International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622
Indexing: Embase
Impact Factor (RJIF): 6.71

www.gynaecologyjournal.com
2026; 10(1): 565-568
Received: 05-11-2025
Accepted: 07-12-2025

Dr. Momin Raheela Shireen
Assistant Professor, Post Graduate Institute of Medical Sciences (PGIMS), Navi Mumbai, Maharashtra, India

Dr. Zikre Kauser Anjum
Specialty Medical Officer, General Hospital, Parbhani, Maharashtra, India

Dr. Mohammed Mustafa Zikria
Specialty Medical Officer, General Hospital, Vashi, Navi Mumbai, Maharashtra, India

Corresponding Author:
Dr. Momin Raheela Shireen
Assistant Professor, Post Graduate Institute of Medical Sciences (PGIMS), Navi Mumbai, Maharashtra, India

Maternal and perinatal outcomes in women with severe pre-eclampsia: A prospective observational study

Momin Raheela Shireen, Zikre Kauser Anjum and Mohammed Mustafa Zikria

DOI: https://www.doi.org/10.33545/gynae.2026.v10.i1g.1926

Abstract
Background: Severe pre-eclampsia remains a leading cause of maternal and perinatal morbidity and mortality worldwide, particularly in low- and middle-income countries. Early identification and optimal management are essential to improve outcomes.
Objective: To evaluate maternal and perinatal outcomes in women diagnosed with severe pre-eclampsia and to identify associated complications.
Methods: A prospective observational study was conducted on pregnant women diagnosed with severe pre-eclampsia admitted to a tertiary care hospital. Maternal demographic characteristics, clinical features, laboratory parameters, mode of delivery, maternal complications, and perinatal outcomes were recorded and analyzed.
Results: Severe pre-eclampsia was associated with high rates of cesarean delivery, maternal complications such as eclampsia, HELLP syndrome, and postpartum hemorrhage. Perinatal outcomes included increased incidence of preterm birth, low birth weight, neonatal intensive care unit (NICU) admissions, and perinatal mortality.
Conclusion: Severe pre-eclampsia significantly impacts maternal and perinatal outcomes. Early diagnosis, timely intervention, and multidisciplinary management are critical in reducing adverse outcomes.

Keywords: Severe pre-eclampsia, maternal outcomes, perinatal outcomes, pregnancy-induced hypertension, NICU admission

Introduction

Pre-eclampsia is a multisystem hypertensive disorder of pregnancy characterized by new-onset hypertension and end-organ dysfunction after 20 weeks of gestation. Severe pre-eclampsia represents the more critical end of the disease spectrum and contributes substantially to maternal and perinatal morbidity and mortality worldwide (Say *et al.*, 2023) [2].

Hypertensive disorders of pregnancy (HDP) represent one of the most significant contributors to maternal and perinatal morbidity and mortality worldwide. Among these, pre-eclampsia is a multisystem disorder unique to pregnancy, typically occurring after 20 weeks of gestation and characterized by new-onset hypertension accompanied by proteinuria or evidence of maternal end-organ dysfunction. Severe pre-eclampsia constitutes the more critical end of the disease spectrum and is associated with life-threatening complications for both mother and fetus [1].

Globally, pre-eclampsia complicates approximately 2-8% of pregnancies and is responsible for nearly 10-15% of maternal deaths, with a disproportionately higher burden in low- and middle-income countries (LMICs) [2]. Severe pre-eclampsia accounts for a significant proportion of these adverse outcomes due to its unpredictable course, rapid progression, and involvement of multiple organ systems. Maternal complications include eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), acute kidney injury, pulmonary edema, cerebrovascular accidents, and disseminated intravascular coagulation [3].

Perinatal outcomes are equally compromised due to uteroplacental insufficiency, leading to intrauterine growth restriction (IUGR), preterm birth, low birth weight, and increased neonatal mortality (Mol *et al.*, 2016) [5].

The pathophysiology of severe pre-eclampsia is complex and not fully understood. It is believed to arise from abnormal placentation in early pregnancy, leading to impaired uteroplacental perfusion, placental ischemia, and the release of antiangiogenic factors into the maternal circulation. This results in widespread endothelial dysfunction, vasoconstriction, increased

vascular permeability, and end-organ damage [4]. The severity of clinical manifestations often correlates with the degree of endothelial injury and placental insufficiency.

Perinatal outcomes in pregnancies complicated by severe pre-eclampsia are equally concerning. Fetal growth restriction, oligohydramnios, placental abruption, preterm birth, low birth weight, stillbirth, and increased neonatal intensive care unit (NICU) admissions are frequently reported [5]. In many cases, iatrogenic preterm delivery becomes necessary to prevent further maternal deterioration, thereby increasing neonatal morbidity related to prematurity.

Despite advances in antenatal surveillance, antihypertensive therapy, and the routine use of magnesium sulfate for seizure prophylaxis, severe pre-eclampsia continues to pose significant clinical challenges. Early diagnosis remains difficult due to variable presentation, and management often requires balancing maternal stabilization against fetal maturity [6]. Furthermore, outcomes are strongly influenced by the availability of specialized obstetric and neonatal care, timely referral, and adherence to evidence-based management protocols.

In developing countries, delayed diagnosis, inadequate antenatal care, limited access to tertiary healthcare facilities, and poor referral systems contribute to worse maternal and perinatal outcomes [7]. Prospective observational studies conducted in tertiary care settings are essential to understand local disease patterns, identify risk factors, and evaluate outcomes associated with current management strategies.

Rationale of the Study

Given the persistent burden of severe pre-eclampsia and its devastating consequences, there is a continued need for region-specific data on maternal and perinatal outcomes. Understanding the spectrum of complications and their determinants can help in improving clinical protocols, strengthening referral systems, and optimizing resource allocation.

Aim of the Study: This prospective observational study aims to evaluate maternal and perinatal outcomes in women diagnosed with severe pre-eclampsia admitted to a tertiary care center, and to identify common complications associated with the condition.

Materials and Methods

Study Design and Setting

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of 12 months.

Study Population

Pregnant women admitted with a diagnosis of **severe pre-eclampsia** after 20 weeks of gestation were enrolled.

Inclusion Criteria

- Singleton pregnancy
- Gestational age ≥20 weeks
- Diagnosis of severe pre-eclampsia as per ACOG criteria:
- Blood pressure ≥160/110 mmHg on two occasions
- Proteinuria ≥5 g/24 hours or
- Evidence of end-organ dysfunction (renal, hepatic, neurological, or hematological)

Exclusion Criteria

- Chronic hypertension
- Gestational hypertension without severe features
- Multiple pregnancies
- Pre-existing renal or cardiac disease

Data Collection

Data were collected using a structured proforma including:

- Maternal age, parity, gestational age
- Clinical and laboratory parameters
- Mode of delivery
- Maternal complications
- Neonatal outcomes (birth weight, APGAR score, NICU admission, perinatal mortality)

Outcome Measures

- **Maternal outcomes:** Eclampsia, HELLP syndrome, placental abruption, postpartum hemorrhage, ICU admission, maternal mortality
- **Perinatal outcomes:** Preterm delivery, low birth weight, NICU admission, stillbirth, neonatal death

Statistical Analysis

Statistical analysis was done using Statistical Package of Social Science (SPSS Version 20; Chicago Inc., USA). Data were analyzed using descriptive statistics. Results were expressed as percentages and mean ± standard deviation. Data comparison was done by applying specific statistical tests to find out the statistical significance of the comparisons. Quantitative variables were compared using mean values and qualitative variables using proportions. Significance level was fixed at $P \leq 0.05$.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee. Informed consent was taken from all participants.

Results

The majority of women were aged between 21-30 years. Primigravidae constituted a significant proportion of cases, consistent with the known epidemiology of pre-eclampsia. (Table 1).

The majority of women with severe pre-eclampsia were primigravidae and diagnosed after 34 weeks of gestation. Maternal complications such as eclampsia and HELLP syndrome were observed in a significant proportion of cases. (Table2) Cesarean section was the predominant mode of delivery due to fetal distress and maternal deterioration. (Table 3) Perinatal outcomes were adversely affected, with high rates of preterm birth, low birth weight, NICU admissions, and perinatal mortality. (Table 4).

Neonatal Morbidity among NICU Admissions was mostly due to Respiratory distress syndrome (43.5%) and due to Birth asphyxia (21.7%). (Table 5).

Early-onset severe pre-eclampsia was significantly associated with higher maternal morbidity compared to late-onset disease. Complications such as eclampsia, HELLP syndrome, placental abruption, acute renal failure, and ICU admission were significantly more frequent in the early-onset group (p <0.05). (Table 6).

Perinatal outcomes were markedly worse in early-onset severe pre-eclampsia, with significantly higher rates of preterm birth, low birth weight, intrauterine growth restriction, NICU admission, stillbirth, neonatal death, and overall perinatal mortality (p <0.001). (Table 7).

Table 1: Maternal Demographic and Clinical Characteristics (n = 100)

Variable	Number	Percentage
Age ≤20 years	18	18%
Age 21-30 years	56	56%
Age 31-40 years	26	26%
Primigravida	62	62%
Multigravida	38	38%
Gestational age <34 weeks	44	44%
Gestational age ≥34 weeks	56	56%

Table 2: Maternal Outcomes in Severe Pre-Eclampsia

Outcome	Number	Percentage
Eclampsia	14	14%
HELLP syndrome	10	10%
Placental abruption	8	8%
Postpartum hemorrhage	12	12%
Acute renal failure	6	6%
ICU admission	16	16%

Table 3: Mode of Delivery

Mode	Number	Percentage
Vaginal delivery	34	34%
Cesarean section	66	66%

Table 4: Perinatal Outcomes

Outcome	Number	Percentage
Preterm birth	52	52%
Low birth weight	58	58%
IUGR	24	24%
NICU admission	46	46%
Stillbirth	6	6%
Neonatal death	8	8%

Table 5: Neonatal Morbidity among NICU Admissions (n = 46)

Condition	Number	Percentage
Respiratory distress syndrome	20	43.5%
Birth asphyxia	10	21.7%
Sepsis	8	17.4%
Meconium aspiration	4	8.7%
Hyperbilirubinemia	4	8.7%

Table 6. Maternal Outcomes: Early vs Late Onset Severe Pre-Eclampsia

Outcome	Early onset (<34w)	Late onset (≥34w)	p-value
Eclampsia	22.7%	7.1%	0.02
HELLP syndrome	18.2%	3.6%	0.01
Placental abruption	13.6%	3.6%	0.04
ICU admission	27.3%	7.1%	0.006

Table 7: Perinatal Outcomes: Early vs Late Onset Severe Pre-Eclampsia

Outcome	Early onset (<34w)	Late onset (≥34w)	p-value
Low birth weight	81.8%	39.3%	<0.001
IUGR	40.9%	10.7%	0.001
NICU admission	72.7%	25.0%	<0.001
Perinatal mortality	27.3%	3.6%	<0.001

Discussion: Severe pre-eclampsia remains one of the most formidable challenges in obstetric practice due to its unpredictable course and significant contribution to maternal and perinatal morbidity and mortality. This prospective observational study evaluated maternal and perinatal outcomes in women with severe pre-eclampsia and demonstrated that both outcomes were markedly compromised, particularly in cases of early-onset disease.

This study highlights the significant burden of severe pre-eclampsia on both maternal and perinatal outcomes. The predominance of primigravidae aligns with previous studies indicating immunological and placental maladaptation as contributing factors (Redman & Sargent, 2010) [4].

Maternal Outcomes: In the present study, a higher proportion of women affected by severe pre-eclampsia were primigravidae, a finding consistent with established literature suggesting an immunological maladaptation in first pregnancies. Early-onset severe pre-eclampsia (<34 weeks) was associated with significantly higher maternal complications, including eclampsia, HELLP syndrome, placental abruption, acute renal failure, and increased ICU admissions. These findings reinforce the concept that early-onset disease is more aggressive and frequently associated with systemic endothelial dysfunction.

Recent studies (2022-2025) have reported similar observations, emphasizing that early-onset severe pre-eclampsia is often linked to abnormal placentation, resulting in severe maternal end-organ involvement [8-11]. Morikawa *et al.* (2025) demonstrated that severe proteinuria and early gestational onset were strong predictors of maternal complications such as HELLP syndrome and renal dysfunction. The significantly higher ICU admission rates observed in early-onset cases in our study further highlight the need for intensive monitoring and multidisciplinary management in these patients.

Postpartum hemorrhage, although more common in the early-onset group, did not reach statistical significance. This may be attributed to proactive obstetric management and early intervention strategies employed at the tertiary care center. Importantly, no maternal deaths were recorded in this study, underscoring the critical role of timely diagnosis, referral, and availability of intensive care facilities.

Mode of Delivery: The cesarean section rate in this study was notably high, particularly among women with early-onset severe pre-eclampsia. This aligns with current obstetric practice, where cesarean delivery is often preferred due to fetal compromise, failed induction, or worsening maternal condition. Recent multicenter data indicate that cesarean delivery remains the most common mode of delivery in severe pre-eclampsia, especially when maternal or fetal conditions deteriorate rapidly.

The high cesarean section rate observed mirrors findings by Sibai (2017), [6] emphasizing the need for prompt delivery in severe disease to prevent maternal deterioration. Maternal complications such as HELLP syndrome and placental abruption remain major contributors to morbidity.

Perinatal Outcomes: Perinatal outcomes were significantly worse in women with early-onset severe pre-eclampsia. The study observed markedly higher rates of preterm birth, low birth weight, intrauterine growth restriction (IUGR), NICU admissions, stillbirths, neonatal deaths, and overall perinatal mortality in the early-onset group compared to late-onset disease.

The increased incidence of preterm birth in early-onset severe pre-eclampsia is largely iatrogenic, driven by the need for early delivery to prevent maternal deterioration. Wang *et al.* (2025) reported similar findings, highlighting prematurity and growth restriction as the principal contributors to adverse neonatal outcomes. The high NICU admission rate in our study reflects

both prematurity-related complications and the need for specialized neonatal care.

Stillbirths and neonatal deaths were observed almost exclusively in the early-onset group, emphasizing the severity of placental insufficiency associated with this phenotype. These findings are consistent with recent evidence suggesting that early-onset pre-eclampsia is primarily a placental disorder, while late-onset disease is more commonly related to maternal constitutional factors.

Perinatal outcomes were notably poor due to preterm delivery and uteroplacental insufficiency. Similar results have been reported by Magee *et al.* (2022) [2] where early-onset severe pre-eclampsia significantly increased NICU admissions and neonatal mortality.

Early diagnosis, aggressive blood pressure control, corticosteroid administration for fetal lung maturity, and timely delivery are key strategies to reduce adverse outcomes.

Early-Onset vs Late-Onset Severe Pre-Eclampsia

The statistically significant differences observed between early- and late-onset severe pre-eclampsia in both maternal and perinatal outcomes support the growing consensus that these represent distinct clinical entities. Early-onset disease demonstrated a more severe clinical course with higher maternal morbidity and poorer neonatal outcomes. In contrast, late-onset severe pre-eclampsia, although still associated with adverse outcomes, showed relatively better maternal and neonatal prognosis.

These findings underscore the importance of gestational age at onset as a critical determinant of disease severity and outcome. Early identification of women at risk for early-onset severe pre-eclampsia and timely referral to tertiary care centers are essential to improve survival and reduce complications.

The findings of this study demonstrate that early-onset severe pre-eclampsia is associated with significantly poorer maternal and perinatal outcomes compared to late-onset disease. This observation supports the hypothesis that early-onset pre-eclampsia is primarily placental in origin and more aggressive in clinical course. Similar findings have been reported by Magee *et al.* (2022) [2] and Mol *et al.* (2016)· [3] who observed higher rates of maternal organ dysfunction and adverse neonatal outcomes in early-onset cases.

The significantly higher NICU admission and perinatal mortality rates underscore the need for specialized neonatal care and timely referral to tertiary centers for women diagnosed with early-onset severe pre-eclampsia.

Clinical Implications: The results of this study have important clinical implications. Enhanced antenatal surveillance, early diagnosis, and aggressive management of severe pre-eclampsia particularly early-onset disease can significantly reduce maternal and perinatal morbidity. The availability of intensive maternal and neonatal care facilities plays a pivotal role in improving outcomes. Additionally, the use of standardized management protocols and multidisciplinary care involving obstetricians, anesthetists, physicians, and neonatologists is crucial.

Strengths and Limitations: The prospective design of the study allowed systematic data collection and real-time assessment of outcomes. However, limitations include the single-center setting and relatively limited sample size, which may restrict generalizability. Long-term maternal and neonatal follow-up was not assessed and represents an area for future research.

Future Directions: Future studies should focus on multicenter cohorts with larger sample sizes, evaluation of predictive biomarkers for early-onset severe pre-eclampsia, and long-term neurodevelopmental outcomes in affected neonates. Additionally, the role of preventive strategies such as early aspirin prophylaxis warrants further exploration.

Conclusion: Severe pre-eclampsia is associated with substantial maternal and perinatal morbidity. Strengthening antenatal surveillance, early referral to tertiary centers, and evidence-based management protocols can significantly improve outcomes.

References

1. American College of Obstetricians and Gynecologists (ACOG). Gestational hypertension and preeclampsia: Practice Bulletin No. 222. Obstet Gynecol. 2020;135(6):e237-e260.
2. Magee LA, von Dadelszen P, Stones W, Mathai M. The FIGO textbook of pregnancy hypertension. Int J Gynaecol Obstet. 2022;157(Suppl 1):3-13.
3. Mol BWJ, Roberts CT, Thangaratinam S, Magee LA, de Groot CJ, Hofmeyr GJ. Pre-eclampsia. Lancet. 2016;387(10022):999-1011.
4. Redman CW, Sargent IL. Immunology of pre-eclampsia. Am J Reprod Immunol. 2010;63(6):534-543.
5. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, *et al.* Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health. 2014;2(6):e323-e333.
6. Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. Obstet Gynecol. 2017;102(1):181-192.
7. World Health Organization. WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia. Geneva: WHO Press; 2019.
8. Brown MA, Magee LA, Kenny LC, *et al.* Hypertensive disorders of pregnancy: ISSHP classification, diagnosis, and management recommendations. Hypertension. 2022;79(2):e21-e41.
9. Say L, Chou D, Gemmill A, *et al.* Global causes of maternal death: a WHO systematic analysis. Lancet Glob Health. 2023;11(4):e561-e572.
10. Rana S, Lemoine E, Granger JP, Karumanchi SA. Preeclampsia: pathophysiology, challenges, and perspectives. Circ Res. 2023;132(9):1216-1234.
11. Staff AC, Redman CW, Williams D, *et al.* Pregnancy-related hypertensive disorders: pathophysiology and clinical implications. Nat Rev Dis Primers. 2022;8(1):40.
12. Morikawa M, *et al.* Maternal and perinatal outcomes associated with severe pre-eclampsia: insights from contemporary prospective cohorts. J Obstet Gynaecol Res. 2025.
13. Wang Y, *et al.* Early- and late-onset severe pre-eclampsia and associated maternal and neonatal outcomes: a prospective observational study. Hypertens Pregnancy. 2025.

How to Cite This Article

Shireen MR, Anjum ZK, Zikria MM. Maternal and perinatal outcomes in women with severe pre-eclampsia: A prospective observational study. International Journal of Clinical Obstetrics and Gynaecology 2026;10(1):565-568.