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Maternal Mortality Audits at the Yaoundé University Teatching Hospital in Cameroon between 2017 and 2023: Findings and Quality Improvement Perspectives

Audits de mortalité maternelle au Centre hospitalier universitaire de Yaoundé (Cameroun) entre 2017 et 2023 : enseignements tirés et pistes d'amélioration de la qualité

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Original Article

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ABSTRACT

Introduction: Maternal mortality remains a major public health challenge in Cameroon. This study aimed to analyze maternal death audits conducted at the Yaoundé University Hospital to identify causes, preventable factors, and avenues for improving obstetric care.

Method: This was a retrospective and descriptive study of 16 cases of maternal deaths audited between 2017 and 2023. Data were extracted from institutional audit reports and analyzed using a standardized grid. Causes of death, occurrence of the three delays, and recommendations were examined.

Results: The average age of the deceased women was 28.9 years. The majority of deaths occurred at the postpartum period (75%), with a predominance of obstetric hemorrhage (43.8%). Delays in hospital care (3rd delay) were present in 87.5% of cases. Three-quarters of the deaths were considered preventable.

Conclusion : The audit study revealed significant failures in the care chain, particularly in the postpartum period. Improved postpartum monitoring, rapid access to blood, and structured care are top priorities for reducing maternal mortality in Cameroon.

RESUME

Introduction : La mortalité maternelle reste un défi majeur de santé publique au Cameroun. Cette étude visait à analyser les audits des décès maternels réalisés à l'hôpital universitaire de Yaoundé afin d'identifier les causes, les facteurs évitables et les pistes d'amélioration des soins obstétricaux.

Méthode : Il s'est agi d'une étude descriptive et rétrospective de 16 cas de décès maternels audités entre 2017 et 2023. Les données ont été extraites des rapports d'audit institutionnels et analysées à l'aide d'une grille standardisée. Les causes de décès, la survenue des trois retards et les recommandations ont été examinées.

Résultats : L'âge moyen des femmes décédées était de 28,9 ans. La majorité des décès est survenue après l'accouchement (75 %), avec une prédominance des hémorragies obstétricales (43,8 %). Des retards dans les soins hospitaliers (3ème retard) ont été constatés dans 87,5 % des cas. Les trois quarts des décès étaient considérés comme évitables.

Conclusion : L'audit des décès maternels a révélé des défaillances importantes dans la chaîne de soins, en particulier pendant la période post-partum. L'amélioration du suivi post-partum, l'accès rapide au sang et la mise en place de soins structurés sont des priorités absolues pour réduire la mortalité maternelle au Cameroun.

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Introduction

Maternal mortality remains a crucial indicator of a country's health system performance and level of development. According to the World Health Organization (WHO), approximately 287,000 women died from causes related to pregnancy and childbirth in 2020, more than 70% of which were in sub-Saharan African countries [1]. In Cameroon, the maternal mortality rate remains worrying, with an estimated 467 deaths per 100,000 live births in 2018 [2]. Despite efforts to strengthen the quality of obstetric care, this maternal mortality ratio remains very high because it is three times higher than the minimum acceptable ratio required by the Sustainable Development Goals, which must be less than 140 maternal deaths per 100,000 live births [3]. In this context, maternal death audits are a fundamental tool for understanding the causes, circumstances and contributing factors of deaths. These audits enable the evaluation of care provided, identification of systemic gaps, and formulation of concrete recommendations to enhance the quality of obstetric and neonatal care, in line with the standards outlined in the Global Strategy for Women's Health [4].

The Yaoundé University Hospital (CHU) in Cameroon serves as a crucial tertiary referral facility for managing serious obstetric complications. Despite its importance, audit evidence is not being fully utilized for scientific publications. Therefore, it is essential to evaluate the implementation of maternal mortality audits at this institution, identify preventable factors related to maternal deaths, and propose strategies for improvement.

This study aimed to describe the organization and outcomes of maternal mortality audits conducted at Yaoundé University Hospital. It analyzes the underlying causes of maternal deaths and discusses priority actions to enhance obstetric care at this reference center, as well as to support prevention efforts at the national level.

Method

This study was conducted at the Yaoundé University Hospital, a tertiary-level hospital located in the capital of Cameroon. Referred for the management of complex obstetric pathologies, the university hospital has a university maternity ward with a gynecology-obstetrics department, a neonatology unit, an obstetric operating room, and an internal maternal mortality audit committee. This is a descriptive retrospective study based on the analysis of audit reports of maternal deaths occurring between 2017 and 2023. The audits were conducted in accordance with national guidelines and WHO recommendations on maternal death review. Data were extracted from official audit reports produced by the institutional review board, including case summaries, clinical analyses, collective conclusions, and recommendations. Reports typically originate from multidisciplinary audit meetings including physicians, midwives, anesthesiologists, managers, and quality managers. The study included all cases of maternal deaths audited during the study period; whose audit reports were complete, including at least the cause of death, whether it was preventable, and contributing factors. We excluded cases where reports were unusable or missing and deaths not classified as maternal according to the WHO definition. The variables collected included sociodemographic data (age, parity) ; obstetric parameters (term, complications, number of prenatal consultations, time of death) ; support data (admission method, quality of care) ; audit analysis (immediate and underlying causes of death, preventability, contributory delays, recommendations).

The three types of delays (the "3 delays" model [5]) were taken into account to characterize the contributing factors: the delay in deciding to consult ; the delay in accessing a healthcare facility and the delay in providing adequate care within the establishment. Data were extracted manually using a standardized form designed in Microsoft Excel. A descriptive analysis was performed, including the frequency of causes of death, the proportion of avoidable deaths, the distribution of delays according to cases and the most frequently made recommendations. The results are presented in the form of tables, frequencies, and percentages. A complementary thematic qualitative analysis was carried out on the recommendations made, in order to identify recurring areas for improvement. The study was conducted in accordance with ethical standards and with full respect for the confidentiality of the extracted information. No personal or sensitive data were used. Administrative authorization was obtained from the Yaoundé University Hospital for access to the audit reports, and ethical clearance was granted by the Institutional Ethics Committee of the Faculty of Medicine and Biomedical Sciences, University of Yaoundé I.

Results

The study focused on 16 cases of maternal deaths occurring at the Yaoundé University Hospital during the period under consideration. The average age of the patients was 28.9 years with extremes ranging from 19 to 39 years. The most represented age group was [25–30] years with 43.8 % of cases. Regarding parity, primiparous and multiparous women represented respectively 31.3% and 37.5% of cases, constituting the majority (Table I).

Among the deceased women, 75% had not had any prenatal consultation. The admission method showed that 56.3% of patients were referred from a peripheral center, and 43.8% came on their own or without a structured referral. The majority of deaths occurred

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within 24 hours of admission (Table II). Most deaths (75%) took place in the postpartum period (Table II).

Table I : Sociodemographic and obstetric characteristics of deceased women (N=16)

Variable	Number	%
Age groups (years)		
[19-24]	4	25.0
[25-29]	7	43.8
[30-40]	5	31.3
Parity		
Nulliparous	2	12.5
Primiparous	5	31.3
Multiparous	6	37.5
Grand multiparous	3	18.7
Number of antenatal care		
01 ANC	1	6.3
04 ANC	2	12.5
06 ANC	1	6.3
Not specified	12	75.0
Gestational age		
20 to 28 weeks	3	18.8
28 to 40 weeks	7	43.8
Not specified	6	37.0

ANC= antenatal care

Table II : Distribution of maternal deaths according to admission mode, location, and time of occurrence (N=16)

Variables	Number	%
Moment of death		
Pregnancy	3	18.8
Labour	1	6.3
Postpartum	12	75.0
Admission-to-death interval		
≤24 hours	7	43.8
>24 hours	3	18.8
Not specified	6	37.5
Hospital death site		
Operating room	1	6.3
Delivery room	2	12.5
Intensive care unit	2	12.5
Labour ward	1	6.3
Resuscitation unit	3	18.8
Not specified	7	43.8
Mode of admission		
Referred	11	56.3
Direct	6	43.8
Total	16	100

Obstetric hemorrhages were the leading immediate cause of death, accounting for 43.8% of cases. Underlying causes frequently included: severe anemia, unrecognized heart disease and complicated abortion (Table III).

Table III : Direct and indirect medical causes of maternal mortality identified (N=16)

Categories	Spécific Causes	Number (n)	%
Direct	Postpartum haemorrhage due to uterine atony	2	12.5
	Haemorrhagic shock (after childbirth/ abortion)	2	12.5
	Placental retention complicated by haemorrhage	1	6.3
	Uterine rupture	2	12.5
	Eclampsia/ hypertensive complications	2	12.5
Subtotal direct	—	10	62.5
Indirect	Severe anaemia	1	6.3
	Malaria	1	6.3
	Heart disease/ associated medical condition	1	6.3
Subtotal indirect	—	3	18.8
Undetermined	Cause unknown/ unspecified	3	18.8
Total	—	16	100

Among all audited deaths, 75% were considered preventable by the audit committee.

The most frequently identified contributing factors was the third deadline, accounting for 87.5 % of cases (Table IV).

Key failures included late referral, suboptimal health status assessment, delayed or inadequate care, lack of blood products, and inadequate postpartum monitoring The audits highlighted some notable deficiencies of the healthcare system affecting care delivery in 43.8% of death cases (Figure 1).

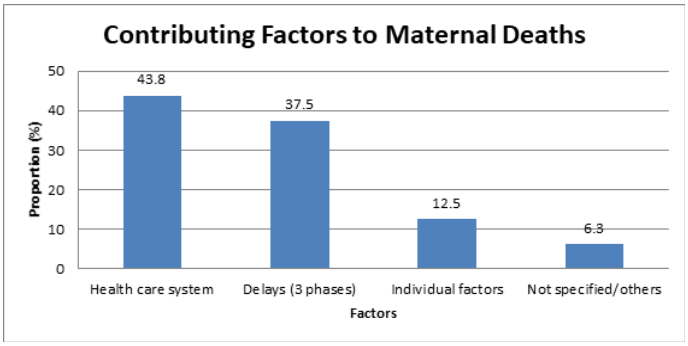

Figure 1 : Factors contributing to maternal deaths identified through the audit (N=16)

The recommendations made by the audit teams mainly focused on improving the reference/counter-reference system, strengthening continuing training of staff, the regular supply of blood and essential consumables, the establishment of systematic

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postpartum monitoring.

Table IV : Delay in management

Categories	Number(n)	%
1st delay		
Delay in decision-making	1	6.3
Inadequate means of transport	1	6.3
Not specified	14	87.5
2nd delay		
Late referral	7	43.8
Referral by affinity	1	6.3
Not specified	8	50.0
3rd delay		
Inadequate care/treatment (clinical management errors, inappropriate transfusion, inadequate vascular filling, insufficient resuscitation).	4	25.0
Delayed decision-making/late treatment (late entry into the operating theatre, delayed treatment of atony/eclampsia).	5	31.3
Inadequate monitoring (inappropriate/ neglected monitoring, poor perinatal monitoring).	2	12.5
Late or incomplete diagnosis/assessment (late diagnosis of eclampsia, misidentified disease, incomplete admission).	2	12.5
Organisation/coordination of care (non-multidisciplinary care, absence of haemostasis assessment, incomplete admission conditions).	1	6.3
Not specified	2	12.5

Discussion

This study of 16 cases of maternal deaths audited at the Yaoundé University Hospital highlights major failures in the maternal care continuum, reflected by a high proportion of preventable deaths (75%) and a predominance of deaths occurring postpartum (75%). These findings are consistent with trends observed in many resource-limited settings, where maternal mortality remains heavily influenced by delays in access to emergency obstetric care [5,6].

The average age of the deceased women (28.9 years) corresponds to the age group of high fertility, but also of increased risk of obstetric complications. The predominance of women aged 25 to 30 years (43.7%) is similar to that observed in other African studies where the majority of deaths concerned young adults of childbearing age [1, 2]. The relatively low proportion of nulliparous women (13%) contrasts with other studies where nulliparous women are sometimes more exposed to hypertensive complications, but here highlights the involvement of multiparous and grand multiparous women, often exposed to an increased risk of hemorrhage or uterine rupture [7].

The fact that 75% of women did not have a prenatal consultation reveals a major gap in the implementation of obstetric monitoring, which is essential for early identification of high-risk pregnancies. This finding is worrying and in line with WHO reports which highlight that the lack of prenatal monitoring is a major factor in avoidable mortality [4]. Furthermore, although more than half of the women were referred (56.2%), their arrival in critical condition and death within 24 hours of admission suggest a delay in referral or inadequate upstream care. This phenomenon has also been described in similar audits conducted in Burkina Faso and Mali by Compaoré et al. (2011) and Diarra et al. (2015) respectively [8, 9].

The majority of deaths occurred in the postpartum period (75%), confirming that this phase is often neglected in surveillance strategies. This trend was reported by Aboyeji et al (2007) who identified the immediate postpartum period as the most critical period, mainly due to undetected or poorly managed hemorrhages and infections [10]. This finding is corroborated by WHO analyses, which indicate that nearly two-thirds of maternal deaths occur after delivery, particularly in the first 24 hours [1]. The lack of continuous surveillance, early hospital discharges or lack of staff in maternity wards contribute to this situation [11].

Obstetric hemorrhages accounted for 43.8% of the deaths in this series. This is a consistent trend in most African studies, where uterine atony, uterine ruptures, and placental insertion anomalies are poorly managed due to lack of training, emergency protocols, or available blood bags [4,12]. The presence of hypertensive complications in 12.5% of cases confirms their increasing weight in maternal mortality, as do cardiovascular causes and Disseminated Intravascular Coagulation, often not diagnosed in time in the absence of an appropriate technical platform [13].

The identification of the three delays of Thaddeus and Maine [5] as major contributing factors confirms that deaths are multifactorial: The first delay (12.5%) remains moderate here, but indicates a lack of awareness of danger signs. The second delay (50%) reflects logistical difficulties (distance, transport, cost) and a lack of rapid referral. The third delay (87.5%) is the most worrying: it highlights the inadequacies of the hospital system itself, particularly in terms of rapid care, assessment of clinical condition, availability of blood and coordination between teams [14].

The recommendations proposed in the audit reports are aligned with international standards (WHO, FIGO) [4], particularly with regard to strengthening the referral system, improving blood supply, and postpartum surveillance. However, their implementation remains conditional on institutional will, sustainable funding, and regular monitoring of corrective measures. Continuous training of staff and the development of obstetric protocols adapted to the local context are

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essential to reverse this trend.

Conclusion

This study, based on audits of 16 maternal deaths, highlights major failures in the obstetric care continuum. Data analysis revealed a predominance of preventable deaths, occurring mainly postpartum, and linked mainly to obstetric hemorrhage, hypertensive complications, and intercurrent medical conditions. The absence of prenatal consultations in the majority of cases, the variable quality of referrals, and especially delays in intra-hospital care are the main contributing factors. The recommendations resulting from these audits converge on the need to strengthen the health system at several levels. Although the number of cases studied is limited, the data provide valuable qualitative information to guide corrective interventions within the hospital and inform national maternal health policies.

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Conflict of Interest : The authors work at the university hospital where the audit was conducted, but this has not influenced the study design, data collection, analysis, or reporting. The authors declare that they have no conflict of interest.

Data Availability Statement : The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Ethics Approval Statement : This study was first submitted to the institutional research ethics committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I for ethical clearance, so that it could be conducted in strict compliance with medical ethics. The data collected were treated anonymously and confidentially.

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