

Original Research Article

Fetomaternal outcomes in eclampsia at a tertiary care centre: a prospective observational study

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Received: 09 February 2026

Revised: 16 March 2026

Accepted: 26 March 2026

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ABSTRACT

Background: Eclampsia remains one of the most severe hypertensive disorders of pregnancy and continues to contribute substantially to maternal and perinatal morbidity and mortality, particularly in low- and middle-income countries.

Methods: This hospital-based cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care centre in Nepal from July 2024 to July 2025. All women presenting with antepartum, intrapartum, or postpartum eclampsia beyond 28 weeks of gestation and up to seven days postpartum were included. Women with chronic hypertension, epilepsy, metabolic disorders, renal disease, or infectious causes of seizures were excluded. A total of 114 women were enrolled using non-probability convenient sampling. Maternal demographic details, clinical characteristics, management, and outcomes were recorded. Neonatal outcomes including birth weight, Apgar scores, NICU admission, and perinatal mortality were assessed. Data were analysed using SPSS version 25 with descriptive statistics.

Results: The incidence of eclampsia was 3.39%. Most women were young (≤ 20 years, 42.98%), primigravida (72%), and unbooked (94.74%). Antepartum eclampsia was the most common presentation (93.85%). Vaginal delivery occurred in 48.24% and caesarean section in 46.49% of cases. Maternal complications were observed in 38.60%, with acute renal failure being the most frequent. Two maternal deaths were reported. Among neonates, 25.43% were preterm and the perinatal mortality rate was 21.05%, with prematurity being the leading cause.

Conclusions: Strengthening antenatal surveillance, early referral, and timely management are crucial to improving outcomes in resource-limited settings.

Keywords: Eclampsia, Hypertensive disorders of pregnancy, Maternal outcome, Perinatal outcome, Antenatal care

INTRODUCTION

Hypertensive disorders of pregnancy complicate nearly 10% of all pregnancies worldwide and continue to be a major contributor to maternal and perinatal morbidity and

mortality, particularly in low- and middle-income countries.¹ Among these disorders, eclampsia represents the most severe and life-threatening manifestation. Despite advances in obstetric care, the burden of eclampsia remains disproportionately high in developing nations, with reported case fatality rates of 17.7% in India and 13% in Nepal, compared with 1.8% in developed countries. The

World Health Organization estimates that eclampsia occurs in approximately 2.3% of women with preeclampsia in developing regions, as opposed to 0.8% in high-income countries. Along with haemorrhage and sepsis, hypertensive disorders form a deadly triad responsible for nearly 63,000 maternal deaths globally each year.^{2,3}

The term *eclampsia*, derived from the Greek word meaning “flash of lightning,” aptly describes the sudden and dramatic onset of the disease. Eclampsia is clinically defined by the occurrence of new-onset generalized tonic-clonic seizures or coma during pregnancy or the puerperium, in the absence of other neurological conditions, in women with features of preeclampsia.³ Although hypertension is considered a cardinal feature, up to 16% of women with eclampsia may present without documented hypertension, making early recognition challenging. The condition typically develops after 20 weeks of gestation, with the majority of cases occurring after 28 weeks, and may present antepartum, intrapartum, or postpartum, including late postpartum cases occurring up to four weeks after delivery.⁴ The pathophysiology of eclampsia is complex and multifactorial, involving abnormal placentation, widespread endothelial dysfunction, vasospasm, and altered angiogenic balance leading to uteroplacental hypoperfusion and end-organ ischemia. Cerebral involvement, characterized by impaired autoregulation, vasogenic edema, and hypoxia, is believed to precipitate seizure activity. Clinically, women often experience prodromal symptoms such as severe headache, visual disturbances, epigastric pain, nausea, and vomiting, which may precede seizures. The convulsions are typically generalized tonic-clonic in nature and are frequently followed by a postictal state.^{5,6}

Eclampsia is associated with significant maternal complications including abruptio placentae, intracranial haemorrhage, HELLP syndrome, acute renal failure, pulmonary edema, disseminated intravascular coagulation, and cardiopulmonary arrest.⁷ Adverse perinatal outcomes largely result from uteroplacental insufficiency and prematurity, contributing to intrauterine growth restriction, stillbirth, neonatal asphyxia, and increased neonatal mortality. Although the introduction of magnesium sulphate as the anticonvulsant of choice has substantially reduced seizure recurrence and mortality, optimal outcomes are heavily dependent on timely diagnosis, effective antenatal surveillance, and prompt referral to tertiary care facilities. In high-income countries, improved antenatal care and standardized management protocols have led to a marked decline in maternal and perinatal deaths related to eclampsia. However, in resource-limited settings, delayed presentation, inadequate antenatal monitoring, and limited access to comprehensive obstetric care continue to pose major challenges. Evaluating local trends and outcomes is therefore essential to identify gaps in care and guide evidence-based interventions.⁸ The present study was undertaken to assess the epidemiological profile of eclampsia and to evaluate its

impact on maternal and perinatal outcomes at a tertiary care centre, with the aim of informing strategies to reduce preventable morbidity and mortality associated with this serious obstetric emergency. The primary objective of this study was to determine the fetomaternal outcomes among women with eclampsia presenting after 28 weeks of gestation and up to seven days postpartum. Secondary objectives included assessing the distribution of eclampsia with respect to maternal age, parity, booking status, and gestational age at presentation; evaluating fetal outcomes in terms of prematurity, birth asphyxia, meconium aspiration syndrome, and perinatal mortality; and analysing maternal outcomes with regard to disease severity, complications, intensive care unit (ICU) admission, and maternal mortality.

METHODS

This hospital-based cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology at a tertiary referral centre in Nepal catering to patients from surrounding districts and neighbouring regions of India. The study was carried out over a period of twelve months, from July 2024 to July 2025, after obtaining approval from the Institutional Review Committee (PG-NMC/407/075/076).

All women diagnosed with antepartum, intrapartum, or postpartum eclampsia with a period of gestation beyond 28 weeks and up to seven days following delivery, who presented to the emergency obstetric services during the study period, were eligible for inclusion. Women with chronic hypertension diagnosed before 20 weeks of gestation, epilepsy, diabetes mellitus, chronic renal disease, connective tissue disorders, electrolyte imbalance, infectious causes of seizures (such as meningitis, encephalitis, or cerebral malaria), or conversion disorders were excluded. A non-probability convenient sampling technique was employed, and a total of 114 women fulfilling the inclusion criteria were enrolled. After obtaining written informed consent, detailed demographic, obstetric, and clinical information was collected using a predesigned and pretested structured proforma. History was obtained from the patient or attendants, including antenatal care details, number and nature of convulsions, symptomatology suggestive of preeclampsia, past medical and obstetric history, and relevant family history. Gestational age was determined based on last menstrual period and/or first-trimester ultrasonography.

A thorough general, systemic, and obstetric examination was performed at admission. Blood pressure was recorded in the right arm in the left lateral position using standard technique. Neurological status was assessed using the Glasgow Coma Scale, and obstetric examination included assessment of uterine height, fetal presentation, liquor volume, fetal heart rate, and Bishop’s score. Baseline laboratory investigations included complete blood count, blood grouping and RH typing, random blood sugar, coagulation profile, liver and renal function tests, serum

uric acid, lactate dehydrogenase, urine routine examination, and 24-hour urinary protein estimation. Management, including seizure control with magnesium sulphate and antihypertensive therapy, was instituted as per institutional protocol (Figure 1). The mode of delivery was decided by the senior obstetrician based on cervical status, gestational age, and maternal and fetal condition.

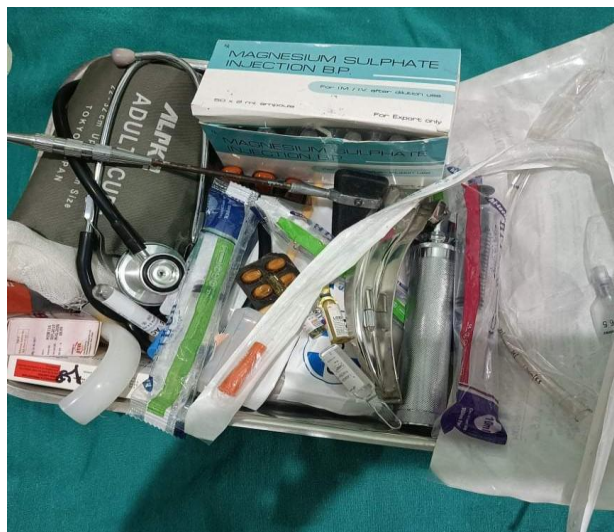


Figure 1: Emergency tray for eclampsia.

All neonates were attended by a neonatologist at birth. Apgar scores were recorded at one and five minutes, and neonatal resuscitation was provided as required. Neonates with complications or low Apgar scores were admitted to the neonatal intensive care unit and followed until discharge or death. Mothers were monitored post-delivery for complications, ICU admission, and survival outcome until discharge. Maternal outcomes assessed included mode of delivery, complications, ICU admission, and maternal mortality. Neonatal outcomes included birth weight, Apgar scores, need for resuscitation, NICU admission, neonatal morbidities, stillbirths, early neonatal deaths, and perinatal mortality.

Statistical analysis

Data were entered into Microsoft Excel and subsequently analysed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means with standard deviations. Results were tabulated and interpreted appropriately to assess maternal and perinatal outcomes associated with eclampsia.

RESULTS

During the study period from July 2024 to July 2025, a total of 3,355 deliveries were conducted at tertiary care centre. Among these, 114 cases of eclampsia were recorded, yielding an incidence of 3.39%.

Table 1: Distribution of gestational age in weeks.

Gestational age (weeks)	Frequency	Percentage (%)	Mean±SD
≤34	13	11.04	
35-38	77	67.54	36.15±2.64
>38	24	21.05	
Total	114	100	

The majority of women were young, with 42.98% (n=49) aged ≤20 years. The mean maternal age was 21.9 ± 4.3 years, while only 7.02% (n=8) of patients belonged to each of the 26-30 years and ≥31 years age groups. Regarding parity, 72% (n=82) were primigravida and 28% (n=32) were multigravida. Antenatal care utilization was notably poor, with 94.74% (n=108) being unbooked at presentation. Most women presented at 35–38 weeks of gestation (67.54%, n=77), with a mean gestational age of 36.15±2.64 weeks. Presentation beyond 38 weeks occurred in 21.05% (n=24), while 11.40% (n=13) presented at or before 34 weeks. (Table 1). Antepartum eclampsia was the predominant type, accounting for 93.85% (n=107) of cases, whereas 2.63% (n=3) and 3.51% (n=4) were intrapartum and postpartum eclampsia, respectively (Table 2).

Table 2: Distribution of type of eclampsia.

Type	Frequency	Percentage
Antepartum	107	93.85
Intrapartum	3	2.63
Postpartum	4	3.50
Total	114	100

Table 3: Distribution of convulsion to admission interval in hours.

Time(hrs)	Frequency	Percentage	Mean±SD
≤5	92	80.70	
6-10	21	18.42	4±2.1
>11	1	0.88	
Total	114	100	

Table 4: Distribution of convulsion to delivery interval (CDI) (hours).

CDI (hr)	Frequency	Percentage	Mean±SD
≤5	34	29.82	
6- 10	77	67.54	6.6±2.5
>11	3	2.63	
Total	114	100	

The majority of patients experienced 4-6 convulsions (67.54%, n=77), with a mean of 4.4±1.7 seizures. 27.19% (n=31) had 1-3 convulsions, while seizures exceeding seven were uncommon. Most women (80.70%, n=92) reached the hospital within 5 hours of the first convulsion,

with a mean convulsion-to-admission interval of 4.0±2.1 hours (Table 3).

At admission, 79.82% had blood pressure <160/110 mmHg, while 20.18% presented with severe hypertension. Delivery occurred within 6-10 hours of first convulsion in 67.54% (n=77) of cases, with mean convulsion-to-delivery interval 6.6±2.5 hours (Table 4).

Proteinuria was significant in most of the patients, with 64.03%(n=73) showing 2+ and 32.46% (n=37) showing 3+ albuminuria. Regarding mode of delivery, 48.24% (n=55) delivered vaginally, 46.49% (n=53) underwent caesarean section, and 5.26% (n=6) had instrumental deliveries (Table 5).

Table 5: Distribution of the cases according to mode of delivery.

Mode of delivery	Frequency	Percentage
Vaginal	55	48.24
Instrumental	6	5.26
LSCS	53	46.49
Total	114	100

Among those undergoing emergency caesarean section, the most common indication was an unfavourable cervix (47.16%), followed by fetal distress (30.19%), breech presentation (9.43%), and failed induction (5.66%). Of the 114 neonates, 74.56% (n=85) were term and 25.43% (n=29) were preterm. The mean birth weight was 2442.98 ± 699.15 g, with 57.89% (n=66) weighing between 2100 and 3000 g. Low birth weight (<2000 g) was observed in 24.56% (n=28). (Figure 2). At birth, 100 neonates were live born, while 14 were stillbirths. Among live births, 10 neonatal deaths occurred, primarily due to prematurity and meconium aspiration syndrome.

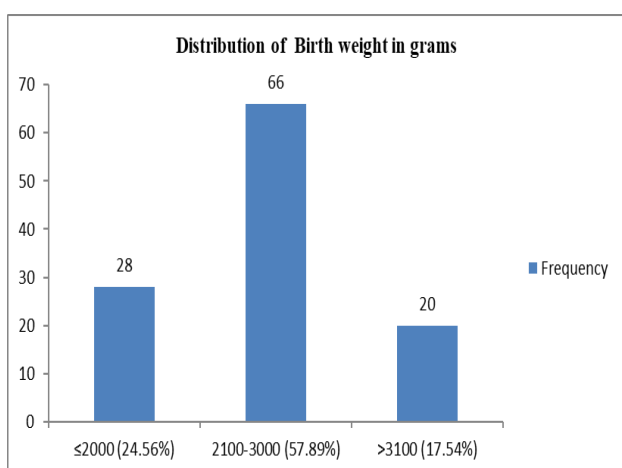


Figure 2: Distribution of birth weight (grams).

Apgar scores ≥7 were recorded in 64 neonates at 1 minute and 93 neonates at 5 minutes. Thirty-six neonates (31.58%) required NICU admission, mainly

for prematurity (63.88%), birth asphyxia (19.44%), and meconium aspiration syndrome (16.67%). The overall perinatal mortality rate was 21.05%. Maternal complications were observed in 44 women (38.60%).

The most common complication was acute renal failure (13.15%), followed by postpartum haemorrhage (7.02%), need for mechanical ventilation (7.02%), and disseminated intravascular coagulation (3.51%). Other complications included pulmonary edema, posterior reversible encephalopathy syndrome, and aspiration pneumonia. There were two maternal deaths, one due to aspiration pneumonia and the other due to pulmonary edema.

DISCUSSION

Eclampsia remains one of the most severe hypertensive disorders of pregnancy and continues to contribute substantially to maternal and perinatal morbidity and mortality, particularly in low-resource settings such as Nepal. Despite national initiatives promoting safe motherhood and improved obstetric care, the burden of eclampsia remains unacceptably high.

Age

In the present study, eclampsia was most frequently observed among women aged ≤20 years, accounting for 42.98% of cases. This finding is consistent with the study by Pal et al, which reported the highest incidence in women younger than 20 years.⁹ Other studies by Kamrun et al and Memon et al noted a higher prevalence in the 21–30-year age group.^{10,11} Overall, these findings suggest that although eclampsia can occur at both extremes of reproductive age, younger women remain at particularly high risk.

Parity

Gravidity significantly influenced the occurrence of eclampsia in this study, with primigravida constituting the majority (71.92%) of cases. Similar observations were reported by Aashika Shrestha et al, Agarwal et al, and Mishra et al.^{1,2,12} In contrast, studies by Karki et al and Khalil et al reported a higher incidence among multigravida women.^{13,14} The predominance among primigravida highlights nulliparity as a well-recognized risk factor for eclampsia.

Antenatal check-up

A striking finding of this study was that 94.74% of patients were unbooked, emphasizing poor antenatal care utilization. Comparable findings have been reported by Ghimire et al, Qadir et al, and Duhan et al.¹⁵⁻¹⁷ This underscores the critical role of inadequate antenatal surveillance in the development and late presentation of eclampsia.

Gestational age

Most patients presented between 35–38 weeks of gestation (67.54%), followed by >38 weeks (21.05%) and ≤34 weeks (11.04%). Similar trends were observed by Agarwal et al and Ghimire et al, where eclamptic seizures were most common in late-term gestation.^{2,15} These findings indicate that eclampsia predominantly manifests in the late third trimester.

Type of eclampsia

Antepartum eclampsia was the most common presentation (93.85%), followed by postpartum and intrapartum eclampsia. These results align with studies by Agarwal et al and Khalil et al, whereas Douglas et al reported a higher proportion of postpartum cases.^{14,18} The predominance of antepartum eclampsia in this study may reflect delayed diagnosis and referral.

Number of convulsions

The majority of patients experienced 4–6 convulsions, with a mean of 4.4 ± 1.7 episodes. Similar findings were reported by Khalil et al, although Chalaliya et al observed fewer convulsive episodes in most cases.^{14,19} The variation may be attributed to differences in early intervention and referral systems.

Convulsion-to-admission interval

Most patients were admitted within five hours of the first convulsion, with a mean interval of 4 ± 2.1 hours. This contrasts with findings by Khalil et al, where delayed hospital admission was more common.¹⁴ Early admission in the present study may have contributed to relatively better maternal outcomes.

Blood pressure

At admission, most patients presented with blood pressure <140/90 mmHg, while one-fifth had severe hypertension. This differs from the findings of Agarwal et al, where severe hypertension predominated, possibly reflecting differences in timing of presentation or pre-hospital management.²

Proteinuria

The majority of patients had 2+ proteinuria. In contrast, studies by Chalaliya et al and Shakya et al reported higher grades of proteinuria. This variability may be related to differences in disease severity and timing of urine assessment.^{19,20}

Convulsion-to-delivery interval

In this study, most women delivered within 6–10 hours of convulsion onset, with a mean interval of 6.6 ± 2.5 hours. These findings are comparable to Ghimire et al, although

Chaudhary et al reported a shorter interval in a subset of patients.^{14,21}

Mode of delivery

Nearly equal proportions of women delivered vaginally and by caesarean section, with a small percentage requiring instrumental delivery. Similar delivery patterns were reported by Jadav et al, while other studies documented a higher caesarean section rate, reflecting institutional policies and clinical judgment.²²

Indications for caesarean section

An unfavourable cervix was the most common indication for caesarean section, followed by fetal distress. Similar findings were reported by Agarwal et al, whereas fetal distress was the predominant indication in studies by Khuman et al and Karki et al.^{2,13,23}

Fetal outcome

Maturity: Most neonates were term, although a significant proportion were preterm. This contrasts with Shrestha et al, who reported a higher preterm birth rate.¹²

APGAR score: A considerable number of neonates had low APGAR scores at one minute, though most improved by five minutes, consistent with findings by Duhan et al.¹⁷

Birth weight: Most babies had birth weights between 2100–3000 grams, with a mean of 2442.98 ± 699.15 grams, comparable to other regional studies.

NICU admission: Prematurity was the leading cause of NICU admission, consistent with findings by Agarwal et al, though admission rates varied across studies.²

Perinatal mortality: The perinatal mortality rate was 21.05%, comparable to findings by Roy et al, though higher than that reported by Agarwal et al.^{2,24} This reflects the persistent vulnerability of neonates born to eclamptic mothers.

Maternal complications

Maternal complications were observed in 38.6% of patients, with acute renal failure being the most common, followed by postpartum haemorrhage and need for mechanical ventilation. Two maternal deaths occurred due to pulmonary edema and aspiration pneumonia. Similar complication patterns were reported by Shrestha et al, and Agarwal et al, reinforcing the life-threatening nature of eclampsia.^{2,12}

CONCLUSION

This study highlights that eclampsia continues to be a major obstetric emergency, contributing significantly to maternal and perinatal morbidity and mortality. The

condition was more frequently observed among young, unbooked primigravida women, underscoring the critical role of inadequate antenatal care. Antepartum eclampsia was the predominant presentation, and vaginal delivery was the most common mode of birth, while an unfavourable cervix was the leading indication for caesarean section. Prematurity emerged as the principal cause of perinatal and neonatal mortality. Acute renal failure was the most frequent maternal complication, followed by postpartum eclampsia. These findings emphasize the need for early detection, timely referral, and improved antenatal surveillance to reduce adverse maternal and neonatal outcomes.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Review Committee (PG-NMC/407/075/076)

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Cite this article as: Bhagat B, Neupane KK, Moktan H, Bista RB, Jaiswal S, Gupta S. Fetomaternal outcomes in eclampsia at a tertiary care centre: a prospective observational study. *Int J Res Med Sci* 2026;14:1965-70.