DETERMINANTS OF MATERNAL MORTALITY AMONG WOMEN WITH ECLAMPSIA MANAGED AT THE IGNACE DEEN NATIONAL HOSPITAL, CONAKRY, GUINEA

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ABSTRACT

BACKGROUND: Maternal mortality, is a fundamental indicator of maternal health and it is a major public health problem in developing countries . Approximately 830 women die every day worldwide from complications related to pregnancy or childbirth Eclampsia, a serious complication of pre-eclampsia, is a major cause of maternal death globally, particularly in low-income countries where its incidence remains high. The objective of this study was to determine factors associated with maternal deaths among eclamptic patients at the Ignace Deen National Hospital in Conakry.

METHODOLOGY: This was a 4-years retrospective study conducted at the Ignace Deen National Hospital in Conakry, among eclamptic patients. Data were collected using a structured data collection form and analyzed with SPSS 26.0. Binary and multivariable logistic regression were employed assess the association of explanatory variables with the outcome variable. a 95% confidence interval (CI) and a threshold value of $p < 0.05$ wrer used for determining statistical significance

RESULTS: A total of 99 eclamptic patients were included in this study. The maternal mortality rate was 20.2%. After logistic regression, the factors significantly associated with maternal death in eclamptic women were the absence of prenatal care (AOR: 11.92; CI: 1.15–123.45), a Glasgow coma scale between 3 and 6 (AOR: 37.83; CI: 37.83–256.92), the delay in accessing healthcare (AOR: 7.07; CI: 1.07–46.63), and status eclampticus (AOR: 6.33; CI: 1.29–31.09).

CONCLUSION: This study highlights the importance of strengthening access to antenatal care and improving e timely and effective management of eclamptic patients, particularly by reducing transfer times to specialized care facilities. Such actions could contribute to the reduction of maternal mortality related to eclampsia in this context.

KEYWORDS: associated factors, maternal deaths, eclampsia, Guinea.

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INTRODUCTION

Maternal mortality is a major public health issue worldwide. According to the World Health Organization (WHO), it is defined as the death of a woman during pregnancy or within 42 days of the end of pregnancy, regardless of the duration or location of the pregnancy, resulting from a cause related to or aggravated by the pregnancy or by the care it provided, excluding accidental or fortuitous causes[1].

About 260, 000 women died during and following pregnancy and childbirth in 2023[2]. Approximately 92% of all maternal deaths occurred in low- and lower-middle-income countries in 2023, and most could have been prevented[3]. In Guinea, the maternal mortality ratio was 553 per 100,000 live births in 2020[4].

In most developed countries, maternal mortality associated with eclampsia has been minimized. In two studies conducted in the United Kingdom and France, no deaths were recorded among eclamptic patients[5,6]. However, eclampsia remains a leading cause of maternal mortality in developing countries, where its incidence remains high[7]. This severe complication of vascular -renal disorders of pregnancy is manifested by tonic-clonic seizures and/or alterations of consciousness, linked to preeclampsia, without a pre-existing neurological pathology being able to explain its origin[8,9]. Eclampsia was associated with a maternal mortality rate of 8.5% in Abuja (Nigeria), 10.7% in Benin City (Nigeria) and 35% in Dakar (Senegal)[10-12].

Factors contributing to maternal deaths due to eclampsia include a Glasgow score ≤ 8 at admission, vaginal delivery, and the occurrence of more than two seizures, as reported in the literature[13]. Reducing maternal lethality due to eclampsia requires accurate identification of risk factors in affected patients.. Such information could help reduce the rate of maternal deaths due to eclampsia by optimizing management strategies within our health structures.

Several studies have been carried out on the determinants of maternal deaths in the study hopsital but none to our knowledge have focused on the factors associated with maternal deaths in eclamptic patients. The objective of this study was to determine factors associated with maternal deaths among eclamptic patients admitted to the obstetrics and Gynecology department at the Ignace Deen National Hospital in Conakry.

METHODOLOGY

Study setting

The Ignace Deen National Hospital, located in the Kaloum district in the heart of the capital city of Conakry, is a level III facility in the country's healthcare system. Together with the Donka National Hospital, it forms the Conakry University Hospital Center (CHU). The study was conducted at the obstetrics and gynecology department of this hospital For the past nine years, it has been the only functioning level III referral center for maternal health, care handling obstetric emergencies from Conakry and some surrounding prefectures. The estimated annual number of deliveries has increased from 3,000 to 8,000 in the past 9yrs.

Study Design

This was a retrospective study with an analytical component .

Study Period

The study was conducted over a four-year period, from June 1, 2020 to May 30, 2024.

Study Population

All Patients with eclampsia who were managed at the department during the study period. Eclampsia was diagnosed in patients who developed convulsive seizures in the peripartum period without a history or clinical signs of another seizure etiology.

Inclusion Criteria: all eclamptic patients who died or were discharged alive, who were treated in the department during the study period, with medical records containing complete data.

Exclusion Criteria: eclamptic patients with records containing missing data and mortuary records of deaths occurring due to eclampsia.

Data Collection

Data collection was carried out through review of the records of eclamptic patients treated in the department during the study period followed by their transcription onto the data collection form. The sample size was 99 eclamptic patients meeting the selection criteria defined above.

Study Variables

Dependent Variable: maternal death following hospitalization.

Independent Variables: These included sociodemographic characteristics, obstetric and clinical profile of the patients, management approach, and the fetal state at birth (alive/dead).

Operational Definitions

The delay in accessing healthcare: we defined as a period exceeding 24 hours between the onset of the first symptoms and hospital admission.

The the 3rd delay (delay in initiating treatment): defined as any period exceeding one hour between the diagnosis of eclampsia and the start of curative treatment.

Maternal Death: it is defined as the death of a woman during pregnancy or within 42 days of the end of pregnancy, regardless of the duration or location of the pregnancy, resulting from a cause related to or aggravated by the pregnancy or by the care it provided, excluding accidental or fortuitous causes.

The Galscow Coma Scale: The Glasgow Coma Scale is a standardized medical tool for assessing a person's level of consciousness, ranging from 3 (deep coma) to 15 (full consciousness), based on three responses: eye opening, verbal response, and motor response.

Classification and interpretation of the Glasgow Coma Scale

15: Normal consciousness

14-10: Drowsiness or mild coma

9-7: Moderate to severe coma

6-3: Deep coma (3 is the lowest score, corresponding to an absence of response).

Eclamptic Patients: An eclamptic patient is a pregnant (or postpartum) woman presenting with sudden-onset generalized tonic-clonic seizures and or/coma after ruling out other causes associated with signs of preeclampsia.

Status Eclampticus: This is a serious neurological emergency characterized by the occurrence of tonic-clonic eclamptic seizures that last abnormally long (more than 5 minutes) or follow one another without recovery of consciousness, leading to continuous cerebral hyperactivity.

Data Management and Analysis

SPSS 26.0 software was used for coding, data entry, cleaning, and analysis. Outliers, duplicates, and missing values were addressed. Maternal case fatality was calculated as the proportion of maternal deaths of deaths among all eclamptic patients during the study period. Descriptive and binary logistic regression analyses were performed, and a p-value < 0.05 in multivariate logistic regression was considered statistically significant with a 95% confidence interval (CI).

Ethical Considerations

Permission from the head of department and the institutional ethics committee (Ignace Deen National Hospital) was obtained before data collection began. Confidentiality and anonymity were Assured.This study was approved by the National Ethics Review Committee in Guinea (approval number 218/CNERS/23).

RESULTS

During the study period, 26,304 births were recorded in the department, including 135 cases of eclamptic patients, among those 36 eclamptic patients were excluded from the study due to insufficient information in the files and others for being admitted without signs of life (death confirmed before or during admission). Ninety-nine (99) eclamptic patients met the inclusion criteria, including 20 patients who died during hospitalization.

Mortality in eclamptic patients: we recorded 20 cases of maternal death out of the 99 eclamptic patients included, representing a mortality rate of 20.20%.

The sociodemographic characteristics and obstetric profile of patients with eclampsia were marked by a median age of 23 years (range: 15–45 years), with a predominance of patients in the 20–29 age group (46.5%). The majority of patients were married (92.9%), had no formal education (43.4%), and were admitted from another hospital (83.8%). Obstetric history showed a predominance of primiparous women (55.6%), and 89.9% of patients had received 1 to 4 prenatal consultations (ANC) (Table 1).

Table 1: Sociodemographic characteristics and obstetric history of eclamptics treated at the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Frequency	Percentage
Sociodemographic characteristics		
Age (in years)		
≤ 19	27	27.3
20-29	46	46.5
30-39	23	23.2
≥ 40	3	3.0
Median age = 23 years; Extremes: 15 and 45 years		
Occupation		
Housewife	30	30.3
Student	18	18.2
Liberal	41	41.4
Employee	10	10.1
Marital status		
Bachelor	7	7.1
Bride	92	92.9
Level of education		
Not in school	43	43.4
Primary	20	20.2
Secondary	23	23.2
Superior	13	13.1
Admission mode		
Came from another hospital	83	83.8
Coming from home	16	16.2
Obstetric history		
Gravidity		
Primigravida	55	55.6
Multigravida	44	44.4
Parity		
Nulliparous	9	9.1
Primiparous	55	55.6
Multiparous	35	35.3
Number of prenatal consultations		
0	9	9.1
1-4	90	90.9

Clinical, therapeutic and prognostic characteristics of eclamptics patients

Clinically, a delay in consultation (2nd delay) was observed in 10.1% of patients. Systolic blood pressure (SBP ≥ 160 mmHg) and diastolic blood

pressure (DBP ≥ 110 mmHg) values were recorded in 73.7% and 56.6% of cases, respectively. Neurological status assessment at admission revealed that a Glasgow coma scale between 3 and 6 was present in 10.1% of patients. The antepartum and antepartum periods were the most frequent for the occurrence of eclampsia (51.5%) (Table 2).

Regarding before the transfer and hospitalization management, 67.5% of patients did not receive magnesium sulfate before evacuation, and a delay in management (3rd delay) was observed in 12.1% of cases. More than 91.9% of patients gave birth, including 58.7% by cesarean section, with 94.4% under general anesthesia. During hospitalization, 90.9% of patients received magnesium sulfate according to the WHO protocol. Eclamptic coma was recorded in 7 patients (7.1%) with a stillbirth rate of 13% (Table 2).

Table 2: Clinical, therapeutic and characteristics of eclamptics treated in the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Frequency	Percentage
Clinical features		
Delay in accessing healthcare		
Yes	10	10.1
No	89	89.9
SBP ≥160mmHg		
Yes	73	73.7
No	26	26.3
DBP ≥110mmHg		
Yes	56	56.6
No	43	43.4
Galscow Coma Scale		
Real to1 15	24	24.3
14-10	53	53.5
9-7	10	10.1
6-3	12	12.1
Time of onset of eclampsia		
Antepartum	51	51.5
Intrapartum	22	22.2
Postpartum	26	26.3
Therapeutic characteristics		
Administration of magnesium sulfate before evacuation		
Yes	27	32.5
No	56	67.5
3rd delay		
Yes	12	12.1
No	87	87.9
Childbirth		
Yes	92	92.9
No	7	7.1
Mode of delivery		
Vaginal delivery	38	41.3
Cesarean section	54	58.7
Type of anesthesia		
General anesthesia	51	94.4
Loco-regional anesthesia	3	5.6
Administration of magnesium sulfate on arrival		
Yes	90	90.9
No	9	9.1
Predictions		
Newborn condition		
Alive	80	87.0
Stillborn	12	13.0
Status eclampticus		
Yes	7	7.1
No	92	92.9
Acute renal failure		
Yes	1	1.0
No	98	99.0

Factors associated with maternal death in eclamptic patients

Bivariate analysis revealed that some factors were significantly associated with an increased risk of maternal death in eclamptic patients ($p < 0.05$). These factors included employment status, absence of antenatal consultations, delay in consultation (delay in accessing healthcare), Glasgow score between 3 and 6, delay in care (3rd delay) and the presence of status eclampticus (Table 3).

After fitting the above variables into in multivariable regression analysis , not having completed the prenatal consultation (aOR : 11.92; CI: 1.15-123.45), having a Glasgow score between 3 and 6 (aOR : 37.83; CI: 37.83-256.92), the delay in accessing healthcare (aOR : 7.07; CI: 1.07-46.63)

and status eclampticus (aOR : 6.33; CI: 1.29-31.09) were statistically significantly associated factors with the occurrence of maternal deaths in eclamptic patients (Table 3).

Table 3: Factors associated with maternal death in eclamptic patients treated at the gynecology-obstetrics department of the Ignace Deen National Hospital, Conakry University Hospital from June 1, 2020 to May 30, 2024 (n=99)

Variables	Maternal deaths in eclamptics		COR (95% CI)	AOR (95% CI)	P value for AOR
	Yes	No			
Occupation					
Student	6	12	1	1	
Liberal	4	37	0.28 (0.08-0.92)	4.47 (0.64-31.17)	0.13
Housewife	4	26	0.51 (0.15-1.67)	5.36 (0.59–48.12)	0.13
Employee	6	4	8.03 (2.00-32.19)	0.26 (0.03-2.15)	0.21
Marital status					
Bride	18	74	0.60 (0.11-3.39)	1.19 (0.05-24.59)	0.90
Bachelor	2	5	1	1	
Admission mode					
Came from another hospital	18	65	1.93 (0.40-9.32)	0.06 (0.01-2.25)	0.13
Coming from home	2	14	1	1	
Lack of prenatal consultation					
Yes	6	3	10.85 (2.42-48.58)	11.92 (1.15-123.45)	0.03
No	14	76	1	1	
SBP ≥160mmHg					
Yes	16	57	1.54 (0.46-5.13)	4.54 (0.40-51.29)	0.22
No	4	22	1	1	
DBP≥110mmHg					
Yes	15	41	2.78 (0.92-8.38)	0.35 (0.05-2.20)	0.26
No	5	38	1	1	
Mode of delivery (n=92)					
Cesarean section	6	48	0.55 (0.17-1.80)	0.71 (0.14-3.54)	0.68
Vaginal delivery	7	31	1	1	
3rd delay					
Yes	6	6	5.21 (1.46-18.52)	2.82 (0.45-17.67)	0.26
No	14	73	1	1	
Glasgow score (10-14)					
Yes	6	47	0.29 (0.10-0.83)	1.91 (0.36-10.11)	0.44
No	14	32	1	1	
Glasgow Score between 3 and 6					
Yes	10	2	38.5 (7.35-201.47)	37.83 (37.83-256.92)	0.00
No	10	77	1	1	
Administration of magnesium sulfate on arrival					
Yes	14	76	0.09 (0.02-0.41)	0.10 (0.01-0.87)	0.03
No	6	3	1	1	
Delay in accessing healthcare					
Yes	5	5	4.93 (1.26-19.18)	7.07 (1.07-46.63)	0.04
No	15	74	1	1	
Status eclampticus					
Yes	4	3	6.33 (1.29-31.09)	6.33 (1.29-31.09)	0.02
No	16	76	1	1	

DISCUSSION

In this study, we analyzed the factors associated with maternal deaths in eclamptic patients treated at the obstetrics-gynecology department of the Ignace Deen National Hospital, between June 2020 and May 2024.

This study reveals that maternal case fatality was not negligible in this group of patients, with two(2) eclamptic women dying out of 10. Maternal case fatality related to eclampsia of 19.4%, 20% and 22.3% have been reported in different regions of Nigeria[15-17]. A lower maternal lethality rate was recorded in a secondary data analysis of 10 low and medium resource geographic regions, at 6.9%[18]. In high-income countries, maternal death rates among eclamptic women remain lower[17]. This result could be explained by the late arrival of some eclamptic patients, often in a state of multiple complications (eclamptic status, eclamptic coma, renal failure, etc.). differences in the level of advancement in maternal health care provision, including infrastructure, medical equipment, and human resource capacity.
The study revealed that the absence of prenatal consultations was associated with the occurrence of maternal deaths in eclamptics. Adamu AN and al. had found in their series that patients who had not had a prenatal consultation were more likely to die from eclampsia and its complications.[20]. Harioly Nirina and al. reported in their study of maternal deaths in eclamptic women in Antananarivo that patients who had fewer than 4 antenatal visits had a 40-fold risk of dying compared to other eclamptic patients[21]. For MacKay AP and al., women who had not received any antenatal consultation had a higher risk of dying from preeclampsia or eclampsia than those who had received any antenatal consultation[22]. This situation could be explained by a lack of prenatal consultations. Pregnant women may therefore miss the opportunity to receive appropriate advice on the symptoms and warning signs of preeclampsia and eclampsia, thus increasing the risk of eclampsia and its complications, including maternal death. This lack of antenatal consultations, although the study was conducted in an urban setting, constitutes a major public health problem. Strengthening awareness-raising actions among pregnant women on the benefits of prenatal consultations could help to reduce the risk of certain pregnancy-related complications and ensure early treatment when they occur.

This study revealed that eclamptic patients admitted in a state of deep coma were at greater risk of dying than other eclamptics. Rakotomboahangy TM and al. and Small MJ and al. had found in their series, respectively, that the comatose state multiplied by 208 and 10 times the risk of maternal death in eclamptic patients[23,24]. This observation could be explained, on the one hand, by the insufficiency of resources for optimal management of eclamptic patients in a comatose state admitted to the department, and on the other hand, by the very limited capacity of the intensive care unit, leading to delays in the transfer of these patients to this department. These delays can contribute to the deterioration of their clinical condition. Despite their comatose state, some patients remain in the department for several days, with occasional assistance from the intensive care unit. The management of comatose eclamptic patients is a major challenge, compromising their vital prognosis. Improving the conditions for managing comatose eclamptic patients in our department, as well as increasing the capacity of the intensive care unit, could significantly improve their vital prognosis.

The study revealed that delay in consultation was associated with death in eclamptic patients. In Nigeria, some authors reported that a consultation delay of 12 hours or more after the onset of seizures increased the risk of maternal death in eclamptics by 104 times[15]. Delay in seeking medical advice has also been reported by some authors in Nigeria and Bangladesh as a factor associated with the occurrence of death among eclamptic patients[25,26]. This implication of delay in consultation in the occurrence of maternal deaths in eclamptics could

be explained on the one hand, by the fact that in our context in most cases, eclampsia occurs at home or during transport exposing patients to repeated tonic -clinical seizures that can cause significant cerebral suffering before arrival in the department and on the other hand, the absence of medical transport and difficult access to the study site for some patients coming from the upper suburbs and greater Conakry. Delay in consultation thus constitutes a factor aggravating the vital prognosis of eclamptic patients. These results highlight the importance of rapid transfer of patients at the onset of prodromal signs or at the onset of crises, as well as appropriate management upon admission to improve the chances of survival.

Strength and limitations of the Study

The limitations of this study lie mainly in its retrospective nature, which may introduce selection bias. However, this study has the potential to provide valuable information on the management of eclamptic patients, as it was carried out in a level III maternity hospital, which receives the majority of obstetric emergencies in the region. This specificity gives the study a particular representativeness and clinical relevance for the analysis of the most serious cases, thus offering perspectives on the needs and challenges of the management of obstetric complications in this context.

CONCLUSION AND RECOMMENDATIONS

This study showed that the absence of antenatal consultations, a Glasgow score between 3 and 6, delay in access to care and status eclampticus are factors significantly associated with an increased risk of maternal death. These data highlight the importance of strengthening access to antenatal care and improving the timely and effective management of eclamptic patients, particularly through reducing referral delays to specialized care facilities.

Conflicts of interest

The authors declare no conflicts of interest related to this work.

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Authors' contributions

Sow AII (design, data collection and analysis, and manuscript writing) Kolie D and Castro GH (data analysis and manuscript writing) , Bah OH and Diallo FB (manuscript review), Diallo IT (data collection), Diallo A (manuscript review), Toure A (manuscript review), Balde IS (manuscript review), Sy T (manuscript review).

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List of abbreviations

ANC: Antenatal Consultations
AOR: Adjusted Odds Ratio
CI: Confidence Interval
COR: Crude Ratio Odds Ratio
DBP: Diastolic Blood Pressure
MMHg: Millimeter of Mercury
SBP: Systolic blood pressure
SPSS: Statistical Package for the Social Sciences
UHC: University Hospital Center
WHO: World Health Organization

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