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Causes of Maternal Mortality in Intensive Care at Ziguinchor Peace Hospital

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Abstract

Introduction: Maternal mortality has both direct and indirect causes. We studied the factors involved in maternal mortality in the intensive care unit of the Peace-hospital of Ziguinchor. Patients and methods: This was a retrospective, analytical study carried out from 1 January 2020 to 31 December 2022 on patients who died in the intensive care unit before, during and after delivery. Epidemiological data and direct and indirect causes were studied.

Results: Twenty-three patients were included in the study. The mean age was 30.6 years. More than half were of rural origin. Direct causes were found in 73.5% of cases. Among the direct causes: haemorrhage was found in more than a third, arterial hypertension and its complications in 28%, acute renal failure in 20%, infections in 8% and thromboembolic infections in 4%. Among the indirect causes, heart disease was responsible for a mortality rate of 55.5%, and severe malaria, pneumopathy, basilar trunk aneurysm rupture and ARDS SARS COV 2 each accounted for 11.1%.

Conclusion: Identification of these factors will contribute to early and rigorous intensive care management to reduce maternal mortality.

Keywords: Causes; Maternal Mortality; Intensive Care; Ziguinchor

Introduction

Maternal death is "the death of a woman during pregnancy or within 42 days after its termination, whatever the duration or location, from any cause determined or aggravated by the pregnancy or the care it prompted, but neither accidental nor fortuitous". Maternal deaths can be divided into two groups: deaths due to direct obstetric causes and deaths due to indirect obstetric causes. The global maternal mortality ratio fell from 342 in 2000 to 211 maternal deaths per 100,000 live births in 2017, a reduction of 38% [1]. This rate is high in the least developed countries, estimated at 415 maternal deaths per 100,000 live births, which is more than 40 times higher than the maternal mortality rate in Europe.

Sub-Saharan Africa is the only region where the maternal mortality rate was very high in 2017, estimated at 542. In Senegal, the maternal mortality rate fell from 553 to 315 per 100,000 live births between 2000 and 2017. The maternal mortality rate is recognised worldwide as an indicator of the quality of obstetric care and reflects the risk to mothers during pregnancy and childbirth. In less than a century, it has fallen sharply in most developed countries. Several international organisations, led by the World Health Organisation (WHO), have been working on this "scourge" for several years, and reducing maternal mortality is one of the Millennium Development Goals (MDGs) [2]. This study, carried out in the Intensive Care Unit of the Hôpital de la Paix in Ziguinchor, Senegal, is part of this effort, with the aim of studying the epidemiological profile and the direct and indirect causes of maternal mortality.

Patients and Methods

This was a retrospective, descriptive and analytical study carried out over a three-year period from 1 January 2020 to 31

December 2022 on all patients who died in the intensive care unit before, during and after delivery. All patients hospitalized in the intensive care unit during the peripartum period and whose outcome was marked by death were included in the study. The information collected was recorded on a form. Microsoft Word was used for word processing and Microsoft Excel 2010 was used for analysis. The following parameters were studied: age, marital status, profession, place of origin, socio-economic level, level of education, terrain, medical, surgical, and obstetric history, pregnancy follow-up, time and period of death, mode of delivery and causes of death (direct or indirect).

Results

During the study period, 26 patients died peripartum in the intensive care unit out of a total of 3535 deliveries (mortality of 0.73%) at the Ziguinchor Peace Hospital. The average age of the patients was 30.6 years, with extremes of 20 and 46 years. The age group between 26 and 30 was the most affected. More than half of the patients (56.6%) were of rural origin. Direct causes were found in almost three quarters of cases (73.5%). The pathologies were often interrelated. Among the direct causes, haemorrhage predominated in 40% of cases. The other causes were arterial hypertension and its complications, acute renal failure, infections, and massive pulmonary embolism (28%, 20%, 8% and 4% respectively). Haemorrhagic causes are the leading direct cause of death.

Delivery haemorrhage accounted for 80% and retroplacental haematoma for 20%. Delivery haemorrhage occurred within 6 hours of delivery in patients whose age was higher than the study average and who had undergone an upper-route extraction. Deaths occurred within the first 24 hours of diagnosis. Hypertensive complications are also interrelated and were found to be the second most common direct cause of mortality. They were represented in the majority of cases by eclampsia refractory to magnesium sulphate (57.1%). The other causes were severe pre-eclampsia complicated by HELLP syndrome in 28.6% of cases, subcapsular haematoma of the liver and haemorrhagic syndrome in 14.2% of cases each. Acute renal failure complicated pre-eclampsia in 60% of cases, haemorrhage, and septic shock in 20% each.

Among the indirect causes, heart disease predominated at 55.5%. Severe malaria with multivisceral failure, inhalation pneumonitis with multivisceral failure in the context of eclampsia, ARDS due to SARS COV 2 with multivisceral failure and basilar trunk aneurysm rupture were found as indirect causes of death in 11.1% each. In our study, two types of heart disease were found. Valvular heart disease of the narrowed mitral type, sometimes associated with aortic or mitral regurgitation, accounted for 60% of cases, while hypokinetic dilated cardiomyopathy accounted for 40%. These cardiac diseases were decompensated by acute pulmonary oedema and cardiogenic shock in 50% each. All the valvulopathies found were of rheumatic origin (Table 1).

Table 1: Causes of Death.

Causes of Death		Total	Percentage (%)
Direct causes	Hémorragies	10	29.40%
	High blood pressure and its complications	7	20%
	Acute Renal Failure	5	14.70%
	Infections	2	5.80%
	Massive Pulmonary Embolism	1	2.90%
Indirect causes	Coronary Heart Disease	5	14.70%
	Severe Malaria	1	2.90%
	Respiratory Diseases	1	2.90%
	ARDS SARS cov2	1	2.90%
	Basilar Trunk Aneurysm Rupture	1	2.90%

Discussion

In our study, the mean age was 30.6 years, with a peak in the 26-30 age group. Ndiaye found an average age of 28.09 years [3]. AKA in Côte d'Ivoire found that maternal mortality occurred in patients aged between 16 and 50 years [4]. The average age of patients was 28. All this confirms the fact that in our context, even young women are at high risk of death in the peripartum period. The majority of the population in developing countries is young. We have noted a disparity in maternal mortality that can be explained by socio-cultural beliefs, differences in socio-economic levels, education and technical facilities between regions of the world, but also between areas within the same region. The causes of death were dominated by direct causes in 73.5% of cases. This result is lower than the rates found in the studies by AKA (82.74%) and Ndiaye (94.4%). Direct causes are the main causes of maternal death in obstetric intensive care and are often interrelated.

Among the direct causes, haemorrhage predominated in 40%, followed by arterial hypertension and its complications in 28%

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and acute renal failure in 20%. Haemorrhagic causes accounted for 29.4%, with 80% of deliveries haemorrhaging and 20% of retro-placental haematomas. Haemorrhage is the leading cause of maternal death worldwide. In Senegal, a study carried out in Ziguinchor between 2016 and 2018 found that 55.5% of deaths were due to haemorrhagic causes. This reduction in prevalence can be explained on the one hand by a broader study framework and on the other hand by efforts to improve the prevention and management of peripartum haemorrhage. Nevertheless, in our context, we still note a shortage of labile blood products and fibrinogen. These results are partly similar to our own.

In France, although the incidence of obstetric haemorrhage has fallen significantly following the reduction in deaths due to uterine atony, it remains the leading cause of maternal death [5]. This observed prevalence is similar to that obtained in our study concerning the share of haemorrhage in maternal mortality. Arterial hypertension and its complications come second in our study, with a prevalence of 20%. In a study carried out in Yaoundé on obstetric complications admitted to intensive care, hypertensive pathologies during pregnancy were found in 72.3% of cases [6]. These pathologies are often interrelated and linked to several risk factors, in particular young age and elderly parturient. Refractory eclampsia is a major cause of maternal mortality in our study, accounting for 42.8%. Eclampsia is still common in developing countries and is associated with high maternal mortality. Other complications of arterial hypertension were found in our study.

These were HELLP syndrome (28.6%), subcapsular haematoma of the liver (14.2%) and haemorrhagic syndrome (14.2%). They are interrelated and increase the risk of haemorrhage in these patients. They are the consequence of poor pregnancy monitoring due to a lack of resources. Acute renal failure (ARF) was found in 14.7% of patients. The cause of AKI is multifactorial in this context, and the literature is sparse. None of our patients underwent haemodialysis due to the lack of a dialysis unit in the intensive care unit. A distinction is usually made between ARF in the first and second trimesters, which are primarily of septic origin, in particular secondary to unsafe abortions, and ARF in the third trimester, which is either accompanied by severe hypertension, pre-eclampsia or eclampsia, which may be associated with HELLP syndrome or acute hepatic steatosis, or are secondary to an obstetric "catastrophe" (retroplacental haematoma, foetal death in utero, amniotic emboli, etc.).). A study carried out in Senegal found a fatality rate for ARF secondary to eclampsia of around 33.3% [7].

This can be explained in part by the still low rate of pregnancy monitoring and the late management of pathological pregnancies. In our study, thromboembolic causes were responsible for 2.9% of maternal deaths. In France, the 2nd most common cause of maternal death is pulmonary embolism, accounting for 11% of deaths. In Africa, the prevalence of thromboembolic causes is relatively low. This low rate can be explained by the anaesthetic technique (locoregional anaesthesia) and early post-caesarean rehabilitation. In our study, heart disease predominated, with maternal mortality of 55.5% of indirect causes and 14.7% of overall mortality. In Senegal, Ndiaye reported a prevalence of heart disease of 1.1%. Poorly treated recurrent tonsillitis and rheumatic fever are still common in Senegal and are responsible for most of the heart disease. SARS COV2 pneumonia was responsible for a maternal mortality rate of 2.9%.

This pathology is the cause of maternal sepsis, which is highly lethal. At the end of 2019, a new coronavirus, known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) appeared in China and spread rapidly around the world. During pregnancy, the disease is asymptomatic or not severe. However, in a minority of cases, severe forms of the disease can occur, which can be life-threatening. Badr has shown that women who are more than 20 weeks' amenorrhoea (SA) pregnant have a significantly higher risk of admission to an intensive care unit (ICU), endotracheal intubation, hospitalisation for symptoms linked to COVID-19 disease and oxygen requirements than infected non-pregnant women. Although data are very limited, and by analogy with other coronaviruses, particular attention should be paid to pregnant women with co-morbidities who may be infected with SARS-CoV-2 [8].

Conclusion

For most women, pregnancy and childbirth are a positive, satisfying, and uncomplicated experience. However, maternal death is a possible outcome if a risk factor is not treated effectively and at the right time. Identifying these factors will contribute to early and rigorous resuscitation management to reduce maternal mortality.

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