Original Article

# Etiology of Obstetric Hemorrhages Associated with Maternal Deaths in a Suburban Commune of Bamako (Mali)

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## Abstract

Objective: To determine the cause of obstetric hemorrhages associated with the occurrence of maternal deaths.

Methodology: This is a descriptive cross-sectional retrospective study at the maternity unit of the Reference Health Center of commune V (RHC CV) of the district of Bamako from January 2014 to December 2018 or 5 years. Any patients who died from obstetric hemorrhage in the antenatal, intrapartum, and postpartum periods were enrolled for the study. Each case of death was reviewed to establish the etiology of the hemorrhage, to specify the factors or even dysfunctions that led to the death, but also, and above all to determine the avoidability of death.

Results: Hemorrhage accounted for 70% of the overall maternal deaths. The mean age of the patients was 30 ± 5 years; they were not educated in 79.36% of the cases. Multipara represented 65.07% of cases. They were evacuated in 80.95% and they did not do, a prenatal check-up in 46.50%. Maternal death occurred in the postpartum period in 88.80% of cases. The causes of obstetric hemorrhage were: uterine atony (58.73%); placental retention (17.46%); birth canal trauma (11.11%) and coagulation disorders (1.60%). The Three Delays and four too were associated with maternal deaths. These deaths were avoidable in 78% of cases.

Conclusion: Immediate postpartum hemorrhage (PPH) remains predominant, with uterine atony as the first cause in the etiology of obstetric hemorrhages associated with the occurrence of maternal deaths.

Keywords: Obstetric hemorrhage, Maternal deaths, RHC CV.

Cite this article as: Soumana T, Amadou B, Seydou F, Issa D, Abdoulaye S, Ibrahim K. Saleck D, et al. Etiology of Obstetric Hemorrhages Associated with Maternal Deaths in a Suburban Commune of Bamako (Mali).J Soc Obstet Gynaecol Pak.2020; Vol 10(4):216-220

## Introduction

According to the international classification of diseases and health related issues (CIM-9) of WHO, maternal death is "the death of a woman occurring during pregnancy or within 42 days of its termination, regardless of the duration or location, from any cause

Authorship Contribution: All of the authors contributed to this work. All have read and approved the final version of the manuscript.

Funding Source: none
Conflict of Interest: none

Received: Jan 1,2021
Accepted: Mar 21, 2021

determined or aggravated by the pregnancy or the care it motivated, but neither accidental nor fortuitous".[1] The obstetric hemorrhage (antepartum and postpartum) is responsible for half of all maternal deaths occurring after childbirth. 20% to 60% of maternal deaths occurring after childbirth are attributable to postpartum hemorrhage (PPH). For many authors, the main direct obstetric cause of maternal deaths remains obstetric hemorrhage.[2,3] Over two-thirds of deaths from hemorrhage occur in the postpartum period.[4] It is only the third leading cause of maternal mortality in developed countries (16.3% of deaths).[4] Uterine atony is the leading cause of PPH, responsible for a proportion of cases ranging from 50 to 80%. Maraux B et al[5] did not report a case of maternal death in a study about 44 cases of PPH associated with birth canal wounds.

In its desire to reduce maternal mortality, the World Health Organization[6] adopted the Sustainable Development Goals (SDGs) which, in paragraph 3, stipulate that, by 2030, we must reduce global maternal mortality to less than 70 per 100,000 live births.

We initiated this study to determine the cause of obstetric hemorrhages associated with the occurrence of maternal deaths in the health district of commune V.

## Methodology

For the sake of clarification of the study, we have defined the following terminologies as:

**Haemorrhage:** we considered as haemorrhage, any loss of blood that is likely to produce or produces hemodynamic instability. It can be antepartum or postpartum.

**Antepartum hemorrhage** was defined as any vaginal bleeding that occurred from the 22nd week of pregnancy until childbirth: placenta previa, retroplacental hematoma, vasa previa (Benkiser's hemorrhage), lesions of the lower genital tract.

-**Postpartum hemorrhage**: It is any excessive bleeding occurring during the first 24 hours after childbirth. It includes the 4Ts which are:

**T1:** **Tone**: uterine atony (failure of uterine retraction after delivery);

**T2:** **Tissues:** total or partial retention of the placenta, membranes or blood clots;

**T3:** **Trauma:** uterine lesions (uterine ruptures), cervical, vaginal, perineal and vulvar;

**T4:** **Thrombin:** pre-existing or acquired coagulopathy (coagulation disorder).

This study was a descriptive retrospective cross-sectional over a period of five years January 2014 to December 2018 in the health district of the commune V of Bamako (Mali). The city of Bamako, still District of Bamako, lodges entirely in the circle of Kati (region of Koulikoro). Bamako is located straddling the Niger River, which divides it into two very distinct geographical entities:

- The left bank including the first 4 communes of Bamako (commune I, II, III and IV);
- The right bank including the last two communes: commune V and commune VI.

The health district of commune V includes 12 community health centers (CHCs), around half a hundred private and denominational health structures and a referral health structure: the Reference Health Center of Commune V (RHC CV) of Bamako. It is a level II reference structure of the health pyramid of Mali. We practice Comprehensive Emergency Obstetric and Neonatal Care (CEONC) and as such, receives all obstetric emergencies coming not only from commune V, but also and above all from certain localities in the neighboring commune of Kati. At the level of the RHC CV, there is a local multidisciplinary committee for the Monitoring of Maternal Deaths and Response (MMDR). This committee meets at a rate whose frequency is dictated by the frequency of maternal deaths recorded. During each meeting, the maternal death records submitted for its assessment are carefully analyzed to determine the cause of maternal death, to identify possible dysfunctions and factors that may have contributed to maternal death. At the end of these meetings, relevant recommendations are formulated for implementation, in order to prevent further maternal deaths occurring in the same circumstances. All of this information, see conclusion from the meetings, is recorded in the software of the Local Health Information System (LHIS), then notified to the hierarchy. For the purposes of this study, we therefore extracted in this software all the cases of maternal deaths that occurred in the context of hemorrhage. As needed, we used other data sources such as obstetric records, admissions, childbirth, caesarean section, hemorrhage, transfusion, anesthesia, maternal deaths. We included in this work, all cases of maternal death that occurred in a care establishment and that were the subject of an audit. Thus deaths occurring in the community, or

during a transfer from the community to a health structure were not included in this work. Because in most of these cases we were not able to do the verbal autopsy. The following variables were studied: age, education, profession, means of transport used, parity, mode of admission, notion of prenatal follow-up, cause of maternal death, preventability maternal death, factors associated with maternal deaths. The data thus collected was entered into Word and Excel 2010 software. Epi-Info version 7.0 software was used for data analysis. During this study anonymity and confidentiality were respected.

## Results

During the study period, 34,109 deliveries were recorded in the health district of commune V of Bamako, among which 90 cases of maternal death were recorded, of which 63 were due to obstetric hemorrhage, or 70% of cases. Maternal deaths occurred in the postpartum in 95.23%.

The mean age of the patients was 30 ± 5 years with extremes 12 years and 47 years. The average parity was 5 with extremes 1 and 11. The patients were not educated in 79.36% of cases. The patients were evacuated in 80.95% of cases. They did no antenatal check-up in 46.62% of cases (Table I).

The etiology of hemorrhage was dominated by uterine atony (77.78%) and placental retention (9.52%) and it was APH in 4.77% of cases (Table II). Deaths were preventable in 82.53% of cases (Table III). These deaths were associated with the 3rd Delay in 62.00% of cases (Table IV) and in 60.32% of cases, the deaths were associated with too many pregnancies (Table V). Maternal death occurred in postpartum in 95.25%. of cases.

**Table I: Characteristics of patients**

| Variables | | Number | Percentage |
|---|---|---|---|
| **Mean age** | | 30 years | - |
| **Education** | Yes | 13 | 20.64 |
| | No | 50 | 79.36 |
| **Profession** | Unpaid | 46 | 73.01 |
| | Paid | 17 | 26.99 |
| **Means of transportation** | Taxi | 41 | 65.07 |
| | Ambulance | 16 | 25.40 |
| | Other | 06 | 9.53 |
| **Average parity** | | 5 | - |
| **Mode of admission** | Evacuated | 51 | 80.95 |
| | Non evacuated | 12 | 19.05 |
| **Prenatal check-up** | Yes | 35 | 52.38 |
| | No | 30 | 47.62 |

**Table II: Distribution of patients according to etiology of maternal death associated with hemorrhage.**

| Cause of death | Number | Percentage |
|---|---|---|
| Ante-partum hemorrhage | | |
| APH | 2 | 3.17 |
| PPH | 1 | 1.58 |
| Postpartum hemorrhage | | |
| Uterine atony | 49 | 77.78 |
| Placenta retention | 6 | 9.52 |
| Birth canal trauma | 4 | 6.35 |
| Coagulation disorders | 1 | 1.60 |
| Total | 63 | 100 |

**Table III: Distribution of patients according to preventable characteristics of maternal deaths.**

| Preventable | Number | Percentage |
|---|---|---|
| Unpreventable | 11 | 17.47 |
| Preventable | 52 | 82.53 |
| **Total** | **63** | **100** |

## Discussion

Regarding the mean age, our rate is similar to that reported by Yambaré A et al[2] who pointed out a mean age of 29 years. Girls' schooling is a major issue in most African countries and our rate of out-of-school patients (79.36%) is similar to that reported by Yambaré A et al in Congo.[2] Obstetric hemorrhages constitute an extreme emergency sometimes requiring evacuation for adequate management, thus 80.95% of our patients were evacuated and Maraux B et al.[7] reported in their study that 77.3% of patients had been evacuated. In our study; 95.2% of deaths occurred after delivery against 50% reported by Algerian authors.[8]

**Table IV: Distribution of patients according to the Delays associated with maternal deaths.**

| Delays | Number | Percentage |
|---|---|---|
| 1st Delay | 12 | 19.00 |
| 2nd Delay | 12 | 19.00 |
| 3rd Delay | 39 | 62.00 |
| **Total** | **63** | **100** |

**Table V: Distribution of maternal death according to the 4 T's associated with maternal deaths.**

| | Number | Percentage |
|---|---|---|
| Too many | 38 | 60.32 |
| Too close | 17 | 27.00 |
| Too early | 08 | 12.38 |
| Too late | 07 | 11.10 |

In our study, the main direct obstetric cause of death as described elsewhere in the literature review[2, 3], was hemorrhage with just over 2/3 of maternal deaths (70%). Hemorrhage remains the main direct cause of postpartum maternal death in African countries.[2] Over two-thirds of deaths from hemorrhage occur in the postpartum period.[4] It is the main direct cause of maternal death in countries with limited resources causing more than a quarter of deaths, whereas it is only the third cause of maternal mortality in developed countries (16.3% of deaths).[4] The majority of maternal deaths occur in regions with the most limited resources, particularly in Sub-Saharan Africa which is the most concerned where PPH is the main direct cause of maternal deaths.[9] Mauro E et al[10] report a prevalence of PPH between 5 and 10% of childbirths in France. Obstetric hemorrhages albeit low compare to that of the precedent triennial (2007-2009) remain the first direct leading cause of maternal deaths. They account for 24% of these deaths. Uterine atony, the leading cause of PPH (our study 77.78%) is responsible for a proportion ranging from 50 to 80% of cases. Maraux B et al[5]] did not report any case of maternal death in a study about 44 cases of PPH associated with wounds of lower genital tract. Yambaré A et al[2] reported that hemorrhage accounted for 41.1% of maternal deaths. In our study, over a total of 63 maternal deaths, only 3 or 4.75% had occurred in antepartum among which 2 by retroplacental hematoma and 1 by placenta praevia hemorrhage. In our study, the main etiologies of obstetric hemorrhages were uterine atony (T1) (77.78%), placental retention (T2) in 9.42%, trauma of the birth canal (T3) in 6.35 % coagulation disorders (T4) in 1.58% of cases. Yambaré A et al[2] reported 13.1% of maternal deaths related to uterine rupture. Deneux C et al[3] found out that 1% of PPH were due to constitutional or acquired coagulopathy. Deaths were avoidable in 82.53% in our study. Maternal death is considered to be avoidable in a great number of cases, more than 90%, including in low income countries.[11] WHO estimates that more than 80% of maternal deaths could be avoided.[12] Morau E et al[13] have pointed that 88.9% of deaths were avoidable or likely avoidable.

These maternal deaths can be avoided even in a context where the country has few resources. This requires the statistics necessary for decision-making. It is not enough to have the figures for maternal mortality; rather, in addition to these figures, it is necessary to understand what are the underlying factors that have led to maternal deaths.[2] In addition to obstetric causes, the occurrence of maternal deaths is the result of many other factors. In our study, the Three Delays were contributing factors to maternal deaths as in several other studies.[2] The 1st and 2nd Delay contributed to maternal deaths in 19.00% each. The 3rd Delay including drug shortage, delay in diagnosis, unavailable staff, non-functional block was associated with 62% of maternal deaths. Morau E et al[13] find that the lack of monitoring, delay in hemorrhage diagnosis, delay in treatment particularly surgery, insufficient transfusion strategy and inappropriate places of care were the most reported factors as being related to maternal deaths. In our study, maternal deaths were associated with too many pregnancies in 60.32% of cases, too close in 27.00% of cases, too early in 12.38% of cases and too late in 11.10% of cases. However, compared to the third Delay, it appears that the lack of understanding of pregnancy-related complications, the lower status of women, and socio-cultural barriers to seeking care were significant at the onset of the first delay event.

## Conclusion

Hemorrhage is a major cause of maternal death in our health district, with uterine atony at the forefront. Sociocultural and religious factors (such as the 4 Too), organizational dysfunctions of healthcare system in Mali (the Three Delays) were contributing factors to these maternal deaths.

## References


1. World Health Organization. Maternal death surveillance and response: technical guidance information for action to prevent maternal death. 2013. ISBN 978 92 4 1506083. NLM classification: WQ 270
2. Yambare A, Ibemba G. Analysis of the determinants of pre-partum maternal mortality in the Republic of Congo (2013-2015). 2017. <hal-01593267>
3. Deneux-Tharaux C, Bonnet MP, Tort J. Epidemiology of postpartum hemorrhage. J Gynecol Obstet Biol Reprod; 2014; 43 (10) P: 936-950. Doi: 10.1016 / j. jgyn.2014.09.023.
4. National Institute of Statistics. Multiple Indicator Cluster Survey, MICS5 Congo 2014-2015: Key Indicators Report. Ministry of Planning and Integration, UNICEF 2015. p14.
5. Langer B, Akladios CY, Sananes N, Gaudineau A, and al. Secondary postpartum haemorrhage J GynecolObstet Biol Reprod, 2014; 10.1016 / d. jgyn.2014.10.002.
6. World Health Organization (WHO), UNICEF, UNFPA, World Bank. Trend in Maternal Mortality: 1990-2015. Estimates of. Geneva, World Health Organization 2015; pp. 1-3.
7. Maraux B, Ricbourg A, BrugierC, Chagnaud S, FargeaudouY, Rossignol M, Barranger E. Postpartum hemorrhage linked to genital tract wounds: study of 44

cases. J. Obstetrics & Fertility Gynecology.2013;41:692–695.
8. Belgherras H, Benchohra S, Bekara A. Maternal mortality at EHS Mother Child Tlemcen / Algeria. Medicine thesis. University of Tlemcen; 2014, 165p.
9. J. Tort A. Dumont. How to reduce maternal mortality associated with postpartum hemorrhage in resource-limited countries? Journal of Perinatal Medicine Volume 9, pages15–19 (2017).
10. E. Morau et al [E. Morau, J.C. Ducloy, S. Le Roux, P. Weber. Maternal mortality by hemorrhage, results of the ENCMM, France 2010–2012 Anesthesia & Resuscitation, Volume 4, Issue 1, January 2018, Pages 39-46.
11. Dumont A, Traoré M, Dortonne JR. Audit of maternal deaths in health establishments. IRD Editions. Marseille: Educational Collection. Introduction, Chapter 1, Maternal Death Peer Review, 2014; p 174 ..
12. WHO.2014. Targets and strategies to end preventable maternal deaths: consensus statement. 2014 [cited 2016 Oct 20]; Available at: http://apps.who.int/iris/handle/10665/1307774. WHO.
13. E. Morau, J.C. Ducloy S. Le Roux P. Weber M. Dreyfus. Maternal deaths due to haemorrhage in France 2013–2015. National Expert Committee on Maternal Mortality https://doi.org/10.1016/j.gofs.2020.11.011 Get rights and content.