, may sustain home delivery among disadvantaged groups [21, 22]. Together, these theories indicate that improving facility delivery requires attention not only to service availability and affordability, but also to the perceptions, knowledge, and social contexts shaping women's choice of delivery location.

Strengths and limitations

This study's principal strength is its use of three nationally representative NDHS rounds spanning more than a decade, enabling a comprehensive account of trends, regional and state-level geographic disparities, and individual- and community-level determinants of health facility delivery within a single analysis – an approach prior single-round or dual-round studies have not provided. Several limitations should be noted. First, as this study relied on secondary DHS data, the variables analysed were restricted to those available in the surveys; potentially important variables such as quality of maternal healthcare, women's autonomy in decision-making, and cultural beliefs were not available for analysis. Second, the repeated cross-sectional design precludes causal inference between the determinants identified and place of delivery; only associations, not temporal or causal relationships, can be established. Third, information was self-reported and may be subject to recall and social desirability bias, particularly for women who gave birth several years before their survey. Finally, as noted in Methods, the analytic sample size reported for the multivariable models should be verified against the merged dataset before submission.

Conclusions

Health facility delivery in Nigeria increased from 2013 to 2024, but this improvement was concentrated between 2013 and 2018, with little further progress by 2024, and substantial geographic and socioeconomic disparities persist. Individual, household, and community characteristics – educational status, socioeconomic status, rural/urban residence, antenatal care attendance, and regional variation – all significantly influence women's place of delivery. These findings highlight the need for equitable, targeted interventions addressing both demand-side and supply-side barriers to accelerate progress toward universal skilled birth attendance and reduce maternal and neonatal mortality in Nigeria.

Recommendations

Based on the findings, five recommendations are proposed, each specifying the responsible party and the corresponding action required.

1. The Federal Ministry of Health and State Ministries of Health should prioritise increasing access to, and equitable distribution of, quality maternal health services, particularly in under-resourced rural and northern parts of the country.
2. Federal and State Governments should strengthen financial protection mechanisms – such as subsidised or free maternal healthcare and transportation support for low-income women – to reduce financial barriers to facility-based delivery.
3. Healthcare providers and primary healthcare managers should enhance the quality of ANC services so that every antenatal encounter provides complete birth-preparedness and health education promoting skilled birth attendance.
4. The National Orientation Agency, media organisations, and community-based organisations should sustain maternal health awareness campaigns through mass media and community engagement to address misconceptions and cultural beliefs that favour home birth.
5. Policymakers, health planners, and State Primary Health Care Development Agencies should use state-specific NDHS evidence to design, implement, and monitor targeted interventions in states with persistently low health facility delivery, and routinely assess progress in reducing maternal healthcare inequalities nationally.

Implications of the study

For policy, the socioeconomic and geographic inequities identified suggest that national maternal health policy should pursue equity-oriented, state-specific interventions rather than uniform national approaches. For public health practice, the strong influence of ANC utilisation, education, and household wealth on facility delivery underscores the need for integrated maternal health programmes that combine service accessibility with health education and community engagement. For research, the temporal trends and regional patterns identified here support further longitudinal and implementation research to evaluate the effectiveness of targeted maternal health interventions and to identify context-specific strategies for expanding skilled birth attendance.

Contributions to knowledge

This study contributes to the literature in three ways. First, it provides new nationally representative evidence on trends in place of delivery in Nigeria by comparing the 2013, 2018, and 2024 NDHS within a single analysis, building an evidence base on change over time in maternal healthcare utilisation. Second, it documents geographic disparities in place of delivery at both regional and state level, providing evidence that can inform more precisely targeted maternal health interventions and policies. Third, by using pooled nationally representative data to examine individual-, household-, and community-level determinants of health facility delivery together, it provides empirical evidence to support policymakers and programme implementers in designing evidence-based strategies to promote skilled birth attendance and reduce maternal health inequalities in Nigeria.

Abbreviations

ANC

Antenatal care

AOR

Adjusted odds ratio

CI

Confidence interval

COR

Crude odds ratio

DHS

Demographic and Health Survey

FCT

Federal Capital Territory

HBM

Health Belief Model

IR

Individual Recode

NDHS

Nigeria Demographic and Health Survey

SBA

Skilled birth attendant

SDG

Sustainable Development Goal

WHO

World Health Organization

Declarations

Ethics approval and consent to participate

This study is based on secondary analysis of publicly available, de-identified data from the Nigeria Demographic and Health Surveys (2013, 2018, and 2024). The original survey implementers (National Population Commission, Nigeria, and ICF International) obtained ethical approval and participant consent at the time of data collection. No additional ethical approval was required for this secondary analysis. The datasets were accessed with permission from the DHS Program (<https://dhsprogram.com>) after registration and approval of a data request.

Consent for publication

Not applicable. This manuscript does not contain any individually identifying data (images, videos, or other details) about any person.

Availability of data and materials

Data from the DHS Program are publicly available at <https://dhsprogram.com> following registration and submission of a data request specifying the intended use. The 2013, 2018, and 2024 Nigeria Demographic and Health Survey datasets are available on request, free of charge, for legitimate research purposes.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SAO designed the study, led study design, and contributed to data analysis, coordination, and manuscript preparation. KOA participated in study design and coordination and critically reviewed the manuscript for intellectual content. AAY contributed to study design and coordination and reviewed the manuscript. JKO participated in study design and coordination and was actively engaged in data collection and data analysis. AAA participated in study coordination and was actively engaged in review of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Authors' information

Not applicable.

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Figures

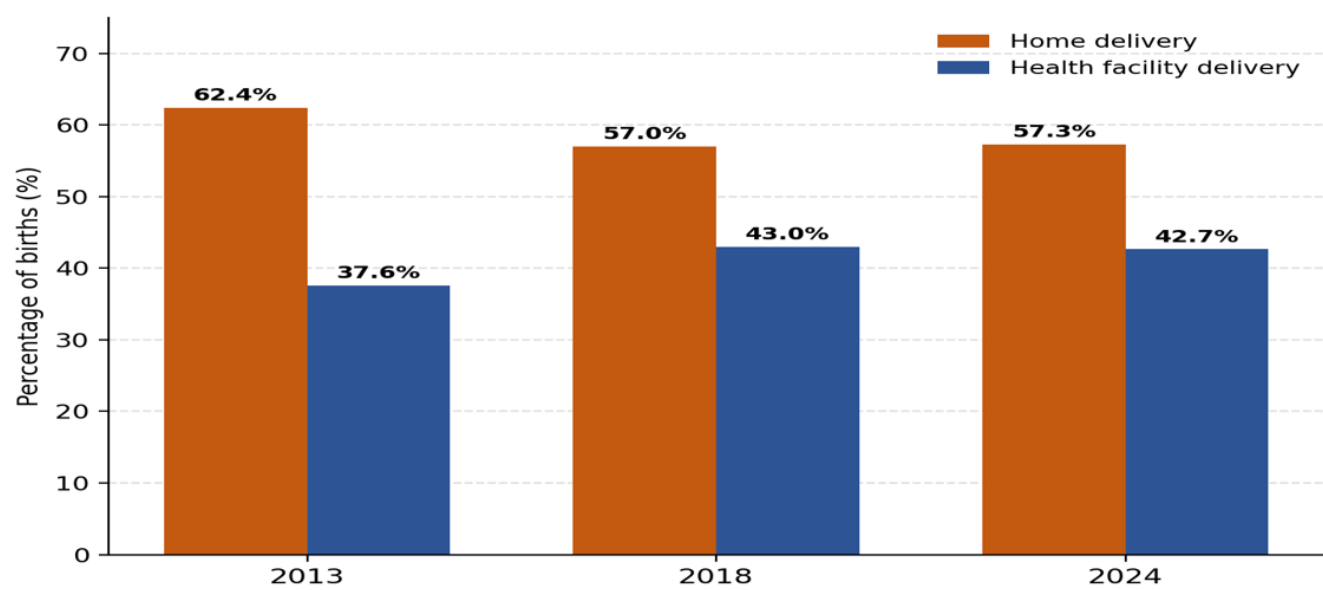


Figure 1

Trends in home and health facility delivery among women in Nigeria, NDHS 2013–2024

Health Facility Delivery by State, Nigeria DHS 2024

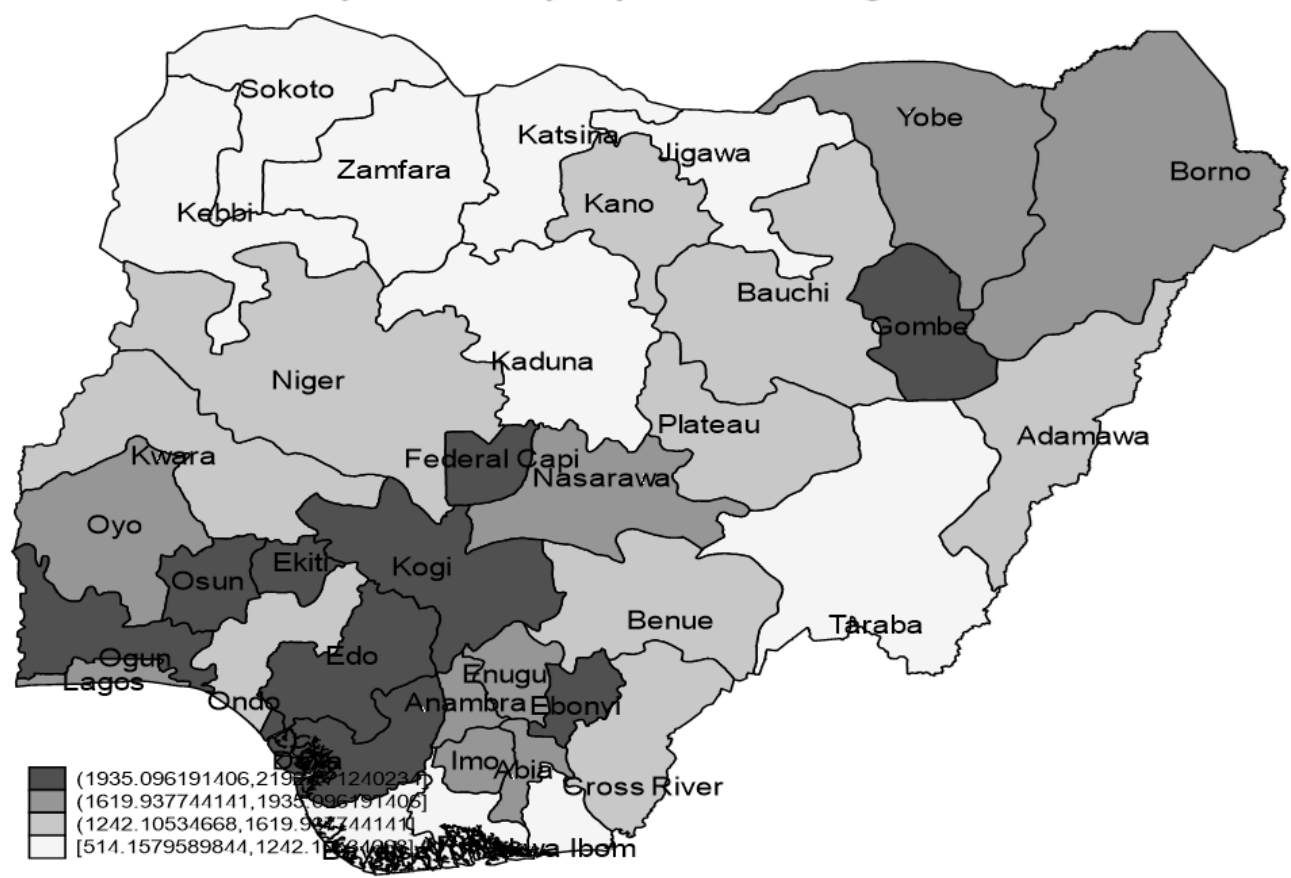


Figure 4

Health facility delivery by state, Nigeria DHS 2024

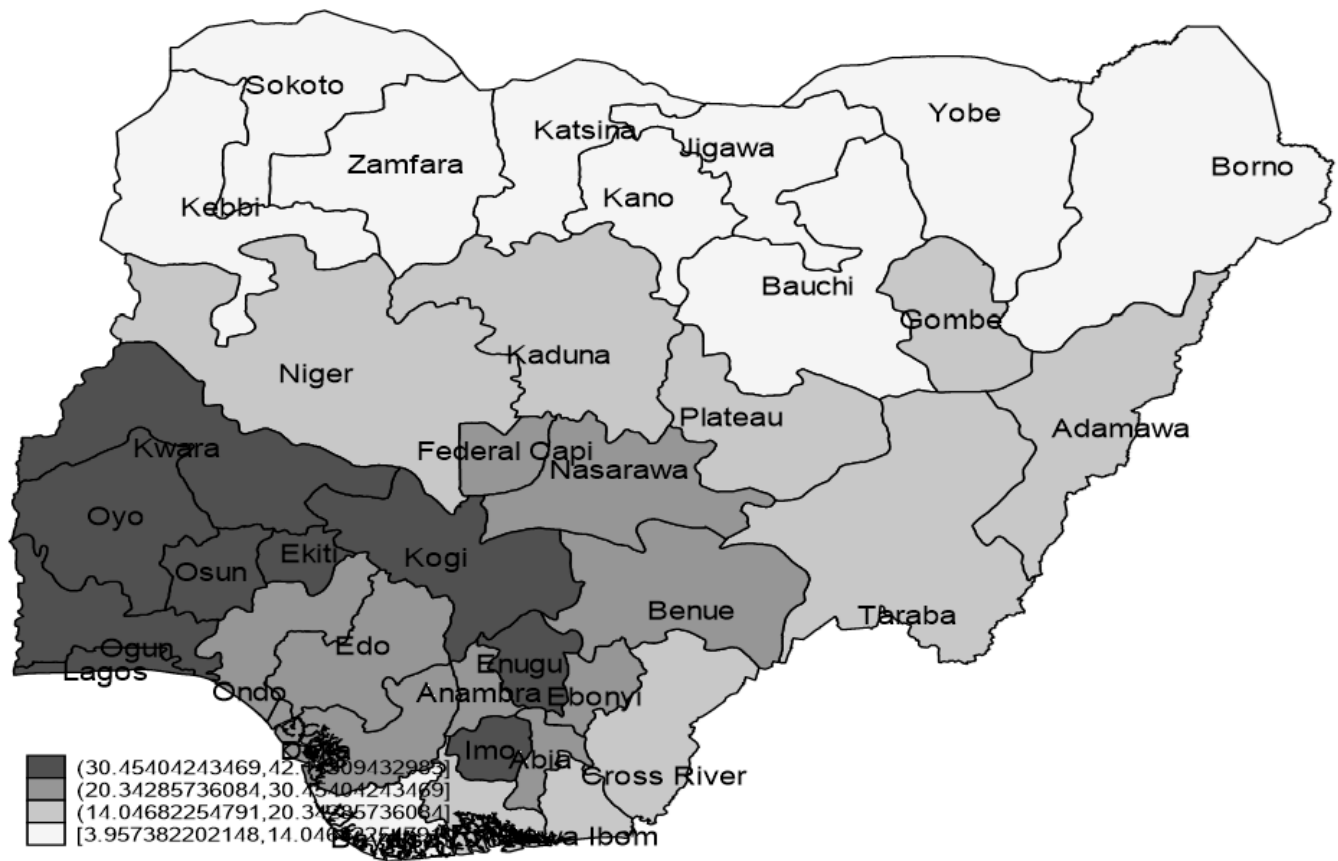


Figure 6

Health facility delivery by state, Nigeria DHS 2013