Eclampsia: Epidemiological Aspects and Maternal and Foetal Prognosis at the University Teaching Hospital Centre (UTH) of Bouake

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Abstract

Objective: To determine the epidemiology and maternal-fetal prognosis of eclampsia at Bouaké University Teaching Hospital. **Material and Methods:** This was a prospective study with descriptive and analytical aims over a period from 01 January 2019 to 31 December 2021. It took place in the obstetrics and gynaecology department of the Bouaké University Teaching Hospital. The inclusion criterion was any seizure in the gravid-puerperal period in the context of preeclampsia. Data were entered and analysed using EPI INFO software version 7.2.2.6. **Results:** We performed 20,958 deliveries and recorded 241 cases of eclampsia, representing a prevalence of 1.14%. The ages of the participants ranged from 13 to 47 years with a mean age ± SD of 22 ± 7 years. The age group ≤ 19 years represented 45.64% of participants. Housewives accounted for 46.47%, and single women accounted for 54.77% of participants. The average parity ± SD was 1 ± 1.6 with range of 0 to 10, and nulliparous women accounted for 49.8% of participants. Patients who were evacuated accounted for 74.27% of our study population. The majority of eclampsia attacks occurred in the antepartum period (56.84%). The mean gestational age ± SD was 36 ± 3.6 weeks with a range of 24 to 42 weeks. The mode of delivery was caesarean section in 64.7% of cases. Maternal lethality was 7.88%. The factors associated with maternal mortality due to eclampsia were evacuation and parity of less than 3. Maternal morbidity was 16.6%. Neonatal

lethality was 18.95%. The factor associated with neonatal death in eclampsia was prematurity. **Conclusion:** We need to detect and manage preeclampsia early and effectively to reduce the frequency of eclampsia and improve its maternal-foetal prognosis in our context.

Keywords

Maternal-Foetal Prognosis, Eclampsia, Bouaké

1. Introduction

Every year, complications of pregnancy claim the lives of 303,000 women, and the causes of these deaths are the same throughout the world [1]. The World Health Organization (WHO) estimates that most maternal deaths are due to haemorrhage, infection, unsafe abortion and eclampsia [1]. Eclampsia is a serious neurological complication of preeclampsia (PE). It is defined by the presence of generalized convulsions and/or consciousness disorders. The frequency of this condition varies throughout the world, depending mainly on the country concerned but also on access to healthcare. In industrialized countries, the incidence is between 0.02% and 0.05% [2]. While the incidence is low in developed countries, it remains relatively high in developing countries, with rates of 6.15% in Mali [3] and 1.35% in Senegal [4]. In Ivory Coast, the prevalence was 5.70%, and mortality according to a study carried out in the intensive care unit of the Treichville University Hospital gave a maternal death rate of 27.6% [5]. Despite the seriousness of eclampsia, no work has been carried out on this condition in the obstetrics and gynaecology department of Bouaké University Hospital, which prompted this study to determine the epidemiology and maternal-foetal prognosis of eclampsia at Bouaké University Teaching Hospital.

2. Material and Methods

2.1. Study Design and Setting

This is a cross-sectional prospective, descriptive and analytical study that took place over a period of thirty-six (36) months from the 1st of January 2019 to the 31st of December 2021. It took place in the Obstetrics and Gynaecology department of the Bouaké University Teaching Hospital. The city of Bouaké is located in the centre of Ivory Coast and is the second most populous city after Abidjan, with a general population estimated at 1,542,000 according to the MICS 2021 [6]. The city has a hospital and university centre, which is a tertiary-level hospital according to the country's health pyramid. This centre has an Obstetrics and Gynaecology department, which provides medical and surgical care for gynaecological and obstetric pathologies. It is a referral service, receiving patients referred from general and peripheral hospitals in the town of Bouaké, as well as from surrounding towns in the centre, north and west of the country. The ma-

ternity ward in the Gynaecology and Obstetrics department has 4 delivery cubicles, 6 post-natal beds and an operating theatre with two operating theatres. The daily team consists of a Gynaecologist Obstetrician, three medical doctors with a diploma in gynaecology and obstetrics, four midwives and two nurses.

2.2. Study Population

The study population consisted of pregnant women, parturients and newborns admitted to the department. Sampling was exhaustive. All pregnant women and recent mothers admitted to the department presenting with a tonic-clonic seizure associated with systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg associated with high proteinuria (greater than 0.30 g/24h) were included in the study. We did not include women with other causes of seizures during pregnancy not associated with the inclusion criteria, patients who had died and patients with hypertension without significant albuminuria.

2.3. Data Collection and Analysis

The data sources were prenatal consultation books, delivery records and hospitalization records. The questionnaire was developed after reviewing different literatures. The variables studied were sociodemographic characteristics, the course of pregnancy and delivery, and neonatal parameters. The data were entered into a computer and analysed using EPI INFO software version 7.2.2.6 with the use of Chi-squared statistical tests for numbers ≥ 5 and Fisher for numbers < 5 with $\alpha = 5\%$. The significant variables were of value less than $p < 0.05$. Descriptive statistics were used to describe the characteristics of the study respondents by using means and standard deviations for numerical variables, frequencies along with percentages for categorical variables and table.

3. Results

Prevalence: During the study period, we performed 20,958 deliveries and recorded 241 cases of eclampsia, giving a prevalence rate of 1.14.

Sociodemographic characteristics: The ages of the participants ranged from 13 to 47 years with a mean age $\pm$ SD of 22 ± 7 years. The age group ≤ 19 years represented 45.64% of participants. Housewives accounted for 46.47%, and single women accounted for 54.77% of participants. The average parity $\pm$ SD was 1 ± 1.6 with range of 0 to 10. Nulliparous women accounted for half of those surveyed (49.8%). Evacuated patients represented 74.27% of our study population. The sociodemographic characteristics of the patients are detailed in Table 1.

Variables related to clinical aspects: With regard to pregnancy monitoring, patients who had not undergone the minimum number of ANCs represented 64.31% of cases. The majority of eclampsia attacks occurred antepartumin 56.84% of cases, followed by postpartum in 40% of cases. The mean gestational age $\pm$ SD was 36 ± 3.6 weeks with a range of 24 to 42 weeks. The majority of

Table 1. Sociodemographic characteristics.

Variables	Frequency	percentage
Age		
≤19 years	110	45.64
20 - 34 years	119	49.38
≥35 years	12	4.98
Activity		
House wife	112	46.47
informal sector worker	51	21.16
Student	47	19.5
Unemployed	26	10.8
Civil servant	5	2.07
Marital status		
Single	132	54.77
Married	109	45.23
Parity		
Nulliparous (0)	120	49.8
Primiparous (1)	75	31.12
Pauciparous (2 - 3)	23	9.54
Multiparous (4 - 5)	14	5.81
Grand multiparous ≥ 6	9	3.73
Mode of admission		
Evacuated	179	74.27
Referred	34	14.11
Brought by parents	28	11.62

seizures (62.2%) occurred after 36 weeks of gestation. The route of delivery was an emergency caesarean section in 64.7% of cases, and the main indication for caesarean section was eclampsia in 60% of cases. The majority of patients (61%) came from towns near Bouaké.

Variables related to maternal prognosis: During the study period, there were 19 maternal deaths, representing a case-fatality rate of 7.88%. The factors significantly associated with maternal mortality due to eclampsia were evacuation and parity of less than 3 (Table 2). Maternal morbidity due to eclampsia remained high in our study, at 16.6%. It was dominated by HELLP syndrome in 45% of cases, followed by persistent coma in 20% and haematological complications in 10%.

Variables related to neonatal prognosis: During the study period, neonatal case fatality was 18.95%. The factor associated with neonatal death in eclampsia was prematurity (Table 3). The Apgar score was poor (less than 7) at the first

Table 2. Distribution according to factors associated with maternal lethality.

	Dead n (%)	Alive n (%)	p
Mode of admission			
Evacuated/Referred	12 (63.16)	190 (85.59)	**0.01**
Brought in by parents	7 (36.84)	32 (14.41)	
Total	19 (100)	222 (100)	
Parity			
≤3	13 (68.42)	205 (92.34)	**0.001**
>3	6 (31.58)	17 (7.66)	
Total	19 (100)	222 (100)	
Prenatal care			
<4	10 (52.63)	144 (64.86)	0.286
≥4	9 (47.37)	78 (35.14)	
Total	19 (100)	222 (100)	
Gestational age			
<35	5 (26.32)	43 (19.37)	0.467
≥35	14 (73.68)	179 (80.63)	
Total	19 (100)	222 (100)	
Mode of delivery			
Caesarean section	11 (57.89)	141 (63.51)	0.674
Vaginal delivery	8 (42.11)	81 (36.49)	
Total	19 (100)	222 (100)	

minute in 73.03% and at the fifth minute in 63.5%. Sixty-five percent of newborns were transferred to the neonatal unit.

4. Discussion

4.1. Prevalence

The prevalence of eclampsia observed in our study was 1.14%. This prevalence is higher than that observed by Vousden *et al.* in their study conducted in Uganda in 2019, which was 0.3% [7]. This is similar to that of Abdoul Aziz Diouf *et al.* in Senegal, who found a prevalence of 1.75% [4], but lower than that of Horo *et al.* in Abidjan, who found a prevalence of 3.4% [8]. The high prevalence in our study can be explained by the fact that it was conducted in a referral centre that receives all cases of complicated pregnancy. The patients evacuated represented 74.27% of our study. In addition, the low rate of ANC coverage observed inwomen with eclampsiacould explain this prevalence. In our study, 64.31% of these women had fewer than or equal to 3ANCs, including 3.73% who had not undergone ANC. It has been clearly established in the literature that good-quality ANC improves maternal health by reducing the risk of anaemia, pregnancy-induced hypertensive disorders and preterm labour and improves the prognosis of the pregnancy.

Table 3. Distribution according to factors associated with neonatal lethality.

	Dead n (%)	Alive n (%)	p
Mode of admission			
Evacuated/Referred	34 (85)	168 (83.58)	0.824
Brought in by parents	6 (15)	33 (16.42)	
Total	40 (100)	201 (100)	
Parity			
≤3	33 (82.5)	185 (92.04)	0.06
>3	7 (17.5)	16 (7966)	
Total	40 (100)	201 (100)	
Gestational age			
<34	9 (22.5)	19 (9.45)	**0.02**
≥34	31 (77.5)	182 (90.55)	
Total	40 (100)	201 (100)	
Delivery mode			
Cesarean section	24 (60)	128 (63.68)	0.890
Vaginal delivery	16 (40)	73 (36.32)	
Total	40 (100)	201 (100)	
Birth weight			
<2500 g	26 (65)	87 (43.28)	**0.02**
≥2500 g	14 (35)	114 (56.72)	
Total	40 (100)	201	

4.2. Clinical and Epidemiological Characteristics

The mean age of the population was 22 ± 7 years (range from 13 to 47 years). The age group ≤ 19 years represented 45.64%. These results are consistent with previous epidemiological data in the literature. Several studies carried out in different countries have confirmed our observation, in particular those reported by Koffi and Bonkoungou [9] [10]. For parity, 49.8% of the women in our study were nulliparous. The occurrence of eclampsia in young nulliparous women is linked to certain factors, such as the failure of the maternal body to adapt to haemodynamic and renal changes and uterine hypoplasia, which is common in young pregnant women. During the study, 97.93% of patients had a low socioeconomic level. This observation had already been made by several studies in Africa, notably that of Bohoussou M. [11] on maternal mortality in Abidjan and Chalumeau M. [12] on maternal health in French-speaking Africa. Nevertheless, we believe that the lack of financial resources may indirectly influence the increase in the percentage of unrecognized preeclampsia, and then eclampsia, by creating the conditions for poor pregnancy monitoring associated with a weakened body. The 3rd edition of the Demographic and Health Survey (EDS) in the Ivory Coast [13] showed that 46.9% of women were single, compared with 27.2% who were married. The same observation was made in our study, which

found that 54.77% of women were single.

Seizures occurred in both the antepartum (56.84%) and postpartum (40%) periods. Coulibaly KT *et al.* [14] and Samake *et al.* [15] found a predominance in the antepartum period (59.4% and 69%, respectively). Our results can be explained by the fact that the seizures that occurred most frequently in theante and postpartum periods are linked to the non-availability of magnesium sulfate for almost the entire duration of our study. Gestational age greater than 36 weeks accounted for 62.2% of our respondents, which corroborates the data in the literature. This trend was similar to those reported by Mamadou Ibrahima Kampo *et al.* in Senegal and Abdoul Aziz Diouf, who found 57% and 59.7%, respectively [4] [16]. These results can be explained by the fact that eclampsia most often occurs at the end of pregnancy, with a better fetal prognosis if the fetus is extracted quickly. The preferred mode of delivery in our study was caesarean section, with a percentage of approximately 64.7%. Our results are similar to those of Mamadou Ibrahima Kampo *et al.* and Abdoul Aziz Diouf *et al.*, who found 77.6% and 54.8%, respectively [4] [16]. The high caesarean section rate in our series could be explained by the fact that the majority of patients were at term and had convulsed in the antepartum period, and rapid extraction is an integral part of the treatment of eclampsia. In addition, delayed uterine evacuation is accompanied by complications that can jeopardize the mother's prognosis, which are difficult to manage due to our inadequate technical facilities.

4.3. Variables Related to Maternal-Foetal Prognosis

Maternal lethality varies between 14% and 15.8% in developing countries [17]. In the studies by Mamadou Ibrahim Kampo *et al.* and Tchaou *et al.*, 4.3% and 11.1%, respectively, died [16] [18]. Our case fatality rate (7.88%) is similar to that of African studies. This high case-fatality rate could be explained by the seriousness of complications such as HELLP syndrome (45%), which makes patient management difficult by clouding the prognosis and delaying admission. In addition, the delay in management and the delay in starting treatment are influenced by the late purchase of medicines by parents and the inadequacy of the technical facilities in intensive care. The factors associated with maternal lethality were parity of less than 3 and evacuation. However, Mamadou Ibrahima Kampo *et al.* did not find a statistically significant association between maternal lethality and parity and mode of admission but rather with the Glasgow score ≤ 8 on admission [16]. The most frequent complication was HELLP syndrome (45%). As reported in the literature, HELLP syndrome is a complication of pregnancy affecting 2% - 30% of women with preeclampsia [17].

The neonatal case fatality rate was high in our study at 18.95%. This corroborates the data in the literature, which mentions that the foetal outcome was less favourable than the maternal outcome. This was the case in the series by Beye *et al.*, who reported 42.8% [19]. The same result was observed in the study of Mamadou Ibrahima Kampo *et al.*, with a percentage of 21.5% [16]. In our study, we

noted a statistically significant association between neonatal lethality and prematurity. The same observation was made in the study by Abdoul Aziz Diallo *et al*. [4], who found a statistically significant association between lethality and prematurity.

5. Conclusion

Eclampsia is a serious and highly fatal condition for both the mother and foetus. It is most often the result of poor pregnancy management. We need to detect and manage preeclampsia early and effectively to reduce the frequency of eclampsia and improve its maternal-foetal prognosis in our context.

Authors' Contributions

All authors have read and approved the final version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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List of Abbreviations

WHO: World Health Organization, PE: Preeclampsia, MICS: Multiple Indicator Cluster Survey, ANC: Antenatal Consultation, HELLP: Hemolysis, Elevated Liver enzymes, Low Platelets.