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Review of Maternal Deaths over 3 and a Half Years at the Kara University Hospital Center, Northern Togo: About 65 Cases

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Abstract

Objective: To analyze maternal deaths, identify causes and dysfunctions leading to these deaths in order to contribute to the implementation of strategies to reduce maternal mortality at CHU Kara. **Method:** Cross-sectional descriptive study involving 65 cases of maternal deaths recorded at CHU-Kara from January 1, 2018 to June 30, 2021. **Results:** Our study focused on 65 cases of maternal deaths recorded at the maternity ward of CHU-Kara. The average age was 30 years, with a range of 15 to 45 years. They were mostly housewives (52.3%), uneducated (38.5%), multiparous (41.5%), and referred (86.2%). The causes were mainly direct obstetric causes (81.54%), with preeclampsia and its complications (28.30%) and immediate postpartum hemorrhage (20.75%) being the most common. However, uterine rupture (20.5%) and post-abortion sepsis (16.4%) were the most lethal etiologies. Delayed evacuation (46.43%), inadequate transportation (91%), and insufficient prenatal care (72.31%) were the dysfunctions before referral. Within the CHU Kara, delays in management (58.46%), unavailability of blood and labile products (18%), and insufficient monitoring were the dysfunctions identified. Ninety-five point four percent (95.4%) of the deaths were preventable. **Conclusion:** The magnitude of intrahospital maternal deaths, the various dysfunctions observed in the occurrence of maternal deaths before referral/evacuation and within the hospital highlight the importance of effectively implementing recommendations from audits in the fight against maternal mortality. The majority of the deaths were preventable (95.38%).

Keywords

Review of Maternal Deaths, CHU Kara, Togo

1. Introduction

Maternal mortality is the death of a woman during pregnancy or within 42 days after the termination of pregnancy, regardless of the duration or location of the pregnancy, due to any cause related to or aggravated by the pregnancy. Accidental or incidental causes are excluded [1]. It constitutes a major public health issue worldwide, especially in Sub-Saharan Africa. In fact, in 2020, approximately 70% of maternal deaths occurred in Sub-Saharan Africa [2]. Like these countries, Togo also faces a high maternal mortality ratio of 396/100,000 live births in 2020 [3] [4]. These figures are quite alarming but do not tell the whole story. While it is important to continue monitoring the overall figures of maternal mortality at the global, regional, and national levels to identify causes of deaths and raise awareness among stakeholders, statistics on the magnitude of maternal mortality alone do not help determine what can be done to prevent these deaths [5]. Hence the need for surveillance of maternal deaths and response through case-by-case analysis to prevent similar cases from occurring with the same fatal outcome, whether in the same location or elsewhere.

In order to support the efforts of health policies in reducing maternal deaths, we conducted this study to determine the epidemiological profile and preventability of maternal deaths, highlighting the shortcomings in patient care with the aim of developing specific actions to recommend for reducing maternal deaths.

2. Patients and Method

This was a series of maternal death cases audited at CHU Kara from January 1, 2018, to June 1, 2021, covering a period of 3 and a half years. All women who died at the maternity ward or in another department of CHU Kara during pregnancy, childbirth, or within 42 days after childbirth, and whose cause of death was neither accidental nor incidental, were included. Data collection was carried out using patient records, referral/counter-referral forms, registers, and maternal death notification forms. The study parameters included the sociodemographic profile of the deceased women (age, education level, occupation, parity), identified dysfunctions (referral dysfunctions, dysfunctions at the referral center), time of death, causes of death, preventability of deaths, level of dysfunction, and follow-up on audit recommendations. These data were processed and analyzed using software such as Word, Excel 2010, and Epi Info version 7. Confidentiality and anonymity were respected during the study.

Operational Definitions:

- Appropriate care: correct application of treatment or any other intervention that meets the specific needs of a patient and complies with guidelines and

other standards of medical profession.

- Inappropriate care: incorrect application of treatment or any other intervention that does not meet the specific needs of a patient, non-compliant with guidelines and other standards of medical profession.
- Avoidability of death: the presence of circumstances that, if corrected, could have prevented the fatal outcome.

Study Limitations

We faced difficulties in accessing data. The records, audit reports and documents were poorly filled and incomplete, with imprecise diagnoses, undetermined causes of death, and inadequate archiving.

3. Results

3.1. Epidemiological Profile

3.1.1. Maternal Mortality Rate

In total, 65 maternal deaths were recorded and audited out of 7035 live births, resulting in an intra-hospital maternal mortality rate of 923.95/100,000 live births.

3.1.2. Sociodemographic Profile

The average age of the victims was 30 ± 6.96 years, ranging from 15 to 45 years. They were mostly housewives, uneducated, and had few children. Table 1 represents the distribution of patients according to socio-demographic profile.

3.2. Prenatal Follow-Up

The majority of deceased women (72.31%) had undergone less than 4 prenatal consultations (PNC), as shown in Table 2.

Table 1. Distribution of deceased patients according to socio-demographic profile.

Socio-demographic profile	Number	Percentage (%)
Age		
15 - 19	8	12.3
20 - 24	10	15.4
25 - 29	11	16.9
30 - 34	15	23.1
35 - 39	18	27.7
≥40	3	4.6
Educational level		
Uneducated	25	38.5
Primary	18	27.7
Secondary	16	24.6
Superior	6	9.2

Continued		
Total	65	100.0
Occupation		
Housewife	34	52.4
Shopkeeper	19	29.4
Student	5	7.7
University student	4	6.2
Government employee	3	4.6
Total	65	100.0
Parity		
Nulliparous	16	24.6
Primiparous	4	6.1
Pauciparous	27	41.5
Multiparous	18	27.7
Total	65	100.0

Table 2. Distribution of deceased women according to the number of CPN.

Number of CPN	Number	Percentage (%)
0	15	23.1
1 - 3	32	49.2
>4	18	27.7
Total	65	100.0

3.3. Malfunctions Identified

3.3.1. Reference Malfunctions

Fifty-six patients, or 86.2%, were referred or evacuated from peripheral centers to the Kara University Hospital. Nine, or 13.8%, came on their own. Dysfunctions were identified during the referral or evacuation of the women (Table 3).

3.3.2. Malfunctions at the Reference Center

After the dysfunctions of the referral, deficiencies were also noted in the care at the referral center (Table 4).

3.4. Period of Death

Thirty-eight (38) patients died in the postpartum period (58.59%), as shown in this Figure 1.

3.5. Time of Occurrence of Deaths at the Referral Center

Deaths occurred within 24 hours after admission to CHU Kara. Figure 2 illustrates the distribution of women according to the time of occurrence of death.

Table 3. Reference/evacuation malfunctions.

Reference malfunctions	Number	Percentage (%)
Qualification of the referring service provider		
Midwife	40	71.4
Accoucheuse	10	17.9
General practitioner	2	3.6
Obstetrician	4	7.1
Means of transportation		
Taxi	34	60.7
Motorcycle	17	30.3
Ambulance	5	9.0
Referral time		
<1 hour	9	16.1
1 to 2 hours	21	37.5
>2 hours	26	46.4
Referred with venous access		
Yes	35	62.5
No	21	37.5

Table 4. Malfunctions noted in the support at the reference center.

Malfunctions at the reference center	Number	Percentage (%)
Delivery time at Kara University Hospital		
<30 min	27	41.5
30 - 60 min	17	26.2
>60 min	21	32.3
Need for blood and labile products		
Satisfied need	31	62.1
Unsatisfied need	12	27.9
Quality of care received		
Appropriate	35	53.8
Inappropriate	30	46.2
Monitoring rhythm in the postpartum		
15 min	8	20.5
30 min	4	10.3
1 - 2 hours	7	17.9
Not specified	20	51.3

Continued

Availability of the operating room*		
Yes	29	90.6
No	3	9.4

*The indication for a surgical procedure in the operating room was made in 32 women.

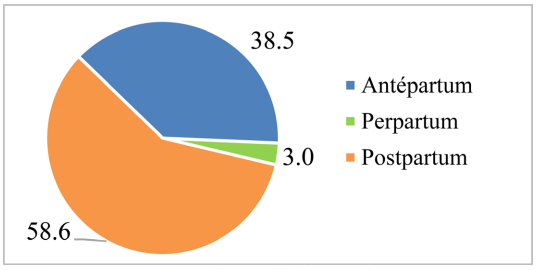

Figure 1. Distribution of patients according to time of death.

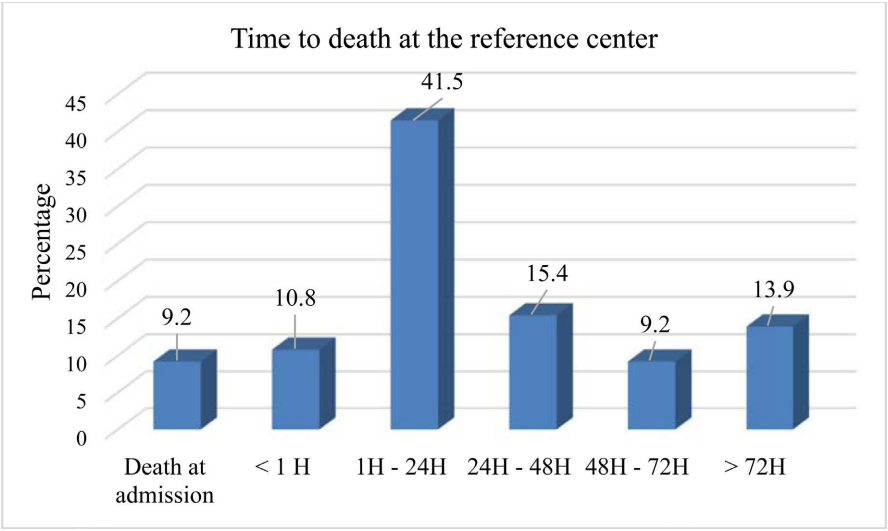

Figure 2. Distribution of women according to time to death at the reference center.

3.6. Causes of Death

Direct obstetric causes of maternal deaths accounted for 81.5% of cases (**Figure 3**). Pre-eclampsia and its complications (28.3%), immediate postpartum hemorrhage (20.7%), uterine rupture (15.09%), and post-abortion sepsis (15.1%) were the main etiologies. In terms of lethality, uterine rupture (20.5%) and post-abortion sepsis (16.4%) were the most lethal causes of maternal death (**Figure 4**). Anemia (39.7%) and major hemoglobinopathies were the main causes of indirect deaths.

3.7. Quality of Care Provided

The care provided was deemed appropriate in 35 cases of death, representing 53.8%. In 30 cases of death, the care provided was considered inappropriate, accounting for 46.2%.

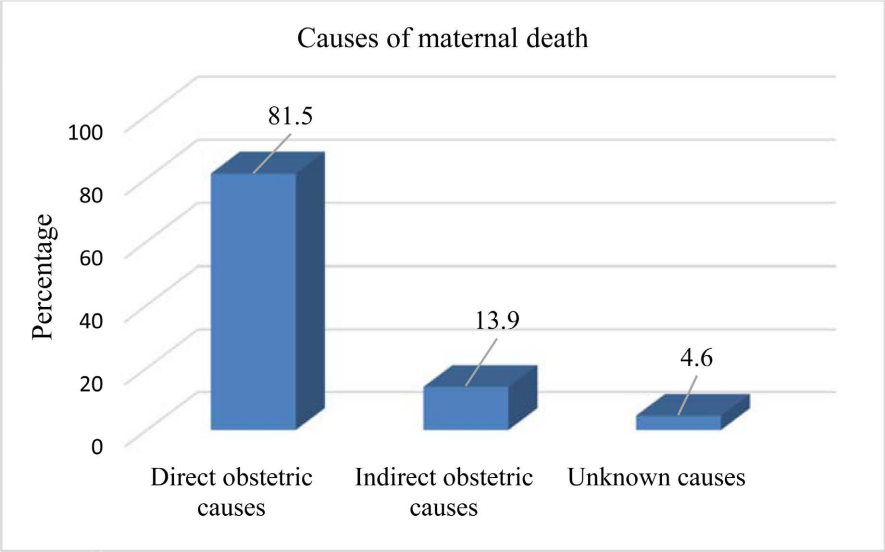

Figure 3. Distribution of patients according to causes of maternal death.

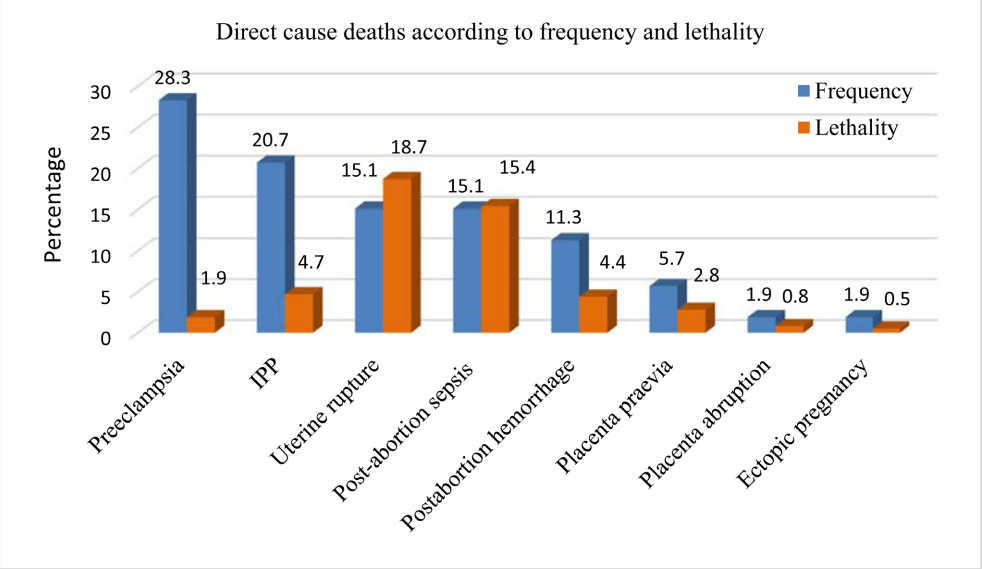

Figure 4. Distribution of etiologies of direct cause deaths according to frequency and lethality.

3.8. Avoidability of Maternal Death

According to the analysis of maternal deaths, it appears that 62 out of 65 deaths, or 95.4%, are avoidable. Three levels of avoidability have been identified, as illustrated in Figure 5.

3.9. Effectiveness of Audit Recommendations

Following each audit, recommendations were formulated. There was no follow-up on these recommendations according to the defined deadlines.

4. Discussion

The Kara region is characterized by the presence of a single national reference

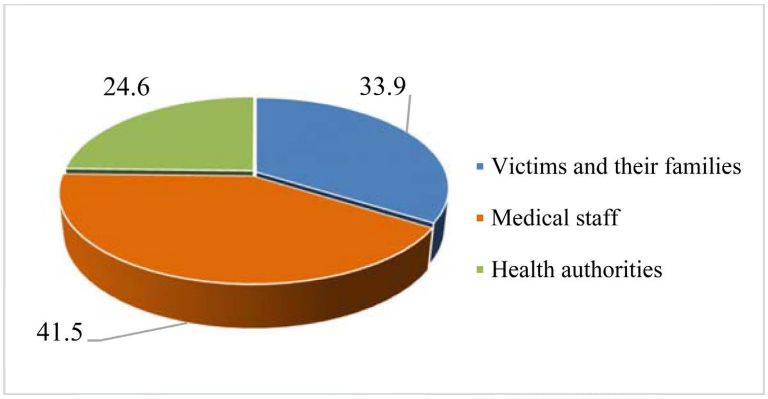

Figure 5. Distribution of maternal deaths according to the level of avoidability.

center in the northern zone. We found an intra-hospital maternal mortality ratio of 923.95/100,000 live births at CHU-K. This rate is lower than that of Aboubakari *et al.* [6], who found an intra-hospital maternal mortality ratio of 3600/100,000 live births from 2002 to 2005. Atade *et al.* in Benin found a rate of 1173 deaths per 100,000 live births between 2015 and 2019 [7]. A very low rate was reported in the same region in 2020 by Ajavon *et al.*, who found 174.8 deaths per 100,000 live births [8]. The variation in rates between studies could be related to the difference in methodology. Indeed, the studies were conducted at two different periods, one where the financial coverage for cesarean sections was fully ensured by the patient and another period of free cesarean sections. Additionally, the study framework is not the same. Nevertheless, these rates are significantly higher than those in developed countries such as France, where Saucedo *et al.* reported a ratio of 10.8 deaths per 100,000 live births in 2021 [9].

In Togo, according to the World Bank, the maternal death ratio was 399 deaths per 100,000 live births in 2020. This reflects the reality of the issue of maternal mortality in Togo specifically, and in sub-Saharan Africa in general, where the risk of maternal death during a woman's lifetime is 1 in 37, compared to just 1 in 7800 in developed countries [2] [4].

Young women aged 20 - 34 are the most affected because they have a high frequency of childbirth. The prevalence of this age group reflects the lifelong risk of maternal death in our communities, where the probability of a woman of reproductive age dying from a maternal cause is higher, at 1 in 49 in low-income regions, compared to 1 in 5300 in developed countries [2]. These women are often uneducated and primarily homemakers.

In 38.5% of cases, the deceased women were not educated, which reflects the illiteracy rate of women aged 15 to 49 in the Kara region, which was 50.2% in 2014 [3]. The vulnerability of uneducated women to maternal death may be related to the fact that women with education are four times more likely to use contraception, and according to Ahmed S *et al.*, the use of a contraceptive method reduces maternal deaths by 29% [10] [11]. These women are characterized by their lack of knowledge about danger signs, preventive care, elements of good nutrition, and family planning.

The majority of these women had not received any prenatal care, even though prenatal visits allow for early diagnosis of pregnancy-related conditions and timely referral for proper management [12] [13]. It is imperative to strengthen the quality of prenatal care and communication for behavior change.

In 86.2% of cases, these women came from peripheral centers in the region that lacked adequate technical equipment and human resources for managing obstetric emergencies. Difficulties also arise when it comes to transportation to reach the referral center. Medical transportation was only available in 9% of cases. According to Diallo *et al.*, a significant number of women die while waiting for transportation or during transportation to primary referral facilities due to inadequate emergency transportation [13]. In the region, we observe the central role of midwives in the referral/evacuation system. As a result, several continuous training programs have been implemented in the Kara region since 2017 to update clinical knowledge and strengthen skills as part of the quality improvement program in the 10 SONU (Safe Obstetric and Neonatal Care) centers in the region.

Dysfunctions were identified within the university hospital (CHU). These included delays in care, unavailability of the operating room and labile blood products, and insufficient postpartum monitoring. In response to these dysfunctions, it is important to strengthen human resources, initiate strategies for collecting and ensuring availability of blood products, and increase the capacity of the operating room.

Maternal deaths are due to two groups of obstetric causes: direct causes, often related to pregnancy-related conditions, and indirect causes, related to preexisting conditions.

Pre-eclampsia and its complications, postpartum hemorrhage, and uterine rupture were the most common etiologies of direct causes, as reported in previous studies [7] [14]. In our study, uterine rupture and septicemia secondary to uterine manipulations for abortion were the most lethal etiologies. Our findings are comparable to those of Bohoussou *et al.* in Ivory Coast, who also reported uterine rupture and infections as the most lethal causes [15]. This highlights the importance of raising awareness about prenatal consultations, family planning, and improving the competence of healthcare providers in monitoring labor and delivery to detect anomalies early and facilitate timely referral.

The main indirect obstetric cause was primarily anemia. This reflects the reality of pregnant women in low-income countries, especially sub-Saharan Africa, with prevalence rates ranging from 52.8% to 61.3% [16]. Anemia is a significant risk factor for maternal morbidity. Major hemoglobinopathies were the second most common etiology of indirect causes of death in our study, accounting for 11.11%. The combination of major hemoglobinopathies and pregnancy is a high-risk situation for both the mother and the fetus [17]. Close monitoring is required for these women during pregnancy, delivery, and especially the postpartum period, which carries a high risk of complications. Encouraging premarital screening is also advisable to promote selective unions.

Concerning the avoidability of deaths, we estimated that 95.38% of deaths could be avoided without the help of the identified dysfunctions. Conclusion shared by Bohoussou *et al.* who reported 89% of preventable deaths [15]. On the other hand, Diassana *et al.* in Mali found 39% of maternal deaths to be preventable compared to 61% for inevitable deaths [18]. These deaths could be avoided if pregnant women normally attended health facilities, received good quality care and if patients were referred in time and taken care of quickly by a well-qualified agent working under good professional conditions [19].

5. Conclusions

Maternal mortality is a real public health problem. Its rate is very high at Kara University Hospital. The majority of victims are young, housewife, and non-educated women. Most of the deaths were preventable and occurred in the immediate postpartum period. The direct obstetric causes were identified. Dysfunctions were found both in the referral system and within Kara University Hospital. Beyond the high ratio of maternal deaths in our setting, there are individual and family, professional, and administrative dysfunctions hiding behind.

In order to reinforce the lessons learned from this study, further studies aimed at identifying areas for improvement for each cause of death would be greatly beneficial in formulating actions to reduce maternal mortality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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