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RESEARCH ARTICLE

Foetomaternal Outcome in Pregnancy Induced Hypertension

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Abstract

Background: Hypertensive disorders of pregnancy are the most common causes of adverse maternal and perinatal outcomes. Such investigations in resource limited settings would help to develop design strategies in preventing maternal and perinatal morbidity and mortality.

Aim of the study: The present study was designed to determine the maternal and perinatal outcome of pregnancy-related hypertensive (PIH) disorder in a Tertiary Care Hospital of Bangladesh.

Methods: The present prospective observational study was conducted in the Department of Obstetrics &Gynaecology, Bangobandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, over a period of 6 months between July to December 2020. Singleton pregnant women with PIH (gestational hypertension, preeclampsia, eclampsia) admitted at BSMMU between 28 to 40 weeks of gestation were the study population.

Results: Over half (56%) of the pregnant women was 20-30 years old, 24% < 20 years and 20% 30 or 30 years old with mean age of the patients being 25 years. The predominent maternal complications were PPH (18%) followed by and thrombocytopenia (14%). The less common adverse complication was abruptio placentae (8%) and rare complications were HELLP syndrome (4%), liver infarction (4%) and cerebrovascular event (2%). Only one mother died of the complications. The common perinatal complications were LBW (38%) and asphyxia neonatorum (32%). The less common perinatal complications were IUGR (26%), preterm birth (18%) and admission to NICU (18%). One neonate was still- born and 3(6%) neonates died of complications; two of them asphyxiated and one was preterm very, low birth weight.

Conclusion: The study concluded that the predominant maternal complication encountered by the pregnant women with PIH is PPH followed by thrombocytopenia. The less common adverse complication is abruptio placentae and rare complications are HELLP syndrome, liver infarction and cerebrovascular events. The common adverse perinatal outcomes are LBW, asphyxia neonatorum and IUGR, while less common perinatal complications are preterm birth and NICU admission. While maternal mortality is rare, the neonatal mortality is higher than the targeted global and national SDG plan.

Keywords: Foetomaternal, Outcome, Pregnancy Induced Hypertension.

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1. Introduction

Pregnancy-induced hypertension (PIH) is defined as new onset of hypertension that appears at ≥ 20 weeks of gestational age of pregnancy with or without proteinuria, which includes gestational hypertension, pre- eclampsia, and eclampsia [1].

Gestational hypertension (PIH) is the development of new hypertension in a pregnant woman after 20 weeks' gestation without the presence of protein in the urine or other signs of pre-eclampsia, while hypertension being defined with blood pressure at least 140 mm Hg for systolic and/or 90 mm Hg for diastolic on at least two occasions at 4-6 hours apart in women known to be normotensive beforehand [2].

Preeclampsia is a hypertensive disorder of pregnancy, which usually manifests after 20 weeks of gestation with hypertension and proteinuria [3-5]. Severe preeclampsia is considered if sustained rises in blood pressure to the level of≥ 160 mm Hg for systolic), and/or >110 mm Hg for diastolic [6]. When convulsions occur in addition to these signs of preeclampsia the condition is referred to as eclampsia. Globally, PIH is a significant public health threat both in developed and developing countries contributing to high perinatal deaths (US National High Blood Pressure Education 2000). PIH complicates 2-8% of pregnancies in the Western world [7].

However, the magnitude of PIH in developing countries reaches up to 16.7% [8].Preeclampsia is primarily a disorder of nulliparous, but multiparous pregnant women with a new partner have an elevated risk of preeclampsia similar to that of nulliparous women [9]. Delivery of placenta is the only treatment yet known, indicating placenta is the primary sponsor to the pathogenesis of preeclampsia [10].

Globally, preeclampsia is a leading cause of maternal and neonatal mortality and morbidity, predominantly in developing countries. The disorder is usually diagnosed in late pregnancy by the presence of high blood pressure with proteinuria and/or edema. Prevention of any disease process needs awareness of its prevalence, etiology and pathogenesis [11].

The World Health Organization estimates that at least one woman dies every seven minutes from complications of pregnancy induced hypertension disorders. Pregnancy complicated with hypertensive disorder is associated with increased risk of adverse fetal, neonatal and maternal outcome [12]. Pregnancy induced hypertension complicates up to 10% of all pregnancies. Maternal risks associated with hypertensive disorders are development of superimposed preeclampsia, eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), acute renal, hepatic failure and death. Perinatal complications include preterm delivery, low birth weight, prematurity, intrauterine fetal death, intrauterine growth restriction, fetal asphyxia, stillbirths and neonatal deaths [13].

Similarly, studies conducted in Africa revealed that adverse perinatal outcomes such as perinatal death, low birth weight, preterm birth, and birth asphyxia were associated with PIH [14-16]. However, the risk and incidence of adverse perinatal outcomes of PIH vary across countries, populations and ethnic-geographic area.

2. Methodology and Materials

The present prospective observational study was conducted in the Department of Obstetrics &Gynaecology, Bangobandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, over a period of 6 months between July to December 2020. Singleton pregnant women with PIH (gestational hypertension, preeclampsia, eclampsia) admitted at BSMMU between 28 to 40 weeks of gestation were the study population. Based predefined eligibility criteria, a total of 50 such women were consecutively included in the study.

The main outcome variables were maternal and perinatal morbidity and mortality. Adverse perinatal outcomes were complications like low-birth weight, prematurity, intrauterine growth restriction, birth asphyxia, small for gestational age, preterm delivery, admission to neonatal intensive care unit and perinatal death, while the adverse maternal outcomes were complications/conditions like HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), acute renal, hepatic failure, thrombocytopenia, disseminated intravascular coagulation (DIC), oliguria, pulmonary edema, cerebrovascular events and placental abruption and death.

Inclusion Criteria:

- Singleton pregnant women between 28 to 40 weeks of gestation with PIH (gestational hypertension, preeclampsia, eclampsia) were selected for the study.

Exclusion criteria:

- Patients with following characteristics were excluded from the study:
- Chronic hypertension
- Diagnosed case of chronic renal failure
- Hepatic disease

- Cardiovascular disease
- Haemorrhagic disorders
- Psychotic diseases
- Systemic lupus erythromatosis and
- Critically ill patients unable to give consent or women who cannot respond to the interview.

BMI categorizations:

- Underweight (≤18.5 kg/m2)
- Normal (18.6-24.9 kg/m2)
- Overweight & above (≥25.0 kg/m2)

2.1 Data Collection Technique

The data was collected by face-to-face interviews of female garment workers who fulfilled the selection criteria. After having developed the relevant research instruments, selected the study place, and determined the sample size, data was collected from the place of the study. The interview was conducted among female garment workers.

Before proceeding with the data collection, the study details were appropriately explained to each respondent, and their written consent was obtained. Data collection was continued on all working days. Data was collected through interviews and a pre-tested questionnaire. The female garment workers were informed about the confidentiality of their information. The study participants were requested to answer the questions according to the developed format of questions. The questionnaire included socio-demographic characteristics and BMI status among female garment workers.

2.2 Data Management And Analysis

At the end of each day of data collection, each questionnaire was checked to see whether it was filled entirely and consistently or not. The data entry was started immediately after the completion of data collection. Collected data was checked, rechecked, edited, coded, and recorded for quality management. After completing data collection, the tabulated data was analyzed and described according to the aims and objectives of the study using SPSS software version 26. Data clean-up was performed, and the frequencies of the variables were run to check the accuracy, outliers, inconsistencies, and missing values.

The results were presented in the form of tables and charts. To assess or measure the objectives for descriptive statistics- frequency, percentage, mean, median, mode, standard deviation (SD), range, minimum, and maximum were used for socio-demographic variables and work-related variables. For significance, a chi-square test was done to see the relationship between health problems with socio-demographic and work-related variables and nutritional status with socio-demographic and work-related variables. Statistically, the significance level was set as p= <0.05. The results were presented in tabulated form and chart.

3. Results

The present study undertaken to determine the foetomaternal outcome (maternal and perinatal morbidity and mortality) of pregnant women with pregnancy induced hypertension (PIH) included a total of 50 pregnant women based on predefined enrollment criteria (as described in earlier Chapter). While the maternal outcome was in terms of HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), acute renal, hepatic failure, thrombocytopenia, disseminated intravascular coagulation (DIC), oliguria, pulmonary edema, cerebrovascular events and placental abruption and death, the perinatal outcome was evaluated in terms of low-birth weight, prematurity, intrauterine growth restriction, birth asphyxia, small for gestational age, preterm delivery, admission to neonatal intensive care unit and perinatal death. Age distribution that over half (56%) of the pregnant women was 20-30 years old, 24% <20 years and 20% 30 or >30 years old.

The mean age of the patients was almost 25 years and the youngest and the oldest women were 18 and 36 years old respectively. Over one-quarter (28%) of the patients was poor, 36% lower middle class, 28% middle class and only 8% upper middle class. Urban residents (56%) were a bit higher than the rural residents (44%). In terms of occupation housewife formed the main bulk (52%) followed by service (26%), business (16%) and labour (Table I).

Presenting symptoms demonstrate that headache was invariably present followed by blurred vision (50%), oliguria (46%), epigastric pain (46%) and others (42%). The predominant sign was oedema (84%). The mean systolic and diastolic blood pressures were 173.7 and 103.3 mmHg respectively. The mild, moderate and severe proteinuria were 28, 38 and 34% respectively. Fifty percent of the patients were unconscious at admission (Table II).

Nearly half (48%) of the patients were primipara, 44% were multipara and 8% grand multipara. Over 80% of the pregnant women were at 37 or 37 weeks of gestation and 18% were preterm. Fifty percent of the patients received irregular antenatal care (ANC), 38% regular ANC and 12% received no ANC. Past history of PIH was reported by 8% and history of abortion or MR was

reported by 44% of the patients (Table III). Over half (54%) of the patients had gestational hypertension, 38% preeclampsia and only 8% had eclampsia (Table IV). Sixty percent of the patients received antihypertensive and anti-convulsant combinedly, 28% received antihypertensive aloneand the rest 12% received conservative management. Nearly In 22% of the cases the onset of labor was spontaneous and in 14% cases it was induced. Nearly two-thirds (64%) of the patients were delivered by caesarean section and 30% have had normal vaginal delivery (Table V). The complications encountered by the mothers with PIH werePPH (18%), thrombocytopenia (14%), abruptio placentae (8%), HELLP syndrome and liver infarction (each 4%), and cerebrovascular event (2%) (Table VI). Majority (98%) of the mothers survived and only 1(2%) mother died of the complications (Fig-I). 19(38%) were born with LBW, 13(26%) had IUGR,9(18%) were preterm, 16(32%) were asphyxiated (APGAR <7 at birth) and9(18%) had to admit in NICU (TableVII). Out of 50 neonates, 46(92%) were discharged alive, 1(2%) were still-born and 3(6%) died of complications(Fig-II).

Table 1. *Demographical characteristics of the study women (N=50).*

Age (years)		
Characteristics	**Frequency**	**Percentage**
<20	12	24.00
20-30	28	56.00
≥30	10	20.00
Socio economic Status		
Poor	14	28.00
Lower middle class	18	36.00
Middle class	14	28.00
Upper middle class	4	8.00
Residence		
Urban	28	56.00
Rural	22	44.00
Occupation		
Service	13	26.00
Business	8	16.00
Labour	3	6.00
Housewife	26	52.00

Table 2. *Distribution of patients by their clinical presentation (n=50)*

Characteristics	**Frequency**	**Percentage**	**Mean±SD (Range)**
Symptoms			
Headache	50	100	---
Blurred vision	25	50	---
Epigastric pain	23	46	---
Oliguria	23	46	---
Others	21	42	---
Signs			
Oedema	42	84	---
Systolic BP (mmHg)	---	---	173.7 ± 16.6 (150-210)
Diastolic BP (mmHg)	---	---	103.3 ± 8.1 (90-115)
Proteinuria			
1+	14	28	---
2+	19	38	---
3+	17	34	---
Unconsciousness	25	50	---
Others	13	26	---

Table 3. *Distribution of patients by their obstetric profile (n=50)*

Characteristics	Frequency	Percentage
Parity		
Primipara	24	48
Multi	22	44
Grand multi	4	8
Gestational age		
<37	9	18
≥37	41	82
ANC received		
Regular	19	38
Irregular	25	50
None	6	12
Past history of PIH	4	8
Past history of abortion or MR	22	44

Table 4. *Distribution of patients by type of PIH (n = 50)*

Type of PIH	Frequency	Percentage
Gestational hypertension	27	54
Preeclampsia	19	38
Eclampsia	4	8

Table 5. *Distribution of patients by management given (n =50)*

Management	Frequency	Percentage
Patient management		
Conservatively	6	12
Antihypertensive	14	28
Antihypertensive + anticonvulsant	30	60
Onset of labour		
Spontaneous	11	22
Induced	7	14
Mode of delivery		
NVD	15	30
CS	32	64
Instrumental	3	6

Table 6. *Distribution of patients by their maternal complications (n =50)*

Maternal complications	Frequency	Percentage
PPH	9	18
Thrombocytopenia	7	14
Abruptio placentae	4	8
HELLP syndrome	2	4
Liver infarction	2	4
Cerebrovascular event	1	2

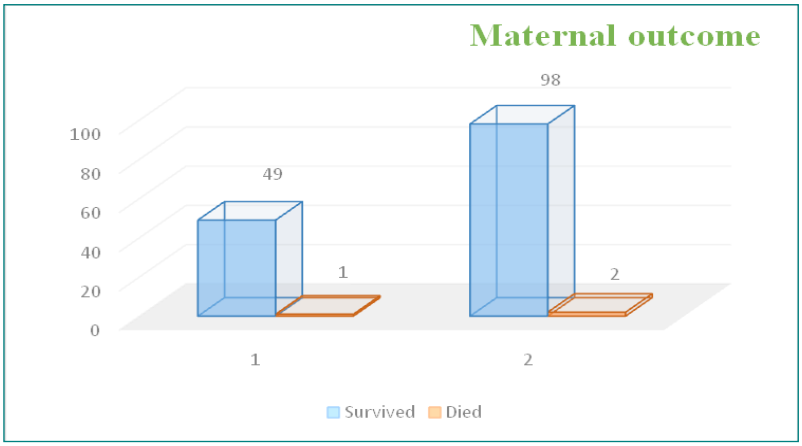

Figure 1. *Distribution of patients by their maternal outcome (n=50)*

Table 7. *Distribution of patients by foetal complications (n=50)*

Complications	Frequency	Percentage
LBW (<2.5 kg)	19	38
Asphyxia neonatorum (APGAR <7 at birth)	16	32
IUGR	13	26
Preterm birth	9	18
Admission in NICU	9	18

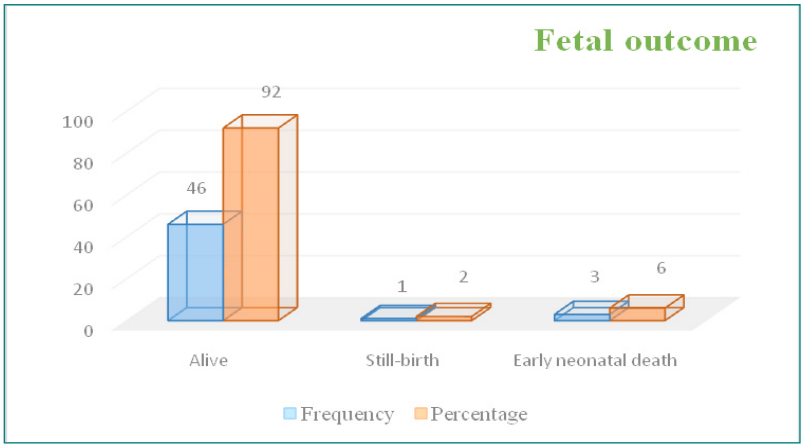

Figure 2. *Distribution of patients by foetal outcome (n = 50)*

4. Discussion

The present study was intended to assess the maternal and perinatal outcomes of pregnancy-induced hypertension. As we have described in the result section that the main maternal complications were PPH (18%), and thrombocytopenia (14%). The less common adverse complication was abruptio placentae (8%) and rare complications were HELLP syndrome (4%), liver infarction (4%) and cerebrovascular event (2%). One mother died of the complications.

The common perinatal complications were LBW (38%) and asphyxia neonatorum (32%). The less common perinatal complications were IUGR (26%), preterm birth (18%) and admission to NICU (18%). One neonate was still-born and 3(6%) neonates died of complications; two of them asphyxiated and one was preterm very, low birth weight. Berhe and associates in a study in Ethiopia found that women with PIH had a higher risk of adverse perinatal outcomes, such as, low birth weight, birth asphyxia, small for gestational age, preterm delivery, stillbirth, admission to NICU and perinatal death [17], which compare well with the findings of the present study.

Specifically, findings of this study revealed that 38, 26 and 18% of women with PIH delivered low birth weight (LBW), IUGR and preterm babies respectively. The LBW in the present study was higher and preterm was lower than the studies conducted in Ghana (24.7% LBW and 21.7% preterm) and India (22.2% LBW and 24.6% preterm) [18,19].

The difference in the incidence of low birth weight and preterm birth across studies could be due to the difference in the quality of antenatal care service and management of PIH between the study areas. There is higher risk of delivering low birth weight and preterm babies among women with PIH compared

to normotensive women; this might be due to intrauterine growth retardation as a result of placental insufficiency and due to the interventional delivery being carried out irrespective of the gestational age to prevent further maternal and perinatal morbidity and mortality. Complications from preterm birth and low birth weight are the leading causes of child deaths every year, accounting for nearly one million deaths globally [17]. Thus, preventing and/or managing PIH should be one of the priority tasks of reducing the risk of low birth weight and preterm births as well as their associated consequences. Additionally, to improve the outcome of those premature newborn infants, health care providers should strengthen kangaroo mother care including thermal care (skin-to-skin contact), family support for the mother-infant, exclusive and frequent breastfeeding.Additionally, the incidence of birth asphyxia among newborn babies born from women with PIH was 32%.

This finding was higher compared to studies conducted in Amhara Region, Ethiopia (10.1%), Ghana (15.2%), India (27.1%), Uganda (21.8%) and Turkey (28.9%) [16,18-21]. This might be related to a decrease in the uteroplacental blood flow resulting from increased blood pressure [22]. Also, the preterm babies born to women with PIH might be vulnerable to the immaturity of muscle tone and reflex irritability. In premature newborns, the lungs may be deficient in surfactant and this makes the lung more difficult to ventilate. Hence, health care providers skilled in neonatal resuscitation should be assigned to every delivery [23].

The variation in the incidence of perinatal death across studies could be due to the difference in the quality of intrapartum and newborn care among health care facilities. However, our finding and those described above are far higher from the targeted global plan of sustainable development goal (SDG) to reduce neonatal mortality to less than 12 per 1000 live births [24]. This indicates the necessity of strengthening maternal and newborn health care in our settings in order to achieve the targeted global and national SDG plan by focusing interventions on the determinants of perinatal mortality such as pregnancy-induced hypertension. The prospective nature of the study is considered as a strength of this study in reducing the incompleteness of data and bias due to missing data. We enrolled the participants at 28-40 weeks of gestational age. The reasons why we did not include women who developed PIH before 28 weeks were;

i). The number of women who develop PIH before 28 weeks is likely to be very small [25,26];

ii). Those women who develop PIH early could be more likely to have more complications and this might overestimate the rates of complications in pregnant women with PIH [25].

Limitations of the study

However, the study was not without limitations. As we did not include normotensive women, the findings obtained lack comparability and, as such, we do not know the differences in maternal and perinatal outcomes between pregnant women with and without PIH.

5. Conclusion

From the findings of the study, it can be concluded that the predominant maternal complication encountered by the pregnant women with PIH is PPH followed by thrombocytopenia. The less common adverse complication is abruptio placentae and rare complications are HELLP syndrome, liver infarction and cerebrovascular events.

The common adverse perinatal outcomes are LBW, asphyxia neonatorum and IUGR, while less common perinatal complications are preterm birth and NICU admission. Although a few neonates died of complications (asphyxia neonatorum and preterm birth), this was much higher than the targeted global and national SDG plan.In the light of the findings obtained and discussion thereof, the following recommendations are put forward:

High perinatal mortality of the neonates born of mothers with PIH demands strengthening of maternal and newborn health care in tertiary health care settings in order to approach the targeted global and national SDG.This could be done by focusing interventions on the determinants of perinatal mortality and morbidity in pregnant women with pregnancy-induced hypertension.

Ethical approval

The study was approved by the Institutional Ethics Committee.

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