

Maternal Deaths in Patients Evacuated to the Fousseyni Daou Hospital in Kayes over a Decade

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Abstract

Introduction: Evacuation refers to the rapid transfer of a patient in an emergency, from one health center to another more equipped and better specialized. The objective of this study was to study maternal mortality in patients evacuated to the gynecology and obstetrics department at the Fousseyni Daou Hospital in Kayes over a period of 10 years. **Materials and Methods:** This was a descriptive, cross-sectional, retrospective study over nine years from January 1, 2011 to December 31, 2019 and prospective over one year from January 1, 2020 to December 31, 2020 involving all patients or parturients evacuated for obstetrical causes and died in the gynecology-obstetrics department of the Fousseyni Daou Hospital. Confidentiality and anonymity were respected. The processing and analysis of the statistical data was carried out using SPSS 20.0 software. **Results:** during our study period we identified 38,854 obstetric admissions including 6758 evacuations or 17.4%, among the 6758 cases of obstetric evacuations 284 died, a frequency of 4.2%. The maternal death audit committee of the Fousseyni Daou hospital in Kayes audited 101/284 cases (files) or 35.5% of which 64 maternal deaths (63.4%) were considered inevitable. In our study the 20 - 29 age group was more represented with 38%. 85% of the deceased patients lived in rural areas. In our series, 63.7% of the deceased patients had not had antenatal consultations (NPC). Eclampsia accounted for 26.8% of admissions diagnoses and 30.9% of causes of death. Seventy-two (72%) of deaths occurred postpartum, 15% perpartum and 13% prepartum. Direct obstetric causes were predominant at 65.1%. **Con-**

Conclusion: Indicators of maternal deaths among evacuated patients remain poor in our work. Maternal deaths were driven by socio-economic and cultural factors, but also by factors related to the health system.

Keywords

Maternal Mortality, Evacuation, Kayes Hospital

1. Introduction

According to the WHO [1], half a million women die worldwide during pregnancy, childbirth or postpartum, leaving one million orphans. This rate is very high in developing countries where the rates recorded can reach 15 to 20 times the figure recorded in industrialized countries [2]. According to the work of UNICEF [3] and WHO [4] maternal deaths are 1/13 in sub-Saharan Africa compared to 1/4100 in industrialized countries. To remedy this, most countries in the world have adopted maternal and child health (MCH) “programs”, hence the referral-evacuation system for Mali. Obstetric evacuation can be defined as the transfer of a pregnant or parturient from one health facility to another more specialized one for a serious obstetric complication requiring emergency care. In Mali, obstetric evacuations are frequent, their maternal and fetal prognoses remain reserved and often aggravated by:

- Poor prenatal follow-up;
- Insufficient care in community health centres;
- The problem of geographical accessibility of reference health centres;
- Lack of logistical, material and financial means.

These causes are usually responsible for delays in the referral/evacuation system for women in childbirth. The route followed by some parturients is particularly long and thorny [5]. A large number of parturient women go up the entire ladder of the health pyramid in search of a reception structure as shown in the following diagram: home → CSCOM (community health centre) → CSREF (reference health centre) → HOPITAL. This diagram represents the shape of our evacuation system. The observation is that there are often dysfunctions in this scheme, this situation deserves attention given today’s realities in terms of reducing the risks associated with pregnancy and childbirth that will lead us to bend the curve of maternal mortality. In a study conducted in Senegal, most maternal deaths were reported in evacuated patients [6]. The Kayes hospital is the only second-reference structure in the entire region, given the significant frequency of evacuations received; we felt it was important to initiate this work.

2. Materials and Methods

The Kayes region is located in western Mali. It covers an area of 120,760 km² and has 2,338,999 inhabitants. The Fousseyni Daou hospital in Kayes is a public hospital of 2nd reference with a capacity of 160 beds.

This was a descriptive, cross-sectional retro and prospective study over a 10-year period. The collection was retrospective over nine years (from 1 January 2011 to 31 December 2019) and prospective over one year (from 1 January 2020 to 31 December 2020); on all patients evacuated for obstetrical causes in the gynecology-obstetrics department of the Fousseyni Daou Hospital in Kayes. The sampling was exhaustive taking into account all deceased evacuated patients. Included in our study were all evacuated patients or parturients who died in the ward or cases of death on arrival. Excluded from this work were: patients or parturients who died but not evacuated, patients evacuated but not died, other causes of death of women. The variables studied are: age, marital status, occupation, residence, background. Risk factors: Number of antenatal visits, means of evacuation, state of consciousness on arrival, type of evacuation, time is taken between evacuation and arrival at the service, type and place of delivery. Data collection was done on an investigation sheet, obstetric records, delivery records, SONU (emergency obstetric and neonatal care) register, operative report and death records. Data entry was performed on Microsoft Office World 2010. The processing and analysis of the statistical data was carried out using SPSS 20.0 software. The khi2 test was used to compare proportions. The links are statistically significant if $p < 0.05$. Confidentiality and anonymity were respected.

3. Results

During our study period we recorded 38,854 obstetric admissions of which 6758 evacuations or 17.4%, among the 6758 cases of evacuations 284 died, a frequency of 4.2%.

Among the 284 cases of maternal deaths among evacuated patients, the maternal death audit committee of the Fousseyni Daou hospital in Kayes audited 101 cases or 35.5% of which 64 maternal deaths (63.4%) were considered inevitable. The year 2016 recorded the most maternal deaths **Figure 1** and **Table 1**.

In our study the majority of women who died had no known medical history with 94.3%, 3.9% reported hypertension. Nulliparous accounted for 33.8%; patients had not performed NPC in 63.7%, 35.2% had performed 1 - 3 NPC. In our

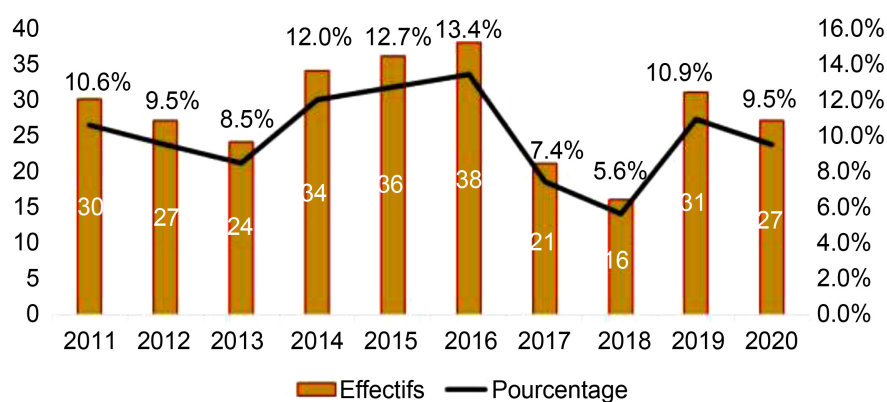


Figure 1. Evolution of the maternal death rate of evacuees by year.

series 58.5% of patients were evacuated by community health centers, 30.6% by referral health centers and ambulance was the most used means of transport with 63.7%. Patients stayed less than 24 hours in the facilities of origin in 86.6%, between 24 - 48 hours in 9.2% and more than 72 hours in 4.2%. Entry diagnoses were consistent with evacuation reasons in 63% (Table 2).

In our study 50.6% of the newborns of the deceased patients were alive. Eclampsia accounted for 67.5% of caesarean section indications in deceased patients. In our series 72% of deaths occurred postpartum, 15% perpartum and 13% prepartum (Figure 2, Table 3, Table 4 and Table 5).

Table 1. Distribution of patients by socio-demographic characteristics.

	Effectif (n = 284)	%
Age ranges (years)		
≤19	90	31.7
20 - 29	108	38
30 - 37	51	18
≥37	35	12.3
Profession		
Housewives	276	97.2
Housekeeper	3	1.1
Student	4	1.4
Official	1	0.3
Marital status		
Bride	271	95.4
Bachelor	13	04.6
Level of education of patients		
Out of school	250	88
Primary level	24	8.5
Secondary level	8	2.8
Upper level	2	0.7

The average age of patients 25 and 60 years, extremes of 14 and 43 years.

Table 2. Distribution of patients by diagnosis at admission.

Diagnosics at the entrance	Effectif	%
Eclampsia	76	26.8
Anaemia	69	23.9
Retroplacental hematoma	37	13
Postpartum hemorrhage	14	4.9
Ionic disorders	10	3.5
Feto-pelvic disproportion	9	3.2
Uterine rupture	8	2.8

Continued

Generally narrowed pelvis (BGR)	6	2.1
Pre-eclampsia	6	2.1
Septicaemia	5	1.8
O A P (acute oedema of the lung)	4	1.4
Severe malaria on pregnancy	3	1.2
Placenta praevia	3	1.2
Sickle cell disease on pregnancy	3	1.2
Fetal death in utero with bleeding disorder	2	0.7
TOTAL	284	100

Eclampsia and anemia were the main diagnoses at admission with 26.8% and 23.9% respectively.

Table 3. Distribution of patients by cause of death.

Causes of death	Effectif	%
Direct obstetric causes	185	64.8
Eclampsia	88	30.9
Retroplacental hematoma	38	13.4
Postpartum hemorrhage	31	10.9
O A P (acute oedema of the lung)	10	3.5
Uterine rupture	9	3.2
Probable pulmonary embolism	5	1.8
Placenta praevia	1	0.4
Indirect obstetric causes	99	35.2
Anaemia	68	23.9
Ionic disorders	12	4.2
Severe malaria	2	0.7
Sickle-cell anemia	2	0.7
Anesthesia complications	3	1.1
septicaemia	15	5.3
TOTAL	284	100

Direct obstetric causes accounted for 64.8% and indirect causes 35.2%.

Table 4. Time from hospital entry to death.

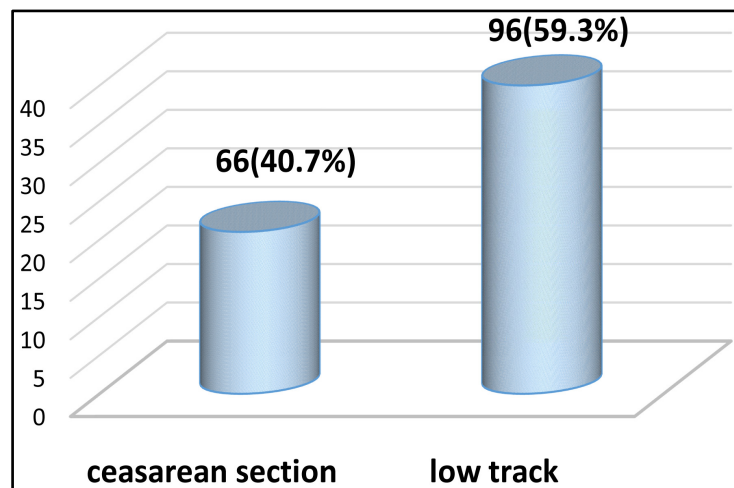
Elapsed time	Effectif	%
Deaths on arrival	30	10.6
Less than 06 hours	52	18.3
06 H - 12 H	48	16.9
12 H - 24 H	28	9.9
more than 24 hours	126	44.4
TOTAL	284	100

In our study 10.6% of deaths were recorded on arrival, 18.3% of deceased evacuees did less than 06 hours in the service.

Table 5. Distribution of patients by means of transport and obstetric causes of death.

Means of transport Used	Cause Obstetric direct	Cause Obstetric Indirect	Total
Ambulance	159 (56.0%)	22 (7.7%)	181 (63.7%)
Private Vehicle	72 (25.4%)	10 (3.5%)	82 (28.9%)
Collective vehicle	9 (3.2%)	7 (2.5%)	16 (5.6%)
Motorcycle	4 (1.5%)	1 (0.4%)	5 (1.8%)
Total	244 (85.9%)	40 (14.1%)	284 (100%)

Khi2 = 12.993; Ddl = 4; p = 0.011; p < 0.05.

**Figure 2.** Distribution of patients by route of delivery in hospital.

4. Discussion

We conducted a cross-sectional, descriptive study with retrospective and prospective collection; including all maternal deaths recorded among evacuated patients at Fousseyni Daou Hospital in Kayes over a decade.

Like many studies with retrospective data collection, we encountered certain difficulties such as the poor maintenance of data carriers at certain levels, the inadequacy of the local health information system. We collected 6758 obstetric evacuations. Of these, 284 cases died, a frequency of 4.2%. This frequency is higher than: from Thiam O [6] in Senegal in 2013, Seydou Z *et al.* [7] in 2018 to CS Ref Commune II in Bamako, Mali, Touré S in 2019 in Banamba [8] which reported respectively 2%; 0.4% and 0.7%. The frequency of maternal deaths among evacuees is variously assessed, depending on the method of recruitment, the area and the duration of study. The mean age of patients in our series was 25.60 years with extremes of 14 years and 43 years. The most affected age group was from 20 to 29 years or 31.7%. In the majority of cases, 95.1% were out-of-school patients. Housewives accounted for 97.2% and brides 95.4%. In Burkina Faso Some D.A [9], the most affected age group was from 21 to 30 years

old, or 38%. In the same study, the majority of patients who died were out of school (64%); housewives (76%). In France [10], the most represented age group was from 20 to 34 years with 59.1%. In our study, 94.3% of the deceased patients had no medical history. High blood pressure, sickle cell anemia; asthma accounted for 3.9% respectively; 1.1%; 0.7%. Primiparous accounted for 33.8%, nulliparous 25%. Indeed, mechanical dystocia and eclampsia in young primiparous are a real risk factor. More than half of the deceased patients (63.7%) had not performed any NPCs, patients who had not received any detection of pregnancy-related risk factors and no curative management. Our result is higher than that of Sissoko A. [11] who found that 31.8% of the women who died had not followed a NPC. Several authors agree that antenatal follow-ups significantly reduce maternal death rates [1] [12]. In our study, 63.7% of deceased patients arrived in the ward by ambulance compared to 28.9% by private vehicle and 5.6% by public transport. Eclampsia accounted for 26.8% of diagnosis retained in the ward, Anemia 23.9%; HRP 13.0%; postpartum hemorrhage 4.9%; Sepsis 1.8%. In 63% of cases the reason for evacuation was consistent with our diagnosis retained at the service. The explanation could be the training and upgrading of health providers, Kire B [13], Diallo M.S. [14] is of the same opinion as us. In our study, 72.2% of women died postpartum, 14.4% intrapartum and 13.4% antepartum. The causes of death are many and varied. Eclampsia resulted in the most deaths with 30.9% followed by anemia (23.9%), HRP (13.4%), postpartum haemorrhage (10.9%) and sepsis (5.3%). Direct obstetric causes accounted for 64.8 per cent compared to 35.2 per cent indirect obstetric causes. A WHO/UNFPA/UNICEF/World Bank study [4] found 80% of direct and 20% of indirect causes of maternal death. Another study by the National Expert Committee on France [15] found a maternal death rate of 18.6%, thromboembolic diseases of 10.5%, hypertension (7.6%), infection (4.21%), anaesthetic complications (0.87%) and conditions complicating pregnancy at 7.6%. These same causes are found in almost all studies on maternal death in developing countries but at higher proportions [15]. Eclampsia was the leading direct cause of maternal death in our study with (30.9%). This result is contrary to that of other authors [16] who have found hemorrhage to be the leading direct cause of maternal death. Sepsis accounted for 5.3% of deaths. It follows a RPM of more than 72 hours, poor hygiene during childbirth and postpartum, infection of the post-abortum. Sissoko A [11] found 3.3% of deaths due to infection. Maternal death rates from infections vary between 14% and 15% according to the WHO [4]. The frequency of infections causing maternal deaths is higher in our developing countries than in developed countries [4] because aseptic measures are more stringent than in Africa. The retroplacental hematoma its rate in our work is 13.4%, this result is higher than that of Baldé M [17] who found 2.9% who performed this work in our department. Our result could be explained by insufficient or late blood supply. Postpartum hemorrhage accounted for 10.9%. It could implicate medical personnel because, according to P. Bernard *et al.* [12] (most dispensing accidents are produced or aggravated by technical errors, in-

adequate supervision, timidity or delay in using effective therapies). Fernandez H. *et al.* [18] reported that a woman with antepartum hemorrhage has an estimated survival of 12 hours before treatment while a woman with postpartum hemorrhage has only 2 hours. The postpartum period is a critical period. On the other hand, it can be explained by socio-economic and cultural factors, namely the lack of financial resources for care, respect for traditional habits leading to a delay in consultation, and the lack of knowledge of the diagnosis by health personnel leading to a delay in evacuation. We had three cases or 1.1%, where anesthesia complications were implicated, for lack of other obvious causes because they are patients taken in emergency caesarean section without pre-anesthetic consultation; our rate is lower than that of Baldé M [17] who found 1.9% of deaths where anesthesia complications were implicated. Anemia accounted for 23.9% of the causes of maternal death in our study. These patients had not received prenatal follow-up to detect their anaemia in time and did not receive transfusion, this could be explained by socio-economic factors that cause women to give birth with very low hemoglobin levels. This is why in recent years active management of the third period of delivery (GATPA) has been introduced to minimize blood loss at the time of delivery. Anemia is considered a common pathology among pregnant women in Mali (30% - 70%) and it is a real public health problem. 20% - 40% of maternal deaths in developing countries have been shown to be associated with anemia.

Of the evacuations received, 59.3% had given birth vaginally. Sissoko A [13] and Keita F [19] reported slightly lower rates than ours with 53.7% and 50% respectively. Throughout the study period, 44.4% of patients spent more than 24 hours in hospital before death. Unlike the study by Sissoko A [13] which finds that 64.5% of women died within the first 24 hours after admission, this would be explained by the fact that in our study most of these deaths are due to eclampsia and anemia.

5. Conclusion

Indicators of maternal deaths in evacuees remain poor in our work. Maternal deaths were mainly related to high blood pressure and its complications as well as bleeding especially from the postpartum which are direct obstetric causes. Maternal deaths were driven by socio-economic and cultural factors, but also by factors related to the health system.

Conflicts of Interest

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

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