Open Access

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

Maternal and Fetal Outcomes of Preeclampsia and Eclampsia: A Hospital-Based Observational Study

Mahfuza Khanam[1*], Miratul Jesmin[2], Nilufar Akter[3], Nusrat Hossain[4]

Received: 11 May 2026
Accepted: 18 May 2026
Published Online: 5 June 2026

Published by:
Gopalganj Medical College, Gopalganj, Bangladesh

*Corresponding Author

DOI: 10.5281/zenodo.20551340

ABSTRACT

Background: *Hypertensive disorders of pregnancy, including preeclampsia and eclampsia, are major causes of maternal and neonatal morbidity and mortality worldwide. These conditions are characterized by hypertension and multi-organ involvement, often leading to severe complications if not managed promptly. The burden is particularly high in low- and middle-income countries due to limited access to quality antenatal care and delayed clinical intervention.* ***Objective:*** *To assess maternal and fetal outcomes associated with preeclampsia and eclampsia in a tertiary care hospital in Bangladesh.* ***Methods & Materials:*** *This prospective observational study was conducted among 120 pregnant women diagnosed with preeclampsia or eclampsia at Rangpur Medical College Hospital between January and December 2025. Data were collected using structured questionnaires and clinical records. Maternal complications and fetal outcomes were recorded and analyzed using SPSS version 25.0. Statistical significance was determined at p<0.05.* ***Results:*** *Among the participants, 51.7% were aged 20–29 years and 61.7% were from rural areas. Preeclampsia accounted for 70.0% of cases, while eclampsia accounted for 30.0%. Severe hypertension, HELLP syndrome, acute kidney injury, ICU admission and maternal mortality were significantly higher in the eclampsia group (p<0.05). Preterm birth occurred in 56.7% of cases and 66.7% of neonates had low birth weight. Adverse fetal outcomes were significantly more common in eclampsia (83.3%) compared to preeclampsia (50.0%) (p=0.001).* ***Conclusion:*** *Eclampsia is associated with significantly higher maternal and fetal complications compared to preeclampsia. Early diagnosis, improved antenatal care and timely management are essential to reduce adverse outcomes.*

Keywords: *Preeclampsia, Eclampsia, Maternal outcomes, Neonatal outcomes, Hypertensive disorders of pregnancy.*

(The Insight 2026; 9(2): 316-319)

1. *Assistant Professor, Department of Obstetrics and Gynecology, Rangpur Medical College and Hospital, Rangpur, Bangladesh (ORCID: 0009-0004-8609-1923)*
2. *Assistant Professor, Department of Obstetrics and Gynecology, Rangpur Medical College, Bangladesh (ORCID: 0009-0002-5594-807X)*
3. *Assistant Professor, Department of Obstetrics and Gynecology, Rangpur Medical College and Hospital, Rangpur, Bangladesh (ORCID: 0009-0003-1880-9975)*
4. *Assistant Professor, Department of Obstetrics and Gynecology, Rangpur Medical College and Hospital, Rangpur, Bangladesh (ORCID: 0009-0004-6386-5084)*

INTRODUCTION

Preeclampsia and eclampsia remain significant contributors to maternal and perinatal morbidity and mortality worldwide. These hypertensive disorders of pregnancy are characterized by elevated blood pressure and multi-organ involvement, often leading to severe complications if not promptly managed [1]. Globally, hypertensive disorders complicate approximately 5–10% of pregnancies and are among the leading causes of maternal deaths, particularly in low- and middle-income countries [2,3].

Preeclampsia is a multisystem disorder typically occurring after 20 weeks of gestation and is associated with proteinuria or end-organ dysfunction [1]. Its progression to eclampsia, marked by the onset of seizures, significantly increases the risk of adverse maternal and fetal outcomes. The underlying pathophysiology is complex and involves abnormal placentation, endothelial dysfunction and inflammatory processes [4,5]. Despite advances in obstetric care, the burden of disease remains high, especially in resource-limited settings.

Epidemiological studies have demonstrated considerable variation in the prevalence of preeclampsia across regions. Studies from Ethiopia and Bangladesh report prevalence rates ranging from 2% to 10%, with several socio-demographic and clinical risk factors identified [6,7]. Factors such as primigravidity, inadequate antenatal care, advanced maternal age and rural residence have been consistently associated with increased risk [8,9]. In Bangladesh, limited access to quality maternal healthcare services further exacerbates the burden of disease.

Maternal complications associated with preeclampsia and eclampsia include severe hypertension, HELLP syndrome, renal failure and increased risk of maternal mortality [10,11]. Eclampsia, in particular, is associated with higher rates of ICU admission and fatal outcomes due to its severe clinical presentation. These complications highlight the importance of early detection and effective management strategies.

Fetal and neonatal outcomes are also significantly affected. Adverse outcomes such as preterm birth, low birth weight, stillbirth and neonatal death are frequently reported [12,13]. Placental insufficiency resulting from impaired vascular development plays a crucial role in fetal growth restriction and hypoxia [14]. Studies have shown that pregnancies complicated by eclampsia are more likely to result in poor neonatal outcomes compared to preeclampsia alone [15].

Despite extensive research, gaps remain in understanding the full spectrum of maternal and fetal outcomes in different populations. Many studies focus on either maternal or fetal outcomes, with limited integrated analysis of both. Furthermore, data from tertiary care hospitals in Bangladesh remain relatively scarce.

Therefore, this study aims to evaluate maternal and fetal outcomes of preeclampsia and eclampsia in a tertiary care setting in Rangpur, Bangladesh. By examining clinical patterns and associated complications, this study seeks to contribute to existing knowledge and support improved management strategies in similar healthcare settings.

OBJECTIVES

The objective of this study was to assess maternal and fetal outcomes associated with preeclampsia and eclampsia in a tertiary care hospital in Bangladesh.

METHODS & MATERIALS

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

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at Rangpur Medical College Hospital, Rangpur, Bangladesh. The study period extended from January to December 2025. The study population consisted of 120 pregnant women diagnosed with hypertensive disorders of pregnancy, including preeclampsia and eclampsia.

Inclusion Criteria:

1. Pregnant women diagnosed with preeclampsia or eclampsia
2. Gestational age ≥20 weeks
3. Singleton pregnancy

Exclusion Criteria:

1. Pre-existing chronic hypertension
2. Multiple pregnancy
3. Known renal or hepatic disease
4. Incomplete clinical data
5. Refusal to participate

Data Collection Procedure

Data were collected prospectively using a structured and pretested data collection form. Upon admission, eligible participants were identified based on clinical diagnosis following standard criteria. Detailed socio-demographic information, obstetric history and antenatal care records were documented through direct patient interviews and hospital records. Clinical assessments included blood pressure measurement, urine protein estimation and routine laboratory investigations such as liver enzymes, renal function tests and complete blood count.

Maternal outcomes were monitored throughout hospitalization, including complications such as severe hypertension, HELLP syndrome, abruptio placentae, postpartum hemorrhage, acute kidney injury, ICU admission and maternal mortality. Fetal outcomes were assessed at delivery and during the early neonatal period. These included birth status, birth weight, gestational age, Apgar score at 5 minutes and need for NICU admission.

Standard hospital protocols were followed for patient management to ensure uniformity. Data collection was conducted by trained medical personnel to maintain consistency and reduce observer bias. All information was recorded carefully to ensure accuracy and completeness. Confidentiality of patient information was strictly maintained by anonymizing data and restricting access to the research team only. Data were regularly cross-checked to minimize errors and ensure reliability.

Statistical Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages. Comparative analysis between the preeclampsia and eclampsia groups was performed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULT

Table I shows the socio-demographic and obstetric characteristics of the participants. Most women were aged 20–29 years (51.7%), followed by 30–39 years (28.3%). A majority resided in rural areas (61.7%). Primigravida constituted 56.7% of cases. Most participants were admitted between 34 and 37 weeks of gestation (40.0%). Irregular antenatal care was reported in 63.3% of cases. Preeclampsia was more common (70.0%) than eclampsia (30.0%).

Table I: Socio-demographic and Obstetric Characteristics of Study Participants (*n* = 120)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	<20	18	15.0
	20–29	62	51.7
	30–39	34	28.3
	≥40	6	5.0
Residence	Urban	46	38.3
	Rural	74	61.7
Parity	Primigravida	68	56.7
	Multigravida	52	43.3
Gestational Age at Admission	<34 weeks	32	26.7
	34–37 weeks	48	40.0
	>37 weeks	40	33.3
Antenatal Care (ANC)	Regular (≥4 visits)	44	36.7
	Irregular (<4 visits)	76	63.3
Type of Hypertensive Disorder	Preeclampsia	84	70.0
	Eclampsia	36	30.0

Table II presents maternal complications in preeclampsia and eclampsia. Severe hypertension was significantly higher in eclampsia (77.8%) compared to preeclampsia (45.2%) (p=0.001). HELLP syndrome was more frequent in eclampsia (19.4%) (p=0.048). Acute kidney injury was also significantly higher in eclampsia (16.7%) (p=0.031). ICU admission was markedly higher in eclampsia (41.7%) (p<0.001). Maternal mortality was significantly greater in eclampsia (11.1%) (p=0.013).

Table II: Maternal Complications and Outcomes in Preeclampsia vs Eclampsia (*n* = 120)

Maternal Outcome	Preeclampsia (n = 84) n (%)	Eclampsia (n = 36) n (%)	Total n (%)	p-value
Severe hypertension	38 (45.2)	28 (77.8)	66 (55.0)	0.001
HELLP syndrome	6 (7.1)	7 (19.4)	13 (10.8)	0.048
Abruptio placentae	5 (6.0)	6 (16.7)	11 (9.2)	0.064
Postpartum hemorrhage	9 (10.7)	8 (22.2)	17 (14.2)	0.099
Acute kidney injury	4 (4.8)	6 (16.7)	10 (8.3)	0.031
ICU admission	10 (11.9)	15 (41.7)	25 (20.8)	<0.001
Maternal mortality	1 (1.2)	4 (11.1)	5 (4.2)	0.013

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

Table III describes fetal and neonatal outcomes. Live births accounted for 78.3%, while stillbirths were 15.0%. Low birth weight (<2.5 kg) was observed in 66.7% of neonates. Preterm birth occurred in 56.7% of cases. NICU admission was required in 35.0% of newborns. An Apgar score <7 at 5 minutes was observed in 25.0%.

Table III: Fetal and Neonatal Outcomes (n = 120)

Fetal Outcome	Frequency (n)	Percentage (%)
Live birth	94	78.3
Stillbirth (IUFD)	18	15.0
Early neonatal death	8	6.7
Birth Weight		
≥2.5 kg	40	33.3
1.5–2.49 kg	56	46.7
<1.5 kg	24	20.0
Preterm Birth (<37 weeks)	68	56.7
Low Birth Weight (<2.5 kg)	80	66.7
Apgar Score <7 at 5 min	30	25.0
NICU Admission	42	35.0

Table IV shows the association between hypertensive disorder type and adverse fetal outcomes. Adverse outcomes were significantly higher in eclampsia (83.3%) compared to preeclampsia (50.0%) (p=0.001). No adverse outcomes were more common in preeclampsia (50.0%).

Table IV: Association Between Type of Disorder and Adverse Fetal Outcome

Outcome	Preeclampsia (n = 84) n (%)	Eclampsia (n = 36) n (%)	Total n (%)	p-value
Adverse fetal outcome present	42 (50.0)	30 (83.3)	72 (60.0)	0.001
No adverse outcome	42 (50.0)	6 (16.7)	48 (40.0)	

DISCUSSION

The present study provides a comprehensive evaluation of maternal and fetal outcomes among women with preeclampsia and eclampsia in a tertiary care setting. The findings highlight a substantial burden of complications, particularly among women with eclampsia, emphasizing the clinical severity and public health importance of hypertensive disorders of pregnancy. The predominance of women aged 20–29 years in this cohort reflects the typical reproductive age group and is consistent with findings reported by Tessema et al., who observed a similar age distribution among affected women [16]. The higher proportion of rural residents and irregular antenatal care attendance observed in this study further supports existing evidence that inadequate access to healthcare services contributes to delayed diagnosis and increased disease severity, as reported by Yeasmin et al. [8].

Primigravidity was identified as a common characteristic among the study participants, which aligns with the findings of English et al., who demonstrated that nulliparous women are at increased risk of developing preeclampsia [17]. This association may be attributed to immunological and vascular maladaptation during the first pregnancy. The predominance of preeclampsia over eclampsia in this study is also consistent with global epidemiological trends, where preeclampsia occurs more frequently but may progress to eclampsia in the absence of timely management [2].

The analysis of maternal complications revealed that eclampsia is associated with significantly higher morbidity. Severe hypertension was markedly more prevalent in eclamptic patients, reflecting the advanced stage of disease progression. This finding is consistent with the observations of Khan et al., who reported that eclampsia represents a more severe clinical spectrum of hypertensive disorders [10]. Similarly, the higher incidence of HELLP syndrome among eclamptic women in this study is in agreement with previous research, indicating that hepatic and hematological complications are more frequent in severe cases.

Acute kidney injury was significantly more common in eclampsia, suggesting extensive systemic involvement and endothelial dysfunction. This observation aligns with findings by Wassie et al., who highlighted the increased risk of organ failure in women with eclampsia [11]. The substantially higher rate of ICU admission among eclamptic patients further underscores the severity of the condition and the need for advanced critical care support. Maternal mortality was also significantly higher in the eclampsia group, reinforcing global evidence that hypertensive disorders remain a leading cause of maternal death, particularly in low-resource settings, as reported by Alkema et al. [18].

Fetal and neonatal outcomes in this study were similarly concerning. The high prevalence of preterm birth and low birth weight reflects the impact of placental insufficiency and compromised uteroplacental perfusion. These findings are consistent with those of Atamamen et al., who demonstrated that hypertensive disorders significantly increase the risk of adverse neonatal outcomes, including prematurity and intrauterine growth restriction [12]. The high rate of preterm delivery observed may also be influenced by clinical decisions to expedite delivery to prevent worsening maternal condition.

The occurrence of stillbirths and early neonatal deaths in this study further highlights the adverse impact of preeclampsia and eclampsia on perinatal survival. Similar findings have been reported by Asseffa et al., who noted increased perinatal mortality among women with hypertensive disorders of pregnancy [13]. The need for NICU admission in a substantial proportion of neonates reflects the severity of neonatal complications and underscores the importance of specialized neonatal care.

A notable finding of this study is the significantly higher rate of adverse fetal outcomes among women with eclampsia compared to those with preeclampsia. This is consistent with the study by Irene et al., which demonstrated that eclampsia is associated with poorer neonatal outcomes due to more severe placental dysfunction and maternal instability [15]. The progression from preeclampsia to eclampsia likely exacerbates hypoxic and ischemic conditions within the placenta, leading to compromised fetal growth and survival.

Overall, the findings of this study are in agreement with existing literature and reinforce the critical importance of early detection, regular antenatal monitoring and timely intervention in managing hypertensive disorders of pregnancy. Strengthening antenatal care services, particularly in rural areas, is essential to reducing disease progression and improving outcomes. Additionally, enhancing the capacity of tertiary healthcare facilities to manage severe cases and provide adequate neonatal support is crucial for reducing both maternal and perinatal morbidity and mortality.

CONCLUSION

Preeclampsia and eclampsia are associated with significant maternal and fetal morbidity and mortality. Eclampsia, in particular, demonstrates a higher risk of severe complications and adverse outcomes. Early identification, regular antenatal care and timely intervention are critical to improving outcomes. Strengthening

healthcare systems, especially in resource-limited settings, is essential to reducing the burden of hypertensive disorders in pregnancy.

ACKNOWLEDGMENT
I would like to express my sincere gratitude for the invaluable support and cooperation provided by the staff, participants and my co-authors/colleagues who contributed to this study.

CONFLICTS OF INTEREST
There are no conflicts of interest.

REFERENCES
1. *Brown MA, Magee LA, Kenny LC, Karumanchi SA, McCarthy FP, Saito S, Hall DR, Warren CE, Adoyi G, Ishaku S. Hypertensive disorders of pregnancy: ISSHP classification, diagnosis and management recommendations for international practice. Hypertension. 2018 Jul;72(1):24-43.*
2. *Umesawa M, Kobashi G. Epidemiology of hypertensive disorders in pregnancy: prevalence, risk factors, predictors and prognosis. Hypertension Research. 2017 Mar;40(3):213-20.*
3. *Vera-Ponce VJ, Loayza-Castro JA, Ballena-Caicedo J, Valladolid-Sandoval LA, Zuzunaga-Montoya FE, Gutierrez De Carrillo CI. Global prevalence of preeclampsia, eclampsia and HELLP syndrome: a systematic review and meta-analysis. Frontiers in reproductive health. 2025 Nov 10; 7:1706009.*
4. *Rana S, Lemoine E, Granger JP, Karumanchi SA. Preeclampsia: pathophysiology, challenges and perspectives. Circulation research. 2019 Mar 29;124(7):1094-112.*
5. *Staff AC. The two-stage placental model of preeclampsia: An update. Journal of reproductive immunology. 2019 Sep 1; 134:1-0.*
6. *Akter K, Khanum H. Prevalance of pre-eclampsia and factors responsible among third trimester pregnant women in hospital of dhaka. Biomedical Journal of Scientific & Technical Research. 2021;33(4):26089-97.*
7. *Mou AD, Barman Z, Hasan M, Miah R, Hafsa JM, Das Trisha A, Ali N. Prevalence of preeclampsia and the associated risk factors among pregnant women in Bangladesh. Scientific reports. 2021 Oct 29;11(1):21339.*
8. *Yeasmin S, Uddin MJ. Determination of Risk Factors for Pre–Eclampsia in aTertiary Hospital of Bangladesh. Chattagram Maa-O-Shishu Hospital Medical College Journal. 2017 Dec 26;16(1):29-32.*
9. *Bartsch E, Medcalf KE, Park AL, Ray JG. Clinical risk factors for pre-eclampsia determined in early pregnancy: systematic review and meta-analysis of large cohort studies. Bmj. 2016 Apr 19;353.*
10. *Khan B, Yar RA, khan Khakwani A, Karim S, Ali HA, Khakwani A, Karim S. Preeclampsia incidence and its maternal and neonatal outcomes with associated risk factors. Cureus. 2022 Nov 6;14(11).*
11. *Wassie AY, Anmut W. Prevalence of eclampsia and its maternal-fetal outcomes at Gandhi memorial hospital, Addis Ababa Ethiopia, 2019: retrospective study. International Journal of Women's Health. 2021 Feb 22:231-7.*
12. *Atamamen TF, Naing NN, Oyetunji JA, Wan-Arfah N. Systematic literature review on the neonatal outcome of preeclampsia. The Pan African Medical Journal. 2022 Jan 31; 41:82.*
13. *Asseffa NA, Demissie BW. Perinatal outcomes of hypertensive disorders in pregnancy at a referral hospital, Southern Ethiopia. PloS one. 2019 Feb 28;14(2):e0213240.*
14. *Herzog EM, Eggink AJ, Reijnierse A, Kerkhof MA, de Krijger RR, Roks AJ, Reiss IK, Nigg AL, Eilers PH, Steegers EA, Steegers-Theunissen RP. Impact of early-and late-onset preeclampsia on features of placental and newborn vascular health. Placenta. 2017 Jan 1;49:72-9.*
15. *Irene K, Amubuomombe PP, Mogeni R andrew C, Mwangi A, Omenge OO. Maternal and perinatal outcomes in women with eclampsia by mode of delivery at Riley's mother baby hospital: a longitudinal case-series study. BMC pregnancy and childbirth. 2021 Jun 24;21(1):439.*
16. *Tessema GA, Tekeste A, Ayele TA. Preeclampsia and associated factors among pregnant women attending antenatal care in Dessie referral hospital, Northeast Ethiopia: a hospital-based study. BMC pregnancy and childbirth. 2015 Mar 29;15(1):73.*
17. *English FA, Kenny LC, McCarthy FP. Risk factors and effective management of preeclampsia. Integrated blood pressure control. 2015 Mar 3:7-12.*
18. *Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, Fat DM, Boerma T, Temmerman M, Mathers C, Say L. Global, regional and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. The lancet. 2016 Jan 30;387(10017):462-74.*