

A health systems' perspective of maternal deaths: a five-year review in Muhammad Abdullahi Wase Teaching Hospital, Kano

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Abstract

Nigeria is the third ranking country with the highest maternal mortality indices, with a lopsided distribution tilting to Northern Nigeria. Kano is amongst the states with the highest maternal mortality in the country. Despite all efforts by the government and various non-governmental organizations at curbing maternal deaths, we are still a far cry from the ideal. This study was conducted to identify health system related factors that significantly contribute to maternal mortality in our centre. Case folders, maternal and perinatal death surveillance and response records were reviewed to identify health services related factors contributing to maternal mortality in our institution. A total of 21,108 deliveries was recorded over the study period, out of these, there were 17,867 live births. One hundred and sixty-eight women died from pregnancy related events, thus a maternal mortality ratio of 940/10⁵ live births. Identified factors were booking status, condition on admission and types 3 and 4 delays. The unbooked/booked elsewhere accounted for 151 (89.9%), while critical patients for 160 (95.2%) and types III and IV delays for 117 (69.6%). More than 70% of the referrals were from primary health centres, 73.5% of which were booked there. In-facility delay was mostly due to anaesthesia-related complications, 12 (48%). There is a need to fully equip peripheral hospitals, address delays in referrals of patients and for regulatory bodies to check the activities of primary healthcare givers. Residency training in anaesthesiology should be commenced in the state. Generally, there needs to be a more proactive change in emergency responsiveness across all the levels of healthcare delivery within the state.

Key words: maternal mortality, health systems perspective.

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Introduction

The death of a mother is the most devastating catastrophe to hit a family and society at large. Maternal mortality is the death of a woman while pregnant or within 42 days of termination of the pregnancy, irrespective of the timing or location of the pregnancy, from causes related to or aggravated by the pregnancy or its management, and not due to incidental or accidental causes.¹

Globally, 810 preventable maternal deaths occur daily, with over two-thirds in sub-Saharan Africa.² Nigeria ranks third worst globally; according to the World Health Organization (WHO)'s 2023 «trends in maternal mortality» report context, Nigeria's Maternal Mortality Ratio (MMR) was estimated at 1,047/100,000 Live Births (LB) in 2020.³

Kano State has one of Nigeria's highest MMRs, estimated at 900/100,000 live births.⁴

While southern Nigeria is recording a decline in maternal deaths, northern Nigeria is lagging behind southern progress.⁵ Although improved from 2,100/100,000 in 2008,⁶ it is at a snail's pace.

When compared to Belarus, which has the lowest maternal mortality indices (1/100,000)³, we realize that we have a long way to go before we achieve the Sustainable Development Goals (SDGs) target <70/100,000.²

The three delays model (Thaddeus and Maine, 1994) provides a framework for contributing to maternal mortality: type 1

(decision to seek care), type 2 (reaching a facility), and type 3 (receiving adequate care).⁷ A type 4 delay (post-intervention care) is also recognized.⁸ Studies demonstrate its critical role. In Malawi, 62% of deaths occurred within facilities, highlighting type 3 delays.⁹ A 2022 scoping review across 27 African countries found suboptimal service delivery (triage, monitoring, referral) was the most frequent facility-level factor.¹⁰ While several Nigerian reviews focus on direct/indirect causes and sociocultural factors,¹¹ this study examines maternal mortality from a health systems' perspective, addressing type 3 and 4 delays and related systemic factors. The aim was to review maternal deaths from a health systems perspective over five years. The objectives were: i) to determine the MMR; ii) to identify sociodemographic/clinical characteristics; iii) to evaluate health system factors, particularly type 2/3 delays; iv) to assess facility-based delays and causes.

Materials and Methods

Consent and ethical approval were obtained from the management of Muhammad Abdullahi Wase Teaching Hospital, Kano. A five-year retrospective review (2018-2022) of maternal deaths was conducted using case folders and Maternal and Perinatal Death Surveillance and Response (MPDSR) forms. Data were entered into Microsoft Excel and analyzed with the Statistical Package for Social Sciences (SPSS) version 25 using descriptive statistics.

Results

There were 21,108 deliveries and 17,867 live births. 168 maternal deaths occurred, giving an MMR of 940/100,000 live births. The mean age was 31.4 years (± 2 Standard Deviation, SD; range 17-50). Parity averaged 4.8 (± 2 SD; range 0-11). Most women were term/post-term. Sociodemographics are shown in Table 1. The year 2019 had the highest mortality (1,286/100,000); 2018 the lowest (585/100,000). Pre-eclampsia/eclampsia (33%) was the leading cause (Figure 1).

As depicted in Table 2 below, almost 90% of deaths were referrals: 70% from primary facilities, 13% secondary, 17% private, 12% nursing homes. Reasons for referral included lack of blood, non-functional theatres, and manpower issues. Among referrals from primary facilities, 73.5% were booked there, and 92% were high-risk. Facility-booked patients contributed 10% of deaths: four defaulted follow-ups, five were wrongly triaged as low-risk. Five died intraoperatively from anesthetic complications; three from intervention delays.

Type 3 and 4 delays accounted for almost 70% of deaths. In-facility delays (15% of deaths) were due to: anesthesia team issues (48%), delay acquiring consumables (20%), surgical team issues (12%), power outage (12%), and blood bank issues (8%).

Discussion

Our MMR (940/100,000) correlates with that of Kano State (900/100,000)⁴ and national figures,³ indicating distance from targets despite interventions.

Referrals, mostly from PHCs, constituted the greatest burden, similar to other studies.^{11,12} High-risk clients that ought to have been referred remained at primary facilities. Although task-shifting policies exist,¹³ this highlights the need to investigate PHC activities and referral failures.

Studies confirm many PHCs lack necessary services and coherent service strategies.^{14,15} Logistical referral issues from secondary institutions also contributed to type 3 delays.

In-facility delays, though the smallest contributor, remain unacceptable. Anesthesia issues accounted for nearly half. Delays in consumables, surgical response, power, and blood are unnecessary and require administrative action. A Benin City study found type 3 delays contributed to >60% of hospital deaths due to lack of blood, oxygen, equipment, manpower, and ICU.¹² A West African systematic review also identified human resources and supply factors as major contributors.¹⁶

Conclusions

The high MMR from our centre is a reflection of that of the state at large. Health system factors, particularly type 3/4 delays, accounted for 70% of deaths, with in-facility delays contributing up to 15%. There is an urgent need to improve service delivery at primary and secondary facilities, address referral delays, and improved monitoring systems.

Addressing anesthesia availability, consumable supplies, blood bank services, and power is critical to curbing in-facility delay. A more proactive approach to emergency responsiveness across all healthcare levels is required to reduce maternal mortality and progress toward SDG targets.

Causes of maternal Deaths



Figure 1. Causes of maternal death. Pie chart showing: preeclampsia/eclampsia 33%, hemorrhage, sepsis, and other causes making up the remainder.

Table 1. Sociodemographic characteristics of the deceased.

	Frequency (%)
Age	
15-19	8 (4.8)
20-24	30(17.9)
25-29	35 (20.8)
30-34	38 (22.6)
≥35	57 (33.9)
Total	168 (100)
Parity	
Primigravida	34 (20.2)
1-4	53 (21.5)
≥5	81(48.3)
Total	168 (100)
Gestational age	
Previaible	10(6.0)
Preterm	50(29.8)
Term/post-term	108 (64.3)
Total	168 (100)

Table 2. Contributory factors to maternal death.

	Frequency (%)
Booking status	
Booked	17 (10.1)
Booked elsewhere/unbooked	151 (89.9)
Total	168 (100)
Condition on admission	
Stable	8 (4.8)
Critical	160 (95.2)
Total	168 (100)
Delay model	
Types I and II	51 (30.4)
Types III and IV	117 (69.6)
Total	168 (100)

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