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Original Research Article

# MATERNAL AND FETAL OUTCOMES OF SEVERE PREECLAMPSIA

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## ABSTRACT

**Background:** Severe preeclampsia significantly contributes to maternal and neonatal morbidity and mortality, particularly in resource-limited settings. It is associated with complications such as organ dysfunction, preterm birth, IUGR, and increased NICU admissions, underscoring the importance of timely diagnosis and management. This study aimed to determine the maternal, foetal, and neonatal outcomes in women diagnosed with severe preeclampsia. **Material and Methods:** This prospective study was conducted on 92 pregnant women with severe preeclampsia and eclampsia > 20 weeks of gestation, who were admitted to Madras Medical College from August 2017 to July 2018. Upon admission, comprehensive history, clinical examination, and baseline investigations were performed. Management included antihypertensives, magnesium sulphate for eclampsia, corticosteroids (<34 weeks), and individualised delivery plans. Both maternal and neonatal outcomes were monitored for up to six weeks postpartum. **Result:** Most women were aged 21–30 years, had completed their schooling, and belonged to a lower socioeconomic status. Over half were primigravida, and the majority were diagnosed between 28 and 34 weeks and delivered between 35 and 37 weeks, with obesity being common. The most frequent mode of delivery was caesarean section (60.8%). Among maternal outcomes, 49.5% were discharged without complications, while 15.2% had impending eclampsia, and 10.9% experienced postpartum haemorrhage. Regarding neonatal outcomes, 28.2% required only observation, 25% had LBW, and 13.2% died. Most babies weighed between 2–2.5 kg or ≥ 2.5 kg. **Conclusion:** Severe preeclampsia is associated with significant maternal and neonatal complications, primarily due to prematurity. Early diagnosis, timely intervention, and appropriate perinatal care are essential for reducing morbidity and mortality in affected pregnancies.

## INTRODUCTION

Severe preeclampsia, a pregnancy-specific syndrome marked by hypertension (≥160/110 mmHg) and significant proteinuria or end-organ involvement, is a leading contributor to maternal and perinatal morbidity and mortality, particularly in low- to middle-resource regions.[1] Hypertensive disorders affect about 5–10% of pregnancies, and severe preeclampsia makes up 20–25% of these cases worldwide.[2] Its pathophysiology is multifactorial, involving abnormal placentation, endothelial dysfunction, and systemic inflammatory responses.[3] Maternal complications of severe preeclampsia span a wide spectrum, including hepatic injury, thrombocytopenia, disseminated intravascular coagulation (DIC), acute renal impairment, pulmonary oedema, cerebrovascular accidents, and progression to eclampsia.[4] In one observational study, pulmonary oedema occurred in about 2.3% of cases, and severe hepatic or neurological complications were similarly prominent.[5] Maternal mortality remains significant in resource-constrained settings, with reported rates up to 1.7%.[6]

Neonatal outcomes are also jeopardised. Severe preeclampsia is associated with increased rates of preterm birth, intrauterine growth restriction (IUGR), low birth weight, stillbirths, and respiratory distress syndrome (RDS).[7] In a South African study, stillbirths occurred in approximately 22% of pregnancies complicated by severe preeclampsia or eclampsia; over half of live-born infants required


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NICU support, with early neonatal death linked to prematurity and very low birth weight[5]. In Ethiopia, nearly half (46.5%) of neonates born to severe preeclamptic mothers experienced unfavourable perinatal outcomes, with preterm gestational age being a strong predictor.[8]

A systematic review confirmed that preeclampsia significantly increases risks for respiratory morbidity, neonatal death, IUGR, preterm birth, and NICU admission.[9] Notably, studies show that gestational age is a pivotal determinant of neonatal survival: each advancing week markedly improves outcomes, reinforcing the strategy of prolonging pregnancy when safely possible.[5,8]

Given the high burden of adverse outcomes, there is a compelling need to elucidate the full spectrum of maternal, foetal, and neonatal sequelae in women diagnosed with severe preeclampsia. While antenatal corticosteroids, antihypertensive therapies, magnesium sulphate for seizure prophylaxis, and timely delivery remain the standard of care, the clinical trajectory varies widely depending on gestational age at onset, severity of organ dysfunction, and healthcare resource availability.[4,6]

Despite existing studies, regional data on maternal and fetal outcomes of severe preeclampsia remain limited in our population. This study aimed to systematically determine the maternal, foetal, and neonatal outcomes associated with severe preeclampsia. We will analyse the rates of maternal complications (for example, HELLP syndrome and renal/hepatic dysfunction), gestational age at delivery, mode of delivery, foetal outcomes (e.g. stillbirth and IUGR), neonatal complications (e.g. preterm birth, NICU admission, RDS), and perinatal survival. Understanding these metrics will aid clinicians in risk stratification, guide the timing of delivery, and optimise management protocols, ultimately seeking to reduce the global burden of severe preeclampsia. Therefore, this study aimed to assess maternal, foetal, and neonatal outcomes in women with severe preeclampsia.

## MATERIALS AND METHODS

This prospective study involved 92 pregnant women with severe preeclampsia and eclampsia, all beyond 20 weeks of gestation, who were admitted to Madras Medical College between August 2017 and July 2018. The study received approval from the Institutional Ethics Committee, and written informed consent was obtained from the patients prior to their inclusion in the study.

**Inclusion Criteria**

Patients with singleton pregnancies, preeclampsia, and eclampsia who had normal blood pressure during the first 20 weeks of gestation were included in the study.

**Exclusion Criteria**

Patients with diabetes, renal disease, anaemia, chronic hypertension, gestational diabetes, multiple pregnancies, liver disease, GTN, and seizures were excluded.

**Methods**

The sample size was determined using convenience sampling, including all eligible cases during the study period. At the time of admission, detailed information on demographic, personal, medical, obstetric, and family histories was collected from the patient or her attendant. General physical, systemic, abdominal, and pelvic examinations were performed. All patients underwent tests, including complete blood count with absolute platelet count, liver function tests, renal function tests, coagulation profile, fundoscopy, and urine examination. Ultrasound was performed after the patient was stabilised. Obstetric care was provided according to the departmental protocol. Corticosteroids were administered if the gestational age was < 34 weeks. The timing and method of delivery were determined based on the individual conditions.

Patients with eclampsia were treated with magnesium sulphate using Zuspan's regimen. Antihypertensive medications, such as nifedipine and labetalol, were administered either alone or in combination. Obstetric care, including spontaneous or induced labour, was performed according to unit protocols, and delivery was performed either vaginally or by caesarean section. A paediatrician attended to the newborn at the time of delivery. Patients with uncontrolled blood pressure were managed by a physician and an anaesthetist. All mothers were followed up for six weeks to observe blood pressure changes and detect any other complications of eclampsia. All newborns were followed up during the early neonatal period to check for complications. Maternal and perinatal complications were also noted. Data are presented as frequencies and percentages using IBM SPSS V25..

## RESULTS

Most participants were aged 21–25 (36.3%) and 26–30 (34.1%), with only 1.1% above 35 years of age. The majority had completed schooling (68.1%), while 26.4% were still undergraduates. Most of them belonged to the lower (35.2%) and lower middle (27.5%) socioeconomic classes. Primigravida women accounted for 54.9%.

The majority were diagnosed between 28 and 34 weeks of gestation (62.6%) and delivered mostly between 35 and 37 weeks (50.55%). Obesity (47.3%) and overweight (30.8%) were more prevalent than normal BMI (22%). Caesarean section was the most common mode of delivery (60.8%), and 28.2% of the women underwent induced labour. Platelet counts were >1.5 lakh in 60.4% of cases, and 3+ proteinuria were the most frequent (42.9%), followed by 2+ (24.2%) (Table 1).


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**Table 1: Distribution of demographic, obstetric, and clinical characteristics**

| | | Frequency (%) |
|---|---|---|
| Age in years | ≤ 20 | 12 (13.2%) |
| | 21 - 25 | 34 (36.3%) |
| | 26 - 30 | 31 (34.1%) |
| | 31 - 35 | 14 (15.4%) |
| | > 35 | 1 (1.1%) |
| Educational status | PG | 4 (4.4%) |
| | Schooling | 63 (68.1%) |
| | UG | 24 (26.4%) |
| | Uneducated | 1 (1.1%) |
| Socioeconomic status | LM | 25 (27.5%) |
| | Lower | 33 (35.2%) |
| | UL | 6 (6.6%) |
| | UM | 28 (30.8%) |
| Parity | Multi | 41 (45.1%) |
| | Primi | 51 (54.9%) |
| Gestational age at diagnosis in weeks | < 28 | 27 (29.7%) |
| | 28 - 34 | 58 (62.6%) |
| | > 34 | 7 (7.7%) |
| Gestational age at delivery in weeks | 28 - 34 | 33 (36.26%) |
| | 35 - 37 | 47 (50.55%) |
| | > 37 | 12 (13.19%) |
| BMI | Normal | 20 (22%) |
| | Overweight | 28 (30.8%) |
| | Obese | 44 (47.3%) |
| Mode of delivery | C-section | 56 (60.8%) |
| | Induced | 26 (28.2%) |
| | Spontaneous | 10 (11%) |
| Platelet count | < 1 L | 5 (5.5%) |
| | 1 - 1.5 L | 31 (34.1%) |
| | > 1.5 L | 56 (60.4%) |
| Proteinuria | 1+ | 15 (16.5%) |
| | 2+ | 22 (24.2%) |
| | 3+ | 40 (42.9%) |
| | 4+ | 15 (16.5%) |

Among maternal outcomes, the majority were discharged without complications (49.5%), while 15.2% had impending eclampsia, 10.9% experienced postpartum haemorrhage, and 8.7% had placental abruption. HELLP syndrome (5.4%), eclampsia (4.9%), DIC (2.1%), pulmonary oedema (2.2%), and acute renal failure (1.1%) were less frequent.

Regarding neonatal outcomes, 28.2% required observation only, while 25% had low birth weight (LBW) with discharge. LBW with respiratory distress syndrome (RDS) and discharge was seen in 15.2%, and 13.2% of neonates expired. Other complications, such as IUD (5.2%), RDS with jaundice, NEC, and sepsis, were less common. Regarding birth weight, most babies weighed 2–2.5 kg (26.1%) or ≥2.5 kg (25%), followed by 1–1.5 kg (23.9%) and 1.5–2 kg (21.7%). Only 3.3% had a very low birth weight (<1 kg) (Table 2).

**Table 2: Distribution of maternal and neonatal outcomes**

| | | Frequency (%) |
|---|---|---|
| Maternal outcomes | Abruption | 8 (8.7%) |
| | ARF | 1 (1.1%) |
| | Dis | 46 (49.5%) |
| | Eclampsia | 4 (4.9%) |
| | DIC | 2 (2.1%) |
| | HELLP | 5 (5.4%) |
| | IE | 14 (15.2%) |
| | PPH | 10 (10.9%) |
| | Pulmonary oedema | 2 (2.2%) |
| Neonatal outcomes | Observation | 26 (28.2%) |
| | Expired | 12 (13.2%) |
| | IUD | 5 (5.2%) |
| | Jaundice | 1 (1.1%) |
| | LBW/dis | 23 (25%) |
| | LBW/RDS/dis | 14 (15.2%) |
| | RDS/jaundice/dis | 5 (5.5%) |
| | RDS/NEC/dis | 2 (2.2%) |
| | RDS/sep/dis | 2 (2.2%) |
| | LBW/RDS/NEC/dis | 1 (1.1%) |
| | VLBW/RDS/Sepsis/dis | 1 (1.1%) |


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| | | |
|---|---|---|
| Baby weight in kilograms | < 1 | 3 (3.3%) |
| | 1 - < 1.5 | 22 (23.9%) |
| | 1.5 - < 2 | 20 (21.7%) |
| | 2 - 2.5 | 24 (26.1%) |
| | ≥ 2.5 | 23 (25%) |

## DISCUSSION

In our study, most women with severe preeclampsia were between 21 and 30 years of age, showing that younger women were more commonly affected. This is similar to the findings of Jantasing and Tanawattanacharoen, where the mean maternal age was 30.7±6.3 years, and Moodley and Koranteng, where the average age was 29±6.4 years.[10,11] Although preeclampsia is often seen in first pregnancies, the risk is higher in women with limited sperm exposure to the same partner before conception. A previous pregnancy with the same partner lowers the risk; however, this protective effect is lost if the partner changes. In the present study, more than two-thirds of the women were nulliparous. These results are in line with the report by Conde-Agudelo and Belizan, which showed that nulliparity increases the risk of preeclampsia.[12]

Obesity and being overweight are major risk factors globally and are linked to a higher chance of developing cardiovascular disease, type 2 diabetes, and a shorter life span. In a study by Chaudhary et al., the average BMI in a pregnant population in Haryana was 28±5.9.[13] Compared to their findings, the number of obese women was higher in our study. Women who were overweight or obese had a higher chance of developing preeclampsia. High maternal haemoglobin levels are usually linked to better maternal and perinatal outcomes. Although this study did not aim to examine the link between haemoglobin levels at admission and the risk of preeclampsia, the average haemoglobin level at admission in our study was 12±5.0. Murphy et al. found that high haemoglobin levels during the first and second trimesters were linked with negative outcomes like preeclampsia.[14] Dekker et al. noted that repeated haemoglobin and haematocrit measurements may help monitor pregnancies at risk of uteroplacental insufficiency.[15]

Aghamohammadi et al. studied 1008 women in Iran and found that the chance of developing pregnancy-induced hypertension was 2.46 times higher in women with Hb ≥ 13.2 g/dl compared than in those with lower haemoglobin levels.[16] In our study, approximately 80% of the patients had a gestational age between 28 and 37 weeks, and 12% had reached term. These results are close to those reported by Shaikh et al., where the average gestational age was 27.04±3.44 weeks.[17] In our study, liver function was altered in 5.5% of cases, and kidney function was affected in 3.5% of cases. Singhal et al. reported higher rates, with 20% of patients showing abnormal liver tests and 27% showing abnormal kidney function tests.[18]

In our study, the rate of operative delivery was higher (60.8%) among patients with GDM. The choice of delivery method was based on the condition of the foetus, gestational age, and Bishop's score. Labour was induced after considering these factors. A study by Shaikh et al. reported a caesarean section rate of 73%, while 26.7% had vaginal delivery.[17] In our study, the maternal complications included imminent eclampsia in 15.2%, PPH in 10.9%, abruption in 8.7%, HELLP syndrome in 5%, eclampsia in 4.9%, and pulmonary oedema in 2.2% of the patients. A total of 49.5% of the patients were discharged without any complications due to timely delivery, monitoring of BP, and efficient intrapartum management. Abruption was seen in nine cases in the study by Shaikh et al., whereas another study by Singhal et al. showed that only one case had abruption.[17,18]

In our study, perinatal death occurred in 12 babies, including five with IUD. Shaikh et al. reported 14 IUDs, 18 neonatal deaths, and a perinatal loss of 38.6%. Most neonatal deaths were due to extreme prematurity and related issues. The higher rate of perinatal illness and death in pregnancies affected by preeclampsia is linked to early delivery and uteroplacental insufficiency, which leads to reduced blood flow to the fetus.[17]

Odendaal et al. also reported that perinatal survival improved with higher birth weight, and Moodley et al. later found that survival rates increased with advancing gestational age.[3,19] In our study, most intrauterine foetal deaths were caused by maternal abruption. Although many patients were administered steroid therapy, the outcomes were mainly affected by prematurity.

**Limitations**

This study is limited by its single-centre design, relatively small sample size, and lack of long-term neonatal outcome data.

## CONCLUSION

Our study showed that severe preeclampsia is a major cause of both maternal and perinatal illness and death, with early delivery being the main cause of poor outcomes in newborns. Many women experienced serious maternal complications, underscoring the importance of early detection and timely care. Differences from other studies may be due to variations in the population and the referral-based nature of our study setting.

The continued high rates of preeclampsia and eclampsia in low-resource settings are likely due to poor antenatal care and low awareness, especially among women from lower socioeconomic status. In our study, better outcomes were observed with timely


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use of magnesium sulphate, planned deliveries, and access to emergency obstetric care. Improving antenatal services, early identification, and quick treatment are important to reduce risks for both mother and baby. Ongoing monitoring and timely delivery with the support of family physicians and rural health services are important for effectively managing high-risk pregnancies.

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