

Prevalence of maternal mortality in northern Nigeria

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Abstract

Background

Nigeria's low maternal and newborn death rates continue to be a major public health concern. According to estimates, maternal fatalities account for around one-third of all deaths among women of reproductive age in Nigeria, where the maternal mortality rate (MMR) is 512 deaths per 100,000 live births.

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In Nigeria, 109 women of this number pass away every day. Nigeria's greatest maternal death rate is seen in northern Nigeria. For instance, the maternal death rate in Kaduna State is 1025 per 100,000 live births

Objective: This paper aims to provide an overview of the prevalence Rate of maternal and mortality indices in the Northern Nigeria.

Method: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Review (PRISMA-ScR) standards were followed in the conduct of the current review. Using Google Scholar search terms like periodontal disease, risk factors, screening, and preventative measures, scientific publications from 2007–2024 that were available in electronic databases like PubMed, Scopus, and the WHO website for the African region were retrieved for this review.

Results: In 2008, Nasarawa has the highest MMRatio range from 879 (95%: 718-1075) maternal deaths per 100,000, while in 2013 Katsina state has the highest MMRatio of 1621 (95%: 1295-2029). In 2020, the national maternal mortality ratio was 196.6 with some northern states exceeding the national target of 288.

Conclusion: the MMRatio levels are similar in cluster in the North. However, studies have shown that the levels of maternal mortality vary within the country. There are states with health facilities that are higher levels of maternal mortality compared to the national average. In 2008, kano had an MMR of 1600 death per 100,000 live births. While in 2020, the National maternal mortality ratio was 196.6 exceeding the national target of 288.

Keywords: Maternal Mortality Ratio, Obstetric Fistula, Morality, New born, Child birth

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1. Introduction

The poor maternal and neonatal mortality indices in Nigeria have remained a serious public health issue (Obinna O. Et'al 2022). Nigeria has a maternal mortality rate (MMR) of 512 deaths per 100,000 live births, an estimate which indicates that maternal deaths are responsible for about a third of all deaths among women of reproductive age (Galadanci H.S et'al 2007). Nigeria has a maternal mortality rate (MMR) of 512 deaths per 100,000 live births, an estimate which indicates that maternal deaths are responsible for about a third of all deaths among women of reproductive age (Meh, C. et'al 2019)

Childbirth and its process is one of the most significant events in the life of a woman. The time of birth, as well as postpartum, are the most critical period in a woman's life especially in the

developing world. The choice of place of delivery for a pregnant woman is important to maternal health care. Every day, approximately 1,000 women die globally from preventable causes related to pregnancy and childbirth, of which, 99% of all maternal deaths occur in developing countries (Titilayo D. O, et'al 2021).

Nigeria has a maternal mortality rate (MMR) of 512 deaths per 100,000 live births, an estimate which indicates that maternal deaths are responsible for about a third of all deaths among women of reproductive age (Galadanci H.S et'al 2007). The situation is much worse within the northern parts of the country, where the MMR is estimated to be over 1000 deaths per 100,000 live births in their study also found a higher maternal mortality rate in Northern Nigeria (Henry V.D et'al 2012).

Maternal death or mortality is defined as the death of a woman while pregnant or within 42 days of pregnancy, expressed as a ratio to 100,000 live births in the population being studied (Obinna O. et'al 2022).

According to, WHO (2008) about 80% of maternal deaths globally are due to four major causes- severe bleeding, infections, hypertensive disorders in pregnancy (eclampsia), and obstructed labor, estimated that in Nigeria, more than 70% of maternal deaths could be attributed to five major complications: hemorrhage, infection, unsafe abortion, hypertensive disease of pregnancy, and obstructed labor (Omoruyi, G 2008).

While several analyses of MM trends show that Nigeria is making progress in reducing the maternal mortality rate, the pace remains slow as a woman's chance of dying from pregnancy and childbirth is 1 in 13 and more startling is that most of these deaths are preventable (Opeyemi O, 2023). Several doubts have risen about the numbers that have been published as the rates of Maternal Mortality in Nigeria, considering the fluctuation and inconsistency of the figures and the uncertainty of their sources. The difficulty in measurement can be attributed rightly to the inadequate recording of adult deaths, misclassification of maternal death, and the relatively rare nature of maternal deaths (Opeyemi O, 2023).

Nigeria, as a country, has an inefficient vital/civil registration system, a challenge several developing countries are battling (WHO, 2012)

Maternal death rates are higher in Nigeria's northern region. Therefore, it is important to determine and examine the causes of the high burden of these fatalities. This would shed additional light on the variables and how they affect maternal mortality. The examination of these determinants will lead to the implementation of targeted policies aimed at lowering the death rate, which will inevitably lower the global mortality index.

A higher maternal mortality rate results in fewer workers in the nation, which can have a detrimental effect on the economy. As a result, the proportion of women in the country's population declines. According to conventional economic theory, women are crucial to the expansion and advancement of an economy. An adverse effect on the country's future labor force may also result from the deaths of pregnant women or women giving birth. This could lower Nigeria's GDP growth rate and make it more difficult for the country to continue growing and developing economically.

An attempt will be made on prevalence on maternal mortality in Northern region of Nigeria to proffer solution and recommendations to reduced maternal mortality in northern region.

Women die as a result of complications during and following pregnancy and childbirth. Most of these complications develop during pregnancy and most are preventable or treatable (WHO, 2024). Other complications may exist before pregnancy but are worsened during pregnancy, especially if not managed as part of the woman's care. The major complications that account for nearly 75% of all maternal deaths are severe bleeding (mostly bleeding after childbirth); infections (usually after childbirth, high blood pressure during pregnancy (pre-eclampsia and eclampsia); complications from delivery; and unsafe abortion (WHO, 2024).

Statement of the problem

Nigeria is second to India in the rating of countries with high pregnancy mortality globally (Yani S.D, et'al 2022). The country is considered one of the most dangerous places in the world to give birth (Polycarp, N. (2018), 109 women of this figure die daily in Nigeria. Northern Nigeria accounts for the highest maternal mortality rate in Nigeria. Kaduna State for example has a maternal mortality rate of 1025/100,000 live births (Yani S.D, et'al 2022).This indicates the need for in-depth reviews on prevalence on maternal mortality in the northern NIGERIA. This paper therefore, seeks to identify and determine factors of maternal mortality Northern Nigeria and the findings from this study will provides insight into how these communities could be assisted to reduce the rate of maternal morbidity and mortality.

Causes and contributing factors of maternal mortality

The causes of maternal deaths can be classified into medical factors, health factors, reproductive factors, unwanted pregnancy, and socioeconomic factors (Mojekwu, J.N et'al 2012) Medical factors include direct obstetric deaths, indirect obstetric deaths, and unrelated deaths. Direct obstetric deaths result from complications of pregnancy, delivery, or their management. Indirect obstetric deaths result from worsening of some existing conditions (such as hepatitis) by pregnancy. Health service factors include deficient medical treatment, mistaken or inadequate action by medical personnel, lack of essential supplies and trained personnel in medical facilities, lack of access to maternity services, and lack of prenatal care. Other risk factors for maternal mortality in Nigeria include maternal age, illiteracy, non-utilization of antenatal services, and grand multi-party (Obinna O. et'al 2022).

There is limited access to healthcare in the region, many of the women never received antenatal care, and they are more likely to give birth at home without the assistance of skilled attendants (Gulumbe, A, et'al. 2018). Conflict and insecurity also affect a large part of the Northern region. Conflict-affected areas in Nigeria have high maternal mortality rates due to the disruption of healthcare services, displacement of populations, and the general insecurity that affects healthcare service delivery (Risikat D, 2023).

Rural areas in Nigeria have higher maternal mortality rates than urban areas. This is due to inadequate healthcare infrastructure, a shortage of skilled healthcare workers, and limited access to essential drugs and equipment (Risikat D, 2023).

The Nigerian Heath Watch revealed that the health and private insurance plans currently used by most Nigerians are unaffordable, and many rural dwellers do not have any active plans. This is not surprising as major macroeconomic challenges faced in rural areas are severe poverty and high illiteracy(Risikat D, 2023).Referral services are slow and unreliable so life-saving care is not timely.

Table 1: Model-Based Estimate of maternal mortality rates (MMRates) and Maternalmortality ratio (MMRatio) inAll States in Nigeria DHS, 2008

Region States	MMRate	MMRatio
North Central		
Kogi	0.09 (0.07-0.12)	577 (440 – 756)
Niger	0.13 (0.10 -0.17)	524 (411 – 668)
Abuja	0.11(0.08 – 0.14)	704 (536 - 920)
Nasarawa	0.14 (0.12 – 0.18)	879 (718 – 1075)
Benue	0.09 (0.06 - 0.13)	448 (315 – 640)

Kwara	0.12 (0.10 -0.16)	718 (575 – 898)
Plateau	0.11 (0.09 -0.13)	629 (524 – 754)
North East		
Yobe	0.15 (0.12-0.19)	583 (475 – 715)
Borno	0.14 (0.12 -0.16)	520 (454 – 595)
Adamawa	0.16 (0.14 -0.18)	709 (621 – 810)
Gombe	0.15 (0.13 -0.17)	562 (483 – 653)
Bauchi	0.14 (0.12-0.17)	533 (452 – 628)
Taraba	0.14 (0.12 -0.16)	687 (599 – 788)
North West		
Katsina	0.14 (0.12 -0.17)	551 (467 – 649)
Jigawa	0.18 (0.15 – 0.22)	728 (595 – 892)
Kano	0.16 (0.12 -0.21)	604 (459 – 794)
Kaduna	0.12 (0.10 -0.14)	541 (453 – 646)
Kebbi	0.17 (0.14 -0.21)	780 (633 – 962)
Sokoto	0.19 (0.16 – 0.22)	662 (553 – 793)
Zamfara	0.17 (0.14 – 0.20)	646 (540 – 773)

Table 2: Model-based Estimate of maternal mortality rates (MMRates) and maternal mortality ratio (MMRatio) in All States in Nigeria, 2013

Region States	MMRate	MMRatio
North Central		
Kogi	0.14 (0.12 – 0.17)	572 (485 – 674)
Niger	0.17 (0.13 – 0.21)	660 (525 -829)
Abuja	0.13 (0.11 – 0.15)	439 (368 -525)
Nasarawa	0.11 (0.10 – 0.13)	422 (358 – 497)
Benue	0.21 (0.17 -0.28)	1257 (973 – 1625)
Kwara	0.14 (0.12 – 0.17)	809 (667 – 982)
Plateau	0.14 (0.12 – 0.16)	514 (466 -592)
North East		
Yobe	0.12 (0.10 – 0.14)	591 (505 – 692)
Borno	0.14 (0.11 – 0.17)	856 (689 – 1062)
Adamawa	0.12 (0.10 – 0.14)	494 (415 – 587)
Gombe	0.13 (0.11 – 0.15)	691 (607 – 788)
Bauchi	0.20 (0.17 -0.24)	998 (845 – 1179)

Taraba	0.08 (0.08 – 0.09)	371 (332 – 414)
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North West

Katsina	0.23 (0.19 – 0.29)	1621 (1295 – 2029)
Jigawa	0.18 (0.14 – 0.22)	960 (766 – 1204)
Kano	0.08 (0.08 – 0.14)	325 (193 – 545)
Kaduna	0.08 (0.06 – 0.10)	267 (213 -334)
Kebbi	0.12 (0.10 – 0.15)	584 (490 -696)
Sokoto	0.14 (0.11 – 0.16)	963 (810 – 1146)
Zamfara	0.11 (0.09 – 0.13)	480 (385 – 599)

Table 3: Model-based Estimate of maternal mortality rates (MMRates) and maternal mortality ratio (MMRatio) inAll States in Nigeria, 2018

Region States	MMRate	MMRatio
North Central		
Kogi	0.14	2308 (2247 – 2314)
Niger	0.09	2464 (2456 -2654)
Abuja	0.21	1206 (1072 -1442)
Nasarawa	0.14	949 (929 – 954)
Benue	0.09	626 (617 – 628)
Kwara	0.14	591 (540 – 614)
Plateau	0.12	862 (844 -992)
North East		
Yobe	0.10	480 (445 – 494)
Borno	0.10	357 (291 -394)
Adamawa	0.12	659 (614 – 687)
Gombe	0.13	811 (743– 862)
Bauchi	0.10	651 (601 – 788)
Taraba	0.11	420 (377 – 536)
North West		
Katsina	0.07	188 (150 – 199)
Jigawa	0.10	173 (70 – 227)
Kano	0.06	233 (149 – 281)
Kaduna	0.07	326 (273 – 346)
Kebbi	0.10	665 (617 -689)
Sokoto	0.12	320 (294 -328)
Zamfara	0.09	809 (761 – 830)

Result and discussion

Model – based estimates of maternal mortality rates and ratio

From 2008, the estimates for MMRatio ranged from 879 (95%: 718 – 1075) maternal deaths per 100,000 in Nasarawa state for 2008 (Figure 1) and ranged from 1621 (95%: 1295 – 2029) maternal death per 100,000 live births in kastina state for 2013 (Figure 2).

Table 1 shows the model – based estimates of MMRatio in the Northern state for 2008. Among all the Northern state, Nasarawa had the highest MMR of 879, 95% maternal death per 100,000 live births, Adamawa state had the highest MMR of 709 (95%: 621-810) maternal deaths deaths per 100,000 live births among the North Eastern state and Kebbi states with MMR of 780, 95%.

Table 2.show the model based estimates of maternal mortality ratio for the Northern state for 2013 respectively. Kastina state in North central part of Nigeria had the highest MMRatio of 1621 (95%: 1295 – 2029) and 1257 (95%: 973 – 1625) maternal death per 100,000 live births respectively followed by Bauchi state in the North East with MMRatio of 998 (95%; 845 – 1179) maternal deaths per 100,000 live births. While Kaduna in North West and Taraba in the North East had relatively lowered MMRatio of 267 (95%: 213 – 234) and 317 (95%: 332 – 414) maternal deaths per 100,000 live births.

Figure 1 and 3 gives insights into how each state in the region fared compared to the national estimates of 545 maternal death per 100,000 live births from the NDHS 2008 is that majority of the state in the Northern region falls below borderline the estimates published by the Nigeria DHS.

In 2013, half of the states have MMR below the published estimates by the Nigeria DHS and the other half have MMR higher than the national estimates by the Nigeria DHS.

In figures 2 and 4 spatial geographical variations in the MMR from the model based method for both 2008 and 2013 are presented respectively. The MMRatio levels are similar in cluster in the North.

However, studies have shown that thelevels of maternal mortality vary within the country.

There are states and health facilities that have higherlevels of maternal mortality compared to the nationalaverage. For instance, some northern states like Kano in2008 had an MMR of 1600 deaths per 100,000 livebirths, while 1049 deaths per 100,000 livebirths were reportedin Zamfara state (Galadanci H, 2010)

In 2020, the National Maternal Mortality ratio was 196.6, withKatsina, Zamfara, Kano, Sokoto, Jigawa, and Kebbi exceeding the national target of288, with Ekiti State had zero MMR in the same period (Health Think, 2020).

Maternal mortality is difficult and complex to measure especially in the settings where the highest burden exists. Data on the number of deaths of women of reproductiveage, their pregnancy status at the time of death and the medical cause of death is required for accurate measurement. This can be particularly difficult to obtain in low-income settings where vital statistics are often incomplete or do not exist. Estimates are frequently based on hospital data, which often do not reflect the maternal risk within communities (Graham W, 2008). Community based studies using direct estimation to measure maternal mortality face numerous challenges including large sample sizes required to produce reliable results, and the fact that most deaths occur at home and follow up is therefore time consuming and costly (Vandana S 2017).

Indirect methods for measuring maternal mortality have been developed to provide practical, less expensive alternatives for estimating the MMR in settings where data on vital events are not routinely collected or are unreliable(Vandana S, 2017).

Solutions and Recommendations

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- Considering the high maternal mortality rate in Nigeria coupled with the effect on the upkeep and health of the newborn, it is imperative to adopt a multi-faceted approach in combating the high maternal mortality rate. The following are policies that various stakeholders should implement.
 - Nigerian hospitals should be well-stocked with the newest medications and technology. Enough blood should also be added to hospitals' blood bank systems. Healthcare professionals ought to receive fair compensation. Additionally, more health workers ought to be hired. A conducive environment should also be created and maintained to reduce the massive brain drain in the health sector.
 - The budget for the Nigerian health sector should be increased. It should be increased to at least the amount agreed upon (at least 15 percent) by the country members of the African Union in 2001. The private and public sectors should explore options to get more support from donor organizations. The budget and donations should be efficiently expended by establishing sustainable institutional and structural frameworks (Risikat D, 2023).
 - Maternal care training and retraining should be provided to healthcare personnel. This will make it easier for medical professionals to spot the warning symptoms that could result in maternal death. In order to avoid maternal deaths, it will also help them provide high-quality prenatal, postnatal, and postpartum care. The need to improve post-natal care coverage for mothers to avoid maternal deaths arising from post-delivery complications
 - Tax breaks and credit facilities with reasonable interest rates ought to be extended to private companies operating in Nigeria's healthcare industry. These will boost their production capacity to provide quality health care at a more affordable rate to the general public. All people will be able to afford and obtain high-quality maternal health care if public hospitals receive more funding and donations.
 - The nation's current insecurity problem should also be addressed, and good road infrastructure and ambulances should be made available to improve access to hospitals. These measures will speed up the time it takes for pregnant women and those about to give birth to receive maternal care from hospitals.
 - Maternal health ought to be a prominent topic in the nation's political discourse and utilized as a crucial metric to assess economic performance and sound governance at all levels of government.
 - It is necessary to set up a program to track the rate of maternal death. This should be done to examine the effectiveness of policies implemented to reduce such mortality rates. The program should also be conducted to improve the policies geared toward avoiding and reducing maternal mortality.
 - Maternal mortality rates should be decreased by identifying areas of need and tracking progress using data collecting and monitoring systems. Enhancing data collecting and monitoring systems should be a top priority for the government in order to measure progress and influence policy decisions. In this sense, the importance of information technology cannot be overstated. Both rural and urban communities should use ICT-based maternal health interventions and systems.
 - Hospitals should educate women and expectant mothers about the value of receiving maternal care. This kind of sensitization can be carried out in collaboration with institutions such as the World Health Organization. This will enhance the desire of pregnant women to seek pre-natal and post-natal care from hospitals.
 - The government should improve primary healthcare. Preventing and treating maternal health issues requires primary healthcare services. By enhancing healthcare infrastructure, hiring and deploying more qualified healthcare professionals, and guaranteeing the
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availability of necessary medications and equipment, the government should place a higher priority on bolstering primary healthcare services. Large-scale implementation of emergency obstetric care and family planning services is also crucial. It is also vital to give incentives for skilled birth attendants in rural areas where the maternal mortality is higher.

- The government, medical professionals, the foreign community, and individuals must work together to improve maternal health in Nigeria. Nigeria can lower maternal mortality and enhance maternal health outcomes by putting these suggestions into practice.

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