

The Role of the Three Delays in Maternal Deaths at the University Hospital Center of Kara (CHU-Kara/Togo) from 2023 to 2025

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Abstract

Maternal mortality is a major public health problem. The objective of this study was to identify and analyze the different types of delays involved in the occurrence of maternal deaths at CHU-Kara. Methodology: This was a descriptive cross-sectional study with retrospective data collection from January 1, 2023, to December 31, 2025, over a period of 3 years, focusing on cases of maternal deaths at CHU-Kara. Results: During the study period, 49 maternal deaths were recorded. The mean age was 27.4 years \pm 6.9 years. The majority (89.8%) were referred/evacuated. Direct causes predominate among maternal deaths, representing 53.1% of cases. Arterial hypertension with its complications (46.2%) and hemorrhagic causes (30.8%) were predominant. The first, second, and third delays were involved in 71.4%, 34.7%, and 61.2% of cases, respectively. Conclusion: The three delays, particularly the first and third, were implicated in maternal deaths, highlighting the need to strengthen awareness, access to emergency obstetric care, and quality of management.

Keywords

Maternal Mortality, Three Delays, Kara (Togo)

1. Introduction

Maternal mortality is a major public health problem. On a global scale, the maternal mortality rate is estimated at 197 deaths per 100,000 live births (LB) in 2023, with significant regional disparities [1]. It remains particularly high in sub-Saharan Africa, with a rate of 447 per 100,000 LB, compared to less than 10 per 100,000 LB in Europe [1] [2]. These high mortality rates observed in Africa are largely explained by the persistence of the three delays: the delay in the decision

to seek care, the delay in accessing health facilities, and the delay in receiving adequate care [3]. In order to contribute to the reduction of mortality, we conducted this study with the main objective of identifying and analyzing the different types of delays involved in the occurrence of maternal deaths at CHU-Kara.

2. Method

This is a descriptive cross-sectional study conducted in the gynecology and obstetrics department of the University Hospital Center of Kara (CHU-Kara). The CHU-Kara is located in the Kara region, in the northern part of Togo, and is one of the three university hospital centers in the country. The study took place over a period of 3 years, from January 1, 2023, to December 31, 2025. It was based on the analysis of medical records of women who died from obstetric complications. The data, extracted from these records, were entered via an electronic form in xlsx format on the Kobo Toolbox platform, then cleaned using Excel 2021 software and analyzed using Epi Info software version 7.2.7.0. The study population included all recorded maternal deaths. Included were the records of women who died during pregnancy or within 42 days after its termination, regardless of the duration or location, from any cause determined by or aggravated by the pregnancy or the care it motivated, but neither accidental nor incidental, at CHU-Kara during our study period, in accordance with the WHO definition [4].

The causes of death were assigned according to the conclusions documented in the medical records. Delays were defined according to the three-delay model: first delay or delay 1 (delay in the decision to seek care), second delay or delay 2 (delay in accessing care), and third delay or delay 3 (delay in receiving care) [3]. These delays were identified based on the information documented in the medical records. Multiple delays could be attributed to the same patient when supported by the findings in the medical records.

The collected data were kept confidential and anonymous for all patients.

3. Results

We recorded 49 maternal deaths out of 8079 live births during the study period, corresponding to a mortality rate of 606 per 100,000 live births.

3.1. Socio-Demographic Profile of the Patients

The mean age of the patients was 27.4 years \pm 6.9 years, with extremes of 17 and 40 years; the age group 18 - 23 represented 30.6%. The patients were uneducated (40.8%), housewives (51.1%), and resided in rural areas (65.3%) (Table 1).

3.2. Obstetric History and Associated Pathologies

The deceased patients had made fewer than 4 prenatal contacts (53.1%). The associated pathologies were arterial hypertension (43.7%), viral hepatitis B (25.0%), and sickle cell disease (18.7%) (Table 2).

Table 1. Distribution of patients according to socio-demographic characteristics.

	No.	Percentage
Age (years)		
<18 years	1	2.0
18 - 23	15	30.6
24 - 29	11	22.5
30 - 35	10	20.4
>35	12	24.5
Total	49	100.00
Education Level		
No Formal Education	20	40.8
Primary	14	28.6
Secondary	13	26.5
Higher Education	2	4.1
Total	49	100.00
Occupation		
Students	3	6.1
Housewives	25	51.1
Salaried Employee	1	2.0
Farmer	1	2.0
Vendors	9	18.4
Artisan	10	20.4
Total	49	100.00
Residence		
Urban	17	34.7
Rural	32	65.3
Total	49	100.00

Table 2. Distribution of patients according to obstetric history and associated pathologies.

	No.	Percentage
Gravidity		
Primigravida	18	36.7
Paucigravida	13	26.6
Multigravida	18	36.7
Total	49	100.0
Parity		
Nullipara	18	36.7
Primipara	09	18.5
Paucipara	11	22.4
Multipara	11	22.4
Total	49	100.0

Continued

Number of Prenatal Contacts		
0	08	16.3
[1 - 4]	18	36.7
[4 - 8]	22	44.9
≥8	01	02.1
Total	49	100.0
Associated Pathologies		
Hepatitis B	04	25.0
Sickle Cell Disease	03	18.7
HIV	01	06.3
Diabetes	01	06.3
Arterial Hypertension	07	43.7
Total	16	100.0

3.3. Mode of Admission and Mode of Transport

The patients were referred/evacuated (89.8%). The ambulance was used in 32.7% of cases (Table 3).

Table 3. Distribution of women according to mode of admission and means of transportation.

	No.	Percentage
Mode of Admission		
Came on their own	05	10.2
Referred/evacuated	44	89.8
Total	49	100.0
Means of Transportation		
Ambulance	16	32.7
Taxi	21	42.8
Motorcycle	10	20.4
Personal vehicle	02	04.1
Total	49	100.0

3.4. Distance and Referral Duration

The average distance traveled was 45.2 kilometers. The patients were admitted to CHU Kara on average 24.8 hours after their referral.

3.5. Clinical Data of Patients at Admission

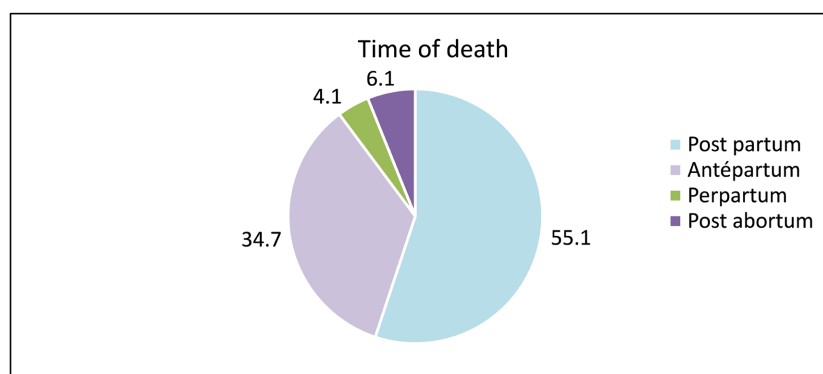
The general condition was altered in 75.5% of cases, and 46.9% of patients had a poor level of consciousness (Table 4).

Table 4. Distribution of patients according to general condition and state of consciousness.

	No.	Percentage
General Condition		
Good	12	24.5
Poor	37	75.5
Total	49	100.0
State of consciousness		
Good	26	53.1
Poor	23	46.9
Total	49	100.0

3.6. Time of Death

The death occurred in the postpartum period (55.1%) (**Figure 1**).

**Figure 1.** Distribution of patients according to the time of death.

3.7. Causes of Death

Direct causes predominate among maternal deaths, representing 53.1% of cases. Arterial hypertension with its complications (46.2%) and hemorrhagic causes (30.8%) are predominant (**Table 5**).

Table 5. Distribution of women according to the cause of death.

	No.	Percentage
Direct Obstetric Causes		
Preeclampsia/Eclampsia	12	46.2
Hemorrhage	8	30.8
Infection	6	23.0
Indirect Obstetric Causes		
Anemia	11	47.9
Acute Complications of Sickle Cell Disease	4	17.5
Hepatic Cirrhosis	2	08.8

Continued

Anesthesia Complication	1	04.3
Ophidian Envenomation	1	04.3
Human Rabies	1	04.3
Acute Polyradiculoneuritis	1	04.3
Diabetic Ketoacidosis	1	04.3
HIV/AIDS	1	04.3
Total	49	100.0

3.8. The Identified Delays

The first delay was identified in 71.4% of cases (**Table 6**).

Table 6. Distribution of patients according to the type of delay.

	No.	Percentage
Delay 1	35	71.4
Delay 2	17	34.7
Delay 3	30	61.2

3.9. Determinants of Delays

The main factor identified for the first delay was the absence or insufficient antenatal care visits in 53.1% of cases (**Table 7**).

Table 7. Distribution of patients according to the determinants of delay.

	No.	Percentage
Elements in Favor of the First Delay		
Admission in critical condition	30	61.2
Consultation delay > 24 hours	24	49.0
Home delivery	06	12.2
Insufficient prenatal contacts	26	53.1
Elements in Favor of the Second Delay		
Long referral delay	13	26.5
More than two facilities visited	12	24.5
Elements in Favor of the Third Delay		
Lack of staff	06	12.2
Lack of blood	07	14.3
Lack of equipment	11	22.4
Delay in care	06	12.2
Delay in diagnosis	03	6.1
Insufficient monitoring	09	18.4

4. Discussion

4.1. Socio-Demographic Profile of the Patients

The mean age of the patients was 27.4 ± 6.9 years, with a predominance in the 18 - 23 age group, representing 30.6% of cases. Thus, it involved a relatively young population. Several authors have reported similar results in the sub-region. For instance, Padonou *et al.* in Benin and Alkassoum *et al.* in Niger reported mean ages of 29.6 and 26 years, respectively [5] [6]. The extremes of reproductive age, particularly young age, are recognized as risk factors for maternal mortality [6] [7] [8]. More than half of the women were educated, but they were housewives in 51.1% of cases. Timsal in Pakistan reported a similar proportion (54.8%) of educated women [9]. In contrast, Diassama *et al.* in Mali reported a very high proportion of uneducated women (98.8%), also predominantly housewives [10]. The non-negligible education rate observed in our study could be explained by the various policies and actions implemented by the Togolese government in favor of literacy and girls' education, considered an essential lever for improving maternal health. However, despite this relatively satisfactory level of education, the economic and social empowerment of women remains limited, as evidenced by the high proportion of housewives (51.1%).

4.2. The Delays

In our study, the most frequent delay was the first delay. The women experienced the first delay in 71.4% of cases. This rate is very high compared to the 37% and 6.3% reported respectively by Diassama *et al.* in Mali and Mohammed *et al.* in Egypt [10] [11]. This result highlights the importance of the delay in deciding to seek care, considered one of the main determinants of maternal mortality in low-resource countries. This delay typically occurs between the onset of the first signs of complications and the decision to consult an appropriate health facility. Several factors could explain this high frequency of the first delay in our context. On one hand, the low economic and decision-making empowerment of women observed in our study could limit their ability to seek care quickly, as nearly half of the women were housewives without income. In many families, the decision to seek care still depends on the spouse or family environment, thereby delaying access to health facilities [12] [13]. On the other hand, the low level of knowledge about danger signs, as highlighted by Duysburgh *et al.*, can lead to an underestimation of symptom severity [14]. This argument is supported by the high rate of primigravidas (36.7%) recorded in our study. All these factors lead to late consultation, often more than 24 hours after the onset of symptoms, and frequently in a state of poor general condition in 75.5% of cases. The high proportion of the first delay observed in our study thus underscores the need to strengthen community-based interventions focused on health education for women and families, particularly on the early recognition of obstetric danger signs. Involving spouses and community leaders, developing financing mechanisms for obstetric emergencies, and improving women's empowerment could significantly reduce this delay and, conse-

quently, maternal morbidity and mortality.

The second delay and especially the third delay also represented significant proportions (34.7% and 61.2%). While the first delay was the most prevalent in our study, this was not the case in the studies by David *et al.* and Mohammed *et al.*, who reported the third delay as the most important in 69.7% and 34.8% of cases, respectively [11] [15]. Muriithi *et al.* also reported a predominance of the third delay [16]. Our rate of the third delay is likely underestimated, as the third delay was analyzed at the referral site, which is CHU-Kara. If the analysis of the third delay had focused on the first referral center, the rate would have been higher, since 44 women, or 89.8%, were referred or evacuated. This high proportion of referrals indirectly highlights the inadequacies of the peripheral health system, particularly in terms of capacity to manage obstetric emergencies, availability of qualified staff, and adequate technical platforms—key determinants of this delay. This difference prompts reflection on expanding the classic three-delays model to include the six delays: delay in seeking initial care, delay in reaching initial care, delay in initial management, delay in seeking referral care, delay in reaching referral care, and delay in management at the referral level [17].

4.3. Study Limitations

This was a monocentric study conducted exclusively at Kara University Teaching Hospital, which limits the generalizability of the findings. In addition, the identification of delays based on medical records may introduce classification bias.

5. Conclusion

This study identified the three delays in the occurrence of maternal mortality, with a predominance of the first delay related to the decision to seek care. These delays promote late consultation, often at a severe stage of the pathology, thereby compromising the maternal prognosis. These results underscore the need to strengthen population awareness, improve access to emergency obstetric care, and optimize the quality of management in order to reduce maternal mortality.

Authors' Contributions

All authors have read and approved the final version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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