

# Pattern and determinants of mortality among eclamptic women that presented in the Federal Teaching Hospital Abakaliki, Southeast, Nigeria

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## ABSTRACT

**Background:** Eclampsia is a life-threatening obstetric emergency and one of the major causes of preventable maternal and perinatal mortality worldwide. Some women suffered eclampsia and died, while some live to tell their stories; what determines who dies?

**Aims:** To determine the pattern and determinants of mortality among eclamptic women in our institution.

**Materials and Methods:** This was a 5-year retrospective study of eclampsia managed between 1<sup>st</sup> January 2012 and 31<sup>st</sup> December 2016.

**Results:** From this study, the incidence of eclampsia was 13.3 per 1000 deliveries and it contributes 21.1% of the maternal death and fetal case fatality rate of 30.2%. Women between the age range of 20–24 years accounted for majority (33.3%) of cases of eclampsia. The modal parity was Para 0 (50%) and most (89.6%) were unbooked. Antepartum eclampsia (53.1%) was the commonest form of eclampsia. Vaginal delivery was the commonest route of delivery. The determinants of maternal death were late presentation (>24 hours) ( $\chi^2 = 15.37$ ,  $P < 0.001$ ), unconsciousness ( $\chi^2 = 7.35$ ,  $P < 0.01$ ), severe blood pressure ( $\chi^2 = 8.42$ ,  $P < 0.01$ ), and fetal death ( $\chi^2 = 8.71$ ,  $P < 0.01$ ), while antepartum eclampsia ( $\chi^2 = 6.23$ ,  $P = 0.04$ ), late presentation (>24 hours) ( $\chi^2 = 16.76$ ,  $P < 0.001$ ), vaginal delivery ( $\chi^2 = 4.82$ ,  $P = 0.03$ ), and maternal death ( $\chi^2 = 12.00$ ,  $P < 0.001$ ) were determinants of fetal demise.

**Conclusion:** Eclampsia is still a huge burden in our environment affecting maternal and perinatal morbidity and mortality profile. Early presentation and adequate treatment can help to reduce the incidence of this preventable obstetric disaster in our environment.

**Key words:** Determinants; eclampsia; maternal mortality; perinatal mortality.

## Introduction

Eclampsia is a life-threatening obstetric emergency.<sup>[1-15]</sup> Eclampsia refers to the occurrence of at least one episode of generalized tonic-clonic seizure in a patient with severe preeclampsia provided that other neurologic conditions have been excluded.<sup>[1-10]</sup>

It is estimated that every year eclampsia is associated with about 50,000 maternal deaths worldwide contributing about 15% of


maternal mortality.<sup>[3]</sup> In our institution, preeclampsia/eclampsia account for 6.1% of maternal death.<sup>[4]</sup> Perinatal mortality due to eclampsia is reported to be 5%–11% in developed countries, whereas it is as high as 40% in developing countries.<sup>[5]</sup>

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In developed world, the incidence of eclampsia is on declining trend due to availability of health care facilities to all pregnant women, whereas in developing countries universal provision of antenatal care is still lacking. Provision of timely and effective care to the women diagnosed with preeclampsia and eclampsia is important for avoiding the majority of morbidity and mortality caused by this disorder.<sup>[6-20]</sup>

Some women suffered eclampsia and died, while some live to tell their stories; what determines who dies? Hence, there lies the importance of continued efforts in reviewing and analyzing factors affecting the fetomaternal outcome of eclamptic patients in our environment.

This study was undertaken to determine the pattern and determinants of mortality among eclamptic women who presented in our hospital.

## Materials and Methods

This was a 5-year retrospective study undertaken between 1<sup>st</sup> January 2012 and 31<sup>st</sup> December 2016 in our hospital. It receives referral from all parts of the state and neighboring states of Benue, Enugu, Cross River and Abia as well as any part of the country.

Eclampsia in this study was defined as convulsion in the presence of hypertension and significant proteinuria (2+ using dipstick). The hospital number of women that had eclampsia during the study period was retrieved from the admission register in the Accident and Emergency department and intensive care unit. Then, the case notes were retrieved from the Medical Records Department of the hospital using the hospital numbers. A proforma containing information on the age, parity, gestational age, booking status, time interval between onset of fit and hospital presentation, type of eclampsia, number of fits, level of consciousness, severity of blood pressure, route of delivery, fetal and maternal death was used to extract information from the case notes. These were compared between those that survived and those that died. The statistical analysis was done using Epi info version 7.1.5, March 2015 (CDC, Atlanta, Georgia, USA). *P* value <0.05 was considered significant. The approval for the study was sought for and obtained from the Research and Ethical Committee of the hospital.

## Results

There were 129 eclamptic patients admitted during the period under review and 96 case notes were available for analysis (case note retrieval rate of 74.4%). There were 9675 deliveries during the same period, giving an incidence of 13.3 per 1000

deliveries (1.3%). There were 114 maternal deaths during the study period and eclampsia accounted for 24 maternal deaths among them, thus contributing 21.1% of the maternal death and a case fatality rate of 18.6%. Eclampsia accounted for 29 perinatal deaths (fetal case fatality rate of 30.2%). Among them, 15 were stillbirth, 5 were early neonatal death, and 9 were not delivered.

The age of the patients ranged from 15 to 45 years with a mean age of 24.1 (2.6) years. Women who were between the age range of 20–24 years accounted for majority (33.3%) of cases of eclampsia, followed by teenagers ( $\leq 19$  years) and elderly gravidas ( $\geq 35$  years) who accounted 28.1% and 17.9%, respectively [Table 1]. The modal parity was Para 0 (50%), while the grand multipara was the least group (7.3%) involved [Table 1]. Although eclampsia is primarily a disease of primigravidae, there was no significant association between parity and maternal ( $\chi^2 = 1.51, P = 0.22, OR = 1.9, 95\% CI = 0.68-5.32$ ), and fetal ( $\chi^2 = 0.07, P = 0.79, OR = 1.15, 95\% CI = 0.42-3.15$ ) outcome when nulliparous women were compared with multiparas. Majority (89.6%) of eclamptic women were unbooked [Table 2].

**Table 1: Age distribution of eclamptic women compared with noneclamptic deliveries over the study period**

Age (years)	Eclamptics (%)	Noneclamptics (%)
15-19	27 (28.1)	480 (4.9)
20-24	32 (33.3)	2620 (27.1)
25-25	12 (12.5)	2796 (28.9)
30-34	4 (4.2)	1844 (19.1)
$\geq 35$	21 (17.9)	1935 (20.0)
Total	96 (100)	9675 (100)

**Table 2: Sociodemographic and clinical characteristics of eclamptic women**

Characteristics	Frequency (%)
Parity	
Nulliparous	48 (50)
Para 1-4	41 (42.7)
$\geq$ Para 5	7 (7.3)
Booking status	
Booked	10 (10.4)
Unbooked	86 (89.6)
Consciousness level	
Conscious	42 (43.8)
Unconscious	54 (56.2)
Convulsion episodes	
Single	5 (5.2)
Multiple	91 (94.8)
Blood pressure range	
Severe	74 (77.1)
Mild	22 (22.9)
Type of eclampsia	
Antepartum	51 (53.1)
Intrapartum	21 (21.9)
Postpartum	24 (25)
Route of delivery	
Vaginal	56 (58.3)
Cesarean section	29 (30.2)
Died undelivered	9 (11.5)

A total of 54 (56.2%) eclamptic women presented with loss of consciousness and unconscious state was associated with poor maternal outcome ( $\chi^2 = 7.35$ ,  $P < 0.01$ , OR = 3.97, 95% CI = 1.41–11.17) [Table 3]. There was no statistically significant association between level of consciousness and fetal outcome ( $\chi^2 = 0.65$ ,  $P = 0.42$ , OR = 1.45, 95% CI = 0.59–3.57). And 91 (94.8%) patients presented with multiple episodes of seizure, while 5 (5.2%) had single episode of seizure prior to presentation. Also, 74 (77.1%) patients had blood pressure at the severe range, while 22 (22.9%) women had blood pressure at mild range. Blood pressure at severe range was associated with adverse maternal outcome in this study ( $\chi^2 = 8.42$ ,  $P < 0.001$ , OR = 4.43, 95% CI = 1.55–12.67). However, there was no statistically significant association between blood pressure range and fetal outcome ( $\chi^2 = 3.31$ ,  $P = 0.07$ , OR = 2.56, 95% CI = 0.91–7.22). And 66 (68.8%) women presented within 12 hours of onset of seizure, while 16 (16.7%) patients presented after 24 hours of onset of seizure. The interval between onset of seizure and presentation to the hospital was associated with statistically

significant adverse maternal and fetal outcome. Women who arrived hospital after 24 hours of onset of seizure when compared with those that presented within 12 hours of onset seizure had poor maternal ( $\chi^2 = 11.62$ ,  $P < 0.001$ , OR = 6.79, 95% CI = 2.09–22.11) and fetal ( $\chi^2 = 16.67$ ,  $P < 0.001$ , OR = 8.78, 95% CI = 2.85–27.06) outcome.

Majority of the women had antepartum eclampsia (53.1%), followed by postpartum eclampsia (25%) and intrapartum eclampsia (21.9%) [Table 2]. Antepartum eclampsia when compared with intrapartum and postpartum eclampsia was associated with poorer maternal outcome. However, this association was not statistically significant ( $\chi^2 = 2.07$ ,  $P = 0.15$ , OR = 0.41, 95% CI = 0.12–1.41 and  $\chi^2 = 1.82$ ,  $P = 0.18$ , OR = 0.43, 95% CI = 0.45–10.94, respectively). There was a statistically significant association between antepartum eclampsia and adverse perinatal outcome when compared with postpartum eclampsia ( $\chi^2 = 4.41$ ,  $P = 0.04$ , OR = 0.29, 95% CI = 0.09–0.96) but not with intrapartum eclampsia ( $\chi^2 = 3.21$ ,  $P = 0.07$ , OR = 0.34, 95% CI = 0.10–1.14) [Table 3].

**Table 3: Determinants of maternal death**

Characteristics	Frequency		P	$\chi^2$	OR	95% CI
	Dead	Alive				
Maternal age						
<30 years	18	58	0.56	0.20	1.38	0.46-4.12
≥30 years	6	14				
Parity						
Nullipara	10	38	0.44	1.63	0.32	0.12-0.89
Multipara	10	20				
Primipara	4	14				
Gestational age						
Preterm	6	27	0.26	1.25	1.80	0.64-5.09
Term	18	45				
Blood pressure range						
Severe	14	62	0.001	8.42	4.43	1.55-12.67
Mild	10	10				
Seizure episode						
Single	1	4	0.79	0.07	1.35	0.14-12.73
Multiple	23	64	0.01	7.35	3.97	1.41-11.17
Level of consciousness						
Conscious	6	41	0.001	15.37	3.44	1.04-4.32
Unconscious	18	31	0.48	0.51	1.52	0.48-4.78
Duration of illness						
<12 h	13	53	0.22	3.08	3.01	0.32-0.12
12-24 h	1	13				
>24 h	10	6				
Route of delivery						
Vaginal	9	50	0.01	8.71	0.24	0.09-0.64
Cesarean section	6	22				
Fit-delivery interval						
<12 h	4	19	0.21	3.13	1.05	0.10-2.12
12-24 h	6	21				
>24 h	1	12				
Fetal demise						
Yes	13	16	0.15	2.07	0.41	0.12-1.41
No	11	56				
Type of eclampsia						
Antepartum	16	33				
Intrapartum	4	20	0.18	1.82	0.43	0.12-1.49
Postpartum	4	19				

The commonest mode of delivery was vaginal delivery (58.3%) followed by caesarean section (30.2%). Nine (11.5%) women suffered mortality before delivery could be accomplished. The route of delivery was not a determinant of maternal death ( $\chi^2 = 0.51$ ,  $P = 0.51$ , OR = 1.52, 95% CI = 0.48–4.78). Conversely, there was statistically significant association between vaginal delivery and perinatal demise ( $\chi^2 = 4.82$ ,  $P = 0.03$ , OR = 1.45, 95% CI = 0.59–3.59) [Table 4].

Fit-delivery interval was not a determinant of maternal and perinatal outcome. There was no significant statistical difference in maternal outcome between women that delivered within 12 hours of onset of convulsion and those that delivered within 12–24 hours of onset of convulsion ( $\chi^2 = 0.18$ ,  $P = 0.07$ , OR = 1.36, 95% CI = 0.33–5.55). Similarly, perinatal outcome was worse among women delivered within 12–24 hour of onset of seizure. This association was not statistically significant when compared with those that delivered within 12 hours of onset of seizure ( $\chi^2 = 3.17$ ,  $P = 0.08$ , OR = 3.3, 95% CI = 0.86–12.71) [Table 4].

Maternal and perinatal death had adverse outcome on each other. Maternal death is a determinant of perinatal death and vice versa ( $\chi^2 = 12.00$ ,  $P < 0.001$ , OR = 0.19, 95% CI = 0.07–0.51 and  $\chi^2 = 8.71$ ,  $P < 0.01$ , OR = 0.24, 95% CI = 0.09–0.64, respectively).

## Discussion

The incidence of eclampsia from this study was 13.3 per 1000 deliveries (1.3%). This is comparable with the incidence

**Table 4: Determinants of perinatal death**

Characteristics	Frequency		P	$\chi^2$	OR	95% CI
	Dead	Alive				
Maternal age						
<30 years	22	53	0.72	0.13	1.20	0.43-3.39
≥30 years	7	14				
Parity						
Nullipara	14	34	0.96	0.08	1.30	0.61-1.37
Multipara	9	19				
Primipara						
Gestational age	6	14	0.11	2.56	0.49	0.20-1.18
Preterm	15	23				
Term	14	14				
Blood pressure range						
Severe	20	57	0.07	3.31	2.57	0.91-7.22
Mild	9	10				
Seizure episode						
Single	2	4	0.86	0.03	0.86	0.15-4.96
Multiple	27	63				
Level of consciousness						
Conscious	10	29	0.42	0.65	1.45	0.59-3.59
Unconscious	19	38	0.001	16.76	1.34	0.43-7.90
Duration of illness						
<12 h	11	52	0.03	4.82	0.25	0.07-0.92
12-24 h	5	8				
>24 h	13	7				
Route of delivery						
Vaginal	17	39	0.15	3.79	0.32	0.12-0.86
Cesarean section	3	28				
Fit-delivery interval						
<12 h	4	22	0.22	3.11	0.45	1.12-4.32
12-24 h	9	15				
>24 h	2	10				
Maternal demise						
Yes	14	10	0.91	0.01	1.10	0.17-7.03
No	15	57				
Type of eclampsia						
Antepartum	21	30	0.001	12.0	0.91	0.07-0.51
Intrapartum	4	17	0.04	6.24	0.56	0.45-52
Postpartum	4	20				

of 1.9% reported from Ibadan,<sup>[7]</sup> and 1.3% from India,<sup>[8]</sup> but lower than 5% reported in Kano.<sup>[15]</sup> This incidence of eclampsia is much higher than that of developed countries like the United Kingdom where eclampsia complicates only 0.05% of total deliveries.<sup>[11]</sup> This study further confirmed that eclampsia, though less common in developed countries, is still a huge burden in our environment influencing maternal morbidity and mortality profiles.

In this study, eclampsia accounted for 21.1% of maternal death and all were unbooked. This findings is similar to 28.5% from a study in Kano<sup>[15]</sup> and 29.4% reported in Sokoto.<sup>[2]</sup> However, it is higher than the finding (6.1%) from previous study done in this environment.<sup>[4]</sup> This is because previous study was done in defunct teaching hospital when two tertiary hospital were existing in the state. Currently, the hospital is the only tertiary hospital in the state and it receives referral from within the state and the neighboring states. This could account for high maternal mortality recorded in this study. In addition, high maternal mortality

recorded in this study could also be linked to factors, such as poor health seeking behavior, low socioeconomic status, lack of utilization of antenatal services, poor health care infrastructure especially in the rural areas where many women reside, and delay in hospitalization.

The perinatal case fatality in this study was 30.2%. This is similar to 21.9% reported in India,<sup>[12]</sup> but higher than 13.2% from Kano,<sup>[9]</sup> and 19.5% from Benin.<sup>[7]</sup> The high perinatal mortality recorded in this study was due to preterm delivery, intrauterine growth restriction, and birth asphyxia.

The age and parity distribution in this study were similar to the study findings in Sokoto<sup>[2]</sup> and Maiduguri.<sup>[10]</sup> However, there was no statistically significant association between parity and fetomaternal outcome in this study. This is in contrast to the findings in Sokoto where maternal death was significantly more among the multiparous women with eclampsia than the primigravidae.<sup>[2]</sup> This was probably because the multiparous women were older and might had other underlying medical conditions.

A total of 16 (16.7%) women had delayed presentation (presentation after 24 hours of onset of seizure) in this study. This finding was higher than 8.2% reported in Kano,<sup>[9]</sup> but lower than 56% reported from Birnin Kudu.<sup>[2]</sup> Late presentation was associated with statistically significant poor maternal and fetal outcome in this study. Also from the findings of this study, 54 (56.2%) of women presented with loss of consciousness. Loss of consciousness following eclamptic fits was associated with statistically significant adverse maternal outcome but not with poor fetal outcome. Therefore, early referral and timely and effective management of eclamptic women is necessary to reduce maternal morbidity and mortality associated with the condition.

From this study, majority of women (77.1%) presented with blood pressure at severe range and antepartum eclampsia (53.1%) was the commonest type of eclampsia noted. These findings were similar to findings from study done in India,<sup>[12]</sup> Sokoto,<sup>[2]</sup> and Kano,<sup>[9]</sup> In this study, severe blood pressure was associated with significant poor maternal outcome but not with fetal outcome. In contrast, antepartum eclampsia was associated with significant adverse fetal outcome when compared with intrapartum and postpartum eclampsia. There was no statistically significant difference between maternal outcome and type of eclampsia. This emphasizes the importance of effective antenatal care, especially at primary health centers, where early onset preeclampsia will be detected and managed

appropriately, so that these women do not go on and develop eclampsia.

Vaginal delivery (58.3%) was the commonest route of delivery of eclamptic parturients in this study. This is similar to the findings in Sokoto,<sup>[2]</sup> and Kano.<sup>[9]</sup> This is because most of our patients had cervical ripening with misoprostol while undergoing resuscitation and stabilization, and many progress satisfactorily and had spontaneous vaginal delivery. There was no significant relationship between maternal mortality and mode of delivery as such; it is worth trying vaginal delivery by induction of labor using misoprostol than to rush for cesarean section. This will also reduce our cesarean section rate. In contrast, fetal outcome in terms of survival is made worse with vaginal delivery. The unfavorable outcome with vaginal delivery may be explained by the fact that most of these fetuses might have had intrauterine hypoxia prior to delivery. Therefore, the route of delivery should be individualized and should be balanced between the surgical risks associated with eclampsia against poor fetal outcome associated with vaginal delivery in order to optimize maternal and fetal outcome.

Fit-delivery interval of up to 12 hours was associated with good maternal and fetal outcome in this study. The findings of this study suggest that the maternal and fetal outcome worsen when fit-delivery interval was more than 12 hours. However, when parturients with fit-delivery interval of up to 12 hours were compared with those of more than 12 hours, there was no statistically significant difference in maternal and fetal outcome. This finding was similar to the findings of study done in Kano<sup>[9]</sup> and India.<sup>[14]</sup> Therefore, prompt delivery of eclamptic women via most expeditious route after resuscitation and stabilization can improve both maternal and fetal outcomes as the definitive treatment is the delivery of the placenta.

Maternal and fetal death negatively affected each other in this study. When there is fetal demise, there is statistically significant risk of maternal death and vice-versa; and this may be due to the severity of the disease that may affect both of them.

This study has several limitations. First, hospital-based approach includes only women that reach hospital but many women and neonates die in rural areas without reaching health facility so community-based studies are a better tool for exploring mortality rates. Second, due to lack of follow up after discharge, the data on neonatal morbidity and mortality as well as maternal outcome for the rest of the puerperium were not available for analysis and finally retrospective nature of study limits its validity.

## Conclusion

Eclampsia was associated with high maternal and perinatal morbidity and mortality in our environment. Enlightenment of the public on the importance of antenatal care during pregnancy, good antenatal care, early diagnosis of preeclampsia with prompt treatment, and timely referral to hospital and delivery of eclamptic patients can help to reduce the incidence of this preventable obstetric disaster in our environment.

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## Conflicts of interest

There are no conflicts of interest.

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