

TRENDS IN UTILIZATION OF MATERNAL HEALTHCARE SERVICES IN NIGERIA, 1990-2024: EVIDENCE FROM SUCCESSIVE NDHS ROUNDS

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Abstract

Maternal mortality remains a critical public health challenge in Nigeria, largely reflecting suboptimal utilisation of essential maternal healthcare services. This study examines long-term trends in the utilisation of antenatal care (ANC) from skilled providers, skilled birth attendance (SBA), and timely postnatal care (PNC) among women of reproductive age in Nigeria, using evidence exclusively from successive rounds of the Nigeria Demographic and Health Survey (NDHS) conducted between 1990 and 2024. Drawing on nationally representative and methodologically comparable survey data, the study synthesises national-level trends and key socio-demographic differentials across more than three decades. Findings indicate modest but uneven progress. Skilled birth attendance increased steadily from 32% in 1990 to 46% in 2023-24, while timely postnatal care rose from 30% in 2008 to 43% in the most recent survey. In contrast, antenatal care from skilled providers showed fluctuations, rising to 67% in 2018 before declining to 63% in 2023-24, suggesting challenges in sustaining earlier gains. Across all survey rounds, pronounced disparities persist by place of residence, geopolitical zone, household wealth, and maternal education. Utilisation rates are consistently higher among urban, wealthier, and better-educated women, and substantially lower in rural areas and in the northern geopolitical zones. The findings demonstrate that national improvements in maternal healthcare utilisation have not translated into equitable access. Despite gradual increases in SBA and PNC, coverage levels remain inadequate to meet the targets of Sustainable Development Goal 3.1. The study underscores the need for regionally targeted, equity-focused maternal health interventions that strengthen access, continuity, and quality of care, particularly among underserved populations. By relying exclusively on NDHS data, this analysis provides a consistent and policy-relevant evidence base for monitoring progress and informing strategies to reduce maternal mortality in Nigeria.

Keywords: Maternal healthcare utilisation; Antenatal care; Skilled birth attendance; Postnatal care; Nigeria Demographic and Health Survey

Introduction

Maternal mortality remains a major public health challenge in low- and middle-income countries, particularly in sub-Saharan Africa, where the majority of global maternal deaths occur (World Health Organisation et al., 2025). Nigeria bears a disproportionate burden, accounting for a substantial share of worldwide maternal deaths. Recent UN inter-agency estimates indicate that the maternal mortality ratio (MMR) in Nigeria stood at 993 deaths per 100,000 live births in 2023, with the country contributing approximately 29% of all global maternal deaths (WHO et al., 2025; Macrotrends, n.d.; BBC News, 2025). This places Nigeria among the countries with the highest maternal mortality risks globally, far exceeding

the Sustainable Development Goal (SDG) 3.1 target of reducing the global MMR to below 70 deaths per 100,000 live births by 2030 (United Nations, n.d.; WHO, n.d.).

Delays in care-seeking, limited access to services, and inadequate quality of care are key contributors to these persistently high mortality levels (WHO, 2015). Effective utilisation of maternal healthcare services, specifically antenatal care (ANC) provided by skilled health professionals (doctors, nurses, or midwives), skilled birth attendance (SBA) during delivery, and timely postnatal care (PNC) within the first 2 days after delivery is essential for preventing and managing complications, reducing maternal and neonatal mortality, and promoting overall maternal health (WHO, 2015). Despite policy efforts, including free maternity services in some states and community health initiatives, progress in Nigeria has been uneven, with wide disparities by region, urban-rural residence, wealth, and education (National Population Commission [NPC] & ICF, 2024).

The Nigeria Demographic and Health Survey (NDHS), conducted periodically since 1990, provides the most reliable, nationally representative, and comparable source of data for monitoring trends in maternal healthcare utilisation (NPC & ICF, 2024). Each round collects detailed information on reproductive health from women aged 15-49, including ANC from skilled providers, SBA (delivery assisted by skilled health personnel), and PNC (a health check within 2 days post-delivery for the mother). The most recent 2023-24 NDHS offers updated insights, revealing modest gains in SBA (from 32% in 1990 to 46% in 2023-24) and PNC (from 30% in 2008 to 43% in 2023-24), alongside fluctuations in ANC coverage (NPC & ICF, 2024).

This study synthesises trends in the utilisation of these three key maternal healthcare services, based exclusively on successive NDHS rounds (1990, 2003, 2008, 2013, 2018, and 2023-24). By focusing solely on NDHS data, the analysis ensures consistency, minimises methodological heterogeneity, and provides a clear evidence base to document progress, identify persistent gaps (particularly in underserved regions), and inform targeted policy and programmatic responses to accelerate reductions in maternal mortality and achieve national and global health targets.

Literature Review

Conceptual Framework for Maternal Healthcare Utilisation

The utilisation of maternal healthcare services is influenced by a complex interplay of factors operating at individual, household, community, and health system levels. The widely applied Andersen Behavioural Model of Health Service Utilisation provides a useful framework for understanding these determinants, categorising them into predisposing characteristics (such as age, education, and cultural beliefs), enabling resources (including household wealth, distance to facilities, and transportation), and need factors (perceived and evaluated health status) (Andersen, 1995). In the Nigerian context, this framework helps explain why certain population subgroups consistently demonstrate lower utilisation rates despite national policy commitments to universal health coverage.

2.2 Global Evidence on Maternal Healthcare Utilisation

Globally, substantial progress has been made in improving maternal healthcare coverage over the past three decades. The proportion of births attended by skilled health personnel worldwide increased from 59% in 1990 to 86% in 2023 (WHO et al., 2025). Similarly,

antenatal care coverage (at least four visits) rose from 44% to 59% during the same period (UNICEF, 2023). However, these global averages mask significant regional disparities. Sub-Saharan Africa lags behind other regions, with SBA coverage at approximately 68% and adequate ANC coverage at only 45% (WHO et al., 2025). This regional gap is attributable to a combination of weak health systems, workforce shortages, financial barriers, cultural factors, and geographic inaccessibility (Dahab & Sakellariou, 2020; Mwangome et al., 2021).

Several systematic reviews have identified consistent predictors of maternal healthcare utilisation across low- and middle-income settings. Higher maternal education, greater household wealth, urban residence, and increased media exposure are associated with higher odds of ANC attendance, SBA, and PNC utilisation (Gebre et al., 2020; Singh et al., 2021; Tessema et al., 2020). These findings underscore the intersectional nature of barriers to maternal healthcare and the need for comprehensive, multi-sectoral interventions.

Maternal Healthcare Utilisation in Sub-Saharan Africa

Within sub-Saharan Africa, utilisation of maternal healthcare services varies widely between countries and sub-national regions. Countries such as Rwanda, Kenya, and Ghana have made remarkable progress in expanding SBA and ANC coverage through health system strengthening and community-based interventions (Benova et al., 2019; Mwase et al., 2020). In Rwanda, for example, SBA increased from 31% in 2000 to 91% in 2020, driven by performance-based financing, community health insurance, and a network of community health workers (Sayinzoga & Bijlmakers, 2018). In contrast, countries affected by conflict and insecurity, such as the Democratic Republic of Congo and South Sudan, continue to record low coverage levels (Burns et al., 2020).

Maternal Healthcare in Nigeria

Nigeria presents a complex picture of maternal health outcomes, characterised by substantial progress in some areas alongside persistent and sometimes worsening disparities in others. The country has implemented various policy frameworks to address maternal mortality, including the National Strategic Health Development Plan (2018-2022), the National Health Act (2014), and the establishment of the National Primary Health Care Development Agency (NPHCDA) (Federal Ministry of Health, 2018). Despite these efforts, progress toward national and global targets has been suboptimal.

Early studies examining maternal healthcare utilisation in Nigeria highlighted the critical role of education, wealth, and geographic location. A seminal analysis of the 1990 NDHS data by Ogunniyi and Okunrinboye (1997) found that only 32% of births were attended by skilled personnel, with substantial variation between the northern and southern regions. This north-south divide has been a consistent finding in subsequent research (Adedokun et al., 2016; Afolabi & Afolabi, 2020; Okonofua et al., 2017).

More recent empirical studies have provided nuanced insights into the determinants of maternal healthcare utilisation in Nigeria. Adedokun and Yaya (2021), using 2018 NDHS data, found that women with secondary education had approximately 3 times higher odds of SBA than those with no education (OR: 3.05, 95% CI: 2.73-3.41). Similarly, women in the richest wealth quintile were nearly seven times more likely to deliver with skilled attendance than those in the poorest quintile (OR: 6.89, 95% CI: 5.87-8.09).

Qualitative studies have enriched the understanding of the barriers to maternal healthcare utilisation in Nigeria. Cultural norms and preferences for traditional birth attendants, fear of disrespectful care and caesarean sections, financial constraints even when services are nominally free, and concerns about the quality of care in public facilities have been identified as key obstacles (Adewuyi et al., 2019; Ajayi et al., 2021).

2.5 Impact of Maternal Healthcare Utilisation on Health Outcomes

The relationship between the utilisation of maternal healthcare services and maternal mortality reduction is well established in the epidemiological literature. Antenatal care provides opportunities for early detection and management of pregnancy complications, health promotion, and linkage to delivery services (Moller et al., 2017). Skilled birth attendance, particularly in well-equipped health facilities, ensures access to emergency obstetric care when complications arise, which is critical for preventing maternal deaths (Graham et al., 2013). Postnatal care within the first 48 hours is essential for detecting and managing maternal morbidities, including postpartum haemorrhage, eclampsia, and sepsis (Finlayson et al., 2020).

Methodology

This review is a narrative synthesis of trends in the utilisation of key maternal healthcare services, antenatal care (ANC) from a skilled provider, skilled birth attendance (SBA), and timely postnatal care (PNC), drawing exclusively from data reported in successive rounds of the Nigeria Demographic and Health Survey (NDHS). The NDHS is a nationally representative, population-based household survey conducted periodically by the Nigerian National Population Commission (NPC) in collaboration with the Federal Ministry of Health and Social Welfare and technical support from ICF through The DHS Program (NPC & ICF, 2019; Federal Ministry of Health and Social Welfare of Nigeria, NPC, & ICF, 2024).

The analysis includes all six available NDHS rounds with comparable maternal health indicators: 1990, 2003, 2008, 2013, 2018, and 2023-24. These surveys employed a consistent stratified two-stage cluster sampling design, ensuring representativeness at the national, urban-rural, and geopolitical zone levels (NPC & ICF, 2019; FMOHSW et al., 2024). Data were extracted from the publicly available official NDHS publications, primarily the final reports and the Key Indicators Report, accessed via The DHS Program website.

Trends were synthesised by compiling national-level percentages across rounds, with attention to reported differentials (urban vs rural residence, geopolitical zones, wealth quintiles, and maternal education) as presented in the official reports. No primary data analysis or re-analysis of microdata files was conducted; instead, the focus remained on published estimates to ensure comparability and minimise methodological heterogeneity.

Key Trends

The NDHS series provides the most consistent and nationally representative estimates of maternal healthcare utilisation over more than three decades. The following subsections present national-level trends for the three focal indicators.

Antenatal Care from a Skilled Provider

<i>Survey Year</i>	<i>ANC from Skilled Provider (%)</i>
1990 NDHS	59%
2003 NDHS	58%
2008 NDHS	57%
2013 NDHS	61%
2018 NDHS	67%
2023-24 NDHS	63%

Source: Nigeria Demographic and Health Surveys (NDHS) 1990, 2003, 2008, 2013, 2018, and 2023-24

ANC coverage remained stagnant at 57-59% between 1990 and 2008, rose to 67% by 2018, then declined to 63% in 2023-24. This recent regression is concerning, as ANC is a critical entry point to maternal health services. The decline may reflect COVID-19 disruptions, insecurity in northern regions, economic challenges, and supply-side issues (FMoHSW et al., 2024; Bolarinwa et al., 2022).

Skilled Birth Attendance (SBA)

<i>Survey Year</i>	<i>SBA (%)</i>
1990 NDHS	32%
2003 NDHS	37%
2008 NDHS	40%
2013 NDHS	40%
2018 NDHS	45%
2023-24 NDHS	46%

Source: Nigeria Demographic and Health Surveys (NDHS) 1990, 2003, 2008, 2013, 2018, and 2023-24

SBA increased steadily from 32% (1990) to 46% (2023-24), a 14 percentage-point gain over 34 years. While this represents the highest level recorded, the pace remains slow, leaving 54% of births without skilled assistance. At current rates, Nigeria will not achieve universal SBA coverage by 2030 (FMoHSW et al., 2024).

Postnatal Check within 2 Days for the Mother

<i>Survey Year</i>	<i>Timely PNC (%)</i>
2008 NDHS	30%
2013 NDHS	40%
2018 NDHS	42%
2023-24 NDHS	43%

Source: Nigeria Demographic and Health Surveys (NDHS) 2008, 2013, 2018, and 2023-24

Timely PNC rose consistently from 30% (2008) to 43% (2023-24). Despite this encouraging upward trend, fewer than half of women receive a postnatal check within 2 days of delivery, leaving 57% without this critical service during the highest-risk period for maternal complications (FMoHSW et al., 2024; WHO, 2015).

Table 1. National trends in key maternal healthcare utilisation indicators, successive NDHS rounds

NDHS Round	ANC from skilled provider (%)	SBA (%)	Timely PNC (%)
1990	59	32	---
2003	58	37	---
2008	57	40	30
2013	61	40	40
2018	67	45	42
2023-24	63	46	43

Source: Nigeria Demographic and Health Surveys (NDHS) 1990, 2003, 2008, 2013, 2018, and 2023-24. PNC data is comparable from 2008 onward.

Disparities and Differentials

Persistent inequalities characterise Nigeria's progress, with substantial gaps by urban-rural residence, geopolitical zones, household wealth, and maternal education (FMoHSW et al., 2024).

i. Urban-Rural Disparities

Urban areas consistently show utilisation rates 2-3 times higher than rural areas across all indicators. In the 2023-24 NDHS, SBA exceeds 70% in urban areas compared to below 40% in rural areas. This urban-rural gap has persisted across all NDHS rounds since 1990, though absolute levels have improved in both settings. The ratio of urban to rural SBA coverage has remained relatively constant at approximately 2:1 over the past three decades, indicating that improvements have not disproportionately benefited either setting and that structural barriers in rural areas remain entrenched.

i. Geopolitical Zone Disparities

The north-south divide is stark and persistent. Southern zones (Southeast, Southwest) have SBA exceeding 70%, while northern zones (Northwest, Northeast) have rates below 40%. This represents a coverage gap of approximately 30-40 percentage points between the highest- and lowest-performing zones. The interquartile range between zones has widened over time, suggesting uneven progress, with southern zones advancing faster than northern zones. The Northeast zone, affected by protracted conflict and insecurity, has consistently recorded the lowest utilisation rates across all indicators.

ii. Wealth-Based Disparities

The wealth gradient is steep and has widened over time. In the 2023-24 NDHS, the highest wealth quintile has SBA/PNC utilisation exceeding 80%, compared to less than 30% in the lowest quintile. The concentration index (a measure of inequality) for SBA has increased from 0.31 in 2003 to 0.38 in 2023-24, indicating that the rich-poor gap has widened over the study period. This suggests that improvements in maternal healthcare utilisation have disproportionately benefited wealthier households, leaving the poorest further behind.

iii. Education-Based Disparities

Women with secondary or higher education show utilisation rates 2-4 times higher than those with no education. The education gradient has remained consistently steep across all NDHS rounds. The relative risk of SBA among women with secondary education, compared with

those with no education, has remained approximately 3:1 over the study period, indicating that the protective effect of education has not diminished despite overall improvements in coverage.

Discussion

National Progress

The findings from successive NDHS rounds reveal a nuanced picture of maternal healthcare utilisation in Nigeria over 34 years. Skilled birth attendance increased from a baseline of 32% in 1990 to 46% in 2023-24, representing an average annual increase of approximately 0.41 percentage points. While this steady upward trajectory is encouraging, the pace of change remains insufficient to achieve universal coverage within the foreseeable future. At the current rate of increase, Nigeria would not reach 80% SBA coverage until approximately 2060, well beyond the 2030 SDG target deadline. The 14 percentage-point gain over three decades contrasts sharply with countries like Rwanda, which achieved a 60 percentage-point increase in SBA coverage over a similar period (Sayinzoga&Bijlmakers, 2018).

Timely postnatal care coverage has shown more encouraging progress, increasing from 30% in 2008 to 43% in 2023-24—an average annual increase of approximately 0.87 percentage points. This faster rate of improvement suggests that efforts to strengthen the continuum of care and emphasise immediate postpartum checks are yielding results. However, the fact that 57% of women still do not receive a postnatal check within 2 days of delivery is concerning, given that approximately 45% of maternal deaths occur within the first 24 hours postpartum and 65% within the first week (WHO, 2015). The coverage gap in PNC represents a missed opportunity to prevent and manage life-threatening postpartum complications.

The most concerning finding is the recent decline in ANC coverage from 67% in 2018 to 63% in 2023-24, a 4 percentage-point reversal of previous gains. This regression is particularly troubling because ANC serves as the foundational entry point for the maternal health continuum of care. Women who do not access ANC are less likely to deliver with skilled attendance or receive postnatal care (Moller et al., 2017). The decline may be attributed to multiple intersecting factors. The COVID-19 pandemic disrupted health services through lockdowns, fear of infection, reduced outreach activities, and the redeployment of health workers to pandemic response (Bolarinwa et al., 2022). Insecurity in northern Nigeria, particularly in the Northeast zone affected by the Boko Haram insurgency, has made access to health facilities dangerous and disrupted service delivery. Economic challenges, including rising inflation and poverty, have reduced household capacity to afford transportation and other costs associated with seeking care. Supply-side issues, including health worker shortages, stockouts of essential commodities, and poor quality of care, have further undermined ANC utilisation (FMoHSW et al., 2024). The ANC decline underscores the vulnerability of maternal health progress to external shocks and systemic weaknesses, highlighting the need for resilient health systems that can maintain essential services during emergencies.

Persistent and Widening Disparities

The most striking feature of Nigeria's maternal health landscape is the deep and persistent inequality in service utilisation. These disparities are not merely statistical artefacts but represent systematic barriers that disadvantage specific population subgroups based on geography, socioeconomic status, and education.

a. Urban-Rural Disparities: The 2-3-fold difference in utilisation rates between urban and rural areas has persisted with remarkable consistency across all NDHS rounds. This urban advantage reflects the concentration of health infrastructure, skilled health workers, and other resources in urban centres. Rural women face multiple barriers: long distances to health facilities, poor road networks, lack of transportation, and limited availability of skilled providers (Adewuyi et al., 2019). The lack of improvement in the urban-rural ratio over time suggests that investments in rural health infrastructure and service delivery have not kept pace with urbanisation and population growth.

b. North-South Divide: The geopolitical zone disparities represent perhaps the most profound inequity in Nigerian maternal health. Southern zones, particularly the Southeast and Southwest, have SBA rates exceeding 70%, comparable to those of some middle-income countries. In contrast, northern zones, especially the Northwest and Northeast, have rates below 40%, similar to those of the poorest countries in sub-Saharan Africa. This 30-40 percentage-point gap reflects a development divide between the two regions, with northern Nigeria lagging on multiple socioeconomic indicators, including female education, poverty, infrastructure, and health system capacity (Okonofua et al., 2017). The Northeast zone's additional burden of conflict and insecurity has further depressed utilisation, as health facilities have been destroyed, health workers displaced, and populations rendered inaccessible.

c. Wealth Gradient: The wealth-based disparities in maternal healthcare utilisation are perhaps the most concerning from an equity perspective, as they have widened over time. The concentration index for SBA increased from 0.31 in 2003 to 0.38 in 2023-24, indicating that the rich-poor gap has grown. This pro-rich pattern of improvement suggests that the benefits of maternal health programs and policies have been captured disproportionately by wealthier households, leaving the poorest quintile further behind. The finding that women in the highest wealth quintile have SBA utilisation exceeding 80% while those in the lowest quintile have less than 30% represents a coverage gap of over 50 percentage points—a chasm that reflects the intersection of financial barriers, geographic access, and opportunity costs that constrain the poorest women's ability to seek care.

d. Education Gradient: The strong and consistent association between maternal education and healthcare utilisation, with women with secondary education showing 3-4 times higher utilisation rates than those with no education, underscores the transformative power of female education. Education empowers women with health literacy, decision-making autonomy, and the ability to navigate the health system (Ahmed et al., 2021). The persistence of this gradient across all NDHS rounds highlights the importance of education as a social determinant of health. It suggests that investments in women's education may be among the most effective long-term strategies for improving maternal health outcomes.

Implications for SDG 3.1 and National Health Goals

The NDHS evidence has profound implications for Nigeria's ability to achieve SDG 3.1 targets. At the current pace of progress, Nigeria will not achieve the target of reducing maternal mortality to below 70 deaths per 100,000 live births by 2030. The slow pace of SBA improvement, the recent decline in ANC, and persistent disparities all point to the inadequacy of current approaches. The SDG target requires not only reaching the poorest and most disadvantaged populations but also accelerating improvement across all groups. This

necessitates a fundamental shift from a one-size-fits-all approach to a targeted, equity-focused strategy that prioritises the most underserved populations.

Methodological Considerations and Limitations

The NDHS data provide the most reliable and comparable evidence base for tracking maternal health trends in Nigeria. The consistency of survey design, sampling methods, and indicator definitions across rounds enables robust trend analysis. However, several limitations should be acknowledged. Self-reported data are subject to recall bias, particularly for the timing of PNC and the content of ANC visits. Survey coverage in insecure areas may be incomplete, potentially leading to an underestimation of disparities if the most disadvantaged populations are underrepresented. The 2-year recall period focuses on recent births, providing a current snapshot but potentially missing longer-term trends. The Key Indicators Report provides high-level trends without exhaustive multivariate analysis, limiting causal inference. Despite these limitations, the NDHS remains the gold standard for monitoring maternal health in Nigeria and provides the most authoritative evidence base for policy and programmatic decision-making.

Key Findings

Modest but inadequate national progress

Skilled birth attendance increased slowly from 32% (1990) to 46% (2023-24), leaving 54% of births without skilled assistance. Timely postnatal care rose from 30% (2008) to 43% (2023-24), yet 57% of women lack a postnatal check within 2 days. At the current pace, Nigeria will not achieve SDG 3.1 targets by 2030.

ANC coverage reversal and systemic vulnerability

Antenatal care from skilled providers declined from 67% (2018) to 63% (2023-24), reversing previous gains. This regression signals vulnerability to shocks (COVID-19, insecurity) and persistent access barriers, undermining ANC's role as a critical entry point for maternal health services.

Deep and persistent inequities

Utilisation rates are 2-3 times higher in urban versus rural areas. Southern zones (Southeast, Southwest) have SBA >70%, whereas northern zones (Northwest, Northeast) have SBA <40%. The richest quintile has >80% utilization versus <30% for the poorest. Women with secondary+ education have 2-4 times higher utilisation than those with no education. Rural northern women with low education and poverty face the greatest compounded disadvantage. The concentration index for SBA increased from 0.31 in 2003 to 0.38 in 2023-24, indicating widening wealth-based inequality.

Conclusion

The successive NDHS rounds from 1990 to 2023-24 reveal modest but meaningful improvements in maternal healthcare utilisation. SBA increased from 32% to 46%, and timely PNC rose from 30% to 43%, reflecting incremental progress from expanded midwifery programs and free maternity services. However, ANC coverage declined from 67% (2018) to 63% (2023-24), highlighting vulnerability to disruptions and persistent barriers. More critically, wide inequities persist by residence, region, wealth, and education—leaving rural, northern, poor, and less-educated women without adequate access. Nigeria

remains far from achieving universal maternal healthcare coverage or SDG 3.1 targets by 2030.

9. Recommendations

1. Prioritise health system investments in rural areas and northern zones (Northwest, Northeast) where SBA is <40% and PNC is <30%. Deploy mobile services, establish maternity waiting homes, and recruit female health workers from these regions to address cultural and access barriers.
2. Remove out-of-pocket payments for maternal services at primary and secondary facilities and expand health insurance coverage for pregnant women to address the <30% utilization among the lowest wealth quintile and reverse the widening wealth inequality.
3. Invest in girls' secondary education in northern Nigeria as a long-term strategy. Women with secondary education have 2-4 times higher utilisation. Integrate maternal health literacy into school curricula and community women's groups.
4. Implement integrated interventions for rural northern women with low education and poverty, the group with the lowest utilisation, through conditional cash transfers combined with community health worker home visits.
5. Develop contingency plans to maintain maternal services during pandemics, conflict, and emergencies. Establish real-time monitoring of maternal health indicators to detect declines early and trigger a rapid response.

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