

Outcome of Hypertensive Disorders of Pregnancy

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Abstract

Hypertension is the most common medical problem encountered in pregnancy and are leading causes of maternal, fetal and neonatal morbidity and mortality worldwide. Definitions, classifications, assessment and management of hypertensive disorders vary considerably in the literature and from country to country. In light of this, we aimed to evaluate different types of hypertensive disorders of pregnancy and to determine the impact of hypertensive disorders of pregnancy (HDP) on maternal, fetal and neonatal outcomes. This Cross Sectional descriptive study was conducted in the Department of Gynaecology and Obstetrics of Community Based Medical College, Mymensingh, Bangladesh from April 2012 to March 2013. All the patients who were diagnosed with HDP and gestational age of 20–40 weeks during the study period were included in the study. Patients with preexisting renal disease, diabetes mellitus, active urinary tract infection or who refused to cooperate with the study were excluded. The data regarding demographic variables, clinical features, pregnancy characteristics, maternal complications, fetal and neonatal outcomes were gathered from available data on medical record files. Edema was the most common clinical symptom. Primipara mothers were predominant in the both mild and severe preeclampsia group. Majority (88%) of mothers in mild preeclampsia group had a history of spontaneous vaginal birth, however 82.9% in severe preeclampsia group by Lower Segment Caesarean Section (LSCS). A higher proportion of mother in mild preeclampsia group delivered at term, whereas 65.7% in severe preeclampsia group delivered preterm. The proportion of maternal complications such as were significantly higher in severe preeclampsia group than those in mild preeclampsia group. Most babies (92%) were born with a birth weight 2500 grams in mild preeclampsia group, while 70% born with birth weight between 1500 – 2499 grams in severe preeclampsia group. All the babies were born with apgar score less than 7 between mild and severe preeclampsia groups. About three quarter (74.3%) of neonates born to women in the severe preeclampsia group required resuscitation compared to 40% in mild preeclampsia group. The maternal death, still birth and neonatal death were found higher in severe preeclampsia group than those in mild preeclampsia group. Pregnancies affected by hypertensive disorders require careful monitoring due to the increased risks of adverse pregnancy outcomes. Frequency of severe hypertensive disorders is high in our set up. It is associated with high maternal, fetal and neonatal mortality.

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Introduction

The term hypertension in pregnancy is commonly used to describe a wide spectrum of patients who may have only mild elevations in blood pressure (BP) or severe hypertension with various organ dysfunctions. The manifestations in these patients may be clinically similar (e.g., Hypertension, Proteinuria); however, they may result from different underlying causes such as chronic hypertension, renal disease or pure preeclampsia. The three most common forms of hypertension are acute gestational hypertension, preeclampsia and chronic essential hypertension¹⁻⁴.

Five classes of hypertensive disorders were identified according to the latest classification system described by the National High Blood

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Preeclampsia can present as HELLP syndrome (hemolysis, elevated liver enzymes and low platelet count) or eclampsia that is occurrence of convulsions that cannot be attributed to other etiologic factors.

Eclampsia is reported to be associated with a maternal mortality rate of 0.5–10% usually requiring high quality intensive care⁸. Additionally, preeclampsia predisposes toward potentially lethal complications involving placental abruption, disseminated intravascular coagulation, intracranial hemorrhage, hepatic failure, acute renal failure and cardiovascular collapse. Intrauterine fetal growth restriction (IUGR), intrauterine fetal demise and prematurity appear to be the other related obstetric problems⁹. All these clinical situations mandate prompt diagnosis and aggressive management in order to reverse adverse maternal-perinatal outcome.

Hypertensive disorder of pregnancy is the commonest medical complication of pregnancy. The incidence varies in different populations and is also affected by the definition used¹⁰⁻¹⁴. Every year nearly 5,29,000 women die globally due to pregnancy related causes. For each death nearly 118 women suffer from life threatening events or severe acute morbidity¹⁵. Hypertensive disorders of pregnancy seems to be one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths specially in developing world¹⁶. World Health Organization estimates that atleast one woman dies every seven minutes from complications of hypertensive disorders of pregnancy¹⁷. These disorders account for 6.4% of deliveries in African Americans, and for 4.8% of deliveries in other women in the United States of America¹⁸. 5.38% in India while preeclampsia, eclampsia and HELLP syndrome accounted for 44%, 40% and 7%, respectively. The rate of maternal mortality was 5.55% and perinatal deaths occurred in 37.5% of the deliveries¹⁰. According to a population based study in South Africa the incidence of hypertensive disorders of pregnancy (HDP) was 12%. Other hospital based studies showed the HDP was

the commonest cause of maternal death which contributed for 20.7% of maternal deaths in the country¹¹. Studies in Ethiopia showed that the incidence of HDP is around 5% of which majority were due to severe preeclampsia; according to one study eclampsia complicates 0.7% of the pregnancies. These disorders are major causes of maternal and perinatal morbidities and mortalities¹²⁻¹⁴. However, the prevalence and incidence of hypertension during pregnancy is not well documented in Bangladeshi literature. Keeping this in mind, the present study was undertaken to study the fetal, neonatal and maternal outcome during pregnancy.

Methods:

This hospital based cross sectional descriptive study was conducted from April 2012 to March 2013 at the Department of Obstetrics and Gynecology, Community Based Medical College, Mymensingh, Bangladesh. A total of 120 pregnant women who signed informed consent form were diagnosed with HDP and gestational age of 20–40 weeks during the study period were included in the study. Patients with preexisting renal disease, diabetes mellitus, active urinary tract infection or who refused to cooperate with the study were excluded. Data were collected using questionnaire and check list which contained demographic variables, clinical features, pregnancy characteristics, maternal complications, fetal and neonatal outcomes. BP was measured using a mercury sphygmomanometer every 4 hours in patients with mild and severe preeclampsia, with the procedure undertaken on the patient's right arm while in a supine position, Korotkoff sounds were monitored to measure systolic and diastolic BP. Assessment of edema was done clinically on general examination by applying thumb pressure over the medial malleolus. "Mild preeclampsia" was defined as BP 140/90mmHg but, <160/110mmHg with proteinuria 300 mg/24 hours. "Severe preeclampsia" was defined as BP 160/110mmHg with urinary protein excretion of 2.0g/24hours or any of oliguria (<400mL urine/24hours) and HELLP syndrome was defined as liver enzyme elevation (aspartate transaminase >70 IU/L), hemolysis (LDH > 600 IU/L) and low platelet count (< 100,000/mm³)

Statistical analysis:

Data were processed and analysed using software SPSS (Statistical Package for Social Sciences) version 11.5. The test statistics used to analyse the data were descriptive statistics and Chi-square (χ^2) test. For all analytical tests, the level of significance was set at 0.05 and $p < 0.05$ was considered significant.

Results:

During the study period 120 mothers were diagnosed to have hypertensive disorders of pregnancy (HDP). About 62% of these mothers was below 25 years and 38.3% 25 years or more than 25 years. Over 48% of mothers was poor, 42.5% middle class and 9.2% rich. Most of the mothers were literate (68.3%), muslim (81.7%) and rural residents (55.8%) (Table I). All of the mothers complained of edema, followed by 29.2% visual symptoms, 25.8% HELLP syndrome, 11.7% vaginal bleeding and another 11.7% central nervous system (Fig. 1). Sixty percent of mothers was primipara and 40% multipara in mild preeclampsia group compare to 70% primipara and 30% multipara in severe preeclampsia group. Majority (88%) of mothers in mild preeclampsia group had a history of spontaneous vaginal birth, however 82.9% in severe preeclampsia group by Lower Segment Caesarean Section. Eighty two percent of mothers in mild preeclampsia group delivered at term and 18% post term compared to 65.7% in severe preeclampsia group delivered preterm and 34.3% term (Table II). The proportion of maternal complications such as acute renal failure, abruption, cerebrovascular accident, PPE, postpartum hemorrhage, chronic hypertension were significantly higher in severe preeclampsia group than those in mild preeclampsia group (25.7% vs. 8%, $p = 0.013$; 34.3% vs. 8%, $p = 0.001$; 17.1% vs. 2%, $p = 0.009$; 51.4% vs. 6%, $p < 0.001$; 25.7% vs. 10%, $p = 0.031$ and 51.4% vs. 12%, $p < 0.001$ respectively). Pulmonary embolism and focal deficit were found in 7.1% and 5.7% in severe preeclampsia mothers. Although maternal death was higher in severe preeclampsia group, but did not turn to significant as evident by $p = 0.399$ (Table III). In mild preeclampsia group, most babies (92%) were born with a

birth weight 2500 grams, whereas in severe preeclampsia group 70% born with birth weight between 1500 – 2499 grams ($p < 0.001$). Still born was found 4 times higher in severe preeclampsia group compared to mild preeclampsia group ($p = 0.013$). All of the babies were born with apgar score less than 7 between mild and severe preeclampsia groups. About three quarter (74.3%) of neonates born to women in the severe preeclampsia group required resuscitation compared to 40% in mild preeclampsia group ($p < 0.001$). The NICU admission and neonatal death occurred in severe preeclampsia group, while none of the patients mild preeclampsia group (Table IV).

Table I. Demographic characteristics of the patients (n=120)

Demographic characteristics	Frequency	Percentage
Maternal age (years)		
<25	74	61.5
≥25	46	38.3
Socioeconomic status		
Poor	58	48.3
Middle class	51	42.5
Rich	11	9.2
Educational status		
Illiterate	38	31.7
Literate	82	68.3
Religion		
Muslim	98	81.7
Hindu	22	18.3
Residence		
Urban	53	44.2
Rural	67	55.8

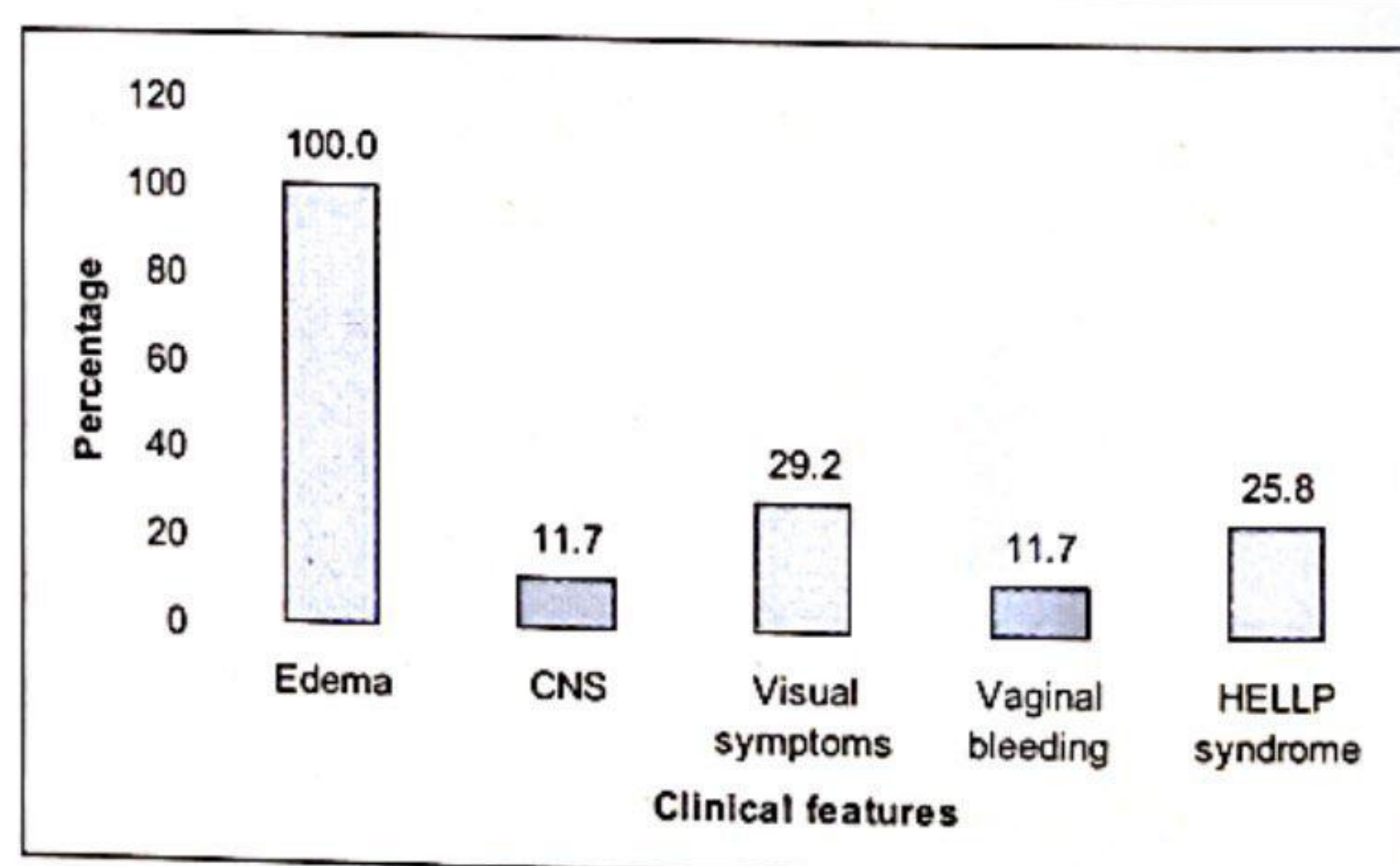


Fig.1 : Distribution of patients by clinical features (n = 120)

Table II. Comparison of pregnancy characteristics between groups (n=120)

Pregnancy characteristics	Group		p-values
	Mild preeclampsia (n = 50)	Severe preeclampsia (n = 70)	
Parity			
Primipara	30(60.0)	49(70.0)	0.255
Multipara	20(40.0)	21(30.0)	
Mode of delivery			
Spontaneous vaginal birth	44(88.0)	12(17.1)	<0.001
LSCS	6(12.0)	58(82.9)	
Gestational age at delivery			
Preterm	00	46(65.7)	<0.001
Term	41(82.0)	24(34.3)	
Post term	9(18.0)	00	

Data were analysed using **Chi-square (χ^2) Test**; level of significance was 0.05.

Table III. Comparison of maternal complications between groups (n=120)

Maternal complications	Group		p-values
	Mild preeclampsia (n = 50)	Severe preeclampsia (n = 70)	
Acute renal failure	4(8.0)	18(25.7)	0.013
Abruption	4(8.0)	24(34.3)	0.001
Cerebrovascular accident	1(2.0)	12(17.1)	0.009
PPE	3(6.0)	36(51.4)	<0.001
Postpartum hemorrhage	5(10.0)	18(25.7)	0.031
Pulmonary embolism	00	5(7.1)	-
Chronic hypertension	6(12.0)	36(51.4)	<0.001
Focal deficit	00	4(5.7)	-
Maternal death	4(8.0)	9(12.9)	0.399

Data were analysed using **Chi-square (χ^2) Test**; level of significance was 0.05.

Table IV. Comparison of fetal & neonatal outcome between groups (n=120)

Fetal & neonatal outcome	Group		p-values
	Mild preeclampsia (n = 50)	Severe preeclampsia (n = 70)	
Fetal outcome			
Fetal weight (gram)			
1500 – 2499	4(8.0)	49(70.0)	<0.001
≥500	46(92.0)	21(30.0)	
Still born	3(6.0)	18(25.7)	0.013
Neonatal outcome			
Apgar score <7	50(100.0)	70(100.0)	-
Required resuscitation	20(40.0)	52(74.3)	<0.001
NICU admission	00	15(21.4)	-
Neonatal death	00	16(22.9)	-

Data were analysed using **Chi-square (χ^2) Test**; level of significance was 0.05.

Discussion:

Hypertension is the most common medical problem with unknown etiology during pregnancy. HDP related maternal, fetal and neonatal complications result in significant devastating effects in public health¹⁹⁻²². During the study period 120 mothers were diagnosed to have hypertensive disorder of pregnancy (HDP). Of them, 50(41.7%) were mild preeclampsia and 70(53.8%) were severe preeclampsia with mean age 24.9 ± 7.2 years. A higher proportion of mothers were poor (48.3%), literate (68.3%), Muslims (81.7%) and rural residents (55.8%). Our findings are in accordance with other study carried out on data for 142 patients in the North Indian population found that 65 cases of mild preeclampsia (45.8%) and 77 cases of severe preeclampsia (54.2%). Majority of patients were in the 25–35 years age group, middle socioeconomic status, below primary level educated and Muslims by religion²³. Our study, however, clearly showed that HDP were high in women with lower socioeconomic status having poor access to health care in rural residents. The findings we observed is as well similar to that reported in other studies²⁴⁻²⁷.

Edema was the most common symptom and seen in 100% of our patients. Edema is a very common manifestation and is seen in upto 90% of normal pregnancies and also seen invariably in patients with preeclampsia-eclampsia. The next most common manifestation were jaundice (57%), central nervous system (42.2%), vaginal bleeding (11.3%), visual symptoms (6.4%) and HELLP syndrome (2.8%)²⁸. Syndrome occurs in up to 20 percent of pregnancies complicated by severe preeclampsia. Two retrospective studies have reported a higher incidence of maternal complications such as visual symptoms (31.6%), vaginal bleeding (19.4%) and central nervous system (17.2%) in women with preeclampsia^{30,31}. Majority (88%) of our patients in mild preeclampsia group had a history of spontaneous vaginal birth, however 82.9% in severe preeclampsia group by Lower Segment Caesarean Section. Various studies showed that most (61.26%) women with HDP had normal

vaginal deliveries compared with 67.74% of women in the control group. Operative intervention was more common with hypertensive disorders with lower segment cesarean sections undertaken in 37.32% of HDP patients versus 32.26% of control subjects^{8,32}. This variation may be due to racial, social and environmental differences among these populations.

Maternal outcome was measured in terms of various maternal complications, mode of delivery and maternal mortality. According to a population based study in South Africa the incidence of hypertensive disorders of pregnancy (HDP) was 12%. Other hospital based studies showed the HDP was the commonest cause of maternal death which contributed for 20.7% of maternal deaths in the country¹¹. Studies in Ethiopia showed that the incidence of HDP is around 5% of which majority were due to severe preeclampsia. These disorders are major causes of maternal and perinatal morbidities and mortalities¹²⁻¹⁴. The overall mortality rate of our study was 20.9% (8% in mild preeclampsia and 12.9% in severe preeclampsia group). The proportion of maternal complications such as acute renal failure, abruption, cerebrovascular accident, PPE, postpartum hemorrhage, chronic hypertension were significantly higher in severe preeclampsia group than those in mild preeclampsia group. Pulmonary embolism and focal deficit were found in 7.1% and 5.7% in severe preeclampsia patients. These were comparable to another study in which higher proportion of patients with acute renal failure, abruption, PPE, postpartum hemorrhage and chronic hypertension were found in severe preeclampsia group compared to mild preeclampsia group. These results are in consistent well with the findings of Indian patients published by Saftlas and associates²⁵.

Fetal and neonatal outcomes were measured in terms of birth weight, Apgar score, the need for resuscitation and/or admission to a neonatal intensive care unit and stillbirths and neonatal deaths. Yadav et al³³ reported in mild preeclampsia group 50.76% babies born with a birth weight between 1500-2499 grams compared to 87.5% in severe preeclampsia

group. In contrast, 44.62% babies born with birth weight 2500 grams in mild preeclampsia group than that 9.40% in severe preeclampsia group. Similar proportion was observed to our study subjects which revealed in mild preeclampsia group most babies (92%) were born with a birth weight 2500 grams, whereas in severe preeclampsia group 70% born with birth weight between 1500 – 2499 grams ($p < 0.001$). As has been stressed in these studies, Prakash et al¹⁰ in their study reported that the percentage of still birth, required resuscitation, NICU admission, neonatal death were higher in severe preeclampsia group than those in mild preeclampsia group. Comparable with the results from our study, still born was found 4 times higher in severe preeclampsia group compared to mild preeclampsia group ($p = 0.013$). All of the babies were born with apgar score less than 7 between mild and severe preeclampsia groups. About three quarter (74.3%) of neonates born to women in the severe preeclampsia group required resuscitation compared to 40% in mild preeclampsia group ($p < 0.001$). The NICU admission and neonatal death occurred in severe preeclampsia group, while none of the patient mild preeclampsia group. This study conducted in others had almost similar results to ours³⁴⁻³⁶. Very few studies have explored hypertensive disorders of pregnancy in Bangladesh, even though these disorders have been associated with adverse maternal, fetal and neonatal outcomes.

Conclusion

Women with severe preeclampsia were more prone to adverse maternal complications in our setup. The presence of HDP has been linked with poor maternal, fetal and neonatal outcomes which were manifested by increased required neonatal resuscitation, NICU admissions, preterm delivery rate and LBW. Further sectional studies from different areas in our country are needed to establish the frequency, clinical pattern and impact of this disorder to guide health care providers.

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