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ISSN: 2663-9491 e-ISSN: 2789-6897

ORIGINAL ARTICLE

# A study of Maternal and Fetal outcome Following Caesarean Section Versus Vaginal Delivery in Eclamptic Patients in Six Months Study in Rangpur Medical College and Hospital, Rangpur

**DOI: 10.5281/zenodo.18351453**

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**Received:** 12 Jan 2026
**Accepted:** 15 Jan 2026
**Published Online:** 22 Jan 2026

**Published by:**
Gopalganj Medical College, Gopalganj, Bangladesh

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***ABSTRACT***

***Introduction:*** *Eclampsia remains a leading cause of maternal and perinatal mortality in low- and middle-income countries due to delayed presentation, poor antenatal care and limited access to emergency obstetric services. The optimal mode of delivery for eclamptic patients remains debated, particularly in resource-constrained settings.* ***Objective:*** *This study aimed to compare maternal and fetal outcomes following caesarean section versus vaginal delivery among eclamptic patients in a tertiary care hospital.* ***Methods:*** *A prospective cross-sectional comparative study was conducted over six months at Rangpur Medical College and Hospital, Bangladesh. One hundred women with eclampsia were grouped according to the delivery mode. Sociodemographic characteristics, clinical profiles, maternal and perinatal outcomes were recorded. Data were analyzed using SPSS version 16.* ***Results:*** *Caesarean section was predominant (70%), while 30% delivered vaginally. Maternal mortality was higher in vaginal delivery (20%) than in caesarean section (7.14%). Maternal morbidity was higher after vaginal delivery (54% vs. 25%). The main complications were pulmonary edema, renal failure, cerebrovascular accident and postpartum haemorrhage. Live births were higher with caesarean deliveries (83%) than with vaginal deliveries (63%), whereas perinatal mortality was greater with vaginal deliveries (37% vs. 17%). Prematurity and birth asphyxia were the main causes of perinatal mortality. Neonates delivered by caesarean section had higher Apgar scores at one and five minutes.* ***Conclusion:*** *Caesarean section showed improved maternal and perinatal outcomes compared to vaginal delivery in selected eclamptic patients. Timely decision-making and improved antenatal care are essential to reducing eclampsia-related mortality.*

***Keywords:*** *Eclampsia, Caesarean section, Vaginal delivery, Maternal outcome, Perinatal outcome*

*(The Insight 2025; 8(4): 807-812)*

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## INTRODUCTION

Eclampsia remains one of the most severe and life-threatening complications of hypertensive disorders of pregnancy, particularly in low- and middle-income countries. Despite advances in obstetric care, it continues to contribute substantially to maternal and perinatal morbidity and mortality worldwide [1]. The burden is disproportionately higher in developing regions, where delayed presentation, inadequate antenatal care and limited access to emergency obstetric services persist [2,3].

Globally, hypertensive disorders of pregnancy account for approximately 10–15% of maternal deaths, with eclampsia representing the most catastrophic end of the disease spectrum [4]. In South Asia, eclampsia remains a leading cause of preventable maternal death, often affecting young, primigravid women from socioeconomically disadvantaged backgrounds [5,6]. In Bangladesh, eclampsia continues to pose a significant public health challenge, reflecting broader inequities in maternal healthcare delivery [7].

The definitive management of eclampsia involves stabilization of the mother, prevention of recurrent convulsions, control of blood pressure and timely termination of pregnancy [8]. However, the optimal mode of delivery in eclamptic patients remains a subject of ongoing debate. Vaginal delivery avoids surgical risks, while caesarean section allows rapid termination of pregnancy, particularly in unfavourable cervical conditions or when maternal or fetal compromise is present [9].

Several studies have evaluated maternal and perinatal outcomes associated with different modes of delivery in eclamptic women, with conflicting results. Some authors report improved perinatal survival and reduced maternal complications with caesarean section, particularly in preterm or primigravid patients [10,11]. Others suggest that vaginal delivery may be safe when labour is advanced and the maternal

ISSN: 2663-9491 e-ISSN: 2789-6897

condition is stable [12]. Variations in study design, population characteristics and healthcare settings contribute to these inconsistencies.

In resource-limited settings, the decision regarding mode of delivery is further complicated by delayed referrals, poor antenatal attendance and limited availability of skilled personnel and intensive care facilities [13,14]. These factors may significantly influence outcomes, independent of the delivery route. Understanding context-specific outcomes is therefore essential for guiding clinical decision-making.

Despite numerous international studies, local evidence from northern Bangladesh remains limited. Rangpur Medical College and Hospital serves a large catchment population, predominantly rural and socioeconomically disadvantaged, where eclampsia remains frequently encountered. Evaluating maternal and fetal outcomes by mode of delivery in this setting is crucial for informing practice and improving care pathways.

The present study was undertaken to compare maternal and fetal outcomes between caesarean section and vaginal delivery among eclamptic patients admitted to Rangpur Medical College and Hospital. By analyzing clinical characteristics, maternal complications and perinatal outcomes, this study aims to contribute context-specific evidence that may assist clinicians in optimizing delivery decisions and improving outcomes in eclampsia.

## OBJECTIVES

The objective of this study was to compare maternal and fetal outcomes following caesarean section versus vaginal delivery among eclamptic patients admitted to a tertiary care hospital.

## METHODS & MATERIALS

This prospective cross-sectional comparative study was conducted in the Department of Obstetrics and Gynaecology, Rangpur Medical College and Hospital, Rangpur, Bangladesh, over six months from July 1 to December 31, 2012. The study population comprised women diagnosed with eclampsia and admitted to the obstetric ward during the study period. Diagnosis was based on clinical presentation of convulsions associated with hypertension and proteinuria. A total of 100 patients were randomly selected and included in the final analysis.

**Inclusion criteria:**

(i) women diagnosed with antepartum or intrapartum eclampsia
(ii) gestational age ≥28 weeks
(iii) delivery by either vaginal route or caesarean section at the study hospital.

**Exclusion criteria:**

(i) women with epilepsy or other seizure disorders
(ii) postpartum eclampsia
(iii) incomplete clinical records.

Ethical approval was obtained from the institutional authority and informed consent was secured from patients or their legal guardians. Confidentiality of patient information was strictly maintained. Data were collected using a structured data collection sheet, recording socio-demographic variables, obstetric history, antenatal care, clinical findings, laboratory results, mode of delivery and maternal and perinatal outcomes. Clinical assessments were performed by attending physicians and relevant investigations were conducted in accordance with hospital protocols. Data were compiled and initially organized using Microsoft Excel. Statistical analysis was performed using SPSS version 16. Descriptive statistics, including frequencies, percentages, means and standard deviations, were calculated. Associations between categorical variables were assessed using the chi-square test. A p-value of <0.05 was considered statistically significant.

## RESULTS

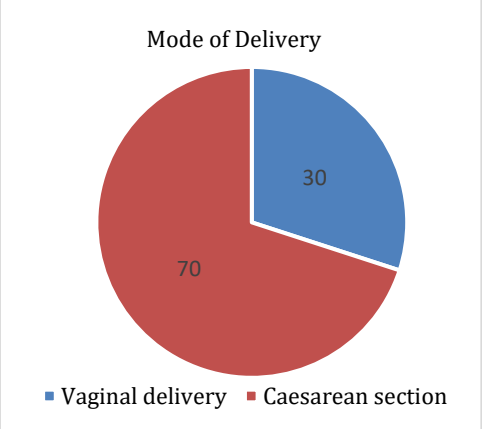


**Figure – 1: Distribution of Mode of Delivery among Eclamptic Patients**

Figure 1 presents the distribution of delivery modes among the study population. Of the 100 eclamptic patients included, 70% underwent caesarean section, while 30% delivered vaginally, indicating a higher reliance on operative delivery in the management of eclampsia.

Table I describes the socio-demographic profiles of patients according to delivery mode. In both groups, the majority of patients were aged ≤20 years, with mean ages of 22.74 ± 3.54 years in the vaginal delivery group and 26.44 ± 6.36 years in the caesarean section group. Primigravida status predominated in both groups (60% vs. 66%). Illiteracy was more frequent in the vaginal delivery group (40%) compared with the caesarean section group (26%). Most participants were housewives and belonged to poor or lower-middle socioeconomic strata. Statistically significant differences were observed across several socio-demographic variables ($p < 0.05$).

ISSN: 2663-9491 e-ISSN: 2789-6897

**Table – I: Socio-Demographic Characteristics of Eclamptic Patients by Mode of Delivery**

| Variables | | Vaginal Delivery (n=30) | Caesarean Section (n=70) | P value |
|---|---|---|---|---|
| Age group (years) | ≤20 years | 16 (53.33) | 36 (51.43) | <0.05 |
| | 21–30 years | 08 (26.67) | 15 (21.43) | |
| | 31+ years | 06 (20) | 19 (27.14) | |
| | Mean ± SD | 22.74±3.54 | 26.44±6.36 | |
| | Range | 16–35 | 18–34 | |
| Parity | Primigravida | 18 (60) | 46 (66) | <0.05 |
| | Primi para | 05 (17) | 09 (13) | |
| | Multipara | 07 (23) | 15 (21) | |
| Level of education | Illiterate | 12 (40) | 18 (26) | <0.05 |
| | Primary | 16 (53) | 45 (64) | |
| | Secondary | 02 (07) | 07 (10) | |
| | Higher Secondary | 00 (00) | 00 (00) | |
| Occupation | Housewife | 30 (100) | 68 (97) | <0.05 |
| | Employed | 00 (00) | 02 (03) | |
| Socioeconomic status | Poor | 12 (40) | 32 (45.71) | <0.05 |
| | Lower middle | 09 (30) | 20 (28.57) | |
| | Upper middle | 05 (16.67) | 12 (17.14) | |
| | Upper | 04 (13.33) | 06 (8.57) | |

Table II outlines antenatal care patterns, gestational age, blood pressure levels, seizure history and biochemical findings. Irregular or absent antenatal care was common in both groups. Preterm gestation (<37 weeks) was observed in 60% of vaginal deliveries and 67.14% of caesarean sections. Mean systolic and diastolic blood pressures were comparable between groups. A higher mean number of convulsions before admission was recorded in the vaginal delivery group. Most patients had moderate to severe proteinuria and delayed presentation following the first convulsion was common in both groups.

**Table – II: Obstetric and Clinical Background Characteristics of Study Participants**

| Parameters | | Vaginal Delivery (n=30) | Caesarean Section (n=70) | P value |
|---|---|---|---|---|
| Frequency of Antenatal Visit | No | 07 (23.33) | 18 (25.71) | <0.05 |
| | Irregular | 12 (40) | 30 (42.86) | |
| | Regular | 11 (36.67) | 22 (31.43) | |
| Gestational Age | <37 weeks | 18 (60) | 47 (67.14) | <0.05 |
| | >37 weeks | 12 (40) | 23 (32.86) | |
| Duration of Pregnancy (weeks), Mean ± SD | | 33.7±3.14 | 34.25±6.49 | 0.65 |
| Systolic BP (mmHg), Mean ± SD | | 154±20.83 | 159.3±24.52 | 0.3 |
| Diastolic BP (mmHg), Mean ± SD | | 97.7±11.22 | 97±12.4 | 0.79 |
| Other symptoms (headache, blurred vision, vomiting) | | 28 (87) | 63 (90) | 0.66 |
| Use of $MgSO_4$ outside the hospital | No anticonvulsants | 19 (63.33) | 49 (70) | <0.05 |
| | With anticonvulsants | 11 (36.67) | 21 (30) | |
| | Number of convulsions before hospitalization (Mean ± SD) | 7.17±2.19 | 5.4±1.4 | <0.05 |
| Interval between 1st convulsion and admission (hours) | <6 hours | 16 (53.33) | 28 (40) | <0.05 |
| | 6–12 hours | 08 (26.67) | 30 (43) | |
| | >12 hours | 06 (20) | 12 (17) | |
| Urine albumin | (+) | 00 (00) | 00 (00) | <0.05 |
| | (++) | 18 (60) | 38 (54) | |
| | (+++) | 06 (20) | 27 (39) | |
| | (++++) | 06 (20) | 05 (07) | |
| Time Interval between 1st Convulsion and Delivery | <12 hours | 12 (40) | 32 (48) | <0.05 |
| | >12 hours | 18 (60) | 38 (54) | |

Table III presents maternal mortality and morbidity patterns. Maternal death occurred in 20% of vaginal deliveries and 7.14% of caesarean sections. Overall maternal morbidity was higher in the vaginal delivery group (54%) compared with the caesarean section group (25%). Reported complications included pulmonary oedema, cerebrovascular accident, renal failure, postpartum haemorrhage and wound infection.

ISSN: 2663-9491 e-ISSN: 2789-6897

**Table – III: Comparison of Maternal Outcomes by Mode of Delivery**

| Variables | | Vaginal Delivery (n=30) | Caesarean Section (n=70) |
|---|---|---|---|
| Maternal death | None | 24 (80) | 65 (92.86) |
| | Expired | 06 (20) | 05 (7.14) |
| Maternal morbidity | Abruption placenta | 01 (3.33) | 00 (00) |
| | Hepatic failure | 00 (00) | 02 (3.07) |
| | Pulmonary oedema | 03 (12.5) | 03 (4.61) |
| | Obstetric shock | 01 (4.16) | 00 (00) |
| | Cerebrovascular accident | 02 (8.33) | 01 (1.43) |
| | Wound infection | 00 (00) | 05 (7.69) |
| | Postpartum haemorrhage | 03 (12.5) | 02 (3.07) |
| | Renal failure | 02 (8.33) | 03 (4.61) |
| | Puerperal psychosis | 01 (4.16) | 00 (00) |
| | Total morbidity | 13 (54) | 16 (25) |

Table IV describes clinical and socio-demographic risk factors among patients who developed morbidity or mortality. A higher proportion of affected patients were young, primigravida, illiterate, from poor socioeconomic backgrounds and had received no antenatal care. Delayed admission and absence of anticonvulsant therapy before hospitalization were frequent in both groups.

**Table – IV: Risk Factors Associated with Maternal Morbidity and Mortality**

| Parameters | | Vaginal Delivery (n=19) | Caesarean Section (n=21) |
|---|---|---|---|
| Age | <20 years | 11 (58) | 14 (67) |
| | >20 years | 08 (42) | 07 (33) |
| Parity | Primigravida | 13 (68) | 17 (81) |
| | Primipara | 02 (11) | 03 (14) |
| | Multipara | 04 (21) | 01 (05) |
| Education | Illiterate | 14 (74) | 13 (62) |
| | Primary | 05 (26) | 06 (38) |
| Socioeconomic status | Poor (<20,000 Tk/year) | 14 (73) | 12 (57) |
| | Lower middle (20,000–50,000 Tk/year) | 05 (27) | 09 (43) |
| Antenatal visits | No | 16 (84) | 15 (71) |
| | Irregular | 03 (16) | 05 (24) |
| | Regular | 00 (00) | 01 (05) |
| Gestational age | <37 weeks | 16 (84) | 17 (80) |
| | >37 weeks | 03 (16) | 04 (20) |
| Use of $MgSO_4$ outside hospital | No anticonvulsants | 19 (100) | 18 (86) |
| | With anticonvulsants | 00 (00) | 03 (14) |
| Interval between 1st convulsion and admission (hours) | <6 hours | 05 (26) | 02 (10) |
| | 6–12 hours | 06 (32) | 12 (57) |
| | >12 hours | 08 (42) | 07 (33) |
| Interval between 1st convulsion and delivery | <12 hours | 07 (37) | 09 (43) |
| | >12 hours | 12 (63) | 12 (57) |
| Urine albumin | (++) | 13 (68) | 15 (71) |
| | (+++) | 04 (22) | 04 (19) |
| | (++++) | 02 (10) | 02 (10) |
| Systolic BP (mmHg) | | 160±22.6 (140–190) | 156±23.8 (135–170) |
| Diastolic BP (mmHg) | | 98±12.33 (85–115) | 97±11.22 (75–110) |

Table V compares perinatal outcomes among high-risk deliveries. Live birth rates were higher following caesarean section (76%) than vaginal delivery (58%). Stillbirth and early perinatal death were more frequent in the vaginal delivery group.

**Table – V: Perinatal Outcomes among High-Risk Groups**

| Fetal Outcome | Vaginal Delivery (n=19) | Caesarean Section (n=21) | P value |
|---|---|---|---|
| Live birth | 11 (58) | 16 (76) | <0.05 |
| Still birth | 05 (26) | 03 (14) | |
| Perinatal death (within 7 days) | 03 (16) | 02 (10) | |

Figure 2 shows the causes of maternal death. Pulmonary oedema and renal failure were the leading causes in both groups, followed by cerebrovascular accident and HELLP syndrome.

ISSN: 2663-9491 e-ISSN: 2789-6897

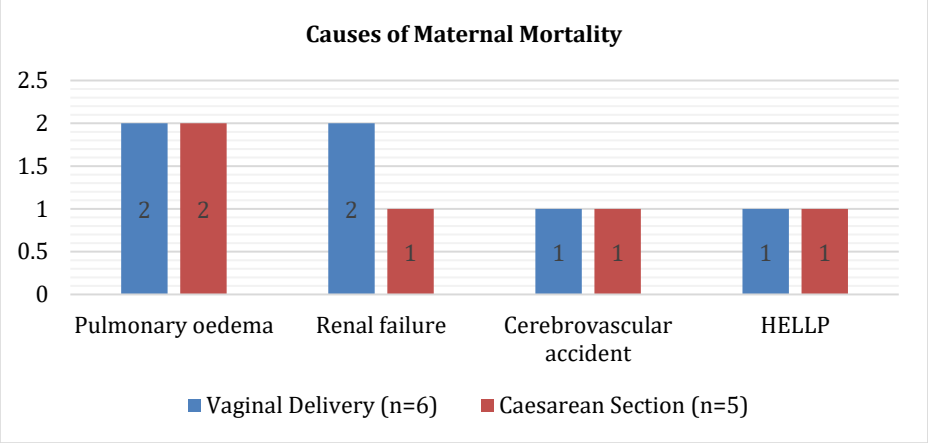


**Figure – 2: Distribution of Patients Based on Causes of Maternal Mortality**

Table VI compares overall perinatal outcomes. Live birth was more frequent in the caesarean section group (83%) compared with the vaginal delivery group (63%). Perinatal mortality, including stillbirths, was higher in the vaginal delivery group.

**Table – VI: Overall Perinatal Outcomes by Mode of Delivery**

| Fetal Outcome | Vaginal Delivery (n=30) | Caesarean Section (n=70) | P value |
|---|---|---|---|
| Live birth | 19 (63) | 58 (83) | >0.05 |
| Perinatal death | 05 (17) | 07 (10) | |
| Still birth | 06 (20) | 05 (07) | |

Table VII describes neonatal parameters among live births. Mean birth weight was similar between groups. Mean Apgar scores at both one and five minutes were higher among neonates delivered by caesarean section.

**Table – VII: Neonatal Characteristics by Mode of Delivery**

| Parameters | Vaginal Delivery (n=24) | Caesarean Section (n=64) |
|---|---|---|
| Birth weight (kg) | Mean ± SD: 2.20±0.54 (Range: 1.8–2.65) | 2.18±0.40 (Range: 1.5–2.6) |
| 1-minute Apgar score | Mean ± SD: 5.33±1.62 (Range: 3–8) | 6.18±1.27 (Range: 4–10) |
| 5-minute Apgar score | Mean ± SD: 5.91±0.87 (Range: 4–10) | 6.46±1.03 (Range: 5–10) |

Table VIII presents the causes of perinatal death. Prematurity was the most common cause in both groups, followed by birth asphyxia.

**Table – VIII: Causes of Perinatal Death**

| Causes | Vaginal Delivery (n=11) | Caesarean Section (n=12) |
|---|---|---|
| Prematurity | 06 (54) | 07 (58) |
| Asphyxia | 05 (46) | 05 (42) |

## DISCUSSION

The present study demonstrates that mode of delivery plays a significant role in determining both maternal and perinatal outcomes among eclamptic patients. Caesarean section emerged as the predominant mode of delivery, accounting for 70% of cases, reflecting current trends in the management of severe hypertensive disorders of pregnancy in resource-limited settings. This pattern aligns with findings reported by Khandoker et al., who observed increased reliance on caesarean delivery in eclamptic women due to unfavourable cervical conditions and the need for rapid termination of pregnancy [13].

Maternal mortality in this study was notably higher among patients who delivered vaginally compared with those undergoing caesarean section. Similar observations were reported by Saeed et al., who documented reduced maternal mortality following operative delivery in eclampsia, particularly when intervention was timely [14]. The higher mortality in the vaginal delivery group may be attributable to prolonged labour, delayed delivery following onset of convulsions and inadequate pre-hospital anticonvulsant therapy, all of which were more common in this group. Rabiu et al. highlighted delayed presentation and lack of antenatal care as critical contributors to adverse maternal outcomes in eclampsia, findings that are consistent with the current study [6].

Maternal morbidity was also substantially higher following vaginal delivery. Pulmonary oedema, cerebrovascular accident, postpartum haemorrhage and renal failure were among the most frequent complications observed. Begum et al. similarly reported increased maternal complications in vaginally delivered eclamptic patients, particularly in those with prolonged seizure-to-delivery intervals [7]. In contrast, studies by Chaudhuri et al. suggest that expedited caesarean delivery may reduce the duration of maternal exposure to severe disease, thereby limiting complications [11].

Socio-demographic factors appeared to influence outcomes in both groups. The predominance of young, primigravid, illiterate women from low socioeconomic backgrounds mirrors epidemiological patterns reported across South Asia [15,16]. Nobis and Hajong noted that early marriage, poor nutritional status and limited health literacy increase vulnerability to eclampsia and its complications [2]. In the present study, inadequate antenatal care was strongly associated with poorer outcomes, supporting findings from Vousden et al., who demonstrated that lack of antenatal surveillance significantly increases the risk of severe maternal and perinatal complications [5].

ISSN: 2663-9491 e-ISSN: 2789-6897

Perinatal outcomes in this study favoured caesarean section, with higher live birth rates and lower perinatal mortality. Madan reported comparable findings, noting improved neonatal survival following caesarean delivery in eclamptic women, particularly in preterm gestations [10]. The high prevalence of preterm delivery in both groups reflects the necessity of early termination of pregnancy to safeguard maternal health, as emphasized in international guidelines [17]. However, perinatal mortality remained substantial, largely due to prematurity and birth asphyxia, findings consistent with those reported by Bandyopadhyay et al. and Patel et al. [18,19].

Neonatal condition at birth, as measured by Apgar scores, was marginally better among infants delivered by caesarean section. Similar trends have been described by Chaudhuri et al., who reported improved immediate neonatal outcomes following operative delivery in severe hypertensive disorders [11]. Although mean birth weights were comparable between groups, lower Apgar scores in the vaginal delivery group may reflect prolonged intrauterine hypoxia associated with delayed delivery.

Causes of maternal death in both groups were dominated by pulmonary oedema, renal failure, cerebrovascular accident and HELLP syndrome. These findings are consistent with reports by Mahran et al., who identified multi-organ failure as the leading cause of mortality in eclamptic patients [20]. The persistence of these causes underscores the need for early recognition, prompt anticonvulsant therapy and multidisciplinary critical care support.

Overall, the findings of this study support the growing body of evidence suggesting that, in selected eclamptic patients—particularly those with unfavourable cervix, delayed presentation, or preterm gestation—caesarean section may be associated with improved maternal and perinatal outcomes. These results reinforce recommendations advocating individualized decision-making based on maternal condition, gestational age and resource availability.

## CONCLUSION

Eclampsia continues to be associated with substantial maternal and perinatal morbidity and mortality in low-resource settings. This study demonstrates that caesarean section is associated with improved maternal and neonatal outcomes compared with vaginal delivery in selected eclamptic patients. Early diagnosis, timely referral, appropriate use of magnesium sulphate and judicious selection of delivery mode are critical to improving outcomes.

***Conflicts of interest:*** *There are no conflicts of interest.*

***Ethical approval:*** *The study was approved by the Institutional Ethical Review Committee.*

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