

## Perinatal Outcomes of Hypertensive Pregnancy: A Case Control Study

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### ABSTRACT

**Background:** Hypertensive disorders of pregnancy (HDP) are one of the maternal diseases that cause the most detrimental effects to the mother and the fetus. **Objective:** This study was conducted to compare the perinatal outcomes of neonates delivered by hypertensive mothers and normal mothers. **Methods:** This comparative hospital based study was conducted in Nepalgunj Medical College Teaching Hospital, Kohalpur from December 2014 to December 2015. Fifty mothers fulfilling the inclusion criteria and their fetal outcome in form of still birth and newborn babies were taken for the study and 50 healthy mothers with normotensive pregnancies and their newborn babies or fetal outcome were taken as control. They were followed up till their hospital stay in NICU or postnatal ward and final outcomes were noted. **Results:** The prevalence of HDP in our hospital was 2.16%. Among neonates, 27(54%) in case group and 9(18%) in control group were low birth weight which is statistically significant. It was found that 18(36%) neonates in case group and 7(14%) neonates in control group were IUGR(Intrauterine growth retardation). Seventeen (34%) neonates in case group were preterm as compared to 2(4%) neonates in control group ( $p$  value < 0.001). **Conclusion:** Pregnancies complicated by hypertension were characterized by an increase in the rate of preterm delivery and low birth weight infants compared with normal pregnancies.

**Key words:** *Hypertensive disorders of pregnancy (HDP), Low birth weight, Prematurity, Perinatal period*

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### INTRODUCTION

Hypertensive disorders of pregnancy (HDP) are one of the maternal diseases that cause the most detrimental effects to the mother and the fetus<sup>1</sup>.

Hypertension during pregnancy is defined as a sustained systolic blood pressure of 140 mmHg or more and/or a diastolic blood pressure of 90 mmHg or more. This is best confirmed when evidence is present on 2 occasions at least 6 hours apart but within 7 days<sup>2</sup>.

The Working Group of the NHBPEP-National High Blood Pressure Education Program (2000) has categorized hypertensive disorders of pregnancy into 4 types<sup>1</sup>:

1. **Gestational Hypertension:** Hypertension 1<sup>st</sup> diagnosed after 20 weeks gestation not accompanied by proteinuria.
2. **Pre-eclampsia/pre-eclamptic toxemia (PET) – Eclampsia:** Hypertension 1<sup>st</sup> diagnosed after 20 weeks gestation accompanied by proteinuria greater than 0.3g in 24 hours urine collection or greater than 3+ in a random sample; Eclampsia is occurrence of seizures in women with pre-eclampsia that cannot be attributed to other causes.
3. **Chronic Hypertension:** Hypertension present before pregnancy or 1<sup>st</sup> diagnosed before 20 weeks gestation.
4. Pre-eclampsia superimposed on chronic hypertension. Gestational hypertension is the dominant cause of

hypertension in pregnant population followed by pre-eclampsia - eclampsia while chronic hypertension is seen in small number of patients<sup>1,3</sup>.

Hypertensive disorders of pregnancy (HDP) predispose women to acute or chronic utero-placental insufficiency, resulting in ante or intra-partum asphyxia that may lead to fetal death, intrauterine growth retardation and/or preterm delivery<sup>4,5</sup>.

The complications can be prevented by more widespread use of prenatal care, education of primary medical care personal, prompt diagnosis of high risk patients and timely referral to tertiary medical centers and institutional management<sup>3,6,7,8</sup>.

Since no such study has been carried out in this part of the country, the present study was carried out with the purpose to see perinatal outcome of neonates with maternal hypertensive disorders in pregnancy.

### MATERIAL AND METHODS

A hospital based comparative study was carried out to evaluate the perinatal outcome of neonates delivered by hypertensive mothers without other comorbidities and to compare with the outcome of control group.

The data was collected from the NICU and the Department of Obstetrics and Gynecology of Nepalgunj Medical College

Teaching Hospital Kohalpur, Banke. The study was carried out from December 2014 till December 2015.

Fifty mothers which were given clinically the provisional diagnosis of hypertension in pregnancy admitted in our hospital for further management and neonates delivered to such hypertensive mothers fulfilling the inclusion criteria were taken as cases. Fifty normotensive mothers admitted as full term normal pregnancy in labor and without any complications during pregnancy were taken as control and their fetal outcome (i.e. still birth if any and neonates) were assessed for comparison.

Data regarding the demographic parameters like age, parity, literacy status, socio-economic status, antenatal checkup, gestational age, time of onset of raised blood pressure, associated medical disorders specially the history of hypertensive disorder during their previous pregnancy, family history of hypertension, mode of delivery, and fetal complications like intra uterine death (IUD) were recorded in a structured questionnaire.

Neonatal parameters like perinatal asphyxia, Apgar score, sex, gestational age, birth weight, small for gestational age, NICU admission and duration of stay in hospital, respiratory distress due to hyaline membrane disease (HMD), transient tachypnoea of newborn (TTNB), neonatal sepsis (NNS), meconium aspiration syndrome (MAS), Birth asphyxia (BA) were recorded.

The cases were followed up till their hospital stay in NICU or postnatal ward and outcome was noted. Statistical analyses of clinical and demographic factors were carried out.

**RESULT**

Out of total 100 mothers, 2 mothers from hypertensive group had twin delivery and 2 mothers from normotensive group were chosen with twin pregnancy. But only the first neonate from the twin delivery was selected for study from both the study groups.

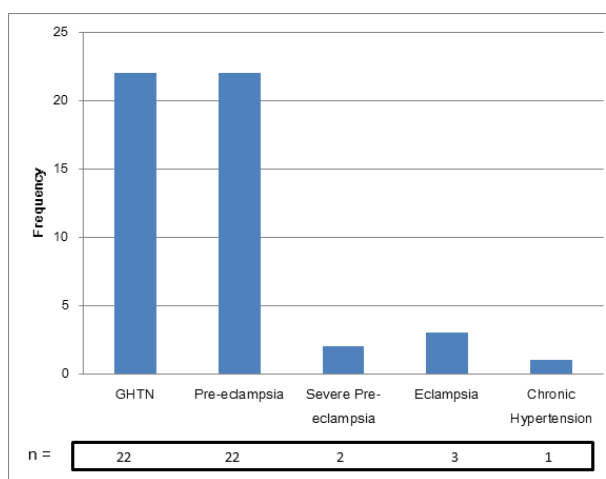


Figure 1: Distribution of cases according to type of hypertension

The above bar diagram shows that in the case group (n=50) maximum cases were diagnosed as gestational HTN 22 (44%) and pre-eclampsia 22 (44%) cases, followed by eclampsia only in 3(6%), severe eclampsia 2(4%) and chronic HTN 1(2%). Thus 88% of the cases fell in GHTN and pre-eclampsia group.

Out of total 50 neonates delivered from mothers with HDP, 3 were intrauterine death/stillbirth (IUFD). Similarly 1 intrauterine death (IUFD) was recorded out of 50 deliveries from normotensive mothers.

Among neonates, 27(54%) in case group and 9(18%) in control group were low birth weight which is statistically significant.

It was found that 18(36%) neonates in case group and 7(14%) neonates in control group were IUGR (Intrauterine growth retardation). Seventeen (34%) neonates in case group were preterm as compared to 2(4%) neonates in control group which is statistically significant.

Group	Outcome	Perinatal complications							Total (%)	P value
		Normal	TTNB	BA	HMD	MAS	NNS	STILLBIRTH		
Control	Alive	42	2	1	0	0	3	-	49 (98.0)	<0.01
	Death	0	0	0	1	0	0	1	1(2.0)	
Total (%)		42 (84.0)	2 (4.0)	1 (2.0)	1 (2.0)	0	3 (6.0)	1 (2.0)	50 (100.0)	
Case	Alive	15	3	9	3	2	10	-	45 (90.0)	
	Death	0	0	2	3	0	0	3	5(10.0)	
Total (%)		15 (30.0)	3 (6.0)	11 (22.0)	6 (12.0)	2 (4.0)	10 (20.0)	3 (6.0)	50(100.0)	

Table 1 : Perinatal complications and neonatal outcome in study group

The table above shows different morbid conditions like TTNB, BA, HMD, MAS, NNS and still birth in both the case and control group.

In control group there was 1 (2%) stillbirth compared to 3 (6%) in case group. Similarly 22% of case had birth asphyxia followed by 20% NNS, 12% HMD, 6% TTNB, 4% MAS in case group as compared to 2% BA, 6% NNS, 2% HMD, 4% TTNB and no MAS in control group. It showed increased perinatal

morbidity in HDP as compared to normotensive pregnancy and it is statistically significant (p value <0.01).

Perinatal Outcome	Groups, n (%)		Total (%)	P value	Crude OR	95% CI for OR	
	Control	Case				Lower	Upper
Alive	48 (96.0)	42 (84.0)	90 (90.0)	0.046	4.571	0.919	22.730
Death	2 (4.0)	8 (16.0)	10 (10.0)				
<b>Total</b>	<b>50 (100.0)</b>	<b>50 (100.0)</b>					

**Table II: Perinatal Outcome in terms of mortality**

The table II shows the perinatal outcome of neonates in term of mortality delivered in case and control groups. It shows that 8(16%) of case had mortality compared to 2(4%) in control group. Out of total 10 mortalities 4 were stillbirths of which 3 were in cases and 1 still birth was in the control group which was the first twin of twin delivery. This table signifies that perinatal mortality was 4.571 times greater than in control group and it is statistically significant (p value 0.046).

## DISCUSSION

Hypertensive disorders of pregnancy have been identified as a major world- wide health problem, associated with increased perinatal morbidity and mortality<sup>9</sup>.

Studies have shown that hypertensive disorders of pregnancy predispose women to acute or chronic uteroplacental insufficiency, there by having an effect on perinatal and neonatal outcome that may result in ante or intra partum anoxia that may lead to fetal death, intrauterine growth retardation and/or preterm delivery<sup>4,10</sup>. Of 3,826 deliveries in our hospital during the defined period of 1 year, 83 cases were managed as hypertensive disorder of pregnancy showing hospital based prevalence of HDP as 2.16%.

According to several published studies, pregnancies complicated by hypertension are characterized by an increase in the rate of preterm delivery, LBW, and VLBW infants, compared with normal pregnancies.

This is true in all groups of hypertensive women independent of presence or absence of proteinuria<sup>11,12</sup>.

In the present study, 54% of the babies born to HDP study group mothers were low birth weight compared to 18% in control group. Nadkarni et al study had similar experience in their study with an incidence of 51.7% LBW babies<sup>9</sup>.

There is an increased incidence of preterm deliveries in our study. 34% of the study group mothers had preterm babies compared to 4% of their counterparts in control group. There was a statistically significant association of preterm births in HDP as compared to control group with p value <0.001. Nadkarni et al study showed 44.3% preterm deliveries which is comparable to our study while Yadav et al study had 28.85% and Solange Regina study had 10.9%<sup>9,13,14</sup>.

One of the main impacts on the fetus is under-nutrition as a result of utero-placental vascular insufficiency, which leads to intrauterine growth retardation. So, fetal growth is a useful marker for fetal well-being<sup>15,16</sup>. Fetal complication associated with HDP is intrauterine growth restriction (IUGR). Pregnancies complicated by intrauterine growth restriction (IUGR), defined as a pathological process of reduced fetal growth, have been associated with an increase in perinatal mortality<sup>17,18</sup>. The incidence of small for gestational age (SGA) amongst women with HDP in our study (36%) was higher than SGA neonates seen in control group (18%) which is statistically significant (p value 0.043). Our study compares favorably to study done by Tranquilli et al., 2002, which reported incidence of 51.3%<sup>5</sup>.

Morbid conditions like Birth asphyxia, HMD, NNS, MAS, TTNB in newborns were considered individually, which showed specific association with HDP in mothers in our study. For Birth asphyxia it was observed in 23.4% newborn in case group compared to 2.04% in control group; HMD (12.8%) in case group compared to 2% in control group; NNS (21.3%) compared to 6.1% in control group and were all statistically significant (p value<0.05). Whereas morbid conditions like MAS and TTNB did not show significant correlation in mothers with HDP and normotensive mothers. Similar studies done by Nadkarni et al showed higher risk of birth asphyxia (14%), neonatal sepsis (7.5%) and HMD (7.3%) in hypertensive pregnant mothers<sup>9</sup>. In one study carried out by Swetha Ananda et al showed increased association of MAS in neonates (5.4%) born to mothers with HDP<sup>19</sup>.

In this study perinatal mortality was 8 (16%) in case group, out of them, 3 (6%) IUD/stillbirth, 5(10%) babies expired during the course of treatment at NICU out of 50 babies. Similarly in control group out of total 50 babies, 2(4%) had perinatal mortality out of which 1(2%) IUD/ stillbirth and 1 (2%) early neonatal death. In the present study, prematurity (HMD) was the commonest cause of perinatal mortality. In the study by Shaheen et al. perinatal mortality was 41.6 percent and prematurity was the main risk factor<sup>20</sup>. In a study done by Nadkarni et al., total perinatal death was 68 (15.9%) out of 427, 40 (31.1%) was early neonatal deaths and 28 (6.5%) still births<sup>9</sup>.

## CONCLUSION

HDP is a common complication in antenatal women and is a major cause of maternal and fetal morbidity and mortality. The prevalence of HDP in our hospital was 2.16%.

Pregnancies complicated by hypertension were characterized by an increase in the rate of preterm delivery, LBW and VLBW infants compared with normal pregnancies. The commonest cause of perinatal mortality in the present study was prematurity (HMD) followed by birth asphyxia.

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