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## Original Research Article

## Insights into fetomaternal outcomes in pre-eclampsia: A tertiary care center descriptive study

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## ABSTRACT

**Background:** Preeclampsia and eclampsia remain significant challenges in both maternal and perinatal health worldwide, with a pronounced impact in regions such as India, where access to comprehensive maternal care can be limited. The objective of this study was to examine the outcomes for both mothers and babies, along with the complications linked to severe cases of preeclampsia and eclampsia, within a tertiary healthcare facility situated in South India.

**Materials and Methods:** Sixty-five pregnant women diagnosed with severe preeclampsia or eclampsia were enrolled in this descriptive observational study conducted at a tertiary care teaching hospital, Chennai, spanning from March 2023 to December 2023. Inclusion criteria comprised women with singleton pregnancies exhibiting severe preeclampsia (defined by blood pressure  $\geq 160/110$  mmHg and 1+ or more albuminuria) or eclampsia. Exclusion criteria included chronic hypertension, multiple pregnancies, chronic renal disease, connective tissue disorder, neurological complications, and refusal of consent. Data on sociodemographic variables, obstetric characteristics, maternal symptoms, and complications were collected using a structured questionnaire. Maternal and fetal well-being were assessed through biochemical, radiological, and nonstress tests.

**Results:** The results revealed that 80% of the study population with severe preeclampsia or eclampsia fell within the age group of 21-30 years, with 49.2% aged between 26-30 years. Majority (60%) were primigravida. Common maternal symptoms included headache (60%), oedema (76.9%), with fewer experiencing epigastric pain (3.1%) and vaginal bleeding (15.4%). Complications observed were HELLP syndrome (12.35%), placental abruption (7.7%), and eclampsia (10.8%). Perinatal outcomes included intrauterine fetal death (4.6%), fetal growth retardation (23.1%), low birth weight (30.8%), respiratory distress syndrome (4.6%), and stillbirth (1.5%), with 35.4% being normal births.

**Conclusion:** This study emphasises the substantial impact of severe preeclampsia and eclampsia on the health of both mothers and fetuses, underscoring the importance of thorough antenatal care, prompt identification of risk factors, and timely interventions to minimise negative consequences. There is a clear call for additional research to investigate and implement effective strategies for prevention and management, aiming to decrease the morbidity and mortality rates associated with these hypertensive disorders during pregnancy.

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## 1. Introduction

Together with bleeding and infection, hypertensive disorders of pregnancy complicate around 10% of pregnancies globally and pose a severe health risk. Together, these three contribute significantly to maternal

morbidity and mortality.<sup>1</sup> The World Health Organization's comprehensive evaluations of maternal mortality indicate that hypertensive diseases account for about 16% of maternal deaths in affluent nations.<sup>2</sup> These illnesses are the third most common cause of maternal death in India.<sup>3</sup> Based on evidence-based guidelines from the American College of Obstetricians and Gynaecologists (ACOG) guidelines (2013b) and the National High Blood Pressure Education Programme (NHBPEP), hypertensive diseases in pregnancy are classified and defined.<sup>4</sup>

According to ACOG,

1. Preeclampsia, a complex condition affecting multiple bodily systems, is identified by a blood pressure measurement of  $\geq 140/90$  mm Hg on two occasions at least 4 hours apart and  $>0.3$  g protein in a 24-hour urine sample after 20 weeks of gestation in a woman who was previously normotensive.
2. Severe Preeclampsia is characterised by a blood pressure reading of  $\geq 160/110$  mm Hg and  $>5$  g protein in a 24-hour urine sample or the presence of symptoms indicating end-organ damage such as abnormal liver function tests, low platelet count, reduced urine output, visual disturbances, or fluid in the lungs.
3. Eclampsia, a severe complication, presents as generalised tonic-clonic seizures and unexplained coma in a woman with preeclampsia.<sup>4</sup>

Preeclampsia and eclampsia continue to be significant global hazards to maternal and neonatal health, even with advances in medical therapy. A host of potentially fatal outcomes can result from severe preeclampsia, such as eclampsia, cerebral haemorrhage, heart problems, liver and kidney failure, pulmonary oedema, disseminated intravascular coagulation (DIC), adult respiratory distress syndrome (ARDS), HELLP syndrome (Haemolysis, Elevated Liver Enzymes, Low Platelet count), retinal detachment, cortical blindness, hypoxic cerebral damage, and maternal mortality. Inadequate uteroplacental function is the leading cause of foetal problems, which include low birth weight, intrauterine foetal death (IUID), intrauterine growth restriction (IUGR), and preterm difficulties. Specific maternal and pregnancy characteristics, such as nulliparity, prior history of preeclampsia, advanced maternal age, multiple gestations, molar pregnancy, pregestational diabetes, vascular, endothelial, or renal diseases, maternal smoking, obesity, and particular genetic factors, have been identified as risk factors, even though there are currently no widely accepted biochemical markers for the early detection of preeclampsia.<sup>5</sup>

Numerous biological, biochemical, and biophysical markers have been investigated in detail in preeclampsia syndrome. Doppler velocimetry of the uterus performed in the latter stages of the first and second trimesters has shown promise as a predictive diagnostic for the emergence of

preeclampsia.<sup>5,6</sup> But as of right now, none of the other tests show adequate validity, cost-effectiveness, or reliability; the majority also show low sensitivity and positive predictive value (p). Though various treatments have been attempted to prevent or mitigate the severity of preeclampsia, none have yielded reliable or convincing results.<sup>1</sup> Early identification of risk factors, vigilant surveillance, timely therapies, and access to high-quality prenatal care are all necessary to minimise maternal and neonatal mortality and morbidity resulting from preeclampsia. This study was conducted at a tertiary care referral hospital in South India to evaluate the maternal and perinatal outcomes and difficulties related to severe preeclampsia and eclampsia.

## 2. Materials and Methods

This descriptive observational study was conducted at the tertiary care teaching in South India, Chennai, from March 2023 to December 2023. The study enrolled 65 patients with pregnancies complicated by the onset of pre-eclampsia.

### 2.1. Inclusion criteria

1. Women exhibiting severe preeclampsia, defined by a blood pressure reading of  $\geq 160/110$  mmHg accompanied by 1+ or more albuminuria. Additionally, women with eclampsia, characterised by seizures occurring in the context of preeclampsia and not attributed to other causes, were included.
2. Singleton pregnancies and patients who provided consent were included.

### 2.2. Exclusion criteria encompassed

1. Chronic hypertension (Pregnancy less than 20 weeks)
2. Multiple pregnancies
3. Chronic renal disease
4. Connective tissue disorder
5. Participants who declined consent
6. Other Neurological complications
7. Other associated medical conditions

Data on sociodemographic variables and obstetric characteristics were collected using a pre-designed and pre-tested structured questionnaire. Upon admission, patients were monitored for blood pressure, symptoms, and proteinuria and evaluated through various biochemical and radiological tests. Foetal well-being was assessed using nonstress tests. Details of labour and delivery modes were recorded, along with maternal and foetal conditions and complications.

The compiled data were analysed using SPSS, with the significance of statistical associations tested at a P value of less than 0.05.

3. Results

Out of 65 patients in the current study, pre-eclampsia was seen in 80% of the study population who were in the age group of 21- 30 years. Among them, 49.2% were 26 - 30 years old. 10.8% were less than 10.8%, and 9.2% were more than 30 years. (Table 1)

60% were Primigravida, and the rest 40% were Gravida 2. (Table 2)

60% of the study population had a headache. 3.1% had epigastric pain, 15.4% had bleeding per vagina, and 76.9% had oedema. (Table 3)

12.35 had HELLP syndrome, and 7.7 had abruption. 10.8% had eclampsia, and 1.5% had pulmonary oedema (Table 4)

Among the study participants, 4.6% of the study were Intra Uterine Death, 23.1% had Foetal growth retardation, 30.8% of the study population had low birth weight, 4.6% of the study population had Respiratory Distress syndrome, and 1.5% were stillbirth. 35.4% were normal. (Table 5)

Table 1: Distribution of study population according to age

Age group	Frequency	Percentage
Less Than 20 years	7	10.8
21-25 years	20	30.8
26-30 years	32	49.2
More than 30 years	6	9.2

Table 2: Distribution of study population according to parity

Parity	Frequency	Percentage
Multigravida	26	40.0
Primigravida	39	60.0

Table 3: Distribution of study population according to symptoms

Symptoms	Absent		Present	
	F	%	F	%
Headache	26	40.0	39	60.0
Epigastric pain	63	96.9	2	3.1
Bleeding per vaginum	55	84.6	10	15.4
Pedal Oedema / anasarca	15	23.1	50	

Table 4: Distribution of study population according to maternal outcomes

Maternal Factors	Absent		Present	
	F	%	F	%
HELLP	57	87.7	8	12.3
Abruptio	60	92.3	5	7.7
Eclampsia	58	89.2	7	10.8
Pulmonary Oedema	64	98.5	1	1.5
No Complications	22	33.8	43	66.2

Table 5: Distribution of study population according to neonatal outcomes

Neonatal Factors	Absent		Present	
	F	%	F	%
IUD	62	95.4	3	4.6
FGR	50	76.9	15	23.1
Prematurity	45	69.2	20	30.8
RDS	62	95.4	3	4.6
SB	64	98.5	1	1.5
Normal	42	64.6	23	35.4

4. Discussion

The study investigated maternal and neonatal outcomes among a specific population of pregnant women, categorised by age, parity, symptoms, and complications. The results provided insights into the distribution of various clinical factors and their correlation with adverse maternal and neonatal outcomes.

In this study, the highest proportion of women fell within the 26-30 age group (49.2%), followed by the 21-25 years group (30.8%). This age distribution is comparable to studies investigating pregnancy-related complications across different age groups. For instance, a study by M Lopian et al.<sup>7</sup> found that women aged 25-30 had a higher incidence of hypertensive disorders in pregnancy, including preeclampsia, compared to younger or older women. Similarly, Sibai et al.<sup>8</sup> highlighted that women over 30 are at a slightly increased risk of pregnancy complications such as preeclampsia. However, the risk tends to be higher in those over 35 years. The comparatively low percentage of women over 30 in the current study suggests that the population under investigation might experience fewer age-related risks compared to populations with more advanced maternal age.(Table 1)

In this study, 60% of women were primigravida, while 40% were multigravida. Primigravida status is associated with a higher risk of developing pregnancy complications, including preeclampsia and gestational hypertension, which aligns with findings in research by Bartsch et al.,<sup>9</sup> who noted that first pregnancies are more prone to hypertensive disorders. This finding is reinforced by S Panda et al.,<sup>10</sup> who observed that primigravida women had a higher rate of preeclampsia, leading to adverse maternal outcomes. Multigravida women, while at slightly reduced risk, are not entirely exempt from these complications. These findings support the higher risk of complications seen in the study population, particularly among primigravida women.(Table 2)

Headache (60%) and pedal oedema or anasarca (50%) were the most common symptoms observed, while epigastric pain and bleeding per vaginum were less frequent. These findings align with those reported by Steegers et al.<sup>5</sup> who emphasised that symptoms like headache and oedema

are strong indicators of hypertensive disorders in pregnancy. Sibai et al.<sup>11</sup> similarly found that headache is a primary symptom in women diagnosed with preeclampsia, while pedal oedema is often seen in more severe cases. This suggests that a substantial portion of the study population was likely at risk of hypertensive complications. The low frequency of epigastric pain (3.1%) contrasts with its higher occurrence in some studies, potentially reflecting the relatively lower incidence of HELLP syndrome (12.3%) in this population, as epigastric pain is a crucial symptom of this complication.(Table 3)

Maternal complications were present in 66.2% of the study population, with the most common complications being eclampsia (10.8%), HELLP syndrome (12.3%), and placental abruption (7.7%). These findings are consistent with the literature, which documents a similar range of complications in women with hypertensive disorders of pregnancy. Ghulmiyyah & Sibai<sup>12</sup> found that eclampsia is a severe complication that can occur in approximately 1-2% of pregnancies complicated by preeclampsia. Still, its incidence can rise to 10% in populations with limited access to antenatal care. The incidence of HELLP syndrome in this study (12.3%) mirrors findings by K Haram et al.,<sup>13</sup> who noted that HELLP occurs in about 10-20% of pregnancies with severe preeclampsia. Placental abruption, a life-threatening complication, was reported in 7.7% of the women, which is comparable to the 5-7% rate seen in women with hypertensive disorders, as reported by MacKay et al.<sup>14</sup> The high rate of maternal complications (66.2%) underscores the importance of timely intervention and monitoring in pregnancies complicated by hypertensive disorders.(Table 4)

Regarding neonatal outcomes, the most common adverse outcomes were prematurity (30.8%) and foetal growth restriction (FGR) (23.1%), followed by intrauterine death (IUD) (4.6%), stillbirth (SB) (1.5%), and respiratory distress syndrome (RDS) (4.6%). The high rates of prematurity and FGR align with findings from studies by Xiong et al.,<sup>15</sup> which reported a strong correlation between hypertensive disorders in pregnancy and premature delivery. The incidence of FGR in hypertensive pregnancies, often linked to placental insufficiency, was also found to be around 20-25%, similar to the rates seen in this study. The relatively low rate of stillbirth (1.5%) and intrauterine death (4.6%) suggests that while adverse neonatal outcomes are prevalent, they are not as high as in populations with more severe maternal complications, as reported by Brown et al.<sup>16</sup> However, the overall rate of adverse neonatal outcomes (65.6%) remains high, necessitating improvements in antenatal care to prevent complications like prematurity and FGR. Our study did not result in any maternal deaths. Still, it did include two instances of maternal near-misses caused by HELLP syndrome, which were handled by a multidisciplinary team in the critical care unit of our hospital.(Table 5)

## 5. Conclusion

The study highlights the significant impact of severe preeclampsia and eclampsia on the health outcomes of both mothers and newborns within the Indian context. Notably, primigravidae, particularly those under 20 years old, were identified as a high-risk group, with a higher incidence of severe preeclampsia observed among them. The presence of uteroplacental insufficiency as a significant contributor to intrauterine growth restriction (IUGR) underscores the importance of early detection and management of these conditions. Moving forward, comprehensive antenatal care tailored to the unique needs of Indian women is essential for improving maternal and neonatal health outcomes in cases of severe preeclampsia and eclampsia.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

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