

Determinants of the Utilization of Traditional Birth Attendants and Its Health Implications on Childbearing Women in Yobe State, Nigeria: A Rural-Urban Comparison

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Abstract

Skilled birth attendance in Yobe State, in Nigeria's North East geopolitical zone, remains among the lowest in the country despite two decades of survey-based monitoring and a succession of state-level primary health care investments. This study synthesizes secondary quantitative data from the 2018 Nigeria Demographic and Health Survey (NDHS), the 2021 Multiple Indicator Cluster Survey (MICS), and the 2023-24 NDHS Key Indicators Report, together with state health system documentation and a body of Yobe-specific and northeast Nigerian published literature, to examine the determinants of Traditional Birth Attendant (TBA) utilization among childbearing women in Yobe State and the extent to which these determinants differ between rural and urban populations. Using Andersen's Behavioral Model of Health Services Use as its organizing framework, the study finds that the proportion of Yobe births assisted by a skilled provider rose from 17.8 percent in 2018 to 35.4 percent in 2023-24, while TBA-assisted delivery fell from 20.3 percent to an estimated 6.0 percent in the intervening 2021 MICS round, though state-level sample sizes are small enough that year-to-year figures should be read as indicative rather than precise. National-level Nigeria Demographic and Health Survey and Multiple Indicator Cluster Survey data show a persistent and substantial rural-urban gap in skilled attendance (67.6 percent urban and 28.0 percent rural in 2018; 77.3 percent and 35.5 percent urban and rural in 2021, respectively), and Yobe-specific literature and state health system records indicate that this gap is compounded, rather than offset, by an uneven distribution of primary health care investment, a severe shortfall in health workforce planning, and periodic insurgency-related disruption concentrated in the state's rural and border local government areas. The findings support the study's rural residence and socioeconomic hypotheses in direction, and points to a

need for state-level microdata access and routine rural-urban disaggregation in future Yobe-focused surveys.

Keywords: *Traditional birth attendants, skilled birth attendance, Yobe State, Nigeria, Andersen's Behavioral Model, maternal health, rural-urban disparities*

1. Introduction and Background

Skilled attendance at birth is one of the most consistently emphasized single interventions for reducing maternal and neonatal mortality, and its absence remains disproportionately concentrated in Nigeria's northern states (National Population Commission [NPC] & ICF, 2019, 2024). Yobe State, in the North East geopolitical zone, has for over a decade recorded some of the lowest rates of skilled and facility-based delivery in the country, alongside some of the highest fertility, poverty, and child mortality indicators (NPC & ICF, 2019, 2024; National Bureau of Statistics [NBS], 2022). Against this backdrop, Traditional Birth Attendants (TBAs) - lay providers who assist deliveries on the basis of experience and inherited practice rather than formal clinical training - continue to occupy a central and, in many rural communities, a socioculturally legitimate place in childbirth care (Mohammed, Dahiru, & Geidam (2026)).

The persistence of TBA utilization in Yobe reflects an interaction of factors that has been documented, in fragments, across a decade of Yobe-specific and northeast Nigerian scholarship: sociocultural preference and trust in known community figures (Doctor, Findley, Afenyadu, Uzundu, & Ashir, 2013); economic constraint and the direct and indirect costs of facility delivery (Dapchi, Kolo, Baba, & Gebriel, 2023); geographic distance and the poor state of rural roads and transport, particularly in the state's more remote and hard-to-reach local government areas (LGAs) such as Gulani, Yunusari, Geidam, Yusufari, Karasuwa, Machina, and Jakusko (Yobe State Ministry of Health, 2010); and health system limitations, including a persistently thin and unevenly distributed health workforce (National Primary Health Care Development Agency [NPHCDA], 2015). Overlaying these structural conditions is the northeast's exposure to Boko Haram-linked insurgency and, in the current period, renewed non-state armed group activity across the Borno-Adamawa-Yobe (BAY) states, which has intermittently disrupted health service delivery and displaced populations, with consequences that are documented to fall most heavily on rural and border communities (Mohammed & El-Hamza, 2023; United Nations Population Fund [UNFPA], 2026).

At the same time, Yobe State has, in the years since the last round of Yobe-specific TBA scholarships, been the focus of substantial, well-documented primary health care investment. Between 2020 and 2023, the state government and development partners, including Plan International, the German Cooperation agency (GIZ), and the World Bank's Saving One Million Lives project, constructed, rehabilitated, or upgraded 138 primary health centers (PHCs) against a target of one PHC per ward, reporting 78 percent achievement of that target as of May 2023 (Mohammed & El-Hamza, 2023). A state-funded free healthcare scheme prioritizing pregnant women, alongside enrollment in the federal Basic Health Care Provision Fund, has sought to reduce the direct cost barrier to facility delivery for a defined cohort of beneficiaries (Mohammed & El-Hamza, 2023). Most recently, Yobe was named the 2025 National Champion for Primary Health Care Leadership by the Nigerian Governors' Forum, UNICEF, and NPHCDA, attracting a combined USD 1.2 million prize for leadership commitment and measurable improvement in primary health care outcomes (Yobe State Government, 2026). Whether and how this investment trajectory has narrowed the rural-urban gap in skilled birth

attendance, relative to the sociocultural, economic, and security-related pressures sustaining TBA reliance in rural communities, remains a question that existing Yobe-specific literature has not yet addressed directly, and one to which the present study is intended to contribute.

This study builds on an established line of Yobe-focused maternal health scholarship, most directly the sociological assessment of TBAs and women's health in rural Yobe communities by Mohammed, Dahiru, and Geidam, the antenatal care determinants work of Abba, Gana, Musa, and Abba (2024), and the stakeholder-perspective analysis of maternal and newborn health prioritization in the state by Iwu et al. (2024). It extends this work specifically to the question of birth attendant choice and its rural-urban patterning, a dimension that has been examined in other Nigerian states - for instance in Ogun State's rural-urban comparison of skilled birth attendance (Adefala, Osinaike, Omotosho, Bamidele, & Sodeinde, 2024) and in Ondo State's analysis of sociodemographic predictors of TBA utilization (Adeleke, 2026) - but not yet, to the same degree, in Yobe. Broader Nigerian evidence points in the same direction: nationally, non-utilization of a health facility for childbirth has been shown to vary systematically by rural-urban residence (Adewuyi, Zhao, Auta, & Lamichhane, 2017), and regional variation in the factors influencing place of delivery has been documented across Nigeria's geopolitical zones more generally (Alabi, Atinge, Ejim, & Adejoh, 2022), underscoring that the rural-urban patterning this study investigates for Yobe is part of a wider, structurally rooted national picture rather than a feature unique to the state.

2. Theoretical Framework

The study adopts Andersen's Behavioral Model of Health Services Use as its primary analytical lens, a framework that has been applied extensively in Nigerian maternal health research and permits direct comparability with the existing Yobe antenatal care and TBA utilization literature. The model organizes the determinants of health service utilization into three categories.

Predisposing factors are the demographic and sociocultural characteristics that incline women toward or away from using formal health services, independently of their access to resources: maternal age, parity, educational attainment, religion, ethnicity, and marital status. In Yobe, a predominantly Muslim, Hausa-Kanuri-Fulani state with high fertility (a total fertility rate of 7.5 births per woman, the highest of any state in the North East zone in the 2023-24 NDHS) and low female educational attainment, predisposing factors are expected to weigh heavily toward TBA reliance. Enabling factors are the resources and structural conditions that facilitate or constrain access to skilled care once a woman is otherwise inclined to seek it: household wealth, distance and travel time to the nearest functional facility, husband's occupation and education, health insurance or free-care scheme enrollment, and exposure to health-related media messaging. Given that Yobe recorded a National Multidimensional Poverty Index incidence of roughly 82 to 85 percent across age groups in the NBS's 2022 Multidimensional Poverty Index Survey, among the highest of any Nigerian state, and that the state's Primary Health Care Under One Roof (PHCUOR) governance assessment recorded a human resources domain score of only 13 percent - reflecting an unresolved mal-distribution of primary health care staff - enabling constraints are expected to be substantial and geographically uneven.

Need factors capture the perceived and evaluated need for maternal health services: the number of antenatal care contacts attended, prior pregnancy or delivery complications, and parity-related risk. Because antenatal care contact is itself a strong predictor of subsequent skilled delivery care in the Nigerian literature (Fagbamigbe, Olaseinde, & Setlhare, 2021), and because Yobe's

antenatal care coverage, while improving, remains well below the national average, need-related pathways to skilled delivery are expected to be only partially activated.

While the rural-urban comparison in this study suggests that structural, health-system-level factors such as facility distribution, workforce density, and security-related access disruption, are driving disparities beyond what individual-level predisposing and enabling variables can explain, the discussion also draws on a socio-ecological framing, situating these structural determinants at the level of the health system and the broader security environment rather than at the level of the individual woman.

3. Research Questions, Objectives, and Hypotheses

The overarching research question guiding this study is: what predisposing, enabling, and need-based factors determine the utilization of Traditional Birth Attendants among childbearing women in Yobe State, and how do these determinants and their associated health implications differ between rural and urban populations?

Five specific objectives followed from this question: to determine the prevalence of TBA-assisted delivery in Yobe State, disaggregated by rural and urban residence where data permit; to identify the predisposing, enabling, and need factors associated with TBA utilization; to compare the determinant profiles of TBA utilization between rural and urban women in Yobe State; to assess the documented health implications of TBA-assisted delivery relative to skilled birth attendance; and to situate the findings within Yobe State's health system and security context to explain observed rural-urban disparities.

Three working hypotheses were specified at the design stage. H1 proposed that rural residence would be significantly associated with higher odds of TBA utilization, independent of wealth and education. H2 proposed that lower maternal education and lower household wealth quintile would increase the odds of TBA use in both rural and urban strata, with a stronger effect in rural areas. H3 proposed that antenatal care attendance would reduce the odds of TBA utilization more strongly in urban than in rural areas. Because state-level microdata access did not permit new regression estimation, these hypotheses are evaluated in Section 6 against the direction and consistency of published descriptive associations rather than against newly estimated odds ratios.

4. Study Design and Data Sources

4.1 Design

This is a desk-based, comparative, cross-sectional analysis of secondary quantitative data, supplemented by a structured synthesis of qualitative and descriptive literature specific to Yobe State and comparable settings in northeast Nigeria. No primary data collection was undertaken; all data are drawn from existing nationally representative surveys, state health system documentation, and institutional or grey-literature publications obtained for this study.

4.2 Data Sources

Four nationally representative survey rounds anchor the quantitative component of the analysis: the 2018 Nigeria Demographic and Health Survey (NPC & ICF, 2019), which provides a full, state-disaggregated table of assistance during delivery by attendant type (doctor, nurse/midwife, auxiliary nurse/midwife, community health extension worker, TBA, relative/other, or no attendant); the 2021 Multiple Indicator Cluster Survey and National Immunization Coverage Survey (NBS & UNICEF, 2022), which provides an equivalent state-disaggregated table together with institutional-delivery and antenatal-care-coverage indicators; the 2023-24 NDHS

Key Indicators Report (NPC & ICF, 2024), the most recent round available at the time of writing, which provides state-level indicators of skilled delivery, facility delivery, and antenatal care but does not yet disaggregate attendant type by state pending release of the full final report; and, for national and North East zonal urban-rural context, the corresponding residence-disaggregated tables in each of these three rounds. The 2016-17 Nigeria MICS state-level reports for Kano and Lagos (NBS & UNICEF, 2018) were reviewed for comparative methodological purposes but did not contain Yobe-specific data and are not drawn upon substantively below.

Health system and structural context is drawn from the NPHCDA's Primary Health Care Under One Roof Implementation Scorecard III (NPHCDA, 2015), which scores Yobe's state primary health care governance structure and facility inventory; the National Health Management Information System (NHMIS) Annual Report 2021 (Federal Ministry of Health, 2022); the Yobe State Ministry of Health's institutional profile (Yobe State Ministry of Health, 2010), a scanned internal document providing baseline geographic and workforce description; two contemporary secondary sources on state health system investment, a Nigeria Health Watch feature on PHC rehabilitation and social equity initiatives in Yobe (Mohammed & El-Hamza, 2023) and a Yobe State Government release on the state's 2025 national PHC leadership award (Yobe State Government, 2026); and the UNFPA's April 2026 Nigeria Humanitarian Situation Report, which documents the current security and displacement context in the Borno-Adamawa-Yobe states (UNFPA, 2026). Poverty and socioeconomic context is drawn from the NBS's 2022 Nigeria Multidimensional Poverty Index Survey results (NBS, 2022) and the accompanying NBS press release (NBS, 2022b). Yobe-specific and northeast Nigerian literature on TBA practice, determinants of antenatal care, maternal and infant mortality, and stakeholder perspectives is drawn from the reference list assembled for this study (see References), together with a broader set of Nigerian rural-urban maternal health determinant studies used for external comparison.

4.3 Departure from the Original Analytical Plan

The original data collection framework specified extracting Yobe-subsample microdata from the 2023-24 NDHS and 2021 MICS individual (women's) recode datasets, filtering by state and cluster identifiers, and analyzing with binary logistic regression, entering residence as a key predictor and testing interaction terms for residence by wealth and residence by education where sample size permitted. Access to these unit-record datasets was not obtained within the scope of this study; the analysis instead relies on the published, aggregated state- and residence-disaggregated tabulations contained in the final survey reports. This is precisely the contingency the original design anticipated for the circumstance in which "sample size is insufficient for robust regression at state level" (Research Plan, Section 7.2), and the same fallback, "a structured narrative synthesis of Yobe-specific and northeast Nigerian TBA-utilization literature combined with descriptive tabulation of available survey indicators", is applied here, with the limitation stated transparently rather than obscured. Chi-square tests of association and stratified odds ratios reported in this paper, where reported, are those already computed and published by the NDHS/MICS survey teams or by the cited secondary literature; no new inferential statistical testing was conducted by this study.

5. Prevalence of TBA-Assisted Delivery in Yobe State

5.1 Attendant-Type Distribution across Survey Rounds

Table 1 summarizes the distribution of birth attendant type for Yobe State across the two survey rounds - the 2018 NDHS and the 2021 MICS - for which state-disaggregated attendant-type data were available.

Table 1. Person providing assistance at delivery, Yobe State, 2018 and 2021 (percent of live births)

Attendant type	2018 NDHS (N=1,253)	2021 MICS (N=180)
Doctor	1.1	2.1
Nurse/midwife	15.0	43.2
Auxiliary nurse/midwife / other qualified provider	0.2	2.2
Community health extension worker/community health worker	1.7	15.3
Traditional birth attendant	20.3	6.0
Relative/friend or other	38.2	24.5
No attendant	23.4	6.6
Total	100.0	100.0
Total skilled attendant	17.8	47.5

Sources: NPC & ICF (2019), Table 9.6; NBS & UNICEF (2022), Table TM.6.2 (state table). The two surveys use slightly different attendant-category labels; "relative/friend or other" combines the 2021 MICS's separate "relative/friend" (22.7 percent) and "other" (1.8 percent) categories for comparability with the 2018 NDHS's combined "relative/other" category. Percentages may not sum exactly to 100.0 due to rounding in the original source tables.

Two features of Table 1 warrant attention before interpretation. First, the direction of change between 2018 and 2021 is consistent across all indicators: skilled attendance rose sharply, TBA-assisted delivery fell, and unassisted delivery fell. Second, the 2021 MICS Yobe subsample (180 women with a live birth in the two years preceding the survey) is small enough that individual cell estimates carry wide confidence intervals. The MICS report itself flags estimates based on fewer than 25 unweighted cases. While the Yobe total sample exceeds this threshold, several finer-grained cross-tabulations do not, and neither survey published a residence-disaggregated (rural/urban) breakdown specific to Yobe State. The 47.5 percent skilled-attendance figure for 2021 sits notably above the 35.4 percent figure recorded for Yobe in the preliminary 2023-24 NDHS Key Indicators Report (NPC & ICF, 2024), and the corresponding facility-delivery figures move in the same non-monotonic pattern (16.2 percent in 2018; 47.8 percent institutional delivery in 2021; 32.1 percent in 2023-24). This volatility is very unlikely to represent a genuine near-tripling and subsequent one-third reduction in skilled attendance within five years; it is far more plausibly an artifact of small state-level survey samples interacting with true, more modest underlying improvement, which is itself the empirical demonstration of the sample-size limitation. TBA-specific prevalence for the most recent survey round could not be directly confirmed; it can be inferred only indirectly, as the residual after skilled attendance (35.4 percent) is subtracted from the total (100 percent), leaving 64.6 percent of Yobe deliveries assisted by a TBA, a relative, or no one at all, or delivered outside a health facility without skilled assistance.

5.2 Place of Delivery

Complementing the attendant-type data, Yobe's health-facility delivery rate was 16.2 percent in 2018 (NPC & ICF, 2019, Table 9.5), rising to 47.8 percent institutional delivery in the 2021 MICS (NBS & UNICEF, 2022, Table TM.6.1) and 32.1 percent in the 2023-24 NDHS Key Indicators Report (NPC & ICF, 2024). Across all three rounds, home delivery has remained the modal outcome for Yobe women, a pattern broadly consistent with, though somewhat less extreme than, several of Yobe's North West zone neighbors (Sokoto, Zamfara, Katsina), and consistently worse than the North Central and southern zones.

5.3 Rural-Urban Disaggregation: A Structural Data Gap

This study relies on two indirect strategies, applied consistently and identified as such throughout: first, treating the national and North East zonal rural-urban gap as an informative, if imperfect, proxy for the likely scale of within-Yobe disparity; and second, drawing on Yobe-specific qualitative and facility-level evidence, most notably the PHCUOR governance assessment and the Nigeria Health Watch account of PHC rehabilitation in Damaturu LGA - to describe the qualitative direction and plausible mechanisms of rural-urban difference even where a quantitative Yobe-specific estimate is unavailable.

At the national level, the rural-urban gap in skilled birth attendance was large and stable in direction across both survey rounds reviewed: 67.6 percent urban versus 28.0 percent rural in 2018 (a 39.6 percentage-point gap), and 77.3 percent urban versus 35.5 percent rural in 2021 (a 41.8 percentage-point gap) (NPC & ICF, 2019, Table 9.6; NBS & UNICEF, 2022, Table TM.6.2). TBA-assisted delivery specifically was more than double in rural areas relative to urban areas in both rounds (25.5 percent rural and 12.4 percent urban in 2018; 20.3 percent rural and 6.3 percent urban in 2021). At the North East zonal level - which includes Yobe alongside Adamawa, Bauchi, Borno, Gombe, and Taraba - skilled attendance stood at 24.8 percent in 2018 and 35.4 percent in 2021, in both cases below the corresponding national rural figure, underscoring that the North East zone as a whole, and not only its rural segment, lags the rest of the country. Given that Yobe's own state-level skilled-attendance figures (17.8 percent in 2018; a figure well below even the zonal rural average) place it toward the less-favorable end of the North East distribution, it is reasonable to infer - while stopping short of asserting a precise estimate - that the rural-urban gap within Yobe itself is at least as large as, and quite plausibly larger than, the zonal and national averages reported here.

6. Determinants of TBA Utilization

6.1 Predisposing Factors

Consistent with the Andersen framework's predisposing category, national NDHS and MICS data show birth-attendant choice varying strongly and monotonically with maternal education. In the 2021 MICS, skilled attendance ranged from 21.4 percent among women with no education to 92.6 percent among women with higher or tertiary education (NBS & UNICEF, 2022, Table TM.6.2); TBA-assisted delivery moved inversely, from 20.8 percent among women with no education to 2.1 percent among the most educated. Yobe's female educational attainment is among the lowest of any Nigerian state, and the state's high total fertility rate (7.5 births per woman in the 2023-24 NDHS, the highest recorded for any North East state) implies a large share of higher-parity births, a category the 2018 NDHS associates with markedly lower skilled attendance nationally (25.3 percent among sixth-or-higher-order births versus 56.4 percent among first births) (NPC & ICF, 2019, Table 9.6). Ethnic composition also patterns strongly

with attendant choice nationally: in the 2021 MICS, Hausa and Fulani women - the two largest ethnic groups in Yobe - recorded skilled-attendance rates of 26.3 percent and 24.7 percent respectively, among the lowest of any ethnic group nationally, compared to 91.8 percent among Igbo women and 81.9 percent among Yoruba women (NBS & UNICEF, 2022, Table TM.6.2). While these are national, not Yobe-specific, cross-tabulations, they are directly relevant given Yobe's demographic composition, and they are broadly consistent with the qualitative finding, reported in the Yobe-specific sociological literature, that TBA reliance is embedded in sociocultural norms around modesty, trust, and the perceived appropriateness of a known community figure attending a birth (Mohammed, Dahiru, & Geidam, n.d.; Doctor et al., 2013). These predisposing patterns are consistent with wider Nigerian evidence: parity and birth order have been identified as significant predictors of place-of-delivery choice for a first child specifically (Adeniyi, Afolabi, Akinrefon, Omekam, & Olonijolu, 2022), and maternal age has been linked to reproductive outcomes, including interbirth interval patterns, in the North East zone specifically (Ahmed et al., 2026), reinforcing the relevance of Yobe's high-parity, high-fertility demographic profile to its birth-attendant patterning. Formal birth registration, itself a marker of engagement with the formal administrative and health system, likewise varies with many of the same predisposing characteristics nationally (Shuaib, 2023), suggesting that TBA reliance in Yobe may be one manifestation of a broader pattern of limited formal-system engagement rather than an isolated maternal health behaviour.

Women's autonomy in household decision-making, a further predisposing dimension, is associated nationally with skilled delivery care: the 2018 NDHS reports that women who participated in none of the surveyed household decisions received skilled delivery care in 30.8 percent of births, rising to 71.4 percent among women participating in all three surveyed decision domains (NPC & ICF, 2019, Table 15.16). This association plausibly compounds the education and ethnicity patterns already noted, though it has not, to this study's knowledge, been examined specifically for Yobe.

6.2 Enabling Factors

Household wealth is the most consistently reported enabling determinant of birth attendant choice in the national literature. In the 2021 MICS, skilled attendance rose from 22.1 percent in the poorest wealth quintile to 91.8 percent in the richest (NBS & UNICEF, 2022, Table TM.6.2), a pattern closely mirrored in the 2018 NDHS's wealth-quintile postnatal-care tabulation. Yobe's placement on national poverty measures is severe by any account reviewed for this study: the state's National Multidimensional Poverty Index incidence stood at 82.8 percent for children aged 0-4, 84.8 percent for children aged 0-17, and 81.9 percent for adults in the NBS's 2022 survey (NBS, 2022, Table 12), placing it among the four or five most deprived states in the country, and its 2020 unemployment rate of 52.6 percent was likewise among the highest nationally (NBS, 2022, Table 1). Nationally, rural poverty (72 percent) is substantially higher than urban poverty (42 percent) (NBS, 2022b), a gap that, applied to Yobe's already severe deprivation profile, implies particularly acute enabling constraints in the state's rural areas.

Facility distribution and workforce density constitute the second major enabling dimension, and here the Yobe-specific evidence is unusually direct. The NPHCDA's 2015 PHCUOR governance assessment, while dated, found that Yobe's State Primary Health Care Management Board scored only 13 percent on its human resources domain, the assessment's lowest-scoring category for the state, reflecting an unresolved mal-distribution of primary health care staff across the state's 17 LGAs and the absence of a developed plan to address it (NPHCDA, 2015). The state's own 2010

ministry-of-health profile - a considerably older baseline, but one that establishes the historical starting point against which subsequent investment can be read - recorded 111 medical doctors and 837 nurse/midwives serving a population of over two million, concentrated overwhelmingly, as is typical nationally, in the state capital, Damaturu, and other semi-urban centres, with the state's most remote LGAs (Gulani, Yunusari, Geidam, Yusufari, Karasuwa, Machina, and Jakusko) explicitly identified as "hard-to-reach" (Yobe State Ministry of Health, 2010). More recent evidence suggests this facility and workforce picture has begun to shift materially in the state's favor: between 2020 and 2023, 138 PHCs were built, rehabilitated, or upgraded against a ward-level target (Mohammed & El-Hamza, 2023), and Yobe was named the 2025 national leader in primary health care governance and service delivery improvement (Yobe State Government, 2026). The Nigeria Health Watch account of the rehabilitated Gwange PHC in Damaturu LGA is instructive as a case-level illustration of the enabling mechanism at work: following rehabilitation, monthly antenatal care attendance capacity rose from 20-30 women to roughly 100 women per antenatal care day, and monthly deliveries rose from fewer than 20 to 60-70 (Mohammed & El-Hamza, 2023) - a facility-level demonstration that investment in physical infrastructure and capacity directly increases uptake of facility-based care, consistent with the enabling-factors logic of the Andersen model. The same account, however, records that even this flagship, recently rehabilitated facility continued to face a shortage of staff, a single-solar-panel power supply, and seasonal flooding of the facility compound, illustrating that enabling gains achieved through infrastructure investment are not automatically matched by workforce or resilience investment, and that the benefits of rehabilitation to date have been concentrated in specific, often more urban or accessible, facilities rather than distributed evenly across the state's LGAs.

Cost-related enabling barriers have also been the target of recent state policy: the Buni Expanded Free Healthcare Scheme, launched in 2022, and the state's parallel enrollment of 32,000 beneficiaries in the federal Basic Health Care Provision Fund, both aim to reduce the direct financial cost of facility delivery for defined beneficiary cohorts, chiefly pregnant women, children under five, older persons, and people with disabilities (Mohammed & El-Hamza, 2023). Reported beneficiary numbers (an initial cohort of roughly 42,000 under the state scheme, expanding by a further 2,500 through a 2023 partnership with the Bill and Melinda Gates Foundation) remain modest relative to Yobe's estimated 526,931 women of childbearing age (Yobe State Ministry of Health, 2010), implying that a large majority of Yobe women of reproductive age currently fall outside these specific cost-mitigation schemes even where they are aware of them.

6.3 Need Factors

Antenatal care contact is the clearest available proxy for activated perceived need in the reviewed data, and it is strongly associated with subsequent skilled delivery care nationally: in the 2018 NDHS, skilled delivery care was received by only 7.9 percent of women who attended no antenatal care visits, rising to 65.0 percent among women with four or more visits (NPC & ICF, 2019, Table 9.6). For Yobe specifically, antenatal care coverage by a skilled provider stood at 73.2 percent in the 2023-24 NDHS Key Indicators Report, with 48.5 percent of women completing four or more visits (NPC & ICF, 2024) - figures that, notably, sit above Yobe's own skilled-delivery rate of 35.4 percent in the same survey round, indicating a substantial "antenatal-to-delivery dropout," in which a majority of women who engage with skilled antenatal care nonetheless do not deliver with a skilled attendant. This dropout pattern has been documented at

the national level in recent Nigerian literature (Oyedele & Yusuf, 2026) and is consistent with the enabling-factor constraints described above: engagement with antenatal care reflects perceived need and some baseline access, but does not guarantee that the same enabling conditions (cost, distance, facility readiness, workforce availability) will hold at the time of labour, which is typically less predictable in timing and more urgent than a scheduled antenatal visit.

7. Rural-Urban Comparison of Determinant Profiles

Wealth and education, the two predisposing/enabling variables most consistently associated with skilled attendance nationally, are themselves unevenly distributed between rural and urban Nigeria: national data show rural poverty (72 percent) at nearly double the urban rate (42 percent) (NBS, 2022b), and rural women nationally are markedly less educated than urban women on average. If this national pattern holds within Yobe, and there is no evidence reviewed for this study to suggest Yobe is an exception, then rural Yobe women face a compounding of exactly the two determinants shown to depress skilled attendance most strongly, which is consistent in direction with hypothesis H2 (that lower education and wealth increase TBA use in both strata, with a stronger effect in rural areas), though the comparative strength of the effect across strata cannot be predicted in the study due to microdata limitations.

Facility distribution provides a second, more directly Yobe-specific channel of rural-urban divergence. The PHCUOR assessment and the Nigeria Health Watch account both describe recent and current PHC investment as concentrated in specific, identifiable facilities and LGAs - Damaturu LGA's Gwange PHC being the most fully documented case - rather than uniformly distributed across the state's 17 LGAs, while the state's own ministry-of-health profile explicitly names seven LGAs as "hard-to-reach" due to terrain and remoteness (Yobe State Ministry of Health, 2010). This pattern is consistent with hypothesis H1 (that rural residence independently raises the odds of TBA utilization, beyond what wealth and education alone would predict) operating through a distinct, facility-access channel rather than solely through the compositional wealth/education channel addressed by H2.

Security-related access disruption constitutes a third, largely rural-concentrated channel that sits outside the original Andersen model's core categories and motivates this study's supplementary socio-ecological framing. The UNFPA's April 2026 situation report documents intensified non-state armed group activity across the Borno-Adamawa-Yobe states, more than 900,000 displaced persons across the three states in conditions of severe overcrowding, and direct attacks on health infrastructure and reproductive health service delivery in the wider region (UNFPA, 2026); the Nigeria Health Watch account separately notes that the earlier Boko Haram insurgency had a documented, significant impact on health service delivery in Damaturu LGA specifically, citing a reported fall in skilled antenatal care coverage from 33 percent in 2013 to 19 percent in 2018 as evidence of insurgency-related disruption (Mohammed & El-Hamza, 2023, citing NPC & ICF, 2019). Insecurity of this kind affects urban centers too, but its most severe and sustained effects, like population displacement, facility closure, and interrupted supply chains, are disproportionately concentrated in Yobe's rural and border LGAs, particularly those along the Niger Republic border (Yunusari, Machina, Yusufari) and those bordering Borno State, reinforcing rather than offsetting the facility-access and poverty-related channels already described. Finally, antenatal-care-to-delivery dropout, discussed in Section 6.3 above, is plausibly itself a rural-urban differential, since it is precisely at the point of labour and delivery - when a facility must be reached quickly, often at short notice and potentially at night - that

distance, transport cost, and security conditions bind most tightly; a woman who can reach antenatal care during daylight hours on a scheduled visit may nonetheless be unable to reach the same or a different facility for an unscheduled labour. This mechanism offers a plausible, though not directly tested, explanation consistent with hypothesis H3 (that antenatal care attendance reduces TBA use more strongly in urban than rural areas): if the marginal cost of converting antenatal engagement into skilled delivery is systematically higher in rural areas because of the access barriers just described, then antenatal attendance would be expected to translate into skilled delivery less reliably for rural women even where initial care-seeking intentions are similar. Taken together, the evidence reviewed is consistent in direction with all three of the study's working hypotheses, but in every case the confirmation is qualitative and mechanism-level rather than the quantified, statistically tested confirmation the original design intended; this distinction should not be elided in any application of these findings to policy or programming.

8. Health Implications of TBA-Assisted Delivery Relative to Skilled Attendance

Two categories of evidence are available on health implications. The national NDHS indicators that directly compare outcomes by attendant type, and Yobe-specific and comparable Sub-Saharan African literature on TBA-associated maternal and neonatal outcomes.

At the national level, the 2018 NDHS provides a directly comparable, attendant-type-stratified indicator in its analysis of early breastfeeding initiation: 50 percent of children whose deliveries were assisted by health personnel began breastfeeding within one hour of birth, compared with 33 percent of children whose deliveries were assisted by a TBA, 37 percent assisted by "other" attendants, and 36 percent with no attendant (NPC & ICF, 2019, Table 11.2). Early initiation of breastfeeding is itself protective against neonatal morbidity and mortality, so this gap, while not a direct mortality measure, is a plausible marker of broader differences in immediate newborn-care practice by attendant type. The 2023-24 NDHS's postnatal-care indicators show a comparable gap by place of delivery nationally: only 17.4 percent of newborns delivered outside a health facility (a category that includes the large majority of TBA-assisted deliveries) received a postnatal check within two days of birth, compared with 75.7 percent of those delivered in a health facility (NPC & ICF, 2024, Table 13), a gap that compounds any intrapartum risk with a subsequent gap in early detection of newborn complications.

Quantitative evidence directly linking TBA-assisted delivery to maternal or neonatal mortality outcomes was not located within the documents reviewed for this study; the Yobe- and Damaturu-focused mortality literature identified in the reference list (Dapchi et al., 2023; Liman, Abdullahi, & Mohammed, 2025) addresses socioeconomic determinants of infant and maternal mortality in the state more broadly, and the sociological assessment of TBAs in rural Yobe by Mohammed, Dahiru, and Geidam addresses practice and community perception rather than outcome statistics directly comparable to skilled-attendance benchmarks; this study is therefore not in a position to report a Yobe-specific quantified health-implication estimate, and states this as a data gap rather than inferring one. What can be stated, on the basis of the state-level structural indicators reviewed, is that Yobe's child mortality indicators remain markedly elevated in absolute terms - the PHCUOR assessment's 2015 baseline recorded an infant mortality rate of 142 and an under-five mortality rate of 240 per 1,000 live births for the state (NPHCDA, 2015), among the highest of any zone in Nigeria at that time, and that this elevated mortality burden co-occurs, at the state level, with Yobe's persistently low skilled-attendance rate, a co-occurrence consistent with, though not proof of, the broader Sub-Saharan African literature associating TBA-assisted delivery with elevated risk of unmanaged obstructed labour, postpartum

haemorrhage, and delayed referral relative to skilled facility-based care. This inference is consistent with the wider northern Nigerian literature on the downstream consequences of limited skilled and antenatal care: antenatal care attendance has been identified as a determinant of perinatal mortality at the national level (Dahiru, 2014), state-level contextual factors have been shown to shape early childhood mortality risk independently of individual characteristics (Umesi, 2023), and retrospective mortality assessments in neighbouring northern states have documented high-risk factors for maternal death that overlap substantially with Yobe's own profile of low skilled attendance and high poverty, including in Kaduna (Bashir & Ishaku, 2025) and in Adamawa, a state that directly borders Yobe (Danfulani, Dzarma, & Uduak, 2025). None of these studies provide a mortality estimate on Yobe, but their consistency with Yobe's structural indicators strengthens the plausibility of the health-implications inference drawn here. A further consideration, raised directly in the original research plan's framing and worth restating rather than glossing over, is that TBAs retain genuine sociocultural legitimacy in many Yobe communities, and that the policy implication of the evidence above is not that TBA practice should be dismissed or criminalized, but that the gap in newborn-care practice, postnatal follow-up, and presumed complication-management capacity between TBA-assisted and skilled-assisted delivery is the specific, addressable target - whether through TBA training and referral-linkage programmes of the kind piloted elsewhere in northern Nigeria (Uzondu, Doctor, Findley, Afenyadu, & Ager, 2015; Findley et al., 2013) or through continued expansion of facility-based capacity of the kind documented in Section 6.2.

9. Health System and Security Context: Situating the Rural-Urban Disparity

The first is a genuine and substantial institutional investment trajectory at the state level. Yobe's PHCUOR governance score of 66 percent in 2015 already placed it fourth nationally and second in the North East zone (NPHCDA, 2015); the subsequent 2020-2023 PHC rehabilitation programme, the 2022 free healthcare scheme, and the 2025 national PHC leadership award (Yobe State Government, 2026) together describe a state health administration that has, on the evidence available, prioritized and been recognized for primary health care investment more consistently than many of its regional peers. This investment trajectory is real and should not be understated. The second layer is that this investment has necessarily been uneven in its geographic reach, concentrated in specific rehabilitated facilities and, plausibly, in the state capital and more accessible semi-urban LGAs. The state's own documentation identifies seven of its seventeen LGAs as hard-to-reach on terrain grounds alone, before security conditions are considered (Yobe State Ministry of Health, 2010). The PHCUOR assessment's human-resources domain score of 13 percent indicates that workforce distribution, arguably the single most important enabling factor for skilled birth attendance, since a rehabilitated building without a resident skilled attendant cannot itself deliver skilled care, remains substantially unresolved even as physical infrastructure has improved (NPHCDA, 2015).

The third layer is the security environment, which is neither new nor resolved: the insurgency-related disruption documented for the 2013-2018 period in Damaturu LGA specifically (Mohammed & El-Hamza, 2023) has a direct successor in the intensified non-state armed group activity, mass displacement, and severely underfunded humanitarian response documented for the Borno-Adamawa-Yobe states in April 2026 (UNFPA, 2026). Both episodes are described in the sources reviewed as falling disproportionately on rural and border communities rather than on state capitals, and both are consistent with a pattern in which the same LGAs facing terrain-based and workforce-based access constraints also face the most acute and recurrent security-

based disruption, compounding rather than distributing the burden of Yobe's remaining gap in skilled birth attendance. This pattern is not unique to Yobe: displacement and insecurity have been shown to compound sexual and reproductive health barriers for women elsewhere in Nigeria's conflict-affected north, including reported gaps in met need and coping strategies among internally displaced women in north-central Nigeria (Okorafor, Okeibunor, Oyinlola, Ouedraogo, & Tinuola, 2024) and a documented prevalence of sexual and gender-based violence in Yobe State itself, associated with the same conflict dynamics (Salihu & Bukar, n.d.). The mental health dimension of this burden is also directly relevant: socio-demographic determinants of help-seeking for postpartum depression among women in Yobe and neighboring Niger State have been documented separately (Omale et al., 2026), suggesting that the security and health-system pressures described here likely extend beyond delivery-attendant choice to the broader continuum of maternal mental and physical health care in the state.

Read together, these three layers suggest that Yobe's rural-urban disparity in TBA utilization is not simply a residual of individual women's wealth, education, or care-seeking preferences, once those are accounted for, but is substantially structured by where, within the state, health system investment has been able to reach and remain secure enough to operate continuously. This is the specific sense in which the discussion moves, as the theoretical framework anticipated, from an individual-level Andersen model account toward a socio-ecological one: the same rural woman with a given level of education and wealth faces a materially different probability of skilled delivery depending on whether she lives within reach of a rehabilitated, staffed, and currently secure facility, or does not.

10. Limitations

Several limitations, most anticipated in the original research design, constrain the conclusions that can be drawn from this study. First and most significantly, unit- record microdata for the 2023-24 NDHS and 2021 MICS were not accessible within the scope of this study, precluding the binary logistic regression and residence- interaction analysis specified as the primary inferential technique in the original design; all quantitative findings reported here are therefore drawn from published, aggregated tabulations, and the study's engagement with its own hypotheses is correspondingly qualitative and directional rather than statistically confirmatory. Second, none of the three survey rounds reviewed publish a Yobe- specific rural- urban cross-tabulation of birth attendant type, meaning the rural- urban comparison at the core of this study's mandate is necessarily constructed indirectly, from national and zonal proxies and from Yobe-specific qualitative and facility- level evidence, rather than from a direct Yobe- specific quantitative source; this is stated as a finding in its own right as much as a limitation. Third, Yobe's state- level subsample sizes within national surveys are small - 180 women with a recent live birth in the 2021 MICS - producing year- to- year volatility in reported indicators that this study attributes to sampling variability rather than to genuine short- term reversals in service- use patterns. Fourth, all survey- based indicators rely on women's self- reports of delivery circumstances, introducing recall and social desirability biases inherent to this method, particularly around sensitive or normatively judged practices. Fifth, the Yobe State Ministry of Health profile drawn upon for baseline geographic and workforce description dates from 2010 and should be read as historical context establishing a starting point for subsequent investment, not as a current operational picture; more recent, granular facility- and workforce- distribution data specific to Yobe's rural LGAs were not available within the documents reviewed. Finally, this study did not identify Yobe- specific quantitative evidence directly linking TBA- assisted

delivery to maternal or neonatal mortality outcomes, and the health-implications synthesis in Section 8 accordingly relies on national attendant-type comparisons and structural mortality indicators rather than a Yobe-specific outcome estimate; this is recorded as a specific data gap for future primary or secondary research to address.

11. Conclusion and Policy Implications

This study set out to examine the determinants of TBA utilization among childbearing women in Yobe State and the extent to which these determinants and their health implications differ between rural and urban populations, using Andersen's Behavioral Model as its organizing framework and a desk-based synthesis of secondary survey data and published literature as its method. The available evidence indicates a genuine, if statistically unconfirmed and year-to-year volatile, improvement in Yobe's skilled birth attendance rate between 2018 and 2023-24, occurring alongside a well-documented state-level primary health care investment program and a series of national recognitions for that program's leadership. At the same time, the same evidence indicates that this improvement has not been evenly distributed: national and zonal rural-urban gaps in skilled attendance remain wide and stable in direction across every survey round reviewed, Yobe's own health system documentation identifies specific rural and border LGAs as persistently hard to reach on both terrain and, more recently, security grounds, and the state's primary health care workforce distribution remains, on the most detailed evidence available, substantially unresolved. The findings support, in direction if not in statistically estimated magnitude, all three of the study's working hypotheses: rural residence, lower education and wealth, and weaker translation of antenatal care engagement into skilled delivery all appear, on the evidence reviewed, to sustain higher TBA reliance in rural relative to urban Yobe. They further suggest that a purely individual-level, predisposing/enabling account of this disparity is incomplete without the socio-ecological layer of facility distribution, workforce planning, and security context developed in Section 9. For state-level maternal health policy and programming, three implications follow directly from this synthesis. First, continued facility rehabilitation of the kind documented for Damaturu LGA should be paired explicitly with workforce deployment planning, given the wide gap between Yobe's infrastructure and human-resources domain scores in the most detailed health-system assessment available; a rehabilitated facility without a resident skilled attendant cannot itself close the rural-urban gap. Second, given the documented antenatal-to-delivery dropout, in which Yobe women engage with skilled antenatal care at a substantially higher rate than they subsequently deliver with a skilled attendant, interventions that specifically target the moment of labor and delivery, community-based emergency transport arrangements, referral linkages with trained TBAs, or facility-based maternity waiting arrangements for women identified as at risk during antenatal care, may close more of the remaining gap than antenatal-care promotion alone. Third, and most directly actionable by the state health administration itself, routine collection and publication of Yobe-specific, rural-urban-disaggregated survey indicators, and facilitated access to state-level microdata for local research institutions, would resolve the central data constraint this study encountered and would allow the regression-based, interaction-term analysis the original research design intended to be conducted directly, rather than approximated through the structured narrative synthesis presented here.

References

- Abba, B., Gana, M. L., Musa, A., & Abba, U. (2024). Antenatal care services in Yobe State, Nigeria: The determinants and interventions to increase utilization. *International Journal of Science and Research Archive*, 11(2), 1316-1332.
- Adefala, N. O., Osinaike, A. O., Omotosho, A. Y., Bamidele, F. K., & Sodeinde, K. J. (2024). Determinants of the utilization of skilled birth attendance among women in Ogun East senatorial district, Nigeria: A rural-urban comparison. *Annals of Health Research*, 10(3), 264-275.
- Adeleke, O. R. (2026). Socio-demographic predictors of Traditional Birth Attendant utilization among women in Ondo State, Nigeria. *Journal of Current Health Sciences*, 6(1), 29-34.
- Adeniyi, O. I., Afolabi, N. B., Akinrefon, A. A., Omekam, I. V., & Olonijolu, I. R. (2022). Factors influencing the choice of place of delivery of a first child among Nigerian women. *Tanzania Journal of Science*, 48(2), 324-334.
- Adewuyi, E. O., Zhao, Y., Auta, A., & Lamichhane, R. (2017). Prevalence and factors associated with non-utilization of healthcare facility for childbirth in rural and urban Nigeria: Analysis of a national population-based survey. *Scandinavian Journal of Public Health*, 45(6), 675-682.
- Ahmed, A. M., Sani, J., Yusuf, R. O., Halane, S., Ahmed, M. M., Abdishakur, A. E., & Hussein, A. M. (2026). The influence of maternal age on optimal interbirth intervals prevalence among women of reproductive age in North-East Nigeria. *Discover Public Health*, 23(1), 975.
- Alabi, T. A., Atinge, S., Ejim, C., & Adejoh, S. O. (2022). Does where mothers live matter? Regional variations in factors influencing place of child delivery in Nigeria. *Journal of Biosocial Science*, 54(2), 163-183.
- Bashir, S. A., & Ishaku, S. G. (2025). Maternal mortality in Kaduna, Nigeria: A retrospective analysis using the Sisterhood Method.
- Dahiru, T. (2014). Antenatal care as a determinant of perinatal mortality in Nigeria: Population-based study (Doctoral dissertation, University of the Witwatersrand, Faculty of Humanities, School of Social Sciences).
- Danfulani, U., Dzarma, E., & Uduak, A. (2025). Evaluation of high-risk factors for maternal mortality at Specialist Hospital, Yola, Adamawa State, Nigeria. *Journal of Applied Sciences & Environmental Management*, 29(6).
- Dapchi, A. B., Kolo, A. G., Baba, U. S., & Gebriel, S. (2023). Influence of socio-economic factors on infant and maternal mortality rate in Yobe State. *Jalingo Journal of Social and Management Sciences*, 5(2), 229-238.
- Doctor, H. V., Findley, S. E., Afenyadu, G. Y., Uzundu, C., & Ashir, G. M. (2013). Awareness, use, and unmet need for family planning in rural northern Nigeria. *African Journal of Reproductive Health*, 17(4), 107-117.
- Fagbamigbe, A. F., Olaseinde, O., & Setlhare, V. (2021). Sub-national analysis and determinants of numbers of antenatal care contacts in Nigeria: Assessing the compliance with the WHO recommended standard guidelines. *BMC Pregnancy and Childbirth*, 21(1), 402.
- Federal Ministry of Health [Nigeria] / National Health Management Information System. (2022). National Health Management Information System (NHMIS) Annual Report: Data analysis of key health indicators, January-December 2021. Abuja: Federal Ministry of Health.

- Findley, S. E., Uwemedimo, O. T., Doctor, H. V., Green, C., Adamu, F., & Afenyadu, G. Y. (2013). Early results of an integrated maternal, newborn, and child health program, Northern Nigeria, 2009 to 2011. *BMC Public Health*, 13(1), 1034.
- Iwu, E. N., Maina, C. P., Aimu, R. S., Abimiku, R. H., Israel-Isah, S., Ayodeji, K. O., Odonye, G., Sabo, H., Kozuki, N., & Mothupi, M. (2024). Maternal and newborn health prioritization in Yobe State, Nigeria: Analysis of stakeholders' perspective. *Conflict and Health*, 18(1), 67.
- Liman, U. A., Abdullahi, S., & Mohammed, Y. U. (2025). Infant and maternal mortality in Damaturu. *FANE-FANE International Multidisciplinary Journal*, 9(2), 383-393.
- Mohammed, H., & El-Hamza, M. (2023, July 24). Rebuilding health in Yobe State through PHC rehabilitation and social equity initiatives. *Nigeria Health Watch*.
- Mohammed, H. I., Dahiru, A. U., & Geidam, A. I. (n.d.). Traditional Birth Attendants (TBAs) and the health of women of child bearing age in rural communities of Yobe State, Nigeria: A sociological assessment.
- National Bureau of Statistics [Nigeria]. (2022). *Nigeria Multidimensional Poverty Index (2022)*. Abuja: National Bureau of Statistics.
- National Bureau of Statistics [Nigeria]. (2022b, November 17). Nigeria launches its most extensive national measure of multidimensional poverty [Press release]. Abuja: National Bureau of Statistics.
- National Bureau of Statistics (NBS) & UNICEF. (2022). *Nigeria Multiple Indicator Cluster Survey (MICS) and National Immunization Coverage Survey (NICS) 2021: Survey findings report*. Abuja: NBS and UNICEF.
- National Bureau of Statistics (NBS) & UNICEF. (2018). *Nigeria 2016-17 Multiple Indicator Cluster Survey*. Abuja: NBS and UNICEF.
- National Population Commission (NPC) [Nigeria] & ICF. (2019). *Nigeria Demographic and Health Survey 2018*. Abuja and Rockville, MD: NPC and ICF.
- National Population Commission (NPC) [Nigeria] & ICF. (2024). *Nigeria Demographic and Health Survey 2023-24: Key Indicators Report*. Abuja and Rockville, MD: NPC and ICF.
- National Primary Health Care Development Agency (NPHCDA). (2015). *Primary Health Care Under One Roof (PHCUOR) Implementation Scorecard III report*. Abuja: NPHCDA.
- Okorafor, K. A., Okeibunor, J., Oyinlola, F. F., Ouedraogo, L., & Tinuola, F. R. (2024). Exploring sexual and reproductive health needs, barriers, and coping strategies of internally displaced women of reproductive ages in north-central Nigeria: A qualitative analysis. *PLOS ONE*, 19(12), e0309317.
- Omale, G. E., Oyesomi, K. O., Oladosun, M., Omojola, O., Bamigbolayin-Afolabi, F., & Afolayan, G. A. A. (2026). Socio-demographic determinants of help-seeking behaviour for postpartum depression among women in Yobe and Niger states, Nigeria. *Frontiers in Communication*, 11, 1727485.
- Oyedele, O. K., & Yusuf, O. B. (2026). Spatial variation and hierarchical analysis of institutional delivery dropout after antenatal care contacts in Nigeria: Findings from 3-survey rounds. *Scientific Reports*.
- Salihu, A., & Bukar, H. M. (n.d.). The prevalence of Sexual and Gender-Based Violence (SGBV) in Yobe State: A Managing Conflict in Nigeria (MCN) Programme scoping study report.
- Shuaib, M. A. (2023). Trends in completeness and determinants of birth registration in Nigeria.

- Umesi, L. U. (2023). Underlying and state-level contextual determinants of early childhood mortality in Nigeria (Doctoral dissertation, The University of Waikato).
- United Nations Population Fund (UNFPA). (2026). Nigeria humanitarian situation report: 1-30 April 2026. Abuja: UNFPA.
- Uzondu, C. A., Doctor, H. V., Findley, S. E., Afenyadu, G. Y., & Ager, A. (2015). Female health workers at the doorstep: A pilot of community-based maternal, newborn, and child health service delivery in northern Nigeria. *Global Health: Science and Practice*, 3(1), 97-108.
- Yobe State Government. (2026, March 26). Again, Yobe State emerges best state in primary healthcare delivery in Nigeria, wins USD 1.2 million. Yobe State Government.
- Yobe State Ministry of Health. (2010). Yobe State Ministry of Health profile. Damaturu: Yobe State Ministry of Health.