

Maternal Morbidity and Causes of Maternal Death among Women of Childbearing Age in Sardauna Local Government Area, Taraba State, Nigeria

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Abstract

Keywords

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Maternal morbidity and mortality remain major public health challenges in Nigeria, yet localised evidence from rural, highland communities is scarce. This study identified the types of emerging maternal morbidity affecting women and enumerated the causes of maternal deaths in Sardauna Local Government Area (LGA), Taraba State, Nigeria. A descriptive community - and facility-based cross-sectional study was conducted between January and May 2026 among 405 women of childbearing age (15-49 years) selected through multistage sampling across the 11 political wards. Data were collected with a structured questionnaire and analysed in IBM SPSS Statistics version 25 using frequencies, percentages and the chi-square test at the 0.05 level of significance. Overall, 322 respondents (79.5%) reported illness during pregnancy, delivery or within 42 days postpartum. The most frequent conditions were sepsis/infection (73.4%), severe anaemia (73.1%), HIV/AIDS-related complications (72.1%), hypertensive disorders (71.4%) and malaria in pregnancy (71.4%). Malaria was the leading reported cause of maternal death (21.2%), followed by obstructed labour (13.8%), haemorrhage (12.6%), hypertensive disorders (10.4%), anaemia (10.1%) and sepsis (9.6%). Deaths occurred during pregnancy (37.8%), labour (36.0%) and the postpartum period (26.2%), with 61.2% occurring at home or on the way to a health facility. Socio-demographic factors were not significantly associated with morbidity ($\chi^2 = 5.281$, $df = 6$, $p = 0.508$). Maternal ill-health in Sardauna LGA reflects a combined burden of infectious disease, anaemia, hypertension and obstetric emergencies. Strengthening antenatal care, malaria and anaemia control, emergency obstetric services and maternal death surveillance is urgently needed.

1. Introduction

Maternal morbidity refers to health complications that arise during pregnancy, childbirth or the postpartum period. In contrast, maternal mortality is the death of a woman during pregnancy or within 42 days of the termination of pregnancy from causes related to or aggravated by the pregnancy or its management (World Health Organization [WHO], 2025). Despite global progress since 2000, the burden remains unacceptably high. The WHO (2025) estimates that approximately 260,000 women died from pregnancy- and childbirth-related complications worldwide in 2023, with about 70% of these deaths occurring in Sub-Saharan Africa.

Nigeria continues to carry one of the highest burdens of maternal death globally. Limited access to quality antenatal care, delays in seeking care, low use of skilled birth attendants and socio-economic inequality all contribute to poor maternal outcomes (Wright et al., 2024). Rural women are especially vulnerable because

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of poor transport systems, long distances to health facilities, weak infrastructure and financial constraints (Adaki & John, 2025; Somorija & Idris, 2023).

The pattern of maternal ill health is also changing. While direct obstetric causes such as hemorrhage and hypertensive disorders remain dominant, indirect causes, including malaria, HIV/AIDS, anemia and non-communicable diseases, are increasingly important contributors to illness and death in low-resource settings. Understanding the interaction of medical and health-system factors is therefore essential for targeting interventions.

Sardauna LGA, on the Mambilla Plateau of Taraba State, is predominantly rural, mountainous and difficult to access, particularly in the rainy season. Although government and non-governmental organizations have invested in maternal health, there is limited empirical information on the types of maternal morbidity and the causes of maternal death in this area. Without such local data, policymakers and health managers cannot design interventions that match the needs of women in the LGA. This study addressed that gap through two specific objectives: (i) to identify the types of emerging maternal morbidity affecting women in Sardauna LGA, and (ii) to enumerate the causes of maternal deaths in the LGA.

2. Theoretical Framework and Related Literature

The study draws on the Three Delays Model (Thaddeus & Maine, 1994), which explains maternal deaths and complications through delays in deciding to seek care, in reaching an appropriate facility, and in receiving adequate treatment once there. It is complemented by the McCarthy and Maine (1992) framework, which links maternal outcomes to social, economic and health-service determinants such as education, income, cultural beliefs, access to services and the availability of skilled birth attendants. Disease causation theory further helps to separate direct causes (hemorrhage, eclampsia, sepsis, obstructed labor) from indirect causes (malaria, anemia, HIV/AIDS).

Empirical evidence from the region supports these frameworks. In North-East Nigeria, education level, maternal age, cultural practices, access to health information and the cost of antenatal care were significant predictors of maternal mortality (Salisu & Hamza, 2024). In Taraba State, cultural practices, geographic location and the quality of health services influenced maternal deaths (Adaki & John, 2025), and poverty, financial barriers, limited access and transport difficulties were identified as major contributors to maternal morbidity (Somorija & Idris, 2023). Studies from Cameroon similarly identified postpartum hemorrhage, hypertensive disorders, delayed care-seeking and inadequate emergency obstetric care as major risk factors and noted that most deaths were preventable (Achuondou et al., 2026; Merlin et al., 2023). Despite this body of work, few studies have documented the pattern of maternal morbidity and the causes of death in the rural communities of Sardauna LGA.

3. Research Methodology

3.1 Study area

The study was conducted in Sardauna LGA, in the central zone of Taraba State, North-East Nigeria. The LGA lies on the Mambilla Plateau at an average elevation of about 1,600 m above sea level and shares a border with the Republic of Cameroon. Its headquarters is Gembu. The terrain is mountainous with scattered settlements, the climate is cool (15–25 °C), and a rainy season from April to October makes some communities hard to reach. The population is predominantly rural and agrarian, with Mambilla, Fulani, Kaka and other ethnic groups (National Population Commission [NPC], 2018). The LGA has 11 political wards, which formed the basis for sampling. Maternal health services are delivered through primary health centers, maternity clinics and a few secondary facilities, including Mambilla Baptist Hospital and the general hospitals.

3.2 Study design and population

A descriptive, community- and facility-based cross-sectional design was adopted so that data could be collected at a single point in time. The study population comprised women of childbearing age (15–49 years) resident in the 11 wards who were pregnant, had delivered within the last five years, or had experienced pregnancy-related complications. Eligible women had lived in the LGA for at least six months and gave informed consent. Temporary visitors, non-residents, critically ill women and those who declined or withdrew were excluded. Data collection ran from January to May 2026.

3.3 Sample size and sampling

The minimum sample size was calculated using Cochran's (1977) formula, $n = Z^2pq/d^2$, with $Z = 1.96$, an assumed prevalence of 50% (no recent local estimate was available) and a margin of error of 0.05, giving 384. A finite-population correction for approximately 30,000 women of childbearing age (NPC, 2018) reduced this to about 377. To allow for non-response, a final sample of 405 respondents was adopted and distributed across the 11 wards using multistage sampling. First, the 11 political wards constituted the sampling strata to ensure geographical coverage of the study area. Second, communities were selected from the wards using simple random sampling. Third, eligible women were selected from the sampled communities through systematic or simple random sampling, depending on the availability of household lists. Where household lists were unavailable, a community-based household selection procedure was used. The sample was proportionately allocated across the selected wards based on their estimated population of eligible women. In addition, purposively selected doctors, nurses, and community health workers participated in key informant interviews to provide qualitative insights into maternal health-care challenges and emerging patterns of maternal morbidity and mortality.

3.4 Instrument and data collection

A structured questionnaire addressed the study objectives. Section A captured socio-demographic characteristics (age, marital status, religion, education, occupation, income, residence and parity). Section B captured obstetric history and emerging maternal morbidities, including whether the respondent had experienced illness during pregnancy, delivery or within 42 days postpartum and which conditions she had experienced (tick all that apply). Section C covered the causes, timing and place of maternal deaths in the community. The questionnaire was administered by trained research assistants, in local languages where necessary, after the study purpose was explained and consent obtained. Because the questionnaire allowed information to be reported from family or community knowledge, deaths are community-reported rather than clinically verified.

3.5 Data analysis

Data were entered and analyzed using IBM SPSS Statistics version 25.0. Frequencies and percentages were used to describe respondents' characteristics, the morbidity profile and the causes, timing and place of maternal deaths. The chi-square test was used to assess the association between socio-demographic factors (age, parity and educational level) and maternal morbidity. A p-value below 0.05 was considered statistically significant.

3.6 Ethical considerations

Ethical clearance was obtained under reference MAUTHY/HREC/23/435 from Modibbo Adama University Teaching Hospital, Yola, following an introductory letter from Saint Monica University Institute. Participation was voluntary, written or verbal informed consent was obtained, and respondents could withdraw at any time without penalty. Questionnaires were coded without personal identifiers, and results are reported in aggregate form.

4. Results

4.1 Socio-demographic characteristics of respondents

A total of 405 women took part. As shown in Table 1, most respondents were in their prime reproductive years: 26.3% were aged 25–29 years and 22.6% were aged 30–34 years. Two-thirds (67.0%) were married, 54.8% were Christian, and 40.9% were Muslim. Although 45.9% had tertiary education, 24.8% had no formal education. Housewives formed the largest occupational group (31.7%), more than half (54.4%) had no fixed income, and 53.4% lived in rural areas. Most women had 4–5 births (38.8%) or 2–3 births (35.6%).

Table 1. Key socio-demographic characteristics of respondents (n = 405)

Characteristic	Category	Percentage (%)
Age (years)	25–29 (largest group)	26.3
	30–34	22.6
Marital status	Married	67.0
Religion	Christianity	54.8
	Islam	40.9
Education	Tertiary	45.9
	No formal education	24.8
Occupation	Housewife (largest group)	31.7
Income	No fixed income	54.4
Residence	Rural	53.4
Parity	4–5 births	38.8
	2–3 births	35.6

Note. Percentages are as computed in the study dataset; only the leading categories are shown.

4.2 Objective one: types of emerging maternal morbidity

Table 2 shows that 322 respondents (79.5%) experienced illness during pregnancy, delivery or within 42 days postpartum, whereas 83 (20.5%) did not.

Table 2. Experience of illness during pregnancy, delivery or within 42 days postpartum (N = 405)

Response	Frequency (n)	Percentage (%)
Yes	322	79.5
No	83	20.5
Total	405	100.0

The conditions experienced are presented in Table 3 and Figure 1. Infectious diseases, anemia and hypertension dominated: sepsis/infection (73.4%), severe anemia (73.1%), HIV/AIDS-related complications (72.1%), and both malaria in pregnancy and hypertensive disorders (71.4% each). Miscarriage complications affected nearly half of the respondents (48.4%). Postpartum hemorrhage (28.7%) and obstructed labor (27.2%) were reported at moderate levels, and gestational diabetes was least frequent (9.4%).

Table 3. Conditions of maternal morbidity experienced by respondents (N = 405)

Condition	Reported, n	Percentage (%)
Sepsis/infection	297	73.4
Severe anemia	296	73.1
HIV/AIDS-related complications	292	72.1
Hypertensive disorders	289	71.4
Malaria in pregnancy	289	71.4
Miscarriage complications	196	48.4
Postpartum hemorrhage	116	28.7
Obstructed labor	110	27.2
Gestational diabetes	38	9.4

Note. Respondents could select more than one condition; percentages therefore exceed 100%.

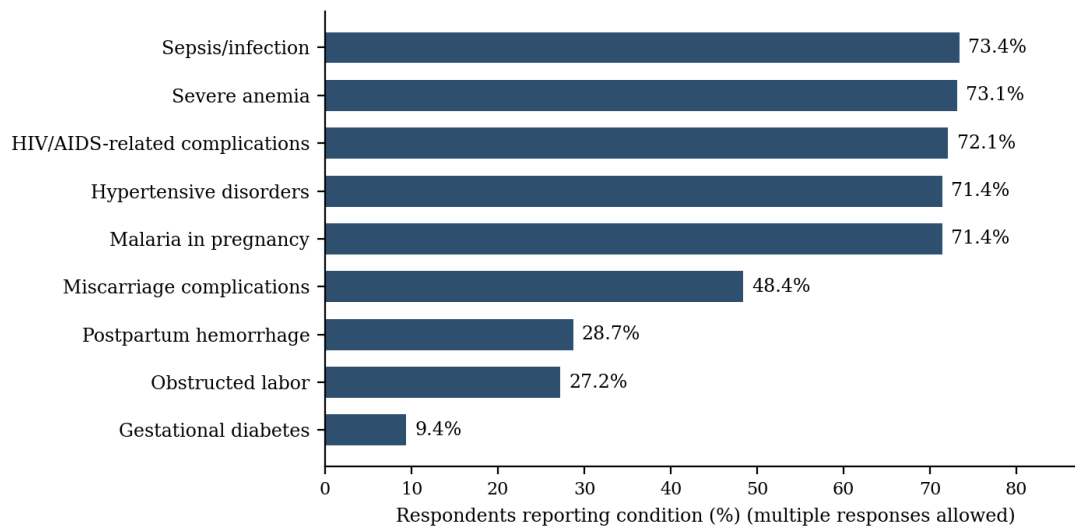


Figure 1. Maternal morbidity conditions reported by respondents in Sardauna LGA (N = 405)

A chi-square test showed no statistically significant association between socio-demographic factors (age, parity and educational level) and maternal morbidity ($\chi^2 = 5.281$, $df = 6$, $p = 0.508$). The null hypothesis was therefore not rejected.

4.3 Objective two: causes of maternal death

Table 4 and Figure 2 present the causes of maternal death reported in the community. Malaria was the leading cause (21.2%), followed by obstructed labor (13.8%) and hemorrhage (12.6%). Hypertensive disorders (10.4%), anemia (10.1%), sepsis (9.6%) and gestational diabetes (9.4%) each accounted for roughly one in ten deaths, while miscarriage/unsafe abortion (6.7%) and HIV/AIDS-related complications (6.2%) were reported least often.

Table 4. Reported causes of maternal death in the community (N = 405)

Cause of death	Frequency (n)	Percentage (%)
Malaria	86	21.2
Obstructed labor	56	13.8
Hemorrhage	51	12.6
Hypertensive disorders	42	10.4
Anemia	41	10.1
Sepsis	39	9.6
Gestational diabetes	38	9.4
Miscarriage/unsafe abortion	27	6.7
HIV/AIDS-related complications	25	6.2
Total	405	100.0

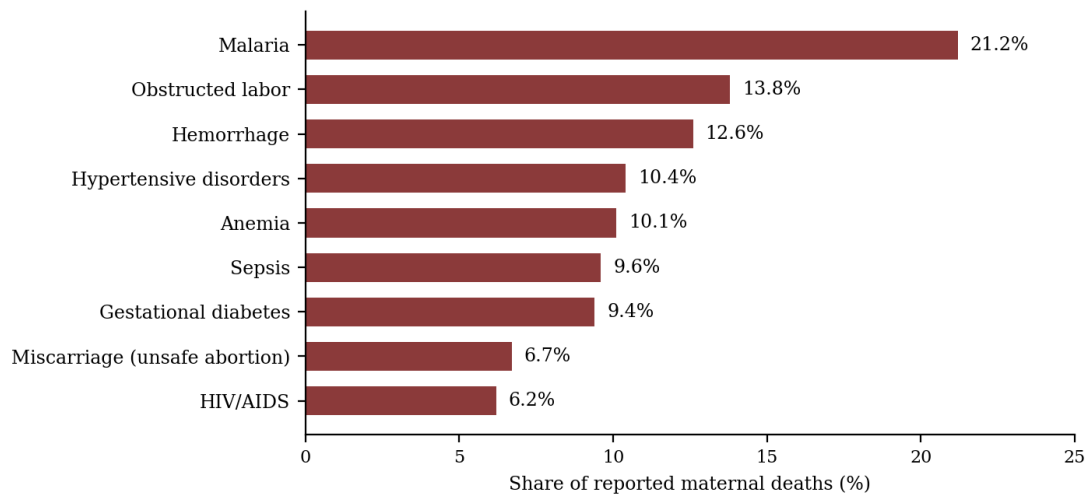


Figure 2. Causes of maternal death reported in Sardauna LGA (N = 405)

The timing and place of death are shown in Table 5. Deaths occurred most often during pregnancy (37.8%) and labor (36.0%), with 26.2% in the postpartum period. By place, 38.8% of deaths occurred in a health facility, 30.8% on the way to a facility and 30.4% at home; in total, 61.2% of deaths occurred outside a health facility.

Table 5. Stage and place at which maternal death occurred (N = 405)

Stage/place of death	Frequency (n)	Percentage (%)
Stage: During pregnancy	153	37.8
Stage: During labor	146	36.0
Stage: Postpartum	106	26.2
Place: Health facility	157	38.8
Place: On the way to a facility	125	30.8
Place: Home	123	30.4

4.4 Summary of findings

Table 6 summarizes the principal findings for the two objectives.

Table 6. Summary of principal findings by objective

Objective	Principal findings
1. Types of emerging maternal morbidity	79.5% reported illness; leading conditions were sepsis/infection (73.4%), severe anemia (73.1%), HIV/AIDS-related complications (72.1%), hypertensive disorders and malaria in pregnancy (71.4% each); no significant association with age, parity or education ($p = 0.508$).
2. Causes of maternal death	Malaria (21.2%), obstructed labor (13.8%), hemorrhage (12.6%), hypertensive disorders (10.4%) and anemia (10.1%) were the main causes; 37.8% of deaths occurred in pregnancy and 36.0% in labor; 61.2% occurred at home or en route to a facility.

5. Discussion

5.1 Context of the respondents

Most respondents were aged 25–34 years, the peak of reproductive life, which is consistent with studies in Sub-Saharan Africa showing that women in this age band account for the largest share of pregnancies and therefore of pregnancy-related complications (Utoo et al., 2023). The predominance of married women (67.0%) agrees with evidence that marriage is associated with higher fertility and cumulative obstetric risk (Bulus et al., 2026; Kahansim et al., 2023). The high proportion of housewives and women without a fixed income (54.4%), together with the rural majority, indicates low socio-economic status, which previous Nigerian work has linked to poor use of maternal services and to maternal death (Iwu et al., 2024; Salisu & Hamza, 2024). High parity is also a recognized risk factor for hemorrhage and anemia (NPC & ICF, 2024).

5.2 Types of emerging maternal morbidity

The finding that 79.5% of women reported illness in the pregnancy–postpartum continuum is very high, but it is in keeping with the reality in low- and middle-income settings where weak health systems and delayed interventions allow complications to go untreated. The morbidity profile shows a dual burden: infectious conditions (sepsis/infection, HIV/AIDS-related complications and malaria) occur alongside anemia and hypertensive disorders. Malaria and anemia are widely documented indirect causes of maternal ill-health in Sub-Saharan Africa, and hypertensive disorders are particularly common where antenatal screening is limited. This combined infectious and non-communicable pattern is what makes the trend an emerging one: classical obstetric complications such as hemorrhage (28.7%) and obstructed labor (27.2%) were far less frequent than the indirect and infectious conditions.

Two results deserve cautious interpretation. First, the prevalence of sepsis/infection (73.4%) is considerably higher than global estimates; this may reflect over-reporting by lay respondents who label any postpartum fever or wound problem as an infection, differences in diagnostic criteria, or genuinely heightened exposure to infection in the study setting. Second, gestational diabetes (9.4%) was the least reported condition, which contrasts with the rising global trend and probably reflects under-diagnosis because routine screening is not available, rather than true absence. The high rate of miscarriage complications (48.4%) points to gaps in access to safe reproductive health services.

The absence of a significant association between age, parity or education and morbidity ($p = 0.508$) suggests that risk is widely spread across demographic groups in this population. This is consistent with the view that environmental and health-system conditions, such as malaria transmission, access to care and service quality, shape outcomes more than individual characteristics. It should be noted, however, that the test examined broad categories and that other studies in the region have reported education and age as significant predictors of maternal outcomes (Salisu & Hamza, 2024).

5.3 Causes of maternal death

Malaria emerged as the leading reported cause of maternal death (21.2%), followed by obstructed labor and hemorrhage. Globally, hemorrhage is usually the leading cause (WHO, 2025); the prominence of malaria here is plausible in a malaria-endemic setting and underlines how indirect causes interact with pregnancy to worsen outcomes. Anemia, HIV/AIDS and sepsis, which together accounted for a further quarter of deaths, reinforce this picture. Obstructed labor and hemorrhage, the principal intrapartum killers, are both preventable where skilled attendance, timely referral and emergency obstetric care are available; Cameroonian studies likewise describe most maternal deaths as preventable with timely quality care (Achuondou et al., 2026; Merlin et al., 2023).

Deaths were distributed almost equally between pregnancy (37.8%) and labor (36.0%), with 26.2% in the postpartum period. Although global data often emphasize the postpartum period as the most critical, the present pattern suggests weaknesses in both antenatal and intrapartum care. Importantly, 61.2% of deaths occurred at home (30.4%) or on the way to a facility (30.8%). This supports the Three Delays Model (Thaddeus & Maine, 1994): in a mountainous LGA with scattered settlements and poor roads, women die before they reach, or while they are reaching, definitive care. It is also consistent with Taraba-based evidence that cultural practices, geographic location and service quality influence maternal mortality (Adaki & John, 2025; Somorija & Idris, 2023).

5.4 Strengths and limitations

The study provides rare community-level data from a hard-to-reach LGA, with respondents drawn from all 11 wards. Its limitations include reliance on self- or proxy-reported information that was not verified against clinical records, possible recall and reporting bias, multiple-response questions that inflate individual condition percentages, and a cross-sectional design. Because the design captures one point in time, the term emerging reflects the current pattern of causes rather than a measured change over time, and a maternal mortality ratio could not be derived. Longitudinal and facility-record-based studies are needed to confirm the trends.

5.5 Implications for practice and policy

The findings carry practical messages for health managers in Taraba State. Because malaria, anemia and hypertensive disorders are both common and treatable, they offer the most immediate opportunity to reduce illness and death: routine malaria prevention during pregnancy, hemoglobin and blood-pressure checks at

every antenatal visit, and prompt treatment of infections can be delivered at primary health-care level without specialist equipment. Since more than six in ten deaths occurred outside a facility, interventions must also reach women in their communities, for example through community health workers who can recognize danger signs, birth-preparedness counselling, and organized emergency transport from remote wards. Finally, the apparent under-diagnosis of gestational diabetes and the high rate of miscarriage complications indicate that screening and safe reproductive health services should be strengthened alongside emergency obstetric care.

6. Conclusion

Maternal morbidity in Sardauna LGA is extremely common and is driven largely by infections (sepsis, HIV/AIDS, malaria), severe anemia and hypertensive disorders, with obstetric emergencies adding to the burden. Malaria, obstructed labor, hemorrhage, hypertensive disorders and anemia were the main reported causes of maternal death, and most deaths occurred outside health facilities or before care could be completed. Maternal health in the LGA is therefore shaped by a combination of infectious disease burden, obstetric complications and health-system and access constraints rather than by the age, parity or education of women alone.

7. Recommendations

1. Health authorities should strengthen maternal health surveillance and routine monitoring, including maternal death reviews, so that changes in morbidity patterns are detected early.
2. Malaria prevention in pregnancy, routine screening and treatment of anemia and hypertensive disorders, and HIV and infection-control services should be integrated into antenatal care.
3. Skilled birth attendance, emergency obstetric care and functional referral and emergency transport systems should be expanded so that women with obstructed labor, hemorrhage or eclampsia receive timely care.
4. Community awareness programs should promote recognition of pregnancy danger signs and early care-seeking, and future studies should use longitudinal and facility-record designs to measure trends over time.

Conflict of Interest

The authors declare no conflict of interest.

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