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Fetal and Maternal Outcomes among Pregnancies Complicated by Hypertensive Disorders at a Tertiary Care Hospital in Nepal

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ABSTRACT

Background

Hypertensive disorders during pregnancy are major contributors to maternal and perinatal morbidity and mortality worldwide. They complicate approximately 5-10% of pregnancies and are among the most common medical disorders encountered during pregnancy. This study aimed to evaluate maternal and fetal outcomes among hypertensive pregnancies compared with normotensive pregnancies. To compare maternal and fetal outcomes between hypertensive and normotensive pregnancies at a tertiary care hospital in Nepal.

Methods

A hospital-based prospective matched comparative study was conducted in the Department of Obstetrics and Gynecology, Dhulikhel Hospital, Nepal, from August 2025 to February 2026. A total of 240 pregnant women were enrolled, including 120 hypertensive and 120 normotensive women. Case and Controls were matched by parity. Data were collected using structured questionnaires, interviews, and medical record review. Odds ratios (OR) with 95% confidence intervals (CI) were calculated using SPSS version 21. A p-value <0.05 was considered statistically significant.

Results

Antepartum hemorrhage (OR=3.14, p=0.016), postpartum hemorrhage (OR=2.43, p=0.026), NICU admission (OR=5.52, p<0.001), and low birth weight (OR=3.80, p=0.001) were significantly higher among hypertensive pregnancies. Neonatal death and low Apgar score were higher but not statistically significant.

Conclusions

Hypertensive disorders during pregnancy were associated with significantly increased maternal and fetal complications. Early diagnosis, close monitoring, and timely management are essential to improve maternal and neonatal outcomes.

Keywords: Fetal outcome; Hypertension; Maternal outcome; Pregnancy; Preeclampsia.

***Correspondence:** Dr. Sweta Mahato, Department of Obstetrics and Gynecology, Dhulikhel Hospital, Kavrepalanchok, Nepal. Email: swetakusms@gmail.com, Phone:+9779849288563 **Article received:** 2026-03-08. **Article accepted:** 2026-06-12. **Article published**: 2026-06-30.

INTRODUCTION

Hypertensive disorders of pregnancy (HDP), including gestational hypertension, preeclampsia, and eclampsia, are among the leading causes of maternal and perinatal morbidity and mortality worldwide. These disorders complicate approximately 5-10% of pregnancies and remain a major public health concern, particularly in low- and middle-income countries.[1] Pregnancy-induced hypertension is commonly defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg occurring after 20 weeks of gestation in a previously normotensive woman.[2] According to the World Health Organization (WHO), hypertensive disorders of pregnancy account for approximately 14% of maternal deaths globally and remain one of the leading preventable causes of maternal and perinatal morbidity and mortality, particularly in resource-limited settings.[3] These disorders are associated with several adverse fetal and neonatal outcomes, including preterm birth, low birth weight, intrauterine growth restriction, and neonatal mortality. In addition to immediate pregnancy-related complications, affected women are at increased long-term risk of chronic hypertension, cardiovascular disease, and renal disease later in life.[4] In Nepal, hypertensive disorders of pregnancy remain a major contributor to maternal mortality. Preeclampsia and eclampsia are reported as the second leading direct causes of maternal death at the community level after postpartum hemorrhage and the leading direct causes of maternal mortality in health facilities, accounting for nearly 30% of maternal deaths.[5] The Nepal Maternal Mortality and Morbidity Study (2008/2009) reported that approximately 21% of maternal deaths were attributable to eclampsia, reflecting an increase from 14% reported in 1998. [6] Several studies have demonstrated a strong association between hypertensive disorders and adverse maternal and perinatal outcomes. A study conducted in Nepal reported that among 8,265 deliveries, 2.18% of women developed preeclampsia, which contributed significantly to maternal complications, perinatal deaths, preterm births, and low-birth-weight infants.[7] However, despite the substantial burden of hypertensive disorders during pregnancy in Nepal, there is limited recent evidence comparing maternal and fetal outcomes between hypertensive and normotensive pregnancies in tertiary care settings. Most available Nepalese studies have primarily focused on preeclampsia and eclampsia alone or have included relatively small sample sizes.

Therefore, this study was conducted to assess and compare maternal and fetal outcomes among hypertensive and normotensive pregnancies at a tertiary care hospital in Nepal. The findings may help strengthen early identification, risk stratification, and management strategies for hypertensive disorders during pregnancy, ultimately improving maternal and neonatal outcomes.

METHODS

Study Area

The study was conducted in the Department of Obstetrics and Gynecology at Dhulikhel Hospital, Kathmandu University Hospital, Nepal.

Study Design

This was a hospital-based prospective matched comparative study.

Sample size and sampling

The sample size was calculated using the formula for comparative studies with a 95% confidence level, 80% power, and an expected proportion of adverse fetal outcomes among hypertensive pregnancies based on previous literature. The minimum required sample size was 110 participants in each group. After adjusting for possible non-response and incomplete data, the final sample size was increased to 120 cases and 120 controls.

Inclusion criteria:Pregnant women aged 18 years and above, women diagnosed with hypertensive disorders of pregnancy (cases), normotensive pregnant women admitted during the same study period (controls) ans women who provided written informed consent

Exclusion criteria: Chronic hypertension diagnosed

before pregnancy or before 20 weeks of gestation, known renal disease, cardiovascular disease, diabetes mellitus, or other major systemic illnesses, multiple pregnancies (twins or higher-order gestations) ans women who did not provide written informed consent

Data Collection

The study was conducted from August 2025 to February 2026. Ethical approval for the study was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences on 14 August 2025 (Ref. No.: 247/25). After obtaining written informed consent, eligible participants were enrolled at admission and prospectively followed until delivery and discharge. Cases included pregnant women diagnosed with hypertensive disorders of pregnancy, while controls included normotensive pregnant women admitted during the same study period. Controls were frequency matched with cases according to parity to minimize confounding. Consecutive eligible participants meeting the inclusion criteria were enrolled during the study period. Socio-demographic, obstetric, and clinical information were collected using a structured questionnaire and medical record review. Participants were followed throughout their hospital stay until delivery and discharge.

Maternal outcomes assessed included antepartum hemorrhage (APH), HELLP syndrome, and postpartum hemorrhage (PPH). Fetal outcomes included neonatal intensive care unit (NICU) admission, neonatal death, low birth weight (LBW), and low APGAR score.

Data Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 21. Descriptive statistics were expressed as frequency and percentage. Chi-square test was used to compare categorical variables. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to assess the association between hypertensive disorders and maternal and fetal outcomes. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 240 pregnant women were enrolled in the study, including 120 hypertensive pregnant women and 120 normotensive pregnant women. The majority of hypertensive pregnant women belonged to the 26-30 years age group (43.3%), followed by 31-35 years (27.5%). There was no statistically significant difference in age distribution between the two groups (p=0.33). (Table 1).

Table 1: Age distribution of hypertensive and normotensive pregnant women (n = 240).

Age group (years)	Hypertensive n (%)	Normotensive n (%)	p-value
<20	8 (6.7)	16 (13.3)	0.33
21-25	27 (22.5)	29 (24.2)	
26-30	52 (43.3)	47 (39.2)	
31-35	33 (27.5)	28 (23.3)	

Most participants in both groups had primary-level education and were housewives. Cephalic presentation was the most common fetal presentation in both groups. No statistically significant differences were observed between the groups regarding education, occupation, fetal presentation, or antenatal care visits. ANC visits were significantly higher among normotensive women compared to hypertensive women (p=0.005). (Table 2).

Table 2: Sociodemographic and obstetric characteristics of study participants (n= 240).

Category	Hypertensive n (%)	Normotensive n (%)	p-value
Education			
Illiterate	43 (35.8)	32 (26.7)	0.76
Primary	51 (42.5)	60 (50.0)	
Secondary	26 (21.7)	28 (23.3)	
Occupation			
Housewife	61 (50.8)	46 (38.3)	0.34
Business	33 (27.5)	52 (43.3)	
Student	26 (21.7)	22 (18.3)	
Presentation			
Cephalic	108 (90.0)	112 (93.3)	0.16
Breech	9 (7.5)	7 (5.8)	
Transverse	3 (2.5)	1 (0.8)	
ANC visits			
≤8	42 (35.0)	38 (31.7)	0.005
>8	78 (65.0)	82 (68.3)	

Maternal complications were more common among women with hypertensive disorders of pregnancy compared to normotensive women. Antepartum hemorrhage was significantly higher among hypertensive pregnancies (14.2% vs 5.0%; OR=3.14, 95% CI: 1.19-8.27, p=0.016). Similarly, postpartum hemorrhage was significantly more common among hypertensive women (18.3% vs 8.3%; OR=2.43, 95% CI: 1.10–5.39, p=0.026). Although HELLP syndrome was more frequent among hypertensive pregnancies, the association was not statistically significant. (Table 3).

Table 3: Maternal complications among hypertensive and normotensive pregnancies (n = 240).

Complication	Hypertensive n (%)	Normotensive n (%)	OR (95% CI)	p-value
APH	17 (14.2)	6 (5.0)	3.14 (1.19-8.27)	0.016
HELLP syndrome	3 (2.5)	2 (1.7)	1.51 (0.25-9.23)	0.89
PPH	22 (18.3)	10 (8.3)	2.43 (1.10-5.39)	0.026

Fetal complications were more common among hypertensive pregnancies compared to normotensive pregnancies. NICU admission was significantly higher among hypertensive pregnancies (22.5% vs 5.0%; OR=5.52, 95% CI: 2.19-13.95, p<0.001). Low birth weight was also significantly associated with hypertensive disorders of pregnancy (25.8% vs 8.3%; OR=3.80, 95% CI: 1.70-8.25, p=0.001). Although neonatal death and low Apgar score were more frequent among hypertensive pregnancies, these associations were not statistically significant.

Table 4: Fetal outcomes among hypertensive and normotensive pregnancies (n = 240).

Outcome	Hypertensive n (%)	Normotensive n (%)	OR (95% CI)	p-value
NICU admission	27 (22.5)	6 (5.0)	5.52 (2.19-13.95)	<0.001
Neonatal death	5 (4.2)	2 (1.7)	2.57 (0.49-13.50)	0.12
Low birth weight	31 (25.8)	10 (8.3)	3.80 (1.70-8.25)	0.001
Low APGAR score	11 (9.2)	5 (4.2)	2.32 (0.78-6.90)	0.13

DISCUSSION

The present study evaluated maternal and fetal outcomes among pregnancies complicated by hypertensive disorders at a tertiary care hospital in Nepal. The findings demonstrated that hypertensive disorders of pregnancy were significantly associated with increased maternal and fetal complications compared to normotensive pregnancies. These findings highlight the persistent burden of hypertensive disorders on maternal and neonatal health, particularly in low- and middle-income countries.

Hypertensive disorders of pregnancy remain a major global public health challenge and a leading cause of maternal and perinatal morbidity and mortality. According to the World Health Organization, hypertensive disorders account for approximately 14% of maternal deaths globally and contribute substantially to adverse neonatal outcomes such as preterm birth, low birth weight, and neonatal intensive care unit (NICU) admission. [7] In Nepal, preeclampsia and eclampsia continue to be among the leading direct causes of maternal mortality, particularly in tertiary care settings where complicated referrals are commonly managed.[8]

In the present study, most hypertensive pregnant women belonged to the 26-30 years age group, followed by 31-35 years. Similar findings have been reported in studies conducted in Nepal and other South Asian countries, where hypertensive disorders were more commonly observed among women in the peak reproductive age group .[9] The present study also observed a higher proportion of hypertensive disorders among multigravida women, which is consistent with findings from previous regional studies. [10] This may be related to cumulative vascular and metabolic stress associated with repeated pregnancies.

Maternal complications such as antepartum

hemorrhage and postpartum hemorrhage were significantly more common among hypertensive pregnancies in the present study. Similar findings have been reported in studies from India, Ghana, and Nigeria, which demonstrated increased obstetric complications among women with hypertensive disorders of pregnancy.[11] The underlying pathophysiology involving abnormal placentation, endothelial dysfunction, systemic vasospasm, and coagulation abnormalities may contribute to the increased risk of hemorrhagic and multisystem complications observed among hypertensive pregnancies.

Regarding fetal outcomes, NICU admission and low birth weight were significantly higher among hypertensive pregnancies. Comparable findings have been reported in recent South Asian studies demonstrating increased risks of fetal growth restriction, prematurity, and neonatal complications among hypertensive mothers.[12] Chronic uteroplacental insufficiency resulting in fetal hypoxia, reduced placental perfusion, and impaired nutrient transfer may explain the increased risk of adverse neonatal outcomes.

Although neonatal death and low Apgar scores were more frequent among hypertensive pregnancies in the present study, the associations were not statistically significant. This may be attributed to improved neonatal intensive care services, timely neonatal resuscitation, and the relatively small sample size, which may have limited the statistical power to detect significant differences for less frequent outcomes.

The findings of this study have important public health implications. Strengthening routine antenatal screening for hypertension, early identification of high-risk pregnancies, and timely referral to tertiary care centers are essential to reduce adverse maternal and neonatal outcomes. Improving community awareness regarding danger signs during pregnancy, promoting regular antenatal care attendance, and implementing standardized management protocols for hypertensive disorders may further improve pregnancy outcomes in Nepal. In addition, strengthening neonatal intensive care services and training healthcare providers in evidence-based management strategies are important to reduce preventable maternal and perinatal morbidity and mortality.

Overall, this study emphasizes the importance of early diagnosis, close maternal and fetal monitoring, and timely intervention in pregnancies complicated by hypertensive disorders to improve maternal and neonatal outcomes in resource-limited settings such as Nepal.

Limitations

This study has several limitations that should be considered while interpreting the findings. First, as this was a hospital-based prospective matched comparative study conducted in a tertiary care center, the findings may not be generalizable to the wider population, particularly women delivering in primary healthcare settings or rural communities. Referral bias may also have occurred because complicated cases are more likely to be managed at tertiary hospitals.

Second, the study included a relatively limited sample size, which may have reduced the statistical power to detect significant associations for less frequent outcomes such as neonatal death and HELLP syndrome.

Third, although parity matching was performed, residual confounding from other factors such as socioeconomic status, nutritional status, body mass index, and pre-existing medical conditions could not be completely excluded.

Conclusions

Pregnant women with hypertensive disorders were found to have significantly increased risks of adverse maternal and fetal outcomes, particularly antepartum hemorrhage, postpartum hemorrhage, neonatal intensive care unit (NICU) admission, and low birth weight compared to normotensive pregnant women. Although neonatal death, HELLP syndrome, and low Apgar scores were more frequent among hypertensive pregnancies, these associations were not statistically significant in the present study. The findings emphasize the importance of

early detection and appropriate management of hypertensive disorders during pregnancy to reduce maternal and neonatal complications. Regular antenatal blood pressure screening, timely referral of high-risk pregnancies, close maternal and fetal monitoring, and adherence to evidence-based treatment protocols are essential for improving pregnancy outcomes.

Strengthening antenatal care services, increasing awareness regarding danger signs during pregnancy, and improving access to emergency obstetric and neonatal care, especially in resource-limited settings, may help reduce the burden of hypertensive disorders and associated maternal and perinatal morbidity in Nepal.

Ethics approval: Ethical approval for the study was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences on 14 August 2025 (Ref. No.: 247/25).

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Author contributions

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