# Improving Maternal Health Outcomes Through Skilled Birth Attendance in Hard-To-Reach Communities of Adamawa State, Nigeria.

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## ABSTRACT

Maternal mortality remains a major public health challenge in Nigeria, particularly in hard to reach communities where access to skilled birth attendance is limited. This study investigates the impact of skilled birth attendance on maternal health outcomes in five underserved local government areas of Adamawa State. Using a mixed methods approach, quantitative data were collected from 300 women of reproductive age and analyzed alongside qualitative insights from interviews with mothers, skilled birth attendants, and health administrators. Findings revealed that only 42 percent of births were attended by skilled personnel, with significantly lower rates of postpartum hemorrhage, prolonged labor, and neonatal complications among those who received skilled care. Barriers to access included geographic isolation, lack of transportation, cultural preferences for traditional birth attendants, and perceived poor quality of facility based care. The study applied the Three Delays Model to interpret how skilled birth attendance mitigates delays in seeking, reaching, and receiving adequate care. Recommendations include deploying mobile clinics, integrating traditional birth attendants into the formal health system, improving transportation and referral networks, and enhancing community health education. The study concludes that expanding skilled birth attendance coverage is essential for reducing maternal mortality and improving maternal health equity in Adamawa State.

**Keywords:** Maternal health, Skilled birth attendance, Adamawa State, Nigeria, Hard to reach communities, maternal mortality, Three Delays Model, Health systems, Traditional birth attendants, Public health intervention

## INTRODUCTION

Maternal health is a cornerstone of public health and a critical indicator of a nation's development. Globally, maternal mortality remains a pressing concern, with sub-Saharan Africa accounting for approximately 70 percent of all maternal deaths (World Health Organization, 2024). Nigeria, Africa's most populous country, continues to grapple with high maternal mortality rates, particularly in its northern regions. According to the Nigeria Demographic and Health Survey, the national maternal mortality ratio stands at 512 deaths per 100,000 live births, with Adamawa State recording even higher figures due to its unique socio-political and geographic challenges (National Population Commission, 2023).

Adamawa State, located in northeastern Nigeria, is characterized by a mix of urban centers and vast rural, hard to reach communities. These areas are often underserved due to poor infrastructure, insecurity from insurgent activities, and limited health workforce deployment. Women in these communities face significant barriers to accessing quality maternal care, including long distances to health facilities, lack of transportation, cultural norms favoring traditional birth attendants, and inadequate health education. These factors contribute to preventable complications such as postpartum hemorrhage, obstructed labor, and sepsis, which are leading causes of maternal death in the region (Afape et al., 2024).

Skilled birth attendance, defined as care provided by trained health professionals such as midwives, nurses, or doctors during childbirth, is a proven intervention for reducing maternal and neonatal mortality. The World Health Organization emphasizes that the presence of skilled birth attendants during delivery can prevent up to 75 percent of maternal deaths by ensuring timely interventions and referrals (World Health Organization, 2024). Despite this, skilled birth attendance coverage in Adamawa's remote communities remains alarmingly low. Recent data suggest that fewer than half of births in these areas are attended by skilled personnel (Adepoju and Yusuf, 2024).

This study seeks to explore the impact of skilled birth attendance on maternal health outcomes in hard to reach communities of Adamawa State. By examining both quantitative health indicators and qualitative experiences of mothers and health workers, the research aims to provide evidence based recommendations for improving maternal care delivery. The findings are expected to inform policy decisions, guide resource allocation, and support the design of culturally sensitive interventions that enhance skilled birth attendance uptake in marginalized populations.

## LITERATURE REVIEW

Improving maternal health outcomes through skilled birth attendance has been widely recognized as a cornerstone of global health strategies. The World Health Organization (2024) asserts that skilled birth attendants trained professionals such as midwives, nurses, and doctors play a critical role in preventing maternal and neonatal deaths by managing complications and ensuring timely referrals. This section reviews existing literature on the relationship between skilled birth attendance and maternal health outcomes, with a focus on Nigeria and, more specifically, Adamawa State.

**Global Perspectives on Skilled Birth Attendance:** Globally, countries that have successfully reduced maternal mortality have done so by expanding access to skilled birth care. Campbell and Graham (2006) emphasized that strategies focusing on skilled attendance at birth and emergency obstetric care are among the most effective interventions. In countries such as Sri Lanka and Malaysia, maternal mortality rates declined significantly following the implementation of nationwide SBA programs. These successes underscore the importance of political commitment, health system strengthening, and community engagement.

**Maternal Health in Nigeria:** Nigeria remains one of the countries with the highest maternal mortality ratios in the world. According to the Nigeria Demographic and Health Survey (NPC, 2023), only 43 percent of births nationwide are attended by skilled personnel, with significant disparities between urban and rural areas. Northern Nigeria, including Adamawa State, consistently reports lower SBA coverage due to factors such as poverty, insecurity, and cultural preferences for traditional birth attendants (TBAs). Studies by Okonofua et al. (2022) and Afape et al. (2024) highlight that young women aged 15 to 24 in northern states are particularly vulnerable, with limited access to skilled care and high rates of maternal complications.

**Barriers to Skilled Birth Attendance in Adamawa State:** Adamawa State presents unique challenges to maternal health service delivery. The regions hard to reach communities suffer from poor road networks, limited health infrastructure, and frequent disruptions due to conflict and displacement. Adepoju and Yusuf (2024) conducted a statistical appraisal of maternal health trends in Adamawa and found that SBA coverage was below the national average, with maternal mortality ratios exceeding 500 deaths per 100,000 live births. Cultural norms also play a significant role; many communities prefer TBAs due to their accessibility, familiarity, and perceived empathy, despite their lack of formal training.

**Interventions and Policy Responses:** Recent policy efforts have aimed to improve maternal health outcomes through increased SBA deployment. The Federal Ministry of Health's 2025 Joint Annual Review reported a 17 percent drop in maternal deaths nationally, attributing the improvement to targeted investments in health worker training and mobile clinic programs (Federal Ministry of Health, 2025). However, these interventions have yet to fully penetrate remote areas of Adamawa. Community-based strategies, such as training TBAs to collaborate with SBAs and expanding health education, have shown promise in pilot programs but require broader implementation.

**Gaps in the Literature:** While existing studies provide valuable insights into the importance of skilled birth attendance, few have focused specifically on hard to reach communities within Adamawa State. Moreover, there is limited qualitative research capturing the lived experiences of mothers and health workers in these areas. This study seeks to fill these gaps by combining quantitative health data with qualitative interviews to offer a comprehensive understanding of the barriers and opportunities for improving maternal health through SBA.

## METHODOLOGY

**Research Design:** This study adopted a mixed methods research design, combining quantitative and qualitative approaches to provide a comprehensive understanding of maternal health outcomes in hard to reach communities of Adamawa State. The quantitative component utilized a cross sectional survey to assess the prevalence and impact of skilled birth attendance, while the qualitative component employed a phenomenological approach to explore the lived experiences of mothers and health workers. This design enabled triangulation of data sources and enhanced the validity of findings through methodological complementarity.

**Study Area and Population:** The study was conducted in five local government areas of Adamawa State identified as hard to reach due to geographic isolation, limited infrastructure, and security challenges. These areas included Michika, Madagali, Gombi, Song, and Lamurde. The target population comprised women of reproductive age who had delivered within the past two years, skilled birth attendants working in primary health centers, and health administrators overseeing maternal health programs. The selection of these groups was based on their direct involvement in childbirth and maternal health service delivery.

**Sampling Technique and Sample Size:** A stratified random sampling technique was used for the quantitative survey to ensure representation across the selected local government areas. A total of 300 women were selected based on proportional allocation from each area. For the qualitative component, purposive sampling was employed to select 30 mothers, 10 skilled birth attendants, and 5 health administrators. The sample size was determined using Cochran's formula for finite populations, adjusted for expected response rates and logistical feasibility.

**Data Collection Instruments:** Quantitative data were collected using structured questionnaires designed to capture demographic information, birth history, access to skilled birth attendants, and maternal health outcomes. Secondary data were obtained from health facility records covering the period from 2022 to 2024. Qualitative data were gathered through semi structured interviews and focus group discussions. Interview guides were developed to explore perceptions of skilled birth attendance, barriers to access, and recommendations for improvement. All instruments were administered by trained field researchers fluent in English and local languages.

**Pretesting and Reliability:** The data collection instruments were pretested in a neighboring local government area not included in the main study to assess clarity, relevance, and reliability. Feedback from the pretest was used to revise ambiguous questions and improve the flow of interviews. Reliability of the quantitative instrument was assessed using Cronbach's alpha, which yielded a coefficient of 0.82, indicating acceptable internal consistency. Interrater reliability for qualitative coding was ensured through independent coding by two researchers and reconciliation of discrepancies.

**Ethical Considerations:** Ethical approval was obtained from the Adamawa State Health Research Ethics Committee. Informed consent was secured from all participants after explaining the purpose, procedures, risks, and benefits of the study. Participants were assured of confidentiality, anonymity, and their right to withdraw at any stage without penalty. Data were stored securely and used solely for research purposes.

**Data Analysis:** Quantitative data were analyzed using the Statistical Package for the Social Sciences version 26. Descriptive statistics such as frequencies and percentages were used to summarize demographic characteristics and maternal health indicators. Inferential statistics including chi square tests and logistic regression were employed to examine associations between skilled birth attendance and maternal outcomes. Qualitative data were transcribed verbatim and analyzed using NVivo software. Thematic analysis was conducted to identify recurring patterns and insights, with coding performed independently by two researchers to ensure consistency.

**Conceptual Framework Application:** The study was guided by the Three Delays Model, which identifies delays in seeking care, reaching care, and receiving adequate care as key contributors to maternal mortality. This framework informed the design of data collection instruments and interpretation of findings. By examining how skilled birth attendance addresses each of these delays, the study provides a structured understanding of the mechanisms through which maternal health outcomes can be improved in hard to reach communities.

## RESULTS

This section presents findings from both the quantitative and qualitative components of the study. The results are organized according to key variables including demographic characteristics, skilled birth attendance coverage, maternal health outcomes, barriers to access, and thematic insights from interviews and focus group discussions.

**Demographic Characteristics of Respondents**: A total of 300 women participated in the quantitative survey. Table 1 summarizes their demographic characteristics.

**Table 1:** Demographic Profile of Respondents (n = 300)

| Variable | Category | Frequency | Percentage (%) |
|---|---|---|---|
| **Age** | 15–19 | 42 | 14.0 |
| | 20–34 | 186 | 62.0 |
| | 35 and above | 72 | 24.0 |
| **Marital Status** | Married | 213 | 71.0 |
| | Single | 48 | 16.0 |
| | Widowed/Divorced | 39 | 13.0 |
| **Education Level** | No formal education | 174 | 58.0 |
| | Primary | 69 | 23.0 |
| | Secondary and above | 57 | 19.0 |
| **Occupation** | Farming/Trading | 201 | 67.0 |
| | Civil service | 36 | 12.0 |
| | Unemployed | 63 | 21.0 |

**Skilled Birth Attendance Coverage:** Only 42 percent of respondents reported that their most recent delivery was attended by a skilled birth attendant. Table 2 shows the distribution of delivery locations and attendant types.

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**Table 2:** Delivery Location and Attendant Type

| Delivery Location | Attendant Type | Frequency | Percentage (%) |
|---|---|---|---|
| **Home** | Traditional birth attendant | 174 | 58.0 |
| **Primary health center** | Skilled birth attendant | 82 | 27.3 |
| **Secondary facility** | Skilled birth attendant | 38 | 12.7 |
| **Other (mission/private)** | Mixed | 6 | 2.0 |

**Maternal Health Outcomes:** The study found a strong association between skilled birth attendance and improved maternal health outcomes. Table 3 compares complications reported by women with and without skilled birth attendance.

**Table 3:** Maternal Complications by Birth Attendant Type

| Complication | With SBA (n = 120) | Without SBA (n = 180) |
|---|---|---|
| **Postpartum hemorrhage** | 7 (6.0%) | 32 (17.8%) |
| **Prolonged labor** | 9 (7.5%) | 41 (22.8%) |
| **Neonatal asphyxia** | 5 (4.2%) | 27 (15.0%) |
| **Sepsis** | 3 (2.5%) | 19 (10.6%) |

Logistic regression analysis revealed that women attended by skilled personnel were 3.4 times more likely to experience safe delivery outcomes ($p < 0.01$).

**Barriers to Skilled Birth Attendance**: Respondents identified several barriers to accessing skilled birth care. Table 4 presents the frequency of reported barriers.

**Table 4:** Reported Barriers to Skilled Birth Attendance

| Barrier | Frequency | Percentage (%) |
|---|---|---|
| **Long distance to health facility** | 234 | 78.0 |
| **Lack of transportation** | 192 | 64.0 |
| **Cultural preference for TBAs** | 156 | 52.0 |
| **Perceived cost of facility delivery** | 117 | 39.0 |
| **Absence of female health workers** | 93 | 31.0 |

**Qualitative Insights:** Thematic analysis of interviews and focus group discussions revealed four major themes:

a. **Trust and Familiarity with Traditional Birth Attendants**: Women expressed strong emotional and cultural ties to traditional birth attendants, citing their accessibility and empathetic care.
b. **Perceived Quality of Care at Health Facilities**: Negative experiences such as verbal abuse, long wait times, and lack of privacy discouraged women from seeking skilled care.
c. **Gender Dynamics and Decision Making**: In many households, decisions about delivery location were made by male partners or elders, limiting women's autonomy.
d. **Impact of Community Health Education**: Communities with active health education programs showed increased awareness and utilization of skilled birth services.

**Health Facility Records:** Review of facility records from 2022 to 2024 supported survey findings. Facilities with higher SBA coverage reported lower maternal mortality ratios. Table 5 summarizes the comparison.

**Table 5:** Maternal Mortality Ratios by SBA Coverage

| Facility Type | SBA Coverage (%) | MMR (per 100,000 live births) |
|---|---|---|
| **High SBA coverage** | >70 | 210 |
| **Low SBA coverage** | <40 | 540 |

## DISCUSSION

The findings of this study provide compelling evidence that skilled birth attendance significantly improves maternal health outcomes in hard to reach communities of Adamawa State. This section interprets the results in relation to existing literature, policy frameworks, and the unique sociocultural context of the study area.

**Skilled Birth Attendance and Maternal Outcomes:** The quantitative data revealed that only 42 percent of births in the study areas were attended by skilled personnel, a figure consistent with national trends in rural northern Nigeria (National Population Commission, 2023). Women who received skilled care experienced markedly lower rates of postpartum hemorrhage, prolonged labor, and neonatal complications. These findings align with global evidence that skilled birth attendance is one of the most effective interventions for reducing maternal and neonatal mortality (World Health Organization, 2024; Campbell and Graham, 2006).

The logistic regression analysis further confirmed that skilled birth attendance was a strong predictor of safe delivery outcomes. This reinforces the argument that increasing skilled birth attendance coverage in underserved areas is not merely a health system improvement but a lifesaving strategy.

**Barriers to Accessing Skilled Care:** The study identified several barriers that hinder women from accessing skilled birth services. Long distances to health facilities and lack of transportation were the most frequently cited challenges, affecting over 70 percent of respondents. These findings echo those of Adepoju and Yusuf (2024), who reported that geographic isolation and poor infrastructure are major impediments to maternal health service delivery in Adamawa.

Cultural preferences for traditional birth attendants also emerged as a significant barrier. Many women expressed trust and familiarity with traditional birth attendants, whom they viewed as more empathetic and accessible than formal health workers. This sentiment was particularly strong among older women and those with limited education. While traditional birth attendants play an important role in community support, their lack of formal training poses risks during obstetric emergencies. Integrating traditional birth attendants into the formal health system through training and collaboration could help bridge this gap.

**Gender Dynamics and Decision Making:** Qualitative data highlighted the influence of gender norms on maternal health decisions. In many households, male partners or elders determined where women should deliver, often favouring home births or traditional birth attendant assisted deliveries. This lack of autonomy limits women's ability to seek skilled care, even when they are aware of its benefits. Addressing gender dynamics through community education and male engagement programs is essential for improving skilled birth attendance uptake.

**Perceived Quality of Care:** Negative experiences at health facilities, including verbal abuse, long wait times, and lack of privacy, were reported by several participants. These issues contribute to mistrust and discourage future use of skilled services. Improving the quality of interpersonal care, ensuring respectful maternity services, and training health workers in patient cantered communication are critical steps toward increasing skilled birth attendance utilization.

**Role of Health Education:** Communities with active health education programs showed higher awareness and utilization of skilled birth services. This suggests that targeted health promotion can effectively shift cultural norms and improve health seeking behavior. Programs that involve community leaders, religious figures, and peer educators are particularly effective in rural settings.

**Facility Performance and System Strengthening:** Health facility records confirmed that centers with higher skilled birth attendance coverage had significantly lower maternal mortality ratios. This underscores the importance of strengthening primary health care systems, deploying skilled personnel, and ensuring functional referral mechanisms. Investments in infrastructure, equipment, and continuous training are necessary to sustain improvements in maternal health outcomes.

**Conceptual Framework Reflection:** The application of the Three Delays Model provided a useful lens for interpreting the findings. The first delay, deciding to seek care, is influenced by cultural beliefs, gender norms, and health education. The second delay, reaching care, is shaped by geographic and transportation barriers. The third delay, receiving adequate care, is affected by facility readiness and quality of services. Skilled birth attendance addresses all three delays by promoting timely decision making, facilitating access through outreach services, and ensuring competent care upon arrival.

## CONCLUSION

This study has demonstrated that skilled birth attendance plays a pivotal role in improving maternal health outcomes in hard to reach communities of Adamawa State, Nigeria. The findings revealed that women who delivered with the assistance of skilled personnel experienced significantly fewer complications such as postpartum haemorrhage, prolonged labour, and neonatal distress. These outcomes affirm the global consensus that skilled birth attendance is a critical intervention for reducing maternal and neonatal mortality.

Despite its proven benefits, the coverage of skilled birth attendance in the study areas remains low, with only 42 percent of respondents reporting access to such care during their most recent delivery. The barriers identified including geographic isolation, lack of transportation, cultural preferences for traditional birth attendants, and perceived poor quality of care highlight the multifaceted challenges that must be addressed to improve maternal health services.

Qualitative insights further emphasized the importance of community trust, gender dynamics, and health education in shaping maternal health behaviours. Women's experiences and perceptions of care, as well as the influence of household decision makers, play a significant role in determining whether skilled services are utilized.

The application of the Three Delays Model provided a useful framework for understanding how skilled birth attendance can mitigate delays in seeking, reaching, and receiving adequate care. By addressing these delays, skilled birth attendance contributes not only to safer deliveries but also to broader improvements in maternal health equity.

In conclusion, expanding access to skilled birth attendance in Adamawa's hard to reach communities is both a public health imperative and a moral obligation. It requires coordinated efforts across government, health systems, and communities to overcome structural and cultural barriers. The evidence presented in this study offers a strong foundation for policy makers, health planners, and development partners to design targeted interventions that will save lives and promote maternal wellbeing.

## RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed to improve maternal health outcomes through increased access to skilled birth attendance in hard to reach communities of Adamawa State:

1. **Strengthen Deployment of Skilled Birth Attendants:** The government and health authorities should prioritize the recruitment, training, and equitable distribution of skilled birth attendants across rural and underserved areas. Incentive packages such as rural service allowances, housing support, and career development opportunities can encourage skilled personnel to work in remote locations.
2. **Establish Mobile Maternal Health Clinics:** Mobile clinics equipped with skilled birth attendants and essential obstetric supplies should be deployed to reach isolated communities. These clinics can operate

on scheduled visits and provide antenatal care, safe delivery services, and postnatal follow up. This approach has proven effective in similar settings and can bridge the gap in facility access.

3. **Integrate Traditional Birth Attendants into the Formal Health System:** Rather than excluding traditional birth attendants, efforts should be made to train and integrate them into the formal health system. This can include basic obstetric training, referral protocols, and collaboration with skilled personnel. Such integration respects cultural norms while enhancing safety and continuity of care.
4. **Improve Transportation and Referral Systems:** Investment in community based transportation schemes such as emergency transport services, tricycle ambulances, and road infrastructure is essential. Strengthening referral systems between primary and secondary health facilities ensures timely management of complications and reduces maternal mortality.
5. **Promote Community Health Education and Engagement:** Health education campaigns should be intensified to raise awareness about the benefits of skilled birth attendance. These campaigns should be culturally sensitive and delivered through trusted community channels including religious leaders, women's groups, and local radio. Engaging men and elders in maternal health education can also shift decision making dynamics in favor of facility based care.
6. **Enhance Quality of Care in Health Facilities:** Improving the quality of care in health facilities is critical to building trust and increasing utilization. This includes training health workers in respectful maternity care, ensuring privacy and dignity during childbirth, and addressing complaints promptly. Facilities should also be adequately equipped with essential drugs, supplies, and emergency obstetric equipment.
7. **Implement Monitoring and Evaluation Systems:** Robust monitoring and evaluation systems should be established to track skilled birth attendance coverage, maternal health indicators, and service quality. Data collected should inform policy adjustments and resource allocation. Community feedback mechanisms can also be incorporated to ensure accountability and responsiveness.
8. **Foster Multi Sectoral Collaboration:** Improving maternal health requires coordinated efforts across sectors including health, transportation, education, and finance. Partnerships with non-governmental organizations, donor agencies, and community based organizations can mobilize resources and expertise to support maternal health initiatives.

## LIMITATIONS

This study was limited to five local government areas in Adamawa State, which may not represent the entire region. Security challenges restricted access to some communities. Data were largely self-reported, introducing potential recall bias. The cross sectional design limits causal inference, and resource constraints affected sample size and depth of qualitative engagement. Despite these limitations, the findings provide valuable insights into maternal health in underserved areas.

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