e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(7); 1148-1152

Original Research Article

Adverse Maternal and Fetal Outcome in Cases of Severe Pre-Eclampsia and Eclampsia

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Received: 01-04-2026 / Revised: 15-05-2026 / Accepted: 21-06-2026

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Conflict of interest: Nil

Abstract

Background: Hypertensive disorders of pregnancy, particularly severe pre-eclampsia and eclampsia, are major causes of maternal and perinatal morbidity and mortality. These conditions can result in multi-organ dysfunction, HELLP syndrome, renal failure, and placental abruption. Fetal complications include prematurity, low birth weight, and intrauterine growth restriction. Early diagnosis, close monitoring, and timely obstetric intervention are essential to improve maternal and neonatal outcomes.

Aim: To study the maternal and fetal outcomes in cases of severe pre-eclampsia and eclampsia and to identify factors associated with adverse maternal outcomes.

Methods: This hospital-based cross-sectional observational study included 65 pregnant women with severe pre-eclampsia or eclampsia after 20 weeks of gestation. Sociodemographic, clinical, laboratory, maternal, and perinatal data were collected using a structured proforma. Statistical analysis was performed using descriptive statistics and the chi-square test to assess associations with maternal and fetal outcomes.

Results: Among 65 patients, 48 (73.8%) had severe pre-eclampsia and 17 (26.2%) had eclampsia. Maternal complications occurred in 24 (36.9%), with ICU admission in 14 (21.5%) and maternal mortality in 2 (3.1%). Preterm delivery occurred in 31 (47.7%), low birth weight in 36 (55.4%), and NICU admission in 23 (35.4%). Severe hypertension, thrombocytopenia, multiple severe features, and inadequate antenatal care significantly increased maternal morbidity.

Conclusion: Severe pre-eclampsia and eclampsia are associated with significant maternal and perinatal morbidity. Early detection, regular antenatal monitoring, and timely obstetric intervention are essential to reduce adverse maternal and fetal outcomes.

Keywords: Severe Pre-Eclampsia, Eclampsia, Maternal Complications, Perinatal Outcome, Hypertensive Disorders Of Pregnancy.

DOI: 10.25258/ijcpr.18.7.175

Introduction

Hypertensive disorders of pregnancy are major pregnancy-specific complications and a leading cause of maternal and perinatal morbidity and mortality worldwide. [1] They include chronic hypertension, gestational hypertension, pre-eclampsia, eclampsia, and chronic hypertension with superimposed pre-eclampsia.

Pre-eclampsia is defined by new-onset hypertension after 20 weeks of gestation with proteinuria and/or maternal organ dysfunction. Eclampsia, characterized by generalized tonic–clonic seizures in women with pre-eclampsia, is the most severe manifestation and constitutes a life-threatening obstetric emergency. [2] The pathogenesis of severe pre-eclampsia and eclampsia involves abnormal placentation, leading to placental ischemia, endothelial dysfunction, and multisystem maternal involvement. [3]

Severe disease is characterized by blood pressure ≥160/110 mmHg with neurological, renal, hepatic, hematological, or pulmonary complications requiring urgent management. Despite advances in antenatal care and magnesium sulfate therapy, these disorders remain major causes of maternal and neonatal morbidity and mortality in low- and middle-income countries, including India. [4]

Maternal complications include cerebrovascular accidents, pulmonary edema, acute kidney injury, HELLP syndrome, disseminated intravascular coagulation, placental abruption, and maternal death. [5] Fetal consequences primarily result from uteroplacental insufficiency and include fetal growth restriction, preterm birth, intrauterine fetal demise, low birth weight, neonatal intensive care unit admission, and increased perinatal mortality. These disorders also impose a considerable burden on healthcare systems because of prolonged hospitalization, intensive care requirements, and neonatal support. [6] Despite standardized management protocols, balancing maternal stabilization with fetal survival remains challenging and often requires early delivery. [7] Clinical presentation and outcomes vary across populations due to socioeconomic, nutritional, genetic, and healthcare differences, emphasizing the need for institutional studies. [8] Therefore, the present study was undertaken to evaluate maternal and fetal outcomes in severe pre-eclampsia and eclampsia at a tertiary care center to improve clinical management and pregnancy outcomes. [9] This study Aim's To evaluate maternal and fetal outcomes in pregnancies complicated by severe pre-eclampsia and eclampsia, with emphasis on morbidity and mortality patterns.

Materials and Methods

Study Design: This cross-sectional observational study evaluated adverse maternal and fetal outcomes among pregnant women diagnosed with severe pre-eclampsia and eclampsia.

Study Location: The study was conducted in the Department of Obstetrics and Gynaecology, Pacific Institute of Medical Sciences, Umarda, Udaipur, Rajasthan, after obtaining approval from the Institutional Ethics Committee.

Study Duration: The study was carried out over one year following ethical approval.

Study Population: The study included pregnant women after 20 weeks' gestation with severe pre-eclampsia or eclampsia admitted to antenatal, labour, or emergency units.

Sample Size: A total of 65 patients were included. The sample size was calculated using the prevalence-based formula $n = Z^2pq/d^2$ with 95% confidence level, prevalence of 6.5%, and allowable error of 6%, giving a calculated sample size of 64.85, rounded to 65.

Inclusion Criteria: Pregnant women beyond 20 weeks' gestation with written informed consent and severe pre-eclampsia or eclampsia diagnosed according to ACOG criteria.

Exclusion Criteria: Women with chronic renal, hepatic or cardiac disease, idiopathic hemolytic anemia, idiopathic thrombocytopenic purpura, epilepsy, or meningitis were excluded.

Methodology: After informed consent, demographic, obstetric, clinical, and laboratory data were recorded. Patients received standard management with magnesium sulfate, antihypertensives, investigations, and timely obstetric intervention according to institutional protocols.

Outcome Measures: Maternal outcomes included complications, ICU admission, and mortality, while fetal outcomes included birth weight, APGAR score, NICU admission, and mortality.

Statistical Analysis: Data were analysed using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages and compared using the Chi-square test. A p value <0.05 was considered statistically significant.

Ethical Considerations: Institutional Ethics Committee approval and written informed consent were obtained. Confidentiality was maintained throughout the study, and as it was observational, no additional risk was imposed on participants.

Result and Observations

Among 65 women, most were aged 20–29 years, rural, unbooked, and primigravida. Severe pre-eclampsia predominated, with most presenting after 28 weeks. Proteinuria ≥3+, prophylactic magnesium sulphate, and caesarean delivery were common. Nearly half delivered preterm, while most neonates had satisfactory birth weight, APGAR scores, and pregnancy outcomes. Significant associations were observed for gestational age, booking status, parity, disease onset, and severe hypertension with adverse outcomes.

Table 1: Distribution of study participants according to presenting symptoms (multiple responses) (n = 65).

Symptom	Number	Percentage
Headache	41	63.1
Visual disturbance	24	36.9
Epigastric pain	21	32.3
Convulsions	17	26.2
Vomiting	19	29.2
Oliguria	11	16.9

Headache was the commonest presenting symptom (63.1%), followed by visual disturbances (36.9%), epigastric pain (32.3%), vomiting (29.2%), convulsions (26.2%), and oliguria (16.9%). These findings indicate that neurological and gastrointestinal manifestations were frequent among women with severe pre-eclampsia and eclampsia.

Table 2: Distribution of study participants according to platelet count, liver function test, and renal function status (n=65).

Parameter		Number	Percentage
Platelet count (/mm³)	<50,000	5	7.7
	50,000–99,999	14	21.5
	≥1,00,000	46	70.8
LFT status	Raised enzymes	19	29.2
	Normal	46	70.8
Serum creatinine	≥1.1 mg/dL	13	20
	Normal	52	80

Among 65 participants, 70.8% had platelet counts ≥100,000/mm³, while 21.5% had 50,000–99,999/mm³ and 7.7% had <50,000/mm³. Raised liver enzymes were observed in 29.2%, and elevated serum creatinine (≥1.1 mg/dL) was present in 20%, indicating hepatic and renal involvement in a subset of patients.

Table 3: Distribution of maternal complications among study participants (multiple responses) (n = 65).

Complication	Number	Percentage
Abruptio placentae	7	10.8
HELLP syndrome	6	9.2
Pulmonary edema	5	7.7
Renal failure	6	9.2
DIC	3	4.6
PPH	8	12.3

Out of 65 cases, postpartum hemorrhage (PPH) was observed in 8 patients (12.3%). Abruptio placentae occurred in 7 patients (10.8%). HELLP syndrome was documented in 6 patients (9.2%). Renal failure was noted in 6 patients (9.2%). Pulmonary edema developed in 5 patients (7.7%). Disseminated intravascular coagulation (DIC) was recorded in 3 patients (4.6%). Multiple complications were present in some cases.

Table 4: Distribution of maternal mortality and neonatal outcomes among study participants (n=65; neonatal outcomes, n=57).

Outcome	Number	Percentage
Survived	63	96.9
Death	2	3.1
Discharged	54	94.7
Neonatal death	3	5.3

Among 65 mothers, 63 (96.9%) survived and 2 (3.1%) died. Of the live-born neonates, 54 (94.7%) were discharged successfully, while 3 (5.3%) died during the neonatal period. These findings indicate a high maternal and neonatal survival rate despite the severity of the disease.

Table 5: Association between type of hypertensive disorder and maternal complications among study participants (n = 65).

Disorder	Complication Present	Absent	p-value
Severe PE	14	34	**0.012**
Eclampsia	10	7	

Maternal complications were significantly more frequent among women with eclampsia than severe pre-eclampsia (p=0.012). Complications occurred in 10 of 17 (58.8%) eclampsia cases compared with 14 of 48 (29.2%) severe pre-eclampsia cases, indicating a significantly higher risk of adverse maternal outcomes in eclampsia.

Table 6: Association between platelet count and maternal complications among study participants (n = 65).

Platelets	Complication	No complication	p-value
<1 lakh	11	8	**0.021**
≥1 lakh	13	33	

Maternal complications occurred in 57.9% of women with platelet counts <1 lakh/mm³ compared with 28.3% having platelet counts ≥1 lakh/mm³. Overall, complications were observed in 36.9% of participants. Thrombocytopenia showed a statistically significant association with maternal complications (p=0.021), indicating increased maternal risk.

Table 7: Association between mode of delivery and NICU admission among neonates (n = 65).

Mode	NICU Yes	NICU No	p-value
Vaginal	7	24	**0.041**
LSCS	16	18	

NICU admission was required in 47.1% of neonates delivered by caesarean section compared with 22.6% following vaginal delivery. Overall, 35.4% required NICU admission. A statistically significant association was observed between mode of delivery and NICU admission (p=0.041), with higher admissions after caesarean delivery.

Table 8: Association between number of severe features and adverse maternal outcome among study participants (n = 65).

Number of severe features	Adverse maternal outcome	No adverse outcome	Total
One severe feature	6	24	30
≥2 severe features	18	17	35
Total	**24**	**41**	**65**

Adverse maternal outcomes occurred in 20.0% of women with one severe feature compared with 51.4% of those having ≥2 severe features. Overall, complications were observed in 36.9% of participants. A highly significant association existed between multiple severe features and adverse maternal outcomes (χ^2=9.88, p=0.002).

Discussion

Severe pre-eclampsia and eclampsia remain major contributors to maternal and perinatal morbidity and mortality, particularly in developing countries. The present study evaluated the clinical profile and maternal and fetal outcomes in affected women. The findings are discussed in comparison with previous studies to identify similarities, differences, and possible explanations for the observed outcomes. Headache was the commonest presenting symptom (63.1%), followed by visual disturbances (36.9%), epigastric pain (32.3%), vomiting (29.2%), convulsions (26.2%), and oliguria (16.9%). Similarly, Cipolla et al. [10] reported headache and visual disturbances as common prodromal features of eclampsia, while Magee et al. [11] described neurological symptoms as frequent manifestations of severe disease.

Thrombocytopenia (<1 lakh/mm³) was significantly associated with maternal complications in the present study. Similarly, Brownfoot et al. [12] reported that platelet counts below 1,00,000/mm³ nearly tripled the risk of ICU admission. Brown et al. [13] observed major maternal complications, including hepatic dysfunction, in severe disease. Maynard et al. [14] explained that endothelial injury causes renal dysfunction in pre-eclampsia, supporting the elevated serum creatinine and renal impairment observed in this study.

Maternal complications were significantly higher in eclampsia than severe pre-eclampsia. Similarly, Say et al. [15] reported increased multi-organ failure and ICU admission among women with eclampsia. Ananth et al. [16] demonstrated a markedly increased risk of placental abruption in severe pre-eclampsia, supporting the higher maternal complication rates observed in the present study.

Maternal mortality was 3.1%, while most neonates survived and were discharged. Similarly, Say et al. [15] reported substantial maternal and neonatal mortality associated with severe hypertensive disorders. Abalos et al. [17] also documented significant contributions of severe pre-eclampsia and eclampsia to maternal deaths, stillbirths, and neonatal mortality worldwide.

Maternal complications were significantly more frequent in eclampsia than severe pre-eclampsia (p=0.012). Similarly, Say et al. [15] reported higher maternal mortality in eclampsia than severe pre-eclampsia. Abalos et al. [17] also demonstrated that eclampsia was associated with significantly increased adverse maternal outcomes, supporting the present findings. NICU admission was significantly associated with mode of delivery (p=0.041). Similarly, Melesse et al. [13] reported high NICU admission rates among neonates of mothers with severe hypertensive disorders, mainly due to prematurity. Magee et al. [11] also observed increased NICU admissions in early preterm deliveries complicated by severe disease. The presence of ≥2 severe features was strongly associated with adverse maternal outcomes (p=0.002). Similarly, Magee et al. [11] reported increased multi-organ dysfunction in severe pre-eclampsia, while Brownfoot et al. [12] demonstrated that severe laboratory abnormalities

significantly increased ICU admission, supporting the cumulative impact of disease severity on maternal prognosis.

Conclusion

Severe pre-eclampsia and eclampsia remain major causes of adverse maternal and fetal outcomes. Early diagnosis, timely referral, vigilant monitoring, and prompt evidence-based management significantly improve prognosis. Severe hypertension, thrombocytopenia, and multiple severe features predict poor maternal outcomes, while prematurity remains the principal determinant of adverse neonatal outcomes.

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