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Abstract

Background

Eclampsia, considered a serious complication of preeclampsia, remains a life-threatening condition among pregnant women. It accounts for 12% of maternal deaths and 16–31% of perinatal deaths worldwide. Most deaths from eclampsia occurred in resource-limited settings of sub-Saharan Africa. This study was performed to determine the optimum mode of delivery, as well as factors associated with the mode of delivery, in women admitted with eclampsia at Riley Mother and Baby Hospital.

Methods

This was a hospital-based longitudinal case-series study conducted at the largest and busiest obstetric unit of the tertiary hospital of western Kenya. Maternal and perinatal variables, such as age, parity, medications, initiation of labour, mode of delivery, admission to the intensive care unit, admission to the newborn care unit, organ injuries, and mortality, were analysed using the Statistical Package for the Social Sciences software version 20.0. Quantitative data were described using frequencies and percentages. The significance of the obtained results was judged at the 5% level. The chi-square test was used for categorical variables, and Fisher's exact test or the Monte Carlo correction was used for correction of the chi-square test when more than 20% of the cells had an expected count of less than 5.

Results

During the study period, 53 patients diagnosed with eclampsia were treated and followed up to 6 weeks postpartum. There was zero maternal mortality; however, perinatal mortality was reported in 9.4%. Parity was statistically associated with an increased odds of adverse perinatal outcomes ($p = 0.004$, OR = 9.1, 95% CI = 2.0-40.8) and caesarean delivery ($p = 0.020$, OR = 4.7, 95% CI = 1.3–17.1). In addition, the induction of labour decreased the risk of adverse outcomes ($p = 0.232$, OR = 0.3, 95% CI = 0.1-2.0).

Conclusion

There is no benefit of emergency caesarean section for women with eclampsia. Instead, it increases the risk of perinatal adverse outcomes, including the risk of admission to the newborn unit and perinatal death.

Background

Eclampsia is among the most common causes of maternal and perinatal mortality and morbidities. It refers to the occurrence of one or more seizures and/or unexplained coma before, during and after birth irrespective of one's history of hypertensive disorders, including preeclampsia [1–3]. The condition has

been recognized and described for years despite the general lack of understanding of the aetiology of the disease. To date, eclampsia is considered a complication of severe preeclampsia because the majority of affected pregnant women (approximately 84%) have hypertensive disorders, and 16% of them have normal blood pressures [3]. In low- and middle-income countries (LMICs), sub-Saharan Africa included nearly 17.9% of women with eclampsia and other hypertensive disorder-related complications during pregnancy (stroke, coagulopathies); furthermore, eclampsia is among the leading causes of intensive care unit (ICU) admission [4, 5]. The disease has been extensively studied [1–6], and the evidence has recommended prompt delivery to reduce maternal and perinatal mortality and morbidity [6]. However, little has been done regarding the maternal and perinatal outcomes by mode of delivery in the particular context of resource-limited settings. Therefore, this study was performed to determine the mode of delivery in women with eclampsia in the largest tertiary hospital of western Kenya.

Methods

This was a hospital-based longitudinal case-series study, which consecutively recruited pregnant and postpartum women diagnosed with eclampsia in a one-year period. The inclusion criteria were one or more convulsions and/or unexplained loss of consciousness in pregnant and postpartum mothers with a negative malaria test and no previous history of convulsive disorders prior to pregnancy. Other conditions, such as meningitis, hypoglycaemic coma and/or alcoholic coma, which could confuse the diagnosis of eclampsia, were ruled out through the patients' history, physical examination and laboratory investigations. Proteinuria and elevated blood pressure were not diagnostic criteria for eclampsia.

Data

The patients with a confirmed diagnosis of eclampsia were interviewed. Data on maternal demographics, clinical characteristics, outcomes and neonatal outcomes were collected. Maternal demographic and clinical characteristics included maternal age, education level, marital status, occupation, geographic residence location, health insurance coverage, parity, comorbidity (diabetes mellitus, chronic hypertension, hyperthyroid disease, renal disease, coagulopathy, human immunodeficiency virus/acquired immunodeficiency syndrome, venous thromboembolism, anaemia, malnutrition, and mental illness), and treatment prior to or during pregnancy. Additionally, other variables collected included symptoms of the disease (convulsion, epigastric pain, dyspnoea, coma, palpitation, lower limb oedema, headache, blurred vision), elevated blood pressure, medications and obstetric data (gestational age by last menstrual period, parity, history of pregnancy loss, previous history of eclampsia or preeclampsia, antenatal care attendance and facility attended, mode of admission, mode of delivery, caesarean section, indication of caesarean section, initiation of labour). Induction of labour was defined as the process of artificially stimulating the uterus to start labour.

Maternal outcomes of interest included the occurrence of ≥ 1 of the following: stroke, acute kidney injuries, HELLP syndrome, ICU admission, and mortality or recovery within 6 weeks postdelivery. Perinatal outcomes of interest were defined by the occurrence ≥ 1 of the following: stillbirths (fresh or macerated),

Apgar score < 7 at five minutes, newborn unit (NBU) admission, and mortality or recovery within 7 days following delivery.

The mode of delivery was defined as the dependent variable. The primary outcome was defined by the occurrence of ≥ 1 adverse maternal and perinatal outcomes indicated above. The secondary outcome was defined by recovery or persistence of maternal complications 6 weeks postdelivery and 7 days following birth for newborns.

Data analysis

The data were analysed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Categorical data are described as frequencies and percentages, while continuous data are described as ranges, means, standard deviations and medians. The Kolmogorov-Smirnov test was used to verify the normality of the distribution of quantitative data. The significance of the obtained results was judged at the 5% level. The chi-square test was used for categorical variables to compare differences between groups based on their outcomes. Fisher's exact test was used for the chi-square analysis when more than 20% of the cells had an expected count of less than 5. The odds ratio and 95% confidence interval (CI) for maternal adverse outcomes were calculated using logistic regression.

Results

During the study period (June 2019 to June 2020), 53 pregnant and postpartum women were admitted with a diagnosis of eclampsia. Maternal socio-demographics can be seen in Supplementary Table 1.1, and clinical characteristics can be seen in Supplementary Table 1.2. Supplementary Table 1.3 represents the management of mothers admitted with eclampsia during the study period.

Maternal and perinatal outcomes. Table 1 represents maternal and perinatal outcomes. There was no maternal death; however, 5.7% of mothers were admitted to the ICU. Additionally, 20.8% of patients had haemolysis, elevated liver enzyme, low platelet (HELLP) syndrome; 15.1% others had acute kidney injury (AKI); and 1.9% developed stroke (Table...). Regarding perinatal outcomes, 34.0% of newborns were admitted to the newborn unit (NBU). Mortality was reported in 9.4% of cases, and 7.5% were fresh stillbirths. The majority of newborns (73.6%) were born with a good Apgar score of >7 at 5 minutes, whereas only 20.8% of newborns had an Apgar score <7 at 5 minutes.

The socio-demographic and clinical characteristics were analysed to determine factors that could be associated with the mode of delivery in pregnant women with eclampsia. The results reported in Table 2.1 show that socio-demographic factors, including maternal age, occupation, health insurance coverage, and geographic location of residence, were not found to be associated with the mode of delivery, even after adjustments were made for confounders. However, low maternal education level increased the odds of caesarean delivery 8-fold ($p=0.029$. 95% CI= 1.2-51.5). In addition, clinical factors such as previous history of eclampsia, symptoms of the disease, parity, history of pregnancy loss, medications, and antenatal care attendance were not significantly associated with the mode of delivery, even after

adjustments were made for confounders. In contrast, the method of the initiation of labour was statistically associated with the mode of delivery, as reported in Table 2.3. As shown in Table 2.4, maternal complications such as stroke, HELLP syndrome, and AKI were not associated with the mode of delivery.

In Table 3.1, factors such as maternal history of eclampsia, symptoms, history of pregnancy loss, and antenatal care attendance were not associated with the risk of newborn admission to the NBU, even after adjustments were made for confounders. In contrast, parity was significantly associated with the risk of newborn admission to the NBU. After adjustments were made for confounders, infants from multiparous women had 7.6-fold increased odds of being admitted to the NBU ($p=0.003$, 95% CI=2.0-28.6), whereas this risk was reduced among infants of nulliparous women ($p=0.031$, OR=0.2, 95% CI=0.1-0.9). In addition, Table 3.2 represents the risk of newborns being admitted to the NBU related to maternal use of medications during the course of the disease. However, the mode of delivery, indication of C-section, and method of labour initiation were significantly associated with the risk of admission to the NBU. Similarly, infants born through caesarean section had a 4.7-fold increase of being admitted to the NBU ($p=0.020$, 95% CI=1.3-17.1). Eclampsia as an indication of C-section increased the risk of admission to the NBU 4.3-fold ($p=0.031$, 95% CI=1.1-16.1). Additionally, the spontaneous onset of labour was associated with a slightly decreased risk of admission to the NBU ($p=0.041$, OR=0.3, 95% CI=0.1-1), while IOL with Cytotec (prostaglandin E1, PGE1) increased the risk by 2.7 times (0.2-31.1). Finally, the multivariate logistic regression showed that parity, especially multiparity, increased the risk of perinatal adverse outcomes ($p=0.004^*$, OR=9.1, 95% CI=2.0-40.8), as shown in Table 3.4.

Discussion

The optimal mode of delivery in women with eclampsia remains controversial in the modern practice of obstetrics and gynaecology. In this study, the caesarean delivery rate was slightly higher than that of women who had normal vaginal delivery. This contrasts with the findings from the study done by Priti Kumari and colleagues, in which the rate of vaginal delivery was higher than that of caesarean delivery [7]. However, in most studies across the world, caesarean section delivery has been repeatedly reported to be higher in women with eclampsia [8-10]. The plausible explanation for the difference is that in most protocols, including ours, with respect to the management of eclampsia, it is recommended that delivery should occur within 12 hours following seizure(s), and only pregnant women admitted in the active phase of labour or with favourable Bishop scores are allowed to progress within the 12 hours if the foetal status is preserved. Additionally, the extensive use of cardiotogram (CTG) machines to monitor labour and the lack of consensus on the interpretation of the tracing have widely contributed to an increased rate of caesarean delivery [11-13]. Another aspect that could explain the increased rate of C-section delivery in eclamptic mothers is the panic attitude of midwives during seizure(s), while most of today's midwives do not agree to monitor the labour of women with eclampsia. Experience and good exposure in the field, as well as evidence-based practice of the art of obstetrics in resource-limited settings, may curve the trends of caesarean delivery among eclamptic mothers.

Socio-demographic factors such as maternal age, education level, occupation, healthcare insurance coverage, and geographic location were not significantly associated with mode of delivery. This finding contrasts with those of previous studies in which maternal age, educational level, parity, household socioeconomic status, rural residence location, and household level of education were associated with caesarean section delivery [14, 15]. However, low maternal education increased the risk of caesarean delivery among affected women. This could be due to the easy accessibility of comprehensive emergency obstetric care, including caesarean section. We also noticed that some of these patients were operated on at county hospitals and were referred for further management of persistent seizures after delivery.

Clinical factors, including symptoms of the disease, parity, history of pregnancy loss, antenatal care attendance and facility attended for ANC, mode of admission, treatment of hypertension, and medications received during seizures, were not associated with the mode of delivery. Begun N and colleagues reported similar findings [16]. This could be explained by the good patient response to treatment. Moreover, evidence recommends that the pregnant mother with eclampsia should be stabilized before making decisions regarding delivery [17]. However, the goal of stabilizing the patient with medications is not to conserve the pregnancy but to allow for better assessment and the ability to determine the optimal and safest mode of delivery within a reasonable amount of time. Thus, the method of initiation of labour was significantly associated with the mode of delivery, where induction of labour (IOL) with Cytotec alone, Foley catheter alone or a combination of the Foley catheter and Cytotec showed reduced morbidity related to caesarean delivery. Pregnant women in whom labour was initiated artificially had an unfavourable cervix (poor Bishop score). However, the duration of labour was not recorded, but the absence of emergency caesarean section delivery among those women showed that vaginal delivery was achieved within a reasonable time of 12 hours. In a randomized study conducted by Seal SL and colleagues on eclamptic patients, IOL was preferably the safest mode of delivery and did not increase the risk of caesarean section delivery [18]. Therefore, the authors of the current study recommend IOL in eclamptic mothers to achieve vaginal delivery, even with an unfavourable cervix. This has a reasonable implication and advantage in terms of cost and the prevention of primary caesarean section with good outcomes.

Regarding maternal outcomes, there was no maternal death reported in this study. This finding contrasts with previous studies conducted in a similar context of resource-limited settings of sub-Saharan Africa and other developing countries, where maternal mortality from eclampsia was higher [16–21]. This is the result of a clear and tight protocol for the management of the disease, as well as interdisciplinary care. For example, patients who were in critical condition after delivery were admitted to the ICU, where they were managed with a multidisciplinary team that included obstetricians, physicians, nephrologists, anaesthesiologists, neurologists and neurosurgeons, and trained nurses in intensive care. Such management approaches, as well as ICUs, are widely lacking in most resource-limited settings in sub-Saharan Africa. Therefore, improving maternal and newborn care in developing countries cannot be achieved on paper but rather through investment in health infrastructure and staff. Moreover, the World Health Organization is defined as a standard roadmap for improving maternal and newborn care in

health facilities [22]. Maternal complications from the disease included HELLP syndrome, acute kidney injury, and stroke, which were not associated with the mode of delivery. Given the current evidence, caesarean section delivery is discouraged with HELLP syndrome and AKI due to the risk of uncontrolled bleeding and poor elimination of anaesthetic drugs [23–26]. The incidence of these complications was also less frequent than that reported in other studies [1–5]. However, the reason for prompt delivery in eclampsia is to prevent serious maternal complications, including death. Townsend and colleagues state that the only cure for preeclampsia and eclampsia is the delivery of the placenta, while all other approaches merely serve to manage symptoms and stabilize the mother [6]. In line with this, the Riley Mother and Baby Hospital (RMBH) protocol has made “delivery” the gold standard for the management of eclampsia, regardless of gestational age and foetal status. Any attempt toward the conservative management of eclampsia is not permitted. To date, if several studies have agreed on non-conservative management and prompt delivery, controversy regarding the mode of delivery has persisted. However, in the current study, even if there was no maternal death, caesarean section delivery was not associated with better maternal outcomes in terms of morbidity and ICU admission. This is congruent with the findings of a randomized controlled study performed by Seal SL and colleagues, who found that C-section was not associated with better outcomes [18].

Maternal convulsive seizures are also dangerous for the foetus. However, perinatal outcomes and maternal clinical characteristics, especially previous history of eclampsia, symptoms of the disease, history of pregnancy loss, antenatal care attendance and facility attended for ANC, mode of admission, treatment of HTN, and medications during eclamptic seizures, were not associated with the risk of infants being admitted to the NBU. This is because eclampsia is associated with transient maternal hypoxic status, which has minimal transient effects on the foetus [17]. In settings where there is a CTG machine, the effects of maternal hypoxia on the foetus during seizures are shown by transient reduced variability and bradycardia for up to 20 minutes after maternal seizures [17]. Persistent reduced variability may be related to the effects of drugs used to control and stabilize maternal conditions and/or persistent maternal hypoxia during status eclampticus [6]. In this study, parity, mode of delivery, indication of C-section delivery, and method of initiation of labour were significantly associated with the risk of infants' admission to the NBU. Regarding parity, Melese MF and colleagues had similar findings, especially in nulliparous and multiparous patients [27, 28]. This could be related to individual factors such as the severity of the disease, drug effects, prematurity, and/or mode of delivery. In addition, caesarean section delivery increased the risk of newborns' admission to the nursery, especially those for whom the indication for C-section was eclampsia, whereas IOL significantly reduced the risk of NBU admission. C-section also slightly increased the rate of perinatal death. Indeed, several factors could have contributed to the occurrence of the observed adverse perinatal outcomes. Surgical skills during the procedure, “difficult extraction in young hands”, and the effects of anaesthesia are major contributors, among others. Therefore, caesarean section delivery is not associated with better perinatal outcomes. It should be performed for obstetric reasons.

Conclusion

Emergency caesarean section delivery offers no benefit for maternal and perinatal outcomes in women with eclampsia. Induction of labour should be performed for eclamptic mothers with unfavourable Bishop scores. Caesarean delivery should be performed for obstetric reasons other than eclampsia.

Limitations And Recommendations

This study was conducted in one tertiary hospital, and the sample size was too small to be generalized. Further study with a large sample size is needed.

Abbreviations

ANC

antenatal care

ICU

intensive care unit

IOL

induction of labour

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Research Ethical Committee of Moi Teaching and Referral Hospital-Moi University School of Medicine (IREC-MTRH-MUSOM) on 14 June 2019 under the number **FAN:0003344**. All participants signed informed consent to participate in this study.

Consent for publication

Not applicable.

Competing interests

There are no competing interests.

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Authors' contributions

K.I. and P.A. drafted the proposal; A.M. contributed to the research design; O.E., R.M, and A.M. critically polished the proposal; K.I. trained and supervised the data collection; K.I. and P.A. approved the completeness of data collection; and A.M., O.E., K.I., R.M, and P.A. validated the analysis. P.A. drafted the manuscript; O.E. critically polished the manuscript; and A.M., O.E., R.M., K.I., and P.A. validated the manuscript.

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Tables

Table 1. Maternal and perinatal outcomes

Variables	No.	%
Maternal outcome		
Postpartum haemorrhage	0	0.0
Death	0	0.0
ICU admission	3	5.7
Recovery	50	100.0
Complications		
HELLP syndrome	11	20.8
Acute kidney injury	8	15.1
Stroke	1	1.9
NBU admission		
No	35	66.0
Yes	18	34.0
Stillbirth		
NA	49	92.5
Fresh	4	7.5
Macerated	0	0.0
Score >7		
NA	3	5.7
Yes	39	73.6
NO	11	20.8
TOP <28 weeks		
NA	1	1.9
Yes	3	5.7
No	49	92.5
Perinatal death		
No	48	90.6
Yes	5	9.4

ICU: intensive care unit, NBU: newborn unit, TOP: termination of pregnancy

2. Factors associated with mode of delivery

Table 2.1. Maternal socio-demographic characteristics and mode of delivery

Variables	Mode of delivery				χ^2	P	OR	P	95%CI
	Vagina (n = 24)		Caesarean (n = 29)						
	No.	%	No.	%					
Maternal age group									
<20 years®	3	12.5	7	24.1	1.538	MC _{p=}	–	–	–
20-34 years	17	70.8	16	55.2		0.466	0.4	0.240	0.1–1.8
35-44 years	4	16.7	6	20.7			0.6	0.640	0.1–4.1
Education level									
Low education level	3	12.5	9	31.0	5.382	0.068	8.0	0.029*	1.2–51.5
Secondary	13	54.2	17	58.6			3.5	0.105	0.8–15.8
Tertiary ®	8	33.3	3	10.3			–	–	–
Marital status									
Married ®	17	70.8	13	44.8	3.616	0.057	–	–	–
Single	7	29.2	16	55.2			2.9	0.061	0.9–9.4
Health insurance									
Yes ®	13	54.2	12	41.4	0.862	0.353	–	–	–
No	11	45.8	17	58.6			1.7	0.355	0.6–4.9
Employees ®	19	79.2	22	75.9	0.082	0.775	–	–	–
Unemployed	5	20.8	7	24.1			1.2	0.775	0.3–4.4
Residence location									
Rural	21	87.5	26	89.7	0.061	FE _{p=}	1.2	0.8	0.2–6.8
Urban®	3	12.5	3	10.3		1.000	–	–	–

c²: Chi square test

MC: Monte Carlo

FE: Fisher Exact

p: p value for association between different categories

OR: Odds ratio

CI: Confidence interval LL: Lower limit UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table 2. 2. Mode of delivery and clinical characteristics

Variables	Mode of delivery				χ^2	P	OR	P	95%CI
	Vaginal (n = 24)		Caesarean (n = 29)						
	No.	%	No.	%					
History of eclampsia									
None®	23	95.8	29	100.0	1.232	FE _p =	-	-	-
Yes	1	4.2	0	0.0		0.453	0.0	1.000	0.0
Symptoms									
Epigastric pain	9	37.5	13	44.8	0.290	0.590	1.4	0.590	0.4-4.1
Coma	2	8.3	0	0.0	2.511	FE _p =0.200	0.0	0.999	0.0
Lower limbs oedema	10	41.7	8	27.6	1.161	0.281	0.5	0.284	0.2-1.7
Headache	16	66.7	18	62.1	0.121	0.728	0.8	0.7	0.3-2.5
Blurred vision	1	4.2	5	17.2	2.236	FE _p =0.204	4.8	0.167	0.5-44.2
Convulsions	20	83.3	28	96.6	2.686	FE _p =0.164	5.6	0.136	0.6-53.9
Parity									
Nulliparous	11	45.8	12	41.4	0.106	0.745	0.8	0.745	0.3-2.5
Multiparous	9	37.5	16	55.2	1.646	0.200	2.1	0.202	0.7-6.2
Grand-Multiparous	4	16.7	1	3.4	2.686	FE _p =0.164	0.2	0.136	0.0-1.7
History of preg. Loss									
No®	21	87.5	24	82.8	0.230	FE _p =	-	-	-
Yes	3	12.5	5	17.2		0.715	1.5	0.633	0.3-6.8
ANC attendance									
No®	2	8.3	2	6.9	0.039	FE _p =	-	-	-
Yes	22	91.7	27	93.1		1.000	1.2	0.844	0.2-9.4

Table 2. 3. Management

Variables	Mode of delivery				χ^2	P	OR	p	95%CI
	Vaginal (n = 24)		Caesarean (n = 29)						
	No.	%	No.	%					
Facility of ANC visit									
None®	2	8.3	2	6.9	7.510	MC _p = 0.243	–	–	–
Teaching &Referral Hosp	1	4.2	0	0.0			0.0	1.000	0.0
County referral Hosp	4	16.7	0	0.0			0.0	0.999	0.0
Sub-county Hosp	3	12.5	3	10.3			1.0	1.000	0.1– 12.6
Health centre	9	37.5	17	58.6			1.9	0.557	0.2– 15.7
Private Hosp	1	4.2	1	3.4			1.0	1.000	0.0– 29.8
Dispensary	4	16.7	6	20.7			1.5	0.733	0.1– 15.5
Mode of admission									
From home ®	12	50.0	12	41.4	0.394	FE _p = 0.587	–	–	–
Transferred	12	50.0	17	58.6			1.4	0.531	0.5– 4.2
Treatment of HTN									
No®	19	79.2	24	82.8	0.111	FE _p = 1.000	–	–	–
Yes	5	20.8	5	17.2			0.8	0.740	0.2– 3.1
Medications									
No treatment®	17	70.8	23	79.3	1.293	MC _p = 0.588	–	–	–
Anticonvulsants	3	12.5	4	13.8			0.9	0.986	0.2– 4.9
Multiples drugs	4	16.7	2	6.9			0.370	0.3	0.2– 5.7
Labour initiation									
None®	0	0.0	17	58.6	28.535*	MC _p <0.001*	–	–	–
Spontaneous	15	62.5	12	41.4			–	–	–

Cytotec	4	16.7	0	0.0	-	-	-
Foley catheter	1	4.2	0	0.0			
Foley catheter+ Cytotec	4	16.7	0	0.0			

Table 2.4. Mode of delivery and maternal outcomes

Variables	Mode of delivery				χ^2	FE _p	OR	p	95%CI
	Vaginal (n = 24)		Caesarean (n = 29)						
	No.	%	No.	%					
Maternal outcome									
ICU admission	0	0.0	3	10.3	2.632	0.242	1ex10 ⁹	0.999	0.0
Recovery	24	100.0	26	89.7	-	-	-	-	-
Complications									
Kidney injury	5	20.8	3	10.3	1.127	0.444	0.4	0.297	0.1-2.1
Stroke	0	0.0	1	3.4	0.844	1.000	0.0	1.00	0.0
HELLP syndrome	5	20.8	6	20.7	0.00	1.000	0.9	0.990	0.3-3.8

3. Factors associated with perinatal outcomes

Table 3. 1. NBU admission and maternal clinical characteristics

Variables	NBU admission				χ^2	p	OR	p	95%CI
	No (n = 35)		Yes (n = 18)						
	No.	%	No.	%					
History of eclampsia									
None®	34	97.1	18	100.0	0.524	FE _p =1.000	–	–	–
Yes	1	2.9	0	0.0			0.0	1.000	0.0
Symptoms									
Epigastric pain	15	42.9	7	38.9	0.077	0.781	0.8	0.781	0.3–2.7
Coma	2	5.7	0	0.0	1.069	FE _p =0.543	0.0	0.999	0.0
Low limbs oedema	12	34.3	6	33.3	0.005	0.945	0.9	0.945	0.3–3.2
Headache	21	60.0	13	72.2	0.772	0.380	1.7	0.382	0.5–5.9
Blurred vision	4	11.4	2	11.1	0.001	FE _p =1.000	0.9	0.972	0.2–5.9
Convulsions	31	88.6	17	94.4	0.480	FE _p =0.651	0.5	0.498	0.1–4.4
Parity									
Nulliparous	19	54.3	4	22.2	4.975*	0.026*	0.2	0.031*	0.1–0.9
Multiparous	11	31.4	14	77.8	10.247*	0.001*	7.6	0.003*	2.0–28.6
Grand-Multiparous	5	14.3	0	0.0	2.839	FE _p =0.153	0.0	0.999	0.0
History of preg. Loss									
No®	31	88.6	14	77.8	1.081	FE _p =0.421	–	–	–
Yes	4	11.4	4	22.2			0.452	0.306	0.098–2.071
ANC attendance									
No®	4	11.4	0	0.0	2.225	FE _p =0..287	–	–	–
Yes	31	88.6	18	100.0			9ex10 ⁸	0.999	0.0

ANC: antenatal care, NBU: newborn unit

Table 3. 2. NBU admission and management

Variables	NBU admission				χ^2	p	OR	p	95%CI
	No (n = 35)		Yes (n = 18)						
	No.	%	No.	%					
Facility of ANC visit									
None®	4	11.4	0	0.0	6.360	MC _p =0.354	–	–	–
Teaching &Referral Hosp	1	2.9	0	0.0			1.000	1.000	0.0
County referral Hosp	2	5.7	2	11.1			2ex10 ⁹	0.999	0.0
Sub-county Hosp	5	14.3	1	5.6			3ex10 ⁸	0.999	0.0
Health centre	14	40.0	12	66.7			1ex10 ⁹	0.999	0.0
Private Hosp	1	2.9	1	5.6			2ex10 ⁹	0.999	0.0
Dispensary	8	22.9	2	11.1			4ex10 ⁸	0.999	0.0
Mode of admission									
From home ®	15	42.9	9	50.0	0.245	0.621	–	–	–
Transferred	20	57.1	9	50.0			0.8	0.621	0.2–2.3
Treatment of HTN									
No®	28	80.0	15	83.3	0.086	FE _p =1.000	–	–	–
Yes	7	20.0	3	16.7			0.8	0.769	0.2–3.6
Medications									
No treatment®	26	74.3	14	77.8	0.216	MC _p =1.000	–	–	–
Anticonvulsants	5	14.3	2	11.1			0.7	0.741	0.1–4.3
Multiples drugs	4	11.4	2	11.1			0.9	0.936	0.2–5.7
Mode of delivery									
Vaginal®	20	57.1	4	22.2	5.850*	0.016*	–	–	–
Caesarean	15	42.9	14	77.8			4.7	0.020*	1.3–

									17.1
Indication of C-section									
N/A®	20	57.1	4	22.2	8.702*	MC _p =	-	-	-
Eclampsia	14	40.0	12	66.7		0.012*	4.3	0.031*	1.1-16.1
NRFS	0	0.0	2	11.1			0.9	8ex10 ⁹	0.0
Arrested disorders	1	2.9	0	0.0			1.000	0.0	0.0
Labour initiation									
None®	8	22.9	9	50.0	9.129*	MC _p =	-	-	-
Spontaneous	21	60.0	6	33.3		0.028*	0.3	0.041*	0.1-0.9
Cytotec	1	2.9	3	16.7			2.7	0.434	0.2-31.1
Foley catheter	1	2.9	0	0.0			0.00	1.000	0.0
Foley Catheter+ Cytotec	4	11.4	0	0.0			0.00	0.999	0.0

HTN: hypertension, C-section: caesarean section, N/A: not applicable, NRFS: non-reassuring foetal status

Table 3. 3. Mode of delivery and perinatal outcomes

Variables	Mode of delivery				χ^2	F _E p	OR	p	95%CI
	Vaginal (n = 24)		Caesarean (n = 29)						
	No.	%	No.	%					
Foetal & neonatal Death									
No ®	20	83.3	28	96.6	2.686	0.164	-	-	-
Yes	1	4.2	4	13.8			0.2	0.136	0.0-1.7

Table 3. 4. Multivariate analysis Logistic regression for NBU admission

Variables	Sig.	OR	95% CI	
			LL	UL
Parity	0.004*	9.1	2.0	40.8
Indication of C-Section	0.323	2.4	0.4	13.4
Labour initiation	0.232	0.3	0.1	2.0

LL: Lower limit

UL: Upper Limit

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