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Original Research Article

Preventable maternal deaths: a 6-year retrospective study of healthcare deficiencies in Yaoundé's teaching hospitals, Cameroon

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ABSTRACT

Background: This study aimed to investigate the management deficiencies contributing to maternal mortality in teaching hospitals in Yaoundé.
Methods: This was a retrospective cross-sectional analytical study conducted from November 2024 to April 2025 at the Yaoundé University Teaching Hospital (CHUY), the Yaoundé Central Hospital (HCY), and the Yaoundé Gynaeco-Obstetric and Paediatric Hospital (HGOPY). We analyzed maternal death review reports and medical records of 257 cases occurring between January 2019 and April 2025. We examined the circumstances of death, identified management deficiencies, and investigated the determinants of each failure. Data were analyzed using SPSS version 25.0.
Results: The median age of the deceased women was 30 years (range: 16–45). Most deaths occurred postpartum (63.0%; 162/257), and the majority of patients (80.9%; 207/257) were referrals from other health facilities. Direct obstetric causes accounted for 91.1% (234/257) of deaths, dominated by hemorrhage (47.0%; 110/234) followed by hypertensive complications (29.1%; 68/234). Severe malaria (52.2%; 12/23) and HIV complications (17.4%; 4/23) were the most frequent indirect causes. The primary management deficiencies identified were delays in reaching the health facility (79.8%; 205/257) and delays in receiving adequate care (30.7%; 79/257). These failures were primarily attributable to inadequate transportation during referral (75.5%; 194/257), delayed access to diagnostic investigations (30.0%; 77/257), late referrals (25.7%; 66/257), and stockouts of essential medicines (17.9%; 46/257) or blood products (16.3%; 42/257). Most of the deaths analyzed were preventable (88.7%; 228/257).
Conclusions: The analysis of maternal deaths highlighted substantial structural and organizational deficiencies. Improved adherence to clinical management protocols, together with reliable provision of essential medical supplies are crucial for reducing maternal mortality.

Keywords: Maternal death, Management deficiencies, Obstetric care, Delays, Yaoundé

INTRODUCTION

According to the tenth International Classification of Diseases (ICD-10), maternal mortality is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes".[1]

According to the WHO, the global Maternal Mortality Ratio (MMR) in 2020 was 223 deaths per 100,000 live births.[2] Approximately 800 women die every day from preventable causes related to pregnancy and childbirth.[2] Sub-Saharan Africa stands out with a particularly high maternal mortality ratio of 545 per 100,000 live births.[2] In Cameroon, despite improvements in maternal death statistics, the figures remain deeply concerning. Current estimates place the maternal mortality ratio in Cameroon at approximately 406 per 100,000 live births.[3]

The causes of maternal death are well documented, with direct obstetric causes comprising the largest proportion. According to the WHO, hemorrhage (27%) and hypertensive disorders (16%) are the leading direct causes of maternal deaths worldwide, while indirect causes (chronic and infectious diseases) now account for nearly a quarter (23%) of global mortality.[4] In Cameroon, maternal mortality is primarily driven by hemorrhage (41.2%), hypertensive disorders in pregnancy (15.7%), and abortion-related complications (11.8%).[5]

The management of these conditions is standardized and well-codified. When a death occurs, it is often due to management deficiencies in accessing appropriate care. Reducing global maternal mortality depends on multiple strategies, with Maternal Death Surveillance and Response (MDSR) playing a central role. This approach incorporates audits, systematic reviews, and verbal autopsies, to assess the quality of maternal and neonatal healthcare. By identifying gaps in care processes, MDSR allows for concrete improvements to prevent avoidable deaths.[6,7] Analysis of these gaps is guided by the "Three Delays" model developed by Thaddeus et al which distinguished three types of delays: delay in deciding to seek care (Phase 1 delay); delay in reaching an appropriate health facility (Phase 2 delay); and delay in receiving adequate care at the facility (Phase 3 delay).[8]

Management deficiencies in maternal care constitute a major public health challenge, severely impacting the health and survival of pregnant women. In 2019, Paswan et al. in India found that the first delay was implicated in 48.6% of deaths, while Thiam in Senegal in 2017 highlighted a comparable responsibility for both the first and third delays.[9,10] These findings suggest that multifaceted interventions are required to effectively reduce maternal mortality. In Cameroon, Tosi Jones et al reported that in rural areas, most deaths were linked to the third delay, thereby implicating the quality of hospital care.[11]

This study aims to identify and analyze management deficiencies contributing to maternal deaths in an urban setting, specifically within three teaching hospitals in Yaoundé. By delineating institutional gaps and challenges, the study seeks to inform targeted recommendations to improve maternal healthcare delivery. Notably, few studies have examined specific management deficiencies within teaching hospitals, where the standard of care is expected to be optimal.

METHODS

Study design

This was a retrospective analytical cross-sectional study.

Study setting

The study was conducted in the maternity departments of the Yaoundé Central Hospital (HCY), the Yaoundé Gynaeco-Obstetric and Paediatric Hospital (HGOPY), and the Yaoundé University Teaching Hospital (CHUY). These institutions are tertiary referral hospitals that provide dacre while also serving as training sites for medical and nursing students, as well as residents in Obstetrics and Gynaecology and Anaesthesia/Critical Care.

The study lasted 5 months, from November 1, 2024, to April 30, 2025. It covered maternal deaths that occurred over a 6-year period, from January 1, 2019, to October 31, 2024.

Study population

We examined all maternal death cases recorded within these three teaching hospitals during the specified period.

Selection criteria

We included all maternal death review reports assessed by the hospitals' maternal death audit committees. Incomplete or unusable reports were excluded.

Sampling

A non-probability exhaustive sampling method was used.

Study variables

We collected socio-demographic characteristics (age, occupation, marital status, education level, and residence), circumstances of death: timing of death, interval between admission and death, place of death, origin of the patient, and adequacy of transfer conditions) ; causes of death ; management deficiencies based on the "Three Delays" model by Thaddeus et al (delay in the decision to seek care, delay in reaching the health facility, and delay in receiving appropriate care); determinants of these deficiencies and preventability of death.[8]

Data collection procedure

Following approval of the research protocol by the Faculty of Medicine's Institutional Review Board and obtaining administrative authorizations from the three hospitals, we

accessed the archives. We reviewed ward registers, patient medical records, and maternal death review committee reports. Data were extracted using a standardized survey form in compliance with ethical and professional standards.

Ethical approval

Patient anonymity was strictly maintained using coded collection forms. Confidentiality of medical record information was rigorously preserved, and data were stored in a secure database accessible only to the authors.

Statistical analysis

Collected data were entered and verified using CSPro 8, then exported to IBM SPSS Statistics 26.0 for analysis. Patient age was presented as median and range, while qualitative variables were expressed as frequencies and percentages.

RESULTS

Study population

During the study period, 311 maternal deaths were recorded across the three facilities. Forty-eight (48) records were missing and six (6) were unusable. A total of 257 cases were included in the final analysis.

Table 1: Socio-demographic profile of the study population.

Variable	Number (N)	Percentage (%)
Socio-professional status		
Unemployed	88	34.2
Merchant	16	6.2
Civil servant	37	14.4
Student / pupil	43	16.7
Informal sector	73	28.4
Marital status		
Single	132	51.4
Married	104	40.5
Widow	3	1.2
Divorced	1	0.4
Level of education		
Primary	16	6.2
Secondary	144	56.0
Tertiary	87	33.9
Not educated	10	3.9
Residence		
Urban	236	91.8
Rural	21	8.2

Socio-demographic data

The median age of the deceased women was 30 years (range: 16–45). Table 1 describes the socio-demographic characteristics. Most women were unemployed (34.2%; 88/257), single (51.4%; 132/257), had a secondary education (56.0%; 144/257), and resided in urban areas (91.8%; 236/257).

Table 2: Distribution according to the circumstances of death.

Variables	Number (N)	Percentage (%)
Period of death		
Post abortum	31	12.1
Post-ectopic pregnancy	12	4.7
During pregnancy	30	11.7
During delivery	22	8.6
Postpartum	162	63.0
Time of death		
Death on arrival	11	4.3
Less than 30 minutes	44	17.1
Between 30 minutes to 6 hours	55	21.4
Between 6 hours to 24 hours	55	21.4
More than 24 hours	92	35.8
Place of death		
During transport	7	2.7
Referral health center	250	97.3
Referral source		
Referred	207	80.9
Not referred	49	19.1

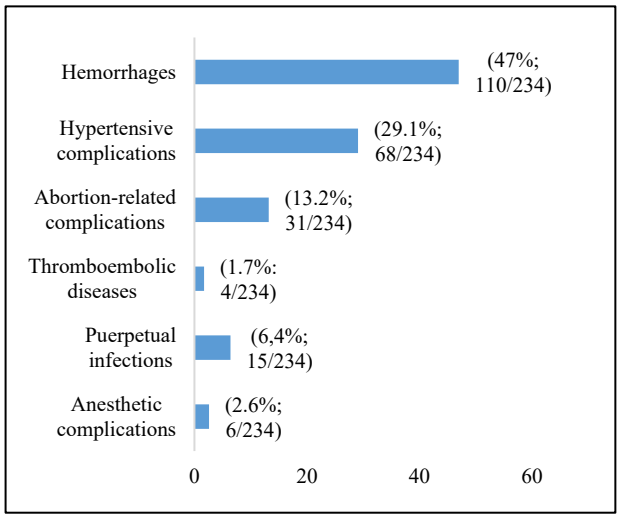

Figure 1: Distribution of direct causes of maternal deaths (n=234).

Circumstances of death

Data on the circumstances of death

Table 2 presents the circumstances surrounding the deaths. Most deaths occurred in the postpartum period (63.0%; 162/257), with 35.8% (92/257) occurring more than 24

hours after delivery. Most deaths occurred among patients referred from other health facilities (80.9%; 207/257).

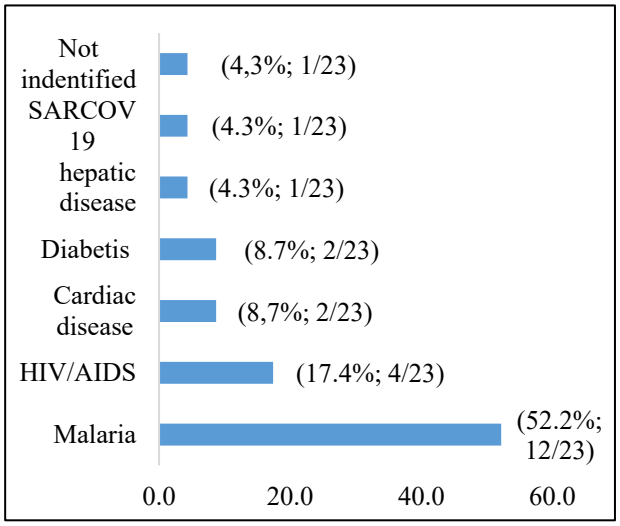

Figure 2: Distribution of indirect causes of maternal deaths.

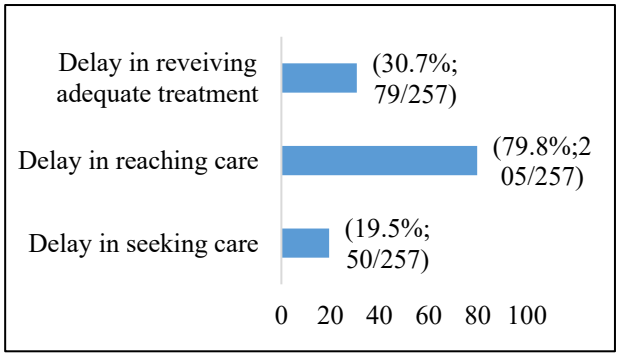

Figure 3: Deficiencies leading to maternal deaths.

Causes of maternal death

Maternal mortality etiologies

Direct obstetric causes were predominant, accounting for 91.1% (234/257) of cases as illustrated in Figure 1. They were predominantly due to hemorrhage (47.0%; 110/234), followed by complications of hypertensive disorders of pregnancy (29.1%; 68/234). Figure 2 displays the indirect causes of death. Malaria and HIV-related complications were the most frequent indirect causes, representing 52.2% (12/23) and 17.4% (4/23) respectively.

Systemic deficiencies leading to maternal deaths

Figures 3 and 4 illustrate the distribution of management deficiencies and their determinants. Most maternal deaths were attributed to delays in reaching a facility capable of providing adequate care (Phase 2 delay) (79.8%; 205/257). The primary determinants of these deficiencies were inadequate means of transport (75.5%; 194/257) and late referrals (25.7%; 66/257). Delays in receiving appropriate care (Phase 3 delay) were most frequently due to delayed access to diagnostic investigations (30.0%; 77/257), as well as stockouts of essential medicines (17.9%; 46/257) and blood products (16.3%; 42/257).

Preventability of maternal deaths

Maternal death preventability

Figure 5 illustrates the distribution of maternal deaths according to their preventability. Deaths judged to be preventable accounted for 89.0% (228/257) of our sample.

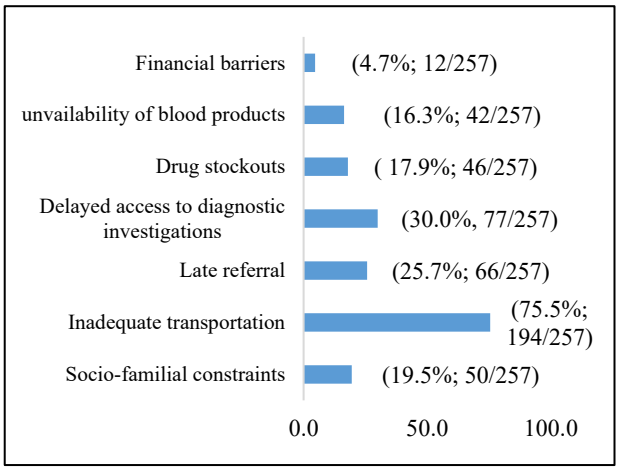

Figure 4: Determinants of maternal deaths.

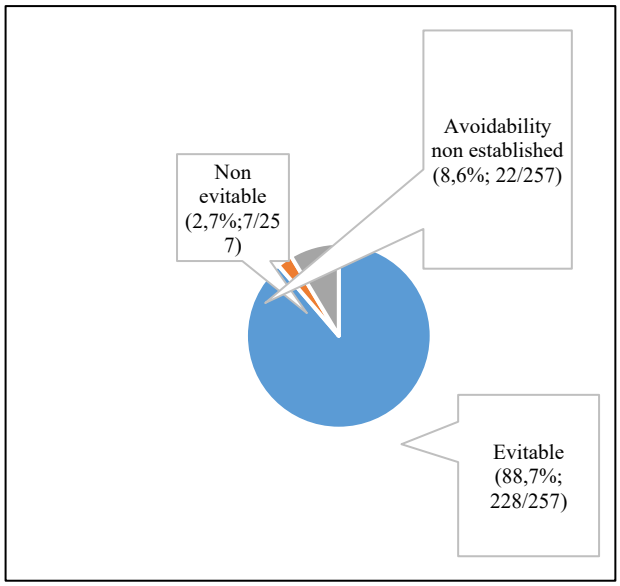

Figure 5: Distribution of deaths by preventability (n=257).

DISCUSSION

Our study aimed to investigate the management deficiencies contributing to maternal deaths in teaching hospitals in Yaoundé, using data from maternal death review committee's reports.

Socio-demographic characteristics of deceased patients

The median age of deceased patients in our study was 30 years, (range: 16 to 45). Other studies have found similar results.[12,13] The 30–40 age group is the most affected. This group corresponds to peak of fertility and multiparity, a period during which most pregnancies occur. Thus, the more a woman is exposed to pregnancy especially in settings where prenatal, obstetric, and postnatal care are sometimes insufficient or inaccessible the more vulnerable she becomes to fatal maternal complications. Most patients were housewives (34.2%) or worked in the informal sector (28.4%) with unstable incomes. Consistent results have also been reported by other authors, finding that low-income women constitute most maternal deaths.[14,15] These categories are more affected by economic instability, low empowerment, and limited access to information and health services. These socio-economic factors are well-documented as negatively influencing access to maternal care, the ability to meet health costs, and use of emergency obstetric services.[16,17]

Circumstances of maternal deaths

We found that 63% of maternal deaths occurred postpartum. Other authors reported similar results.[15,18,19] The postpartum period, especially the first 24 hours following delivery, is critical because it is when most deaths occur.[20] This high burden of postpartum mortality underscores inadequate postnatal care in many resource-limited setting. Most deaths (97.3%) occurred in a hospital setting. This figure, though seemingly reassuring, masks a troubling reality. Indeed, 64.2% of the women died within 24 hours of their arrival. This indicates a late recourse to care or inadequate initial management in peripheral structures. Conversely, 35.8% of deaths occurred after 24 hours of hospitalization, also highlighting internal management failures. Comparable results have been observed in other African contexts where most deaths occurred within 24 hours of admission.[10,21] Women referred from other health facilities were those who died most frequently. These women originated from facilities poorly equipped to manage obstetric emergencies. According to Essiben et al obstetric emergencies account for 11.4% of deliveries in Cameroon.[22] This situation highlights the weakness of the referral system as well as logistical difficulties associated with patient transfer.[23]

Causes of maternal death

Direct causes predominated in our study (91.1%), mainly hemorrhage (47.0%) and hypertensive complications (29%). These are the most frequent causes of death in Africa in general.[17,24,25] Postpartum hemorrhage remains the leading cause of death due to low rates of skilled birth attendance, poor obstetric practices, and low access to blood products. Regarding indirect causes, malaria alone was responsible for 56.5% of deaths. Low uptake of malaria prevention measures increases the incidence of malaria during pregnancy.[26,27] and its severity accounts for the associated adverse outcomes.

Management deficiencies in the care of deceased patients

Analysis of management deficiencies described during maternal deaths in our study population showed that 79.8% of cases presented Phase 1 and Phase 2 delays. These results are like those reported by other African authors.[13,28] Failure the recognize danger signs often related to low educational level and financial barriers are determinants of Phase 1 delay.[29,30] In our study, however, delay in reachong a health facility (Phase 2) was the most prominent largely attributable to prolonged transport times as reported by several authors.[23] Patients arrive at the hospital in critical condition after wandering through health structures incapable of ensuring their management. In Mali, in 2024, this second delay was the most frequent with a prevalence of 48.4%.[21] Similarly, in Ethiopia, a 2020 study showed that late arrival at the health facility contributed to 32% of deaths.[31] Recurring factors associated with these delays include: limited financial resources, poor road conditions, traffic congestion, and "therapeutic wandering" (seeking care at multiple inappropriate facilities). These findings indicate that delays in reaching an appropriate management facility are often worsened by an initial consultation at under-equipped centers staffed by inadequately trained personnel. This observation highlights weaknesses at the first level of the health system in recognizing and managing obstetric emergencies.

The Phase 3 delay is marked by long intervals in the execution and follow-up of adequate care. Although diagnoses and therapeutic decisions were appropriate in 98.8% of cases, treatment execution was delayed. In 30.7% of cases, the time to initiate treatment was greater than 6 hours. Delay in treatment implementation can be fatal and have been similarly reported by other authors. A meta-analysis conducted in India in 2020 estimated that 15% to 60% of maternal deaths were linked to delays in accessing appropriate care.[32] The reasons for this are numerous. Foumane et al in Cameroon described shortages in medical supplies and technical resources, including unavailability of blood products, essential medicines, as well as delays in laboratory and imaging investigations consistent with our study.[23] Indeed, the determinants of these delays included the unavailability of medicines (58.2%), blood bank malfunctions (53.2%), and lack of financial means necessary to pay for prescriptions (15.2%). The "payment before care" system is a key determinant of the provision care. This immediate financial barrier requires families to have funds upon arrival, which delays life-saving interventions, transforming a manageable emergency into a preventable death. Indeed, we found that at least 88.7% of deaths were preventable, with this delay described in 30.7% of cases. Numerous previous studies have found that most deaths were preventable in similar proportions.[5,23]

Limitations

Our study presents some limitations. The identification of management deficiencies relied on the review of medical records several weeks or even months after the events occurred; although this is a conventional methodology, the inherent variability in record-keeping warrants a conservative estimation of certain lapses in care. Furthermore, while the assessment of death preventability followed a rigorous and standardized protocol, it involves a degree of clinical interpretation where overinterpretation or a failure to account for the specific clinical context could lead to biased conclusions. Finally, as the results presented are derived from urban university teaching hospitals, they offer crucial insights into tertiary referral centers but may not necessarily represent the unique challenges faced by rural or peripheral health facilities; consequently, their generalizability should be approached with caution.

CONCLUSION

Maternal mortality in Yaoundé's main teaching hospitals continues to be largely driven by avoidable systemic failures. Deaths primarily affect young, poorly educated women who are inadequately referred from other health facilities. Inadequate means of transport exacerbate the delay in accessing adequate care. Shortages of management resources and the requirement for payment prior to care delay life-saving interventions. Reducing this mortality imperatively depends on improving the referral chain, the immediate availability of emergency kits (blood and medicines), and better monitoring of initiated treatments. It is urgent to break the cycle of delays by removing financial barriers at admission and improving the referral system. Repositioning essential medical supplies and correcting organizational failures could allow for better management of emergencies and reduce maternal deaths.

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Ethical approval: The study was approved by the Institutional Ethical review board of the faculty of medicine and biomedical sciences of the University de Yaoundé I

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