
Research Article

Maternal death reviews in the health region of Agnéby-Tiassa-Mé in Côte d'Ivoire from January to December 2016: a cross-sectional retrospective analysis.

Coulibaly-Koné Soltié Aminata¹, Kourouma Kadidiatou Raissa², Doukouré Daouda³, Agbré Yacé Marie Laurette⁴, Aké Odile⁵

¹Maternal and Child Health Research Group, National Publique Health Institute of Côte d'Ivoire

³Health System Management and Policy Research Group, National Publique Health Institute of Côte d'Ivoire

¹Medical Doctor, MPH, Researcher at the National Publique Health Institute of Côte d'Ivoire, Maternal and Child Health Research Group

²Pharmacist, MscPH, PhD candidate, Researcher at the National Publique Health Institute of Côte d'Ivoire, Health System Management and Policy Research Group

³Sociologist, Researcher at the National Publique Health Institute of Côte d'Ivoire, Maternal and Child Health Research Group

⁴Medical Doctor, MPH, Researcher at the National Publique Health Institute of Côte d'Ivoire, Maternal and Child Health Research Group

⁵Professor in Public Health, National Publique Health Institute of Côte d'Ivoire Head of the Maternal and Child Health Research Group

***Corresponding author: Kourouma Kadidiatou Raissa**

Abstract:

Background Maternal death is a public health concern especially in African countries. Many strategies are developed to improve the quality of maternal and newborn care, such as maternal death review. This paper aims to describe the determinants of maternal deaths among pregnant or postpartum women in Agnéby-Tiassa-Mé health region in Cote d'Ivoire;

Methods: This is a cross-sectional retrospective and descriptive study of maternal death reviews covering the period from January to December 2016.

Results Of a total of 68 maternal deaths registered in the health region, 31 (46%) were reviewed. The highest proportion of maternal deaths was observed among parturient aged between 20-29 (38.7%), paucigravida (48.4%) and pauciparous (29%), referred patients (74.5%) and those taken care of by a midwife (84.1%). The main cause of maternal deaths was hemorrhage (34.5%). Maternal deaths recorded in the region could have been avoided in 83.7% of the cases.

Conclusion Maternal deaths review should be systematic in accordance with national guidelines, correctly and fully informed for an analysis of all the determinants allowing better decision-making to improve the quality of care.

Keywords: maternal death review, quality of care, healthcare system, Cote d'Ivoire

INTRODUCTION

Many women continue to die around the world as a result of pregnancy or childbirth. Maternal mortality is a public health problem, especially in developing countries such as African countries. Maternal mortality is therefore an important indicator of maternal health and health systems 'performance; because interventions that will prevent or narrowly prevent maternal deaths are mostly managed by health services¹.

Recent data on the report of Maternal mortality in sub-Saharan Africa have shown a significant improvement in the maternal mortality rate, which dropped by nearly 45% between 1990 - 2015, from 987 to 546 deaths per 100,000 live births². However, according to the same report, some countries in sub-

Saharan Africa such as Côte d'Ivoire have not made progress. Indeed, the state of health of the population in Côte d'Ivoire is marked by high maternal and infant-juvenile mortality due partly to an inadequate quality of health care. The 2015 Maternal Mortality Report estimated the maternal mortality rate at 645 deaths per 100,000 live births higher than in sub-Saharan Africa².

In order to contribute to the reduction of maternal mortality rate with a better use of health services in the short term, the World Health Organization (WHO) has recommended the introduction of audits in all maternity hospital to count maternal deaths³.

Among these audits, the systematic review of maternal deaths (MDR) is a method that provides in-depth research into the causes and circumstances surrounding the mother's death in health facilities in order to improve quality of care. In particular, it is necessary to trace the history of women who have died, within the health care system and in the health facility, in order to identify preventable or remedial factors that can be addressed and change to improve maternal care in the future. The information should preferably be supplemented by data collected in the community but this has not always been the case⁴.

In Côte d'Ivoire, this method was institutionalized through the 450 / MSLS / CAB decree of 05 August 2015, imposing the obligation of notification of cases of maternal deaths, institutionalization of journals and creation of the national committee for the monitoring of maternal deaths and riposte⁵. Despite the implementation of the notification of maternal death, progress in maternal health is still low. Thus, we are interested in the review of maternal deaths in the health region of Agnéby-Tiassa-Mé, located in the south-east of Côte d'Ivoire; given the increase in home births between 2015 and 2016, from 19% to 25%. The region also has maternal death rates of 189 and 156 per 100,000 live births in 2015 and 2016 respectively⁶. Therefore, it seems appropriate to identify the determinants of these cases of maternal deaths, to appreciate the care given to parturient and to understand the causes of these deaths. Indeed each maternal death is an experience that can produce indications on possible actions to be taken to solve the problem.

METHOD

Study areas

The study was conducted in the health region Agnéby-Tiassa-Mé located in the south-east of Cote d'Ivoire, and consists of six health districts namely Agboville, Tiassalé, Sikensi, Adzopé, Akoupé and Alépé. The population living less than 5 km from a primary health center is 77% against 44% at the national level. Around 6% of this population has to travel more than 15 km to access a primary health center.

Regarding health care delivery in this health region, there is a ratio of one doctor per 10347 inhabitants, one nurse for 2656 inhabitants, one midwife for 795 women of reproductive age and one gynecologist-obstetrician for 43,547 women of reproductive age. In terms of logistics, 27% of vehicles and ambulances are in poor condition.

Type of study

This was a cross-sectional retrospective and descriptive study performed from June to September 2017 in the Agnéby-Tiassa-Mé health region.

Sampling

The study concerned all maternal deaths recorded in the region, at the level of the 6 health districts. Maternal death was defined as any woman who died during pregnancy, delivery, and postpartum period registered in one of the health districts

of the Agnéby Tiassa Mé region that met the WHO maternal death definition criteria.

Data collection

The data collected were those of maternal death reviews. Templates are provided by the Ministry of Health and Public Hygiene in all districts; and must be informed obligatorily after each death.

The MDR is based a questionnaire that traces the circumstances of the death: characteristics of the case, its path, the admission of the parturient, its care on arrival in the referral center, obstetric management, care follow-up, various information on the case as well as the assessment of the quality of care (reception at the facility), the assessment of the factors that contributed to the death of the patients; practitioners, the appreciation of the factors that contributed to the death of the deceased's parents and the proposals for recommendations.

Data analysis

A manual tabulation was done for the maternal death review data to verify concordance, completeness of data and errors. The data analysis was done with the Excel software (calculations, tables and graphs).

Study limitation

Some MDRs were not complete, making difficult the exhaustive analysis of maternal death review.

RESULTS

3.1 Maternal deaths and MDR carried out per health districts

Of the 68 maternal deaths recorded in the region, only 31(45.6%) had been reviewed,. The health district of Agboville carried out the majority of the MDR (89%), followed by the districts of Tiassalé (50%) and Akoupé (40%). The rest of the results will concern only the 31 patients whose MDR was performed (**Table I**).

Table I: Maternal deaths and MDR carried out per health districts

Health districts	Number of maternal deaths registered	Number(%) of MDR carried out
Adzopé	21	5(16.1)
Tiassalé	12	6(19.3)
Agboville	18	16(51.6)
Akoupé	5	2(6.5)
Alépé	10	2(6.5)
Sikensi	2	0(0)
Total	68	31(100)

3.2 Characteristics of the patients

The results of MDRs showed a higher proportion of maternal deaths among parturients who were between 20 and 29 years

of age (38.7%), followed by 30-39 years (32.3%). As for gravidity, the highest number of maternal deaths was observed in the paucigravida (48.4%) and the primigravida (22.6%). In terms of parity, 29% of maternal deaths occurred among pauciparous followed by nulliparous (25.8%) and primiparous (19.4%) (**table II**).

Table II: Characteristics of the patients

	Number(%)
Age group	
<20 years	6(19.3)
20-29 years	12(38.7)
30-39 years	10(32.3)
≥40 years	3(9.7)
Gravidity	
Primigravida	7(22.6)
Paucigravida	15(48.4)
Multigravida	4(12.9)
Grand multigravida	5(16.1)
Parity	
Nulliparous	8(25.8)
Primiparous	6(19.4)
Pauciparous	9(29)
Multiparous	4(12.9)
Grand multiparous	4(12.9)

3.3 Distribution of patients by mode of arrival and conditioning before evacuation

The distribution according to the arrival mode showed that 74.5% of the patients had been referred and 25.5% self referred. The distribution according to the conditioning of the referred patients showed that 56.5% of them were not conditioned during the evacuation towards the reference structure (**table III**).

Table III: Percentage of maternal death by arrival mode and conditioning before evacuation for referred parturient.

	Number (%)
Self referral	8(25.5%)
Referred	23(74.5%)
Referred with initial conditioning before evacuation	10(44.5%)
Referred without initial conditioning before evacuation	13(56.5%)

Distribution of the patient according to modality of care

With an average evacuation time of 130 ±101.71 minutes, 84.1% of the deceased women had been admitted by midwives on admission, compared to 9.6% by physicians.

The average first aid time was 7±15.35 minutes. In 93.5% of the cases the initial examination had been made and the

diagnosis made; and in 67, 8% of cases, parturients already had complications upon arrival.

Regarding treatment, in 83.9% of cases the treatment was protocol-based and in 64.5% of cases the treatment started in the first 15 minutes.

The delay for blood transfusion was higher than 30 minutes in 100% of cases (**table IV**).

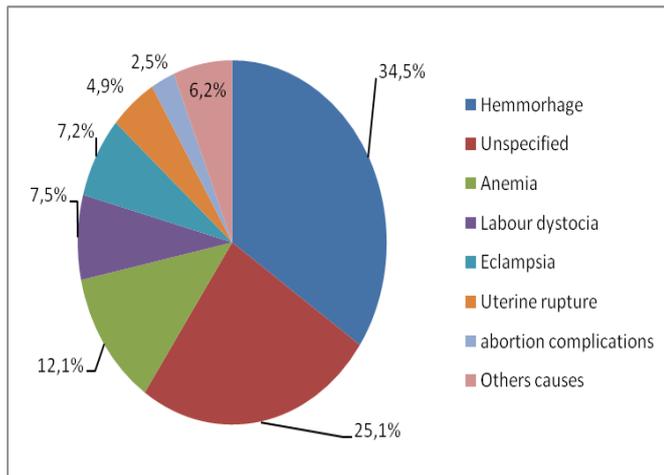
Table IV: Distribution of the patient according to modality of care

	Frequencies	Number(%)
Health worker qualification		
Midwives	26	26(84.1)
Doctors	3	3(9.6)
Unspecifed	2	2(6.3)
Realization of the initial examination and diagnosis		
Yes	29	29(93.5)
No	2	2(6.5)
Presence of complication in the initial examination		
Yes	21	21(67.8)
No	8	8(25.8)
Unspecified	2	2(6.4)
Starting of care		
Within the first 15 minutes	22	22(64.5)
after 15 minutes	3	3(9.7)
Unspecified	6	6(25.8)
Type of treatment		
In accordance with protocol	26	26(83.9)
Not in accordance with protocol	2	2(6.4)
Unspecified	3	3(9.7)
Time for blood transfusion		
<30 minutes		0(0)
> 30 minutes		31(100)
Average evacuation time	130 ±101,71min	
Average first aid time	7±15, 35min	

3.4 Distribution of maternal deaths according to the causes

The results of the study showed that hemorrhage was the leading cause of maternal deaths reported in the region (34.5%) (**figure 1**)

Figure 1: Distribution of maternal death according to the causes



Proportion of deaths that should have been avoided

Data analysis showed that 83.7% of maternal deaths could have been avoided in the health region.

DISCUSSION

Study limitation

The review of maternal death is a method that enables to understand deaths that occur and how they can be prevented or avoided. It helps to work towards safe motherhood. It is a powerful tool for improving the quality of care that has a significant impact on maternal and neonatal morbidity and mortality. However, in our study, reviews were not systematically performed in the districts as recommended by the MSHP and the achievement rate remains low (45.6%). There is also a disparity in the performance of this activity by district as well, while the health district of Agboville housing the Regional Hospital had a realization rate of 89% and the health district of Sikensi had 0%.

A review of maternal and neonatal deaths in health facilities conducted in Benin from January to September 2013 showed that out of a total of 336 maternal deaths, 123 reviews were conducted, representing a completion rate of 36%⁷. The same finding was made in a study conducted in Malawi in 2010, and found that only 89 health facilities out of 309 (29%) had performed MDR and that out of 597 registered maternal deaths 153 (26%) have been reviewed⁸. In our study, the low rate of completion could be explained by the difficulty to gather all the actors to conduct the review (fear of reproach, lack of time), but also by the lack of culture on the utility of the MDR data given the number of missing data in the review. Also, according to Combs et al., The barriers to MDR realization and efficiency include lack of medical records, lack of documentation and record keeping, shortage of senior executives to conduct exams, lack of resources, commitment and knowledge or skills to carry out the reviews⁹.

Factors that contributed to maternal deaths

Patient related factors: age, gravidity and parity

In this study, the proportion of maternal deaths is higher in

patients aged 20 to 29, and these results are similar of those found by Malle CK in her study of the audit of maternal deaths where patients aged 20-34 were the most concerned¹⁰. In our study, maternal deaths occurred mainly in the nulliparous (25.8%) and paucigravida (48.4%). These results differ from those of Aljem in his analysis of maternal deaths at the Hassan II hospital in Morocco in 2009. In fact, in his study, primiparous women had the highest percentage of maternal deaths with 37.5% followed by pauciparous 25%¹¹. Regarding gestationality, our results are also different from those observed in the studies of Malle CK and Abdourhamane M, who found a predominant maternal mortality in multigravida in Mali^{10,12}.

The results of our study show that it is appropriate to increase awareness of the importance of pre- and postnatal consultations and patient acceptance of care.

Mode of arrival

Regarding the reference, the majority of parturients were referred, or 74.5% against 23.2% come from themselves. These results are close to those found by Abdourhamane M. Indeed, in his study on maternal mortality where 73.1% of parturients had been referred and 26.9% came from themselves¹². Malle CK has highlighted in his research a proportion of 59.52% for referred parturients and 40.48% of self referred¹⁰. It should be noted that in our study, 54% of the parturients referred were not put in condition before the evacuation, all that favors the deaths because the continuity of the care was broken during all the duration of travel to the referral health facilities. The finding is that in these cases evacuations are made using public transport vehicles or private vehicles that do not offer the appropriate conditions to properly achieve this conditioning. The same analysis was made by Abdourhamane M. Indeed, his study on maternal deaths leads to the same conclusion that a large proportion of maternal deaths are due to the reference which is made most often late and in conditions that do not respect the standards; because few health centers have an ambulance and it is often the families of the patients who bear the cost of the transfer; which is not within the reach of all. Some parents of patients are forced to fall back on public transport¹². Analysis of the data from our study also showed an average evacuation time of 1 hour 56 minutes with a maximum of 5 hours and a minimum of 30 minutes. In the Malle CK study, 64% of patients were referred within 2 hours and only 20% before 1 hour¹⁰. In our study, the causes of this situation are multifactorial and could be explained by: the unavailability of means of transport (ambulance or any other vehicle), the state of the roads especially during the rainy season, the decision of the parents to accept the very principle of evacuation, evacuation fees that are different from one structure to another and depending on the distance to the reference center, affordability, lack of awareness of danger signs by some service providers, voluntary retention of parturient by some health professional, etc.

Health workers qualification

The majority of the patients were admitted to the referral structure by midwives (84.1%) on admission. It should be noted that, given the insufficient number of gynecologists in the referral centers of the health region because of time constraints, parturients are received first by the midwives. In the Malle CK study, the same finding is reported but in a lower degree with 45.25% of the patients received by midwives¹⁰. As for first aid there was a speed in the implementation, so the average dispensation time was 7 ± 15.35 minutes. Malle CK, meanwhile, found in her study that 48% of patients were treated less than 30 minutes after admission¹⁰. It should not be concealed also the lack of knowledge of the concept of urgency by some health workers from where the proposal for their upgrade to ensure a prompt reference to the signs of danger. This is the reason for the initiative taken by the Ivorian Ministry of Health regarding the implementation of the "mentoring" system. This strategy consists of co-opting in districts with high maternal mortality rates of competent midwives who have already proven themselves, called "mentors" to coach the youngest to build their capacities. This activity is underway in the two administrative centers of Agnéby Tiassa Mé (Agboville and Adzopé). Moreover, in our study, the initial examination was done in 97% of cases, on arrival as well as the diagnosis. Also, in 87.09% of cases, the treatment was based on the protocol, in 64.5% of cases the care started in the first 15 minutes. It is also important to note that 67% of parturients already had complications upon arrival at the health center. These results are similar to those observed in the study of Kongnyuy EJ et al, where 79.1% of the patients were in a critical state upon admission¹³ Curative intervention was performed in 32% of the cases. beyond 30 minutes. In fact, a study conducted in Nigeria also revealed phase III delays in the management of patients in 70.1% of cases. These delays are related to the unavailability of the technical platform and staff¹⁴.

Unavailability of blood products

In our study, hemorrhage was identified as the leading cause of maternal deaths (34%). This result is similar to that found by Bouvier-Colle et al with hemorrhage in the front line and responsible for 29% of maternal deaths¹⁵, and that of Bello FA with 36% of maternal deaths caused by hemorrhage¹⁴. However, Fomulu JN in a retrospective study of maternal mortality at the Yaounde General Hospital showed that hemorrhage was the second leading cause of maternal death just after eclampsia¹⁶. In our study, the unavailability of blood products was a critical factor that made patient care management difficult and inadequate. Indeed, the delay for blood transfusion was higher than 30 minutes in 100% of the cases in our study and the most recurrent causes were related to the insufficiency and the shortage of blood bag. Blood transfusion antennas, which are the regional blood banks of the two administrative regions (Agnéby-Tiassa and Mé), do not have a mobile unit for mobilization activities and regular blood collection. This situation is a major barrier to the

mobilization and availability of blood products. The vehicle request is made to the National Center for Blood Transfusion (CNTS) located in Abidjan which makes the vehicle available according to its availability and the program established by the antennas of Agboville (Agnéby-Tiassa) and Adzopé (Mé).

Deaths that could have been avoided

At the end of MDR, it appeared that deaths could have been avoided in 83.7% of cases, especially those related to hemorrhage because in most cases it was a shortage of blood, or the time taken to achieve blood grouping. A study carried out in Tunisia on maternal mortality from 1990 to 2001, had shown a rate of avoidable deaths also higher than 50%¹⁷. In our study area, deaths could have been avoided if the following conditions were met: the equipment of the block, the availability of a resuscitation service and an ambulance for evacuations, a rapid diagnosis, the adequacy of the treatment, the rapidity with which the intervention is implemented, the availability of blood, medicines and other inputs, the reinforcement of the skills of the health staff, the discipline of the patients through the respect of the instructions at NPCs (including the prohibition of the use of traditional oxytocics and assisted delivery), patient awareness and acceptance of care.

CONCLUSION

This study allowed us to understand the factors favoring maternal deaths from the characteristics, the progression of the cases, the admission, the care at the arrival in the reference structure, the obstetric care, the follow-up of the care and information on the records. Diligent actions should be considered in order to remedy them while taking into account the specific constraints of the region. These corrective and corrective actions are mainly in terms of strengthening the number of specialized human resources (doctors-gynecologists), the technical platform, but also the reinforcement of the skills of the actors in the field; as well as the development of the community component. It will also ensure the availability of drugs (delivery kits, blood products essential drugs) and the strengthening of the car park in ambulance and mobile unit for blood collection. In addition, the review of maternal deaths should be systematic in accordance with national guidelines and the template should be properly and fully informed to allow for a more in-depth and comprehensive analysis of all determinants. Indeed the insufficiency of the realization of the reviews and all missing data are losses of information which could have been analyzed and taken into account to avoid the occurrence of other cases maternal deaths.

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CONFLIT OF INTEREST

The authors declare no conflict of interest

AUTHORS CONTRIBUTION

All authors contributed to the conduct of the work and the writing of the manuscript. All authors have read and approved the final version of the manuscript.

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