Original Article

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Paediatrics Section

Correlation of Severity of Maternal Hypertension and Birth Weight of Neonates- A Longitudinal Study

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ABSTRACT

Introduction: Pregnancy Induced Hypertension (PIH) can lead to intrauterine growth restriction resulting in Low Birth Weight (LBW) neonates. LBW remains a significant cause of under-five mortality in India and Asia.

Aim: To calculate the prevalence of PIH and to study the correlation between Birth Weight (BW) of neonates and severity of maternal hypertension; and compare the incidence of neonatal morbidities across varying severity of maternal hypertension.

Materials and Methods: A longitudinal study was conducted among 153 pregnant mothers, diagnosed with PIH. They were classified into mild {Systolic Blood Pressure (SBP) ≥140-149 mmHg or Diastolic Blood Pressure (DBP) ≥90-99 mmHg}, moderate (SBP ≥150-159 mmHg or DBP ≥100-109 mmHg) and severe (SBP ≥160 mmHg or DBP ≥110 mmHg) hypertension. A total of 142 neonates, born to PIH mothers, were included. The neonates were followed-up for seven days to check for early neonatal outcomes and deaths. Correlation between maternal blood pressure (systolic and diastolic) and BW of the neonates was assessed using Pearson's correlation coefficient (r). Binary Logistic Regression (BLR) was performed to analyse the impact of confounders on BW.

Results: The prevalence of PIH was 7.76% (153/1972). The mean BW of neonates born to mothers with moderate (2.435 kg) and severe hypertension (2.342 kg) was significantly lower than that of neonates born to mothers with mild hypertension (2.828 kg) (p<0.00001). 1SD increase in SBP resulted in 0.245 kg decrease in BW, while an 1SD increase in DBP resulted in 0.312 kg decrease in BW. After accounting for confounders using BLR, maternal DBP still had a significant negative correlation with BW (r=-0.663; p<0.001). The incidence of prematurity (p<0.0001), small for Gestational Age (GA) (p=0.0283), Respiratory Distress (RD) (p=0.002), Neonatal Hyperbilirubinemia (NNH) (p=0.033) and Neonatal Intensive Care Unit (NICU) admissions (p=0.003) were significantly higher among neonates born to mothers with moderate and severe hypertension than those born to mothers with mild hypertension. Three neonatal deaths (all due to perinatal asphyxia) were observed in this study and there was no statistical significance with respect to deaths across neonates of the three groups (p=0.219).

Conclusion: Maternal DBP had a significant negative correlation with BW. The mean BW of neonates born to mothers with severe hypertension was significantly lower compared to those born to mild hypertension.

Keywords: Maternal diastolic blood pressure, Neonatal birth weight, Pregnancy induced hypertension

INTRODUCTION

Hypertension is one among the many medical problems encountered in pregnancy, and can attribute to significant maternal and foetal morbidity and mortality [1]. Studies have shown that hypertensive disorders of pregnancy predispose women to acute or chronic uteroplacental insufficiency, resulting in ante or intrapartum anoxia. This might lead to foetal death, Intrauterine Growth Retardation (IUGR), LBW and/or preterm delivery. Secondary to hypoxic stress, foetal catecholamine secretion may promote glycogenolysis and decreased foetal insulin concentration as well as glucose utilisation can result in IUGR [2-4]. One of the recent prospective studies from north-eastern India, published in 2021, analysed the perinatal outcome among 402 mothers with hypertensive disorders of pregnancy. The authors observed that the incidence of foetal growth restriction among pregnant women with Gestational Hypertension (GHT), preeclampsia, and eclampsia, was 8.1%, 15.8% and 6.7%, respectively while preterm birth rate was 27%, 48.8% and 26.7%, respectively [5].

According to global estimates by United Nations Children's Fund (UNICEF) [6], nearly half of the world's LBW neonates are born in South Asia. A systematic analysis of under-five mortality in India from the year 2000-2015 [7] observed that 57.9% of under-five mortality occurred in neonates. Among these, prematurity and its complications contributed to 27.5% of under-five mortality. LBW in neonates is predominantly due to IUGR and preterm births.

There are multiple risk factors that can contribute to LBW in neonates such as lower income group, lower educational status of mother, short stature, parity, mother's age, maternal chronic anaemia, chronic medical illness in mother, PIH and many more [2,8-10]. Among these, not many can be addressed immediately and effectively to bring down LBW rates in India.

High SBP and DBP, especially in second and third trimester of pregnancy, have been consistently associated with foetal growth restriction leading to LBW neonates [11-14]. A case-control study involving 84 mothers with PIH and 62 mothers as controls [15] investigated correlation of maternal BP with BW. They observed a negative correlation (Pearson's correlation coefficient r=-0.66) between BW and BP amongst the cases.

With this background, this study was planned to primarily bring out the prevalence of PIH and correlate the severity of maternal hypertension with the BW of neonates. Early neonatal outcomes and their association with severity of maternal hypertension were also observed.

MATERIALS AND METHODS

A longitudinal study was conducted at a tertiary care teaching hospital, Medchal, Hyderabad, Telangana, India. The study was conducted from July 2018-July 2019, after obtaining Institutional Ethical Committee (IEC) clearance (Mediciti Ethics Committee: dt:20/04/2018/s. No:12). The procedures followed were in accordance with the ethical standards of responsible committee of human experimentation and with the revised Helsinki declaration in the year 2000.

Sample size calculation: Prevalence of PIH in previous studies ranged from 6.92-8.9% [16,17]. Based on this, the sample size was calculated using the formula: $n=\{Z2\times p\times(1-p)\}/d^2$. Where, Z stands for confidence level (1.96 for 95% CI); 'p' stands for prevalence and 'd' stands for precision. The prevalence was considered to be 8.9%, CI of 95%, and precision of 5%. The calculated sample size was 126.

According to National Institute for health and Clinical Excellence (NICE) guidelines on hypertensive disorders during pregnancy, hypertension was graded into mild, moderate, and severe hypertension based on DBP and SBP [18]. Mild hypertension was defined as DBP ≥90-99 mmHg or SBP ≥140-149 mmHg; moderate hypertension as DBP ≥100-109 mmHg or SBP ≥150-159 mmHg; severe hypertension was defined as DBP ≥110 mmHg or greater or SBP 160 mmHg or greater. Among mothers diagnosed to have PIH and who delivered at the study institute, maternal data such as age, parity, BP, presence of anaemia, and other co-morbidities were collected from mother's case records maintained at the obstetrics department at the time of delivery. The BP of mothers at the time of diagnosis of PIH was taken, irrespective of GA when they delivered at the study institute.

The total number of deliveries (excluding stillbirths and IUD) during the study period was 1972, out of which 153 deliveries were diagnosed with PIH. A total of 1975 neonates (3 mothers had twin pregnancy) were born during this period. Among them, 156 neonates (3 twin pregnancies) were born to mothers with PIH.

Inclusion criteria: All neonates born to mothers with PIH (SBP: ≥140 mmHg and DBP: ≥90 mmHg) during the study period were included in the study.

Exclusion criteria

I. Neonates born to PIH mothers with multiple pregnancies.
II. Neonates born to mothers with pre-existing chronic hypertension.
III. Neonates born to PIH mothers with other co-morbidities like, pre-existing heart diseases, renal diseases etc.,
IV. Neonates born to PIH mothers with uterine anomalies.
V. Neonates born with congenital anomalies.
VI. Neonates born to PIH mothers with history of smoking/alcohol intake/drug abuse.

Study Procedure

Among the 156 neonates born to mothers with PIH, six neonates were excluded as they were from three twin pregnancies; six neonates were excluded as the mothers had chronic illness and two neonates were excluded as their mothers had history of alcohol intake. Thus, 14 neonates were excluded, and 142 neonates were studied further after obtaining informed written consent from the parents.

At birth, Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) scores were done at 1 minute and 5 minutes. In case the neonates had low APGAR scores (<7) at 5 minutes, APGAR was recorded for every 5 minutes, upto an extended period of 20 minutes after birth. GA of the neonates was determined by modified Ballard's score [19] within 24 hours of life and classified as preterm (≤36+6 weeks completed GA) or term (≥37 weeks completed GA). BW was measured using a digital weighing scale with an error of ±10 grams. Length of the neonate was measured using infantometer to the closest 0.1cm. Based on BW, neonates were classified as LBW if they weighed ≥1.5 kg and ≤2.499 kg; Very Low Birth Neonates (VLBW) if they weighed ≥1.0 kg and ≤1.499 kg and Extremely Low Birth Weight (ELBW) neonates if they weighed ≤0.999 kg. Based on Fenton's and World Health Organisation (WHO) Intergrowth 21 charts for preterm and term neonates respectively, they were classified as Appropriate for Gestational Age (AGA) if their weight was between 10^{th}-90^{th} percentile; Small for GA (SGA) if their weight was <10^{th} percentile and Large for Gestational Age (LGA) if their weight was >90^{th} percentile with respect to their GA and sex.

Neonates were then assessed for early outcomes in their first week of life for- RD, NNH, Birth Asphyxia (BA), and neonatal thrombocytopenia. A neonate was diagnosed to have RD when one or more of the following was present- respiratory rate of more than 60/minute, retractions (subcostal, intercostal, sternal, suprasternal) or noisy respiration in the form of a grunt. The distress may or may not be associated with cyanosis and desaturation on pulse oximetry [20]. NNH was defined as total serum bilirubin >95^{th} percentile on the hour specific Bhutani nomogram [21]. BA was defined according to American College of Obstetricians and Gynaecologists (ACOG) guidelines [22]. Neonatal thrombocytopenia was defined as neonatal platelet count <150000/cubic mm [23]. The neonates without any complications at birth were monitored regularly in postnatal ward during daily postnatal rounds. Neonates admitted to NICU were managed according to NICU protocol. All neonates were monitored upto 7^{th} day of life and if death occurred, cause of death noted. Those discharged from hospital earlier than seven days, were followed at outpatient department on day 3, 5, and 7 of life.

STATISTICAL ANALYSIS

The relevant data were collected in a case record form and tabulated in Microsoft Excel and analysis was done by using computer software SPSS version 28.0. (SPSS inc., Chicago, IL USA). Descriptive statistics like mean and Standard Deviation (SD) were used wherever suitable. Analysis of Variance (ANOVA) test and post-Hoc Tukey's HSD (Honestly Significant Difference) test was used to assess difference between the means of greater than two groups. Pearson's correlation coefficient was used to determine correlation between continuous variables. Fisher's-exact test and Chi-square test were used as tests of significance for categorical variables. BLR analysis was done to analyse the effect of confounders. If the p-value was <0.05, it was considered as significant.

RESULTS

The total number of deliveries during the study period was 1972, out of which 153 deliveries had PIH. The mean age of the mothers was 24.31±3.648 years. Prevalence of PIH was 7.76%. Out of total 1972 deliveries during the study period, 153 had PIH during pregnancy. The rest 1819 did not have PIH. Among the 156 neonates born to mothers with PIH (including the twin pregnancies), the prevalence of neonates weighing <2.5 kg at birth was 30.76% (48), while the incidence of the same in pregnancy without PIH was 22.48% (409

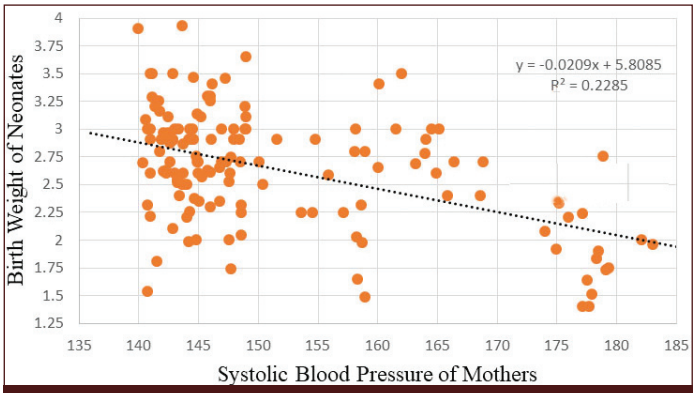
out of 1819). This difference was found to be statistically significant (Chi-square test, p-value=0.019).

A total of 142 neonates from 156 neonates born to mothers with PIH were included in the study. Among 142 neonates, 70 (49.3%) were males and 72 (50.7%) were females; 98 (69%) weighed >2.5 kg, 41 (28.9%) were LBW, 3 (2.1%) were VLBW. No neonates weighed <1000 g (ELBW). Overall, 83 (58.45%) mothers had mild hypertension, 28 (19.72%) had moderate hypertension, and 31 (21.83%) had severe hypertension.

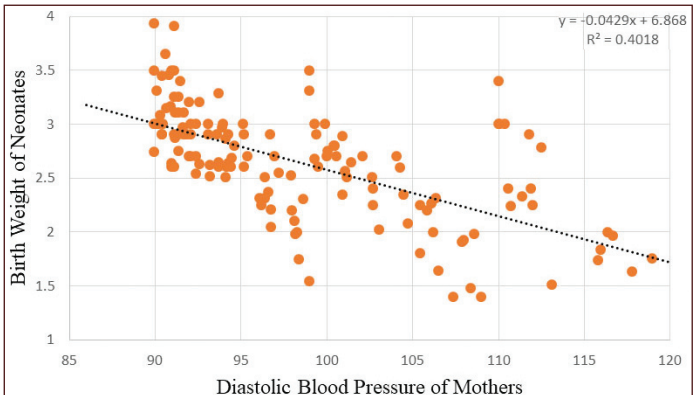
As shown in [Table/Fig-1-3], SBP showed a moderate negative correlation with BW, while DBP showed a strong negative correlation with BW. The mean BW was lowest among neonates born to mothers with severe hypertension.

Parameters	Overall mean	Mild hyper-tension (n=83)	Moderate hyper-tension (n=28)	Severe hyper-tension (n=31)	ANOVA (p)
Maternal SBP±SD (mmHg)	151.46± 11.77	144.36± 2.63	150.76± 6.27	171.08± 7.70	<0.00001*
Maternal DBP±SD (mmHg)	98.49± 7.60	93.16± 2.56	102.63± 3.26	109.05± 5.89	<0.00001*
Birth weight± SD (Kg)	2.644± 0.51	2.828± 0.43	2.435± 0.45	2.342± 0.57	<0.00001†

[Table/Fig-1]: Maternal blood pressure and birth weight of neonates across different categories of hypertensive mothers.
SD: Standard deviation; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; *The Tukey's HSD post-hoc analysis revealed significant difference in mean between mild and moderate; moderate and severe and mild and severe hypertension groups; (p<0.001 for all the groups for both SBP and DBP); †With respect to difference between the mean birth weight of neonates across the three categories, it was significant between mild and moderate (p=0.0011); mild and severe (p=0.00004). It was not significant between moderate and severe (p=0.6639)



[Table/Fig-2]: Scatter plot of SBP of mothers and BW of neonates.
Pearson's correlation coefficient (r) of Maternal SBP with BW of neonates showed a moderate negative correlation (r=-0.478)



[Table/Fig-3]: Scatter plot of DBP of mothers and BW of neonates.
Pearson's correlation coefficient (r) of Maternal DBP with BW of neonates showed a strong negative correlation (r=-0.663)

The BLR was done with multiple variables such as age of mother, number of abortions, parity, grades of systolic hypertension, grades of diastolic hypertension, presence of gestational diabetes, anaemia in the mother and sex of neonate. It was observed that moderate and severe diastolic hypertension affected the BW significantly after adjusting for maternal and foetal covariates (p<0.001) as shown in [Table/Fig-4]. Multiple stepwise analysis of logistic regression was done and the first and final steps are shown in [Table/Fig-4].

Parameters	B	SE	Wald	p-value	Exp (B)
Age of mother	-0.931	1.232	0.571	0.450	0.394
Number of abortions	-19.784	40192.970	0.000	1.000	0.000
Parity	0.982	0.508	3.745	0.053	2.670
Grade of systolic HT: mild vs moderate	-0.072	1.080	0.004	0.947	0.931
Grade of systolic HT: mild vs severe	-0.288	1.222	0.056	0.814	0.750
Grade of diastolic HT: mild vs moderate	1.676	0.727	5.313	**0.021**	5.342
Grade of diastolic HT: mild vs severe	2.662	1.084	6.036	**0.014**	14.329
Gestational diabetes	0.602	1.257	0.229	0.632	1.826
Anaemia in mother	0.654	0.733	0.798	0.372	1.924
Sex of neonate	0.904	0.463	3.805	0.051	2.469
Constant	-2.188	1.642	1.775	0.183	0.112
Final step					
Grade of diastolic HT: mild vs moderate	1.636	0.446	13.470	**<0.001**	5.134
Grade of diastolic HT: mild vs severe	2.412	0.593	16.524	**<0.001**	11.152
Sex of neonate	0.742	0.413	3.237	0.072	2.101
Constant	-2.109	0.392	28.987	<0.001	0.121

[Table/Fig-4]: Binary logistic regression for dependent variable: birth weight.
B-coefficient of constant; SE: Sandard error; Wald: Wald Chi-square test; Exp (B)-exponentiation of the B coefficient

The incidence of LBW, prematurity and SGA neonates were compared across mothers with mild, moderate, and severe hypertension. Mothers with severe hypertension had the highest incidence of LBW, premature and SGA neonates [Table/Fig-5]. Incidence of RD, NNH and admission to NICU were higher in neonates born to mothers with moderate and severe hypertension and were statistically significant [Table/Fig-6]. Three deaths occurred among the 142 neonates (one from mild hypertension category and two from severe hypertension category), and they were all due to severe perinatal asphyxia.

S. No.	Category	Mothers with mild HT (n=83) (%)	Mothers with moderate HT (n=28) (%)	Mothers with severe HT (n=31) (%)	p-value
1.	LBW	12 (14.46)	14 (50)	18 (58.06)	Fischer's-exact test **<0.0001**
	Normal BW	71 (85.54)	14 (50)	13 (41.94)	
2.	Mean BW of LBW (Kg)	2.115	2.074	1.94	ANOVA p=0.237*
	Mean BW of normal weight neonates (Kg)	2.961	2.796	2.896	ANOVA p=0.240†

3.	Preterm	5 (6.02)	12 (42.86)	11 (35.48)	Fischer's exact test **<0.0001**
	Term	78 (93.98)	16 (57.14)	20 (64.52)	
4.	SGA	6 (7.23)	6 (21.43)	10 (32.26)	Fischer's exact test **0.0283**
	AGA	77 (92.77)	22 (78.57)	21 (67.74)	

[Table/Fig-5]: Incidence of Low Birth Weight (LBW), Preterm and Small for Gestational Age (SGA) neonates across different categories of hypertension in mothers.
HT: Hypertension; BW: Birth weight; LBW: Low birth weight; SGA: Small for gestational age; *The Tukey's HSD post-hoc analysis revealed no significant difference in mean of LBW neonates between mild and moderate (p=0.926); moderate and severe (p=0.453) and mild and severe Hypertension groups (p=0.263); †The Tukey's HSD post-hoc analysis revealed no significant difference in mean of normal birth weight neonates between mild and moderate (p=0.300); moderate and severe (p=0.586) and mild and severe Hypertension groups (p=0.869)

S. No.	Category	Mothers with mild HT (n=83) (%)	Mothers with moderate HT (n=28) (%)	Mothers with severe HT (n=31) (%)	p-value fischer's-exact test
1.	RD present	2 (2.41)	1 (3.57)	7 (22.58)	**0.002**
2.	BA present	1 (1.20)	0	2 (6.45)	0.219
3.	NNH present	14 (16.87)	4 (14.29)	12 (38.71)	**0.033**
4.	Thrombocytopenia-present	1 (1.20)	1 (3.57)	1 (3.23)	0.373
5.	Admitted in NICU	16 (19.28)	7 (25)	16 (51.61)	**0.003**
6.	Deaths-Yes	1 (1.20)	0	2 (6.45)	0.219

[Table/Fig-6]: Early neonatal outcomes across different categories of HT in mothers.
RD: Respiratory distress present; BA: Birth asphyxia; NNH: Neonatal hyperbilirubinemia; NICU: Neonatal intensive care unit

DISCUSSION

Multiple studies have been done in the past in India and abroad with respect to hypertensive disorders of pregnancy and neonatal outcomes. A comparison of such studies is outlined in [Table/Fig-7] [5,11,15,24-29].

The index study found a strong negative correlation between BW of neonates and maternal DBP in pregnancies with PIH. It was observed that an 1SD increase in SBP resulted in 0.245 kg decrease in BW while an 1SD increase in DBP resulted in 0.312 kg decrease in BW. Similarly, Bakker R et al., (on a cohort of 8623 normotensive and hypertensive pregnancies) found that per one-SD increase in SBP and DBP at mean gestation of around 30 weeks was associated with 16.9 g and 50.6 g lower BW, respectively [30]. Chaim SRP et al., (in 778 hypertensive pregnant women) observed that a DBP ≥110 mmHg was associated significantly with LBW (p=0.002) and prematurity (p=0.013) [13]. Steer PJ et al., (among 2,10,814 neonates born to normotensive mothers) observed that any significant rise in maternal DBP outside the upper limit of 80 mmHg resulted in LBW [12]. Lim WY et al., (in 713 normotensive pregnancies from southeast Asia) found that each 1-SD increase (10.0 mmHg) in central SBP was inversely associated with birth weight (-40.52 g) [14]. To the best of our knowledge this was the first South Indian study looking at this aspect of correlation between maternal blood pressure and birth weight.

The exact underlying pathophysiology that links higher maternal BP to lower weight in offsprings is not clearly understood. It is hypothesised that a less effective cytotrophoblastic invasion of

S. No.	Author	Region	Study period	Sample size	Prevalence of PIH%	How the study stratified antenatal mothers with HT or Mean BP±SD (mmHg)	Mean maternal age (years)	Mean birth weight±SD (grams)	Outcome	Mortality (%)
1.	Panda S et al., [5]	North-east India	January 2016-January 2019	402	7.3	GHTN/Mild PE/ Severe PE/E	--------	--------	Preterm with RDS: 25.3% Term with FGR: 0.74%; Term with FGR and asphyxia: 3.7%; IUFD: 8.2%	6.7
2.	Verma I et al., [24]	North India	December 2017-November 2018	120	-----	GHTN/Chronic HT/ PE/E; Mean±SD SBP: 160.82±16.85; DBP: 102.19±9.28	27.48±3.96	2199.47± 705.96	LBW: 64.5%; FGR:50%; NICU admissions:46.8% Asphyxia: 6.9%	4.63
3.	Captain M et al., [25]	Pune	September 2017-May 2018	180	-------	GHTN/PE/E	24.76	2486.3± 741.6	LBW: 43.56%; NICU admissions: 32.52%; Prematurity: 25.77%; Asphyxia: 22.09%	5.23
4.	Bharadwaj A et al., [15]	Madhya Pradesh	----------	Case- control (82 and 164 respectively)	4.97	GHTN/PE/E Mean±SD SBP:170.2±16.2; DBP:105±8.1	23.8±5.3	———	NICU admissions: 46.57% IUGR: 44.83%; Prematurity: 38.53%; Pearson's correlation (r) of BP with BW: -0.611	6.1
5.	Tiwari A and Dwivedi R, [26]	Bhopal	March 2013 to March 2016	180	5.97	GHTN/PE/E	-------	---------	LBW: 57.7% Prematurity: 44.2% IUD: 20.4%	12.2%
6.	Vats K and Paul M, [27]	New Delhi	January 2014-December 2014	Cases-controls: (100 in each group)	------	PIH/PE/E	-------	--------	LBW: 32%; Prematurity: 26.5%; Admissions to NICU: 25.5%; APGAR <7 at 5 minutes: 24.5%	4.3%
7.	Siromani SM et al., [28]	Hyderabad	October 2013-March 2014	Case- control (75 and 100 respectively)	-------	PIH/PE/E	-------	--------	Prematurity: 63.01%; LBW: 54.67%; NICU admissions: 34.25%; Asphyxia: 15.06%	2.74

8.	Leidner V et al., [11]	Germany	January 2009-December 2013	245	——	Only Preeclamptic mothers. Mean±SD maximum SBP: 169.0±21.4 Mean±SD maximum DBP: 99.5±15.4	31.7±6.4	2232±852	Admission to NICU: 54.5%; SGA: 20%	1.4%
9.	Yilgwan CS et al., [29]	Nigeria	April 2017-May 2018	Cohort with 45 each of preeclampsia and normotensive pregnant smothers	------	Only preeclampsia Mean±SD SBP: 122±22.6; Mean DBP: 79.8±14.3	31.1±6.3	2529±817.5	LBW: 42.2%; Prematurity: 40%; Admission to NICU: 33.3% Birth Asphyxia: 2.2%	13.3
10.	Index study	Hyderabad	July 2018-July 2019	142	7.76	Mild HT, Moderate HT and Severe HT Mean±SD SBP: 151.46±11.77 DBP: 98.49±7.60	24.31±3.648	2644±510	LBW: 30.98%; Admission to NICU: 27.46% Prematurity: 19.72%; SGA: 15.49%; Birth Asphyxia: 2.1% NNH: 21.13%	2.1

[Table/Fig-7]: Comparison of similar studies from India and abroad [5,11,15,24-29].
SD: Standard deviation; BP: Blood pressure; PIH: Pregnancy induced hypertension; GHTN: Gestational hypertension; PE: Preeclampsia; E: Eclampsia; HT: Hypertension; RDS: Respiratory distress syndrome; BA: Birth asphyxia; IUFD: Intra uterine foetal demise; IUD: Intra uterine deaths; FGR: Foetal growth restriction; IUGR: Intra uterine growth restriction; SGA: Small for gestational age; NNH: Neonatal hyperbilirubinemia

uterine spiral arteries results in reduced placental perfusion [3]. Ultimately this can lead to slow foetal growth and compromised foetal development, limiting adequate oxygen and nutrient delivery to the foetus [4]. The strong inverse association between maternal DBP and BW as compared to SBP and BW can be attributed to compromised placental perfusion during diastole.

Multiple early neonatal outcomes were analysed such as incidence of prematurity, SGA, RD, BA, NNH, Thrombocytopenia, Admission to NICU and mortality [Table/Fig-4,5]. As seen in [Table/Fig-7], this study also found significantly increased incidence of prematurity, SGA, and admission to NICU. Tian T et al., observed that the risk of RD in neonates increased with severity of hypertension in the mothers like this study [31]. There was no significant association between the severity of hypertension and incidence of BA in neonates in the present study like Siromani SM et al., [28]. There was no association between thrombocytopenia and severity of hypertension. The study could not find any significant association between severity of hypertension and early neonatal mortality.

Limitation(s)

Blood Pressure included in the study was that which was recorded at the time of diagnosis of PIH. The follow-up blood pressure of mothers with PIH was not part of the study. BW of neonates born to mothers without hypertension was not included for comparison. LBW has multifactorial aetiology and as few factors like maternal nutrition, weight, height, socio-economic status was not included in the study.

CONCLUSION(S)

The mean BW of neonates born to mothers with severe hypertension was significantly lower compared to those born to mild hypertension. Maternal DBP has significant negative correlation with BW. Significant increase in incidence of LBW, prematurity, small for gestational age, RD and NNH was observed in neonates born to mothers with severe hypertension compared to mild and moderate hypertension categories. Large-scale longitudinal studies are required to look into the effect of BP elevation in pregnant mothers and their neonates.

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