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Original Research Article

Clinical Profile and Outcomes of Preeclampsia in Tertiary Care Hospitals

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Abstract

Background: Preeclampsia is a hypertensive disorder that occurs during pregnancy, defined as the development of hypertension and proteinuria after 20 weeks of gestation. It causes significant morbidity and mortality around the world, especially in developing countries. The condition can cause very serious maternal complications, including eclampsia, HELLP syndrome, and organ dysfunction, and it also adversely affects fetal growth and survival. To enhance the delivery of maternal and neonatal care, it is important to understand the clinical characteristics and outcomes of preeclampsia.

Methods: The study was a prospective observational study carried out in the Department of Obstetrics and Gynecology, Sri Krishna Medical College and Hospital (SKMCH), Bihar, from July 2025 to December 2025. 100 pregnant women were recruited who were diagnosed with preeclampsia at over 20 weeks of gestation. The demographic features, obstetric history, clinical manifestations, laboratory data and maternal and fetal outcomes were documented and analyzed descriptively and inferentially with statistical methods.

Results: Most of the patients were in the age group of 20 to 25 years (45%) and (62%) were primigravida. The most frequently reported combinations of symptoms were headache (72%) and edema (65%). 42% of cases were observed with severe preeclampsia. Cesarean delivery was performed in 56% of patients, eclampsia and HELLP syndrome in 10% and 6% of cases, respectively, and admission to the ICU was observed in 12% of patients. Adverse fetal outcomes were low birth weight (42%), preterm delivery (38%), admission to Neonatal Intensive Care Unit (NICU) (26%) and stillbirth (4%).

Conclusion: Preeclampsia is one of the major causes of morbidity contributor to maternal and neonatal in tertiary care centers. The age group of young primigravida women was more commonly affected, and significant maternal and fetal complications were observed. Early diagnosis, regular antenatal surveillance, prompt referral, and timely management are crucial to minimizing adverse outcomes. Improving maternal healthcare services and neonatal support services could potentially further contribute to the improvement of pregnancy outcomes in resource-limited settings.

Keywords: Preeclampsia, Hypertensive Disorders of Pregnancy, Maternal Outcomes, Fetal Outcomes, Primigravida, Cesarean Delivery, Low Birth Weight.

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Introduction

Preeclampsia is defined as a hypertensive disorder that occurs during pregnancy, with the onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman [1]. It is a multi-system disorder that may involve several maternal organs including the kidneys, liver, brain, and cardiovascular system.

Preeclampsia is a serious public health problem, one of the most significant causes of maternal and perinatal morbidity and mortality around the world, especially in developing countries [2]. The worldwide estimates are that hypertensive disorders affect 5–10% of all pregnancies, with the majority of these being preeclampsia [3,4]. The condition is a major cause of poor maternal outcomes, including eclampsia, stroke, renal failure, and maternal death, as well as preterm delivery, fetal growth restriction, and perinatal mortality [5].

In India, preeclampsia continues to be a major contributor to maternal and neonatal health complications [6]. Preeclampsia affects 3% to 10% of pregnancies and can occur in different areas of

the world and in various health care environments [7]. Although the antenatal health services have improved, there is still insufficient awareness, access to health services and referral systems, resulting in a high proportion of women arriving with a late presentation and with severe disease [8]. Therefore, preeclampsia continues to be a major contributor to maternal death and poor neonatal outcomes, especially in low- and middle-income countries where timely management and early diagnosis may be difficult.

The mechanisms underlying the development of preeclampsia remain incompletely understood and are complex [9]. There is current evidence that abnormal placentation during early pregnancy can result in failure to remodel the uterine spiral arteries, causing a decrease in placental blood flow and placental ischemia [10]. Various inflammatory mediators and antiangiogenic factors are released into the maternal circulation by the ischemic placenta, resulting in generalized endothelial dysfunction. The endothelial damage leads to vasoconstriction, increased vascular permeability and activation of the coagulation system and results in hypertension, proteinuria and multisystem organ involvement [11]. These pathological changes can occur very rapidly, and lead to severe maternal and fetal complications if not recognized and managed promptly.

The importance of preeclampsia is that it can have an impact on the health of both maternal and fetal health. Maternal complications are associated with eclampsia, HELLP syndrome, placental abruption, acute kidney injury and admission to the Intensive Care Unit (ICU) [12]. Preeclampsia for the fetus is associated to intrauterine growth restriction, low birth weight, prematurity, fetal distress, and increased neonatal mortality. Thus, early diagnosis of high-risk pregnancies and prompt treatment is essential for better pregnancy outcomes and to prevent avoidable complications.

Bihar is one of the most densely populated states in India, and it also has a considerable problem in maternal health delivery. SKMCH, Bihar, is a tertiary health-care referral center with a large number of complex obstetric cases, including severe preeclampsia. The clinical profile and outcomes of preeclampsia in this setting are crucial for understanding the patterns of the disease, common complications and maternal and fetal outcomes. The results of this study could help in the development of an improved clinical management plan, enhanced antenatal surveillance and better resource allocation in preventing and managing preeclampsia in tertiary health care institutions.

Objectives

- To evaluate the clinical profile of preeclampsia patients.
- To assess the effect on maternal outcomes.
- To assess the fetal outcome.
- To recognize complications of severe preeclampsia.

Materials and Methods

Study Design and Setting: This prospective observational study was conducted in the Department of Obstetrics and Gynecology at SKMCH, Bihar, a tertiary care teaching hospital, which is a major referral centre for high-risk pregnancies in the region. The study carried out over a period of 6 months from July 2025 to December 2025. The goal was to compare the clinical characteristics and the fetal and maternal outcomes of pregnant women with preeclampsia who were admitted to the hospital during the study period.

Study Population and Sample Size: The study population consisted of pregnant women diagnosed with preeclampsia and admitted to the obstetrics ward or labor room of SKMCH during the study period. Eligible patients were consecutively sampled for a total of 100 patients. All participants were informed about the aims of the research, and those who provided written informed consent were incorporated into the research.

Inclusion and Exclusion Criteria: Pregnant women aged over 20 weeks according to their gestational age, who had the diagnostic criteria of preeclampsia and agreed to participate in the study, were included. To reduce the number of potential confounding factors and obtain reliable results, women who had a history of chronic hypertension prior to the pregnancy, renal disorders, autoimmune diseases or incomplete medical records were excluded.

Diagnostic Criteria: Diagnosis for preeclampsia was made based on the current definition by the American College of Obstetricians and Gynecologists (ACOG) and the World Health Organization (WHO). Preeclampsia was defined as ≥140/90 mmHg on two separate occasions at least 4 hours apart after 20 weeks of gestation and proteinuria of ≥300 mg/24 hours or an equivalent positive urine protein assessment.

Data Collection: A structured case record form was used to collect data. Information collected was demographic data, age, place of residence, socioeconomic status, and educational level. Obstetric parameters like gravidity, parity and gestational age at presentation were noted. Clinical data such as blood pressure, presence of edema, headache, visual disturbances and level of proteinuria were recorded. Laboratory tests of hemoglobin concentration, platelet count, liver

function tests, and kidney function tests were performed. The maternal outcome measures were the development of eclampsia, HELLP syndrome, ICU admission, mode of delivery, and maternal death. Fetal outcomes assessed were preterm birth, low birth weight, NICU admission, stillbirth, and neonatal mortality.

Statistical Analysis: All the collected data were analyzed through the SPSS software. The quantitative variables were presented as mean ± Standard Deviation (SD), and the categorical variables were presented as frequencies and percentages. The chi-square test was used to determine if there was an association between variables. Statistically significant p-values ($p<0.05$) were obtained.

Ethical Considerations: This study protocol was approved by the Institutional Ethics Committee of SKMCH, Bihar.

All participants signed informed consent forms before entering the study. Patient confidentiality and anonymity were strictly observed throughout the study, and all procedures followed ethical guidelines for medical research using human participants.

Results

The study carried out at the Department of Obstetrics and Gynecology, SKMCH, Bihar, from July 2025 to December 2025 included 100 pregnant women with preeclampsia. The following describes the demographic, obstetric profile, clinical presentation, severity of disease and maternal and fetal outcomes.

Table 1: Demographic Characteristics of Study Participants (N = 100)

Variable	Frequency	Percentage (%)
Age Group (Years)		
<20	12	12.0
20–25	45	45.0
26–30	30	30.0
>30	13	13.0
Residence		
Rural	68	68.0
Urban	32	32.0
Education		
Illiterate	18	18.0
Primary Education	28	28.0
Secondary Education	36	36.0
Graduate and Above	18	18.0

Demographic Findings: Most of the participants of the study were aged 20-25 years (45%), and 26-30 years (30%). The proportion of women below 20 years old (12%) and above 30 years (13%) was the highest. The majority of the participants came from rural communities (68%) and the rest from urban communities (32%). As for education, it was found that the secondary level was the highest level of education obtained (36%), while the primary level was the second most common (28%). Illiterate women and graduates each constituted 18% of the study population. The results indicated that young women from rural areas were more likely to develop preeclampsia.

Table 2: Obstetric Profile of Participants

Variable	Frequency	Percentage (%)
Primigravida	62	62.0
Multigravida	38	38.0
Gestational Age 20–28 Weeks	18	18.0
Gestational Age 29–36 Weeks	54	54.0
Gestational Age >36 Weeks	28	28.0

Obstetric Profile: Of the obstetric characteristics, 62% were primigravida and 38% were multigravida. The majority (54%) of participants were at 29–36 weeks gestation. 18% of them were diagnosed between 20-28 weeks and 28% were diagnosed beyond 36 weeks gestation. This reported relationship between first pregnancy and the onset of preeclampsia in women.

Table 3: Clinical Presentation of Preeclampsia

Clinical Feature	n (%)
Headache	72 (72.0)
Edema	65 (65.0)
Blurred Vision	28 (28.0)
Epigastric Pain	20 (20.0)

Clinical Presentation: Of the presenting symptoms, headache was the most common, reported by 72% of patients. The second most common clinical feature was edema in 65% of the cases. Blurred vision was found in 28% and epigastric pain in 20% of women. These symptoms suggest that preeclampsia affects the entire body and reflects the severity of the disease.

Table 4: Severity of Preeclampsia

Severity	Frequency	Percentage (%)
Mild Preeclampsia	58	58.0
Severe Preeclampsia	42	42.0

Severity Distribution: Of the 100 participants, 58% were diagnosed with mild preeclampsia, which was treated with careful monitoring and medications. The majority (42%) of women who presented to the tertiary care facility were diagnosed with severe preeclampsia, presenting a significant proportion of advanced disease. The relatively high proportion of severe cases may be attributed to delayed referrals and late presentation to healthcare services.

Table 5: Maternal Outcomes

Outcome	Frequency	Percentage (%)
Cesarean Delivery	56	56.0
Eclampsia	10	10.0
HELLP Syndrome	6	6.0
ICU Admission	12	12.0

Maternal Outcomes: Maternal outcome assessment revealed that cesarean section (56%) was the most common intervention. 10% of women were at risk of developing eclampsia despite treatment and monitoring. In 6% of cases, HELLP syndrome was found, causing significant maternal morbidity. Furthermore, 12% of the patients were admitted to the ICU because of the intense nature of the symptoms of the disease and associated complications. No maternal deaths were recorded during the study period.

Table 6: Fetal Outcomes

Outcome	Frequency	Percentage (%)
Preterm Birth	38	38.0
Low Birth Weight	42	42.0
NICU Admission	26	26.0
Stillbirth	4	4.0

Fetal Outcomes: Neonatal outcomes were significantly affected by preeclampsia. The highest frequency fetal complication was low birth weight, which occurred in 42% of newborns. 38% of pregnancies were preterm, which indicates that severe maternal conditions were the reason for early delivery. 26% of neonates were admitted to the NICU for specialized care.

The percentage of stillbirths was 4%. The results of these studies reflect the severe impact of preeclampsia on fetal growth, development and neonatal survival.

Discussion

The clinical profile and the maternal-fetal outcome of preeclamptic women were evaluated in the present study in 100 pregnant women admitted to SKMCH, Bihar. The results indicate that preeclampsia continues to be an important factor in poor maternal and neonatal outcomes in tertiary care settings.

Most patients were in the age group of 20-25 years, similar to the age group of patients observed by [13] and a few of the Indian tertiary hospital studies, which reported that preeclampsia was more common in younger women of reproductive age. The prevalence of preeclampsia was higher in

primigravida women (62%), and correlated with the results of [14] and others who showed that the first pregnancy was a significant risk factor for the development of preeclampsia. This increased susceptibility may be due to immunological maladaptation and poor placentation in primiparas.

As for clinical presentation, the most common symptom was headache, followed by edema and epigastric pain. The same observation is made in previous Indian studies, as neurological symptoms and edema were common findings in preeclampsia. In this study, 42% of women had severe preeclampsia at admission, suggesting a significant proportion of high severity of preeclampsia at the time of admission.

Maternal outcomes the rate of cesarean section was 56%, which is similar to the tertiary level studies reported in India. The high cesarean rate can be explained by the requirement to deliver the babies quickly, in the event of complications to the maternal and fetal complications [15].

The prevalence of eclampsia was 10%, and the prevalence of admission to the ICUs was 12%. Similar to previous results, show that women with poorly controlled preeclampsia have a higher risk for severe maternal complications.

Fetal outcomes also demonstrated substantial morbidity. Preterm delivery rate was 38%, low weight was observed in 42% of neonates, and 26% of neonates were admitted to NICU. The results reported here are similar to previous studies and other Indian researchers who have found that placental insufficiency caused by preeclampsia often leads to fetal growth restriction and preterm birth.

The observed maternal and fetal complications may be explained by delayed antenatal care utilization of antenatal care services, late referral from peripheral health services and severity of presentation. SKMCH is a tertiary care hospital, so there are more difficult cases presented and this might explain the high percentage of severe cases.

This study has several strengths; it is prospective, and the hospital is a tertiary care center where detailed assessment of clinical characteristics and outcomes can be obtained. The study is, however, limited by being a single-center study, the relatively small sample size, and the relatively short duration of the study, which can make the results from the study difficult to generalize to other settings.

Conclusion

Preeclampsia remains a significant cause of maternal and perinatal morbidity in tertiary care hospitals. The most common clinical features were headache, edema and hypertension. Maternal complications included cesarean delivery, eclampsia, HELLP syndrome and admission to the ICU, and fetal complications included preterm birth, low birth weight and higher rates of admission to the NICU. Early diagnosis, continued antenatal monitoring and intervention are critical to enhance maternal and neonatal health.

Recommendations

Screening of women regularly during their pregnancy for blood pressure and proteinuria should be reinforced at all levels of health care to ensure the early diagnosis of preeclampsia. High-risk pregnancies should be referred immediately to tertiary care for specialized management. Educational programs to raise awareness of warning signs among pregnant women. Improving intensive care facilities is also necessary. Moreover, larger multicentric studies throughout Bihar should be conducted to generate more evidence about the clinical presentation and outcome of preeclampsia.

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