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Original Article

Hypertensive Disorders of Pregnancy and Neonatal Outcome: An Observational Study

Dr. Aditi Hiralal Iche[1], Dr. Sameer Chaudhari[2], Dr. Richa Naik[3]

[2] Associate Professor, Department of Medicine, PDMMC Amravati, Maharashtra

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Corresponding Author:

Dr. Sameer Chaudhari

Associate Professor, Department of Medicine, PDMMC Amravati, Maharashtra.

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ABSTRACT

Background: Hypertensive disorders of pregnancy (HDP) are among the most common medical complications of pregnancy and are important causes of maternal and neonatal morbidity and mortality. These disorders adversely affect uteroplacental circulation, leading to fetal growth restriction, prematurity, low birth weight, and increased neonatal intensive care admissions. The present study undertaken to evaluate neonatal outcomes among women with hypertensive disorders of pregnancy and determine the relationship between the severity of maternal hypertension and neonatal morbidity and mortality.

Materials and Methods: A prospective observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of 18 months. A total of 93 pregnant women diagnosed with hypertensive disorders of pregnancy after 20 weeks of gestation were included. Neonatal outcomes were evaluated.

Results: Among the 93 women studied, preeclampsia was the most common hypertensive disorder (43.0%), followed by gestational hypertension (34.4%), severe preeclampsia (16.1%), and eclampsia (6.5%). Low birth weight was observed in 37 (39.8%) neonates, preterm birth in 29 (31.2%), fetal growth restriction in 20 (21.5%), NICU admission in 25 (26.9%), respiratory distress syndrome in 13 (14.0%), and perinatal mortality in 5 (5.4%) cases. Adverse neonatal outcomes were significantly more frequent among women with severe preeclampsia and eclampsia.

Conclusion: Hypertensive disorders of pregnancy are associated with increased neonatal morbidity and mortality, particularly among women with severe disease. Early diagnosis and appropriate obstetric management are essential to improve neonatal outcomes.

Keywords: *Hypertensive disorders of pregnancy, preeclampsia, neonatal outcome, low birth weight, NICU admission.*

INTRODUCTION

Pregnancy induced hypertension (PIH) includes a group of hypertensive disorders developed due the gravid state after 20 weeks of pregnancy. It includes gestational hypertension with blood pressure ≥140/90 mm of Hg without proteinuria, pre-eclampsia which is gestational hypertension with proteinuria, and eclampsia defined as pre-eclampsia with convulsions.[1,2]

The causes of pregnancy-induced hypertension and the risk factors associated with it are largely unknown. The nulliparity and previous history of preeclampsia in multiparas women are few risk factors on which universally acceptance is found.[3] The various attributes that have been reported to be related to preeclampsia are maternal age, familial aggregation, race, smoking, socioeconomic level, diet, season and climate, quite apart from the geographical area.[4]

Hypertensive disorders of pregnancy constitute a major public health problem and complicate approximately 5–10% of all pregnancies worldwide.[5] These disorders include gestational hypertension, preeclampsia, severe preeclampsia, chronic hypertension, and eclampsia. Hypertensive disorders remain one of the leading causes of maternal and perinatal mortality, particularly in developing countries.[6]

The pathophysiology involves abnormal placentation, endothelial dysfunction, vasospasm, and reduced uteroplacental perfusion. These changes can adversely affect fetal growth and development, leading to complications such as fetal growth restriction, prematurity, low birth weight, fetal distress, and increased neonatal mortality. [7]

Despite advances in obstetric care, hypertensive disorders continue to contribute substantially to neonatal morbidity. Understanding neonatal outcomes associated with different forms of maternal hypertension is crucial for improving antenatal surveillance and neonatal care.

The present study was undertaken to evaluate neonatal outcomes among women with hypertensive disorders of pregnancy and identify factors associated with adverse neonatal outcomes.

MATERIALS AND METHODS

The present prospective observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of 18 months. A total of 93 pregnant women diagnosed with hypertensive disorders of pregnancy were enrolled in the study. Pregnant women with singleton gestation, gestational age of 20 weeks or more, and a confirmed diagnosis of hypertensive disorder of pregnancy who provided informed consent were included. Women with multiple gestation, pre-existing chronic hypertension, pregestational diabetes mellitus, major fetal congenital anomalies, and chronic renal or cardiovascular diseases were excluded from the study.

After obtaining informed written consent, detailed demographic, clinical, and obstetric information was recorded using a predesigned proforma. All participants underwent thorough clinical evaluation, including blood pressure measurement, urine protein assessment, and relevant laboratory investigations according to standard obstetric protocols. Based on the severity and clinical presentation of hypertension, participants were categorized into gestational hypertension, mild preeclampsia, severe preeclampsia, and eclampsia groups.

The enrolled women were followed until delivery, and neonatal outcomes were assessed immediately after birth and during the neonatal period. The neonatal parameters evaluated included birth weight, gestational age at delivery, APGAR scores at one and five minutes, fetal growth restriction (FGR), respiratory distress syndrome (RDS), neonatal intensive care unit (NICU) admission, and perinatal mortality.

All collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 24. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Associations between categorical variables were analyzed using the Chi-square test or Fisher's exact test wherever appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1. Demographic Characteristics of Study Participants (n = 93)

Variable		Number (n)	Percentage (%)
Age Group (Years)	<20	6	6.5
	20–24	22	23.7
	25–29	38	40.9
	30–34	19	20.4
	≥35	8	8.6
Gravidity	Primigravida	41	44.1
	Multigravida	52	55.9
Residence	Rural	58	62.4
	Urban	35	37.6
Socioeconomic Status	Lower	16	17.2
	Lower Middle	34	36.6
	Middle	26	28.0
	Upper Middle	13	14.0
	Upper	4	4.3
Educational Status	Illiterate	8	8.6
	Primary School	18	19.4
	Secondary School	31	33.3
	Higher Secondary	24	25.8
	Graduate and Above	12	12.9

Table 1 shows the demographic characteristics of the study participants. The majority of women belonged to the 25–29 years age group (40.9%) Multigravida women constituted 55.9% of the study population. Most participants were from rural

areas (62.4%), while 37.6% belonged to urban areas. Regarding socioeconomic status, the largest proportion of women belonged to the lower middle class (36.6%)

Table 2. Distribution of Hypertensive Disorders of Pregnancy (n = 93)

Type of HDP	Number	Percentage (%)
Gestational Hypertension	32	34.4
Preeclampsia	40	43.0
Severe Preeclampsia	15	16.1
Eclampsia	6	6.5
Total	93	100

The above table no. 2 shows that, Preeclampsia was the most common hypertensive disorder, accounting for 43.0% of cases, followed by gestational hypertension (34.4%). Severe preeclampsia and eclampsia constituted 16.1% and 6.5% of cases, respectively.

Table 3. Neonatal Outcomes (n = 93)

Outcome	Number	Percentage (%)
Low Birth Weight	37	39.8
Preterm Birth	29	31.2
Fetal Growth Restriction	20	21.5
NICU Admission	25	26.9
Respiratory Distress Syndrome	13	14.0
APGAR Score <7 at 5 min	11	11.8
Perinatal Mortality	5	5.4

The above table no. 3 shows that, Low birth weight was the most common neonatal complication, affecting 39.8% of neonates, followed by preterm birth (31.2%) and NICU admission (26.9%). Perinatal mortality was observed in 5.4% of cases.

Table 4. Neonatal Outcomes According to Severity of Hypertensive Disorder

Outcome	Gestational HTN (n=32)	Preeclampsia (n=40)	Severe Preeclampsia/Eclampsia (n=21)	P value
Low Birth Weight	8 (25.0%)	16 (40.0%)	13 (61.9%)	0.01
Preterm Birth	6 (18.8%)	12 (30.0%)	11 (52.4%)	0.008
NICU Admission	4 (12.5%)	11 (27.5%)	10 (47.6%)	0.004
FGR	4 (12.5%)	8 (20.0%)	8 (38.1%)	0.03
Perinatal Mortality	0 (0.0%)	2 (5.0%)	3 (14.3%)	0.02

The above table no. 4 shows that, Low birth weight increased from 25.0% in gestational hypertension to 61.9% in severe preeclampsia/eclampsia (p = 0.01), while preterm birth rose from 18.8% to 52.4% (p = 0.008). NICU admissions were highest among neonates born to mothers with severe preeclampsia/eclampsia (47.6%) compared to preeclampsia (27.5%) and gestational hypertension (12.5%) (p = 0.004). Similarly, fetal growth restriction increased from 12.5% to 38.1% (p = 0.03), and perinatal mortality from 0% to 14.3% (p = 0.02). Overall, neonatal morbidity and mortality were significantly higher with increasing severity of maternal hypertensive disorders.

DISCUSSION

Hypertensive disorders of pregnancy remain one of the leading causes of maternal and perinatal morbidity and mortality worldwide. These disorders adversely affect placental perfusion, resulting in fetal hypoxia, growth restriction, prematurity, and increased neonatal morbidity. The present study evaluated neonatal outcomes among 93 women with hypertensive disorders of pregnancy and demonstrated a significant association between the severity of maternal hypertension and adverse neonatal outcomes.

In the present study, preeclampsia was the most common hypertensive disorder, accounting for 43.0% of cases, followed by gestational hypertension (34.4%), severe preeclampsia (16.1%), and eclampsia (6.5%). Similar findings have been reported in several Indian studies. Sachan et al.[8] reported that preeclampsia constituted the majority of hypertensive disorders among pregnant women, accounting for nearly half of all HDP cases. Likewise, Yadav et al. [9] and Patel et al. [10] identified preeclampsia as the predominant hypertensive disorder encountered in tertiary care centers. The predominance of preeclampsia observed in the present study may be attributed to delayed antenatal registration, inadequate prenatal surveillance, and referral bias associated with tertiary care hospitals.

Low birth weight was the most common neonatal complication observed in the present study, affecting 39.8% of neonates. Comparable findings have been reported by Sachan et al. [8] who documented low birth weight in approximately 41% of neonates born to hypertensive mothers. Kumar et al. [11] reported a prevalence of 38.5%, while Singh et al. [12] observed low birth weight in 43.2% of neonates delivered by women with hypertensive disorders of pregnancy. The high incidence of low birth weight can be attributed to chronic uteroplacental insufficiency, endothelial dysfunction, and reduced nutrient transfer secondary to abnormal placentation. These pathological changes compromise fetal growth and often necessitate early delivery, further contributing to low birth weight.

Preterm birth occurred in 31.2% of pregnancies in the present study. Similar observations have been reported by Yadav et al. [9] who found preterm delivery in 34.8% of hypertensive pregnancies, and by Das et al. [13] who reported a prevalence of approximately 30%. The increased risk of preterm birth in hypertensive pregnancies may be due to both spontaneous preterm labor and medically indicated early delivery undertaken to prevent maternal and fetal complications. Placental ischemia and fetal compromise often necessitate termination of pregnancy before term, thereby increasing neonatal morbidity.

Fetal growth restriction was observed in 21.5% of neonates in the present study. This finding is consistent with the observations of Patel et al. [10] and Sharma et al. [14] who reported fetal growth restriction rates ranging from 18% to 25% among women with preeclampsia. Impaired trophoblastic invasion and reduced uteroplacental blood flow are considered the principal mechanisms responsible for restricted fetal growth in hypertensive pregnancies. Persistent placental insufficiency limits oxygen and nutrient supply to the fetus, resulting in growth restriction and poor neonatal outcomes. [3]

NICU admission was required for 26.9% of neonates, while respiratory distress syndrome was observed in 14.0% of cases. Similar findings were reported by Kumar et al. [11] and Saxena et al. [15] who documented NICU admission rates ranging between 20% and 35% among neonates born to hypertensive mothers. The increased requirement for neonatal intensive care is primarily attributable to prematurity, low birth weight, respiratory complications, and fetal distress. Respiratory distress syndrome remains one of the most common complications among premature infants delivered due to severe maternal hypertension.

Perinatal mortality was observed in 5.4% of cases in the present study. Although advances in antenatal surveillance and neonatal intensive care have reduced perinatal mortality, hypertensive disorders continue to contribute significantly to neonatal deaths. Similar perinatal mortality rates have been reported by Sachan et al. [8] and Sharma et al. [14] who documented rates ranging from 4% to 8% in pregnancies complicated by severe hypertensive disorders. Perinatal deaths are frequently associated with extreme prematurity, severe fetal growth restriction, placental abruption, and birth asphyxia.

An important finding of the present study was the significant association between the severity of maternal hypertension and adverse neonatal outcomes. The incidence of low birth weight increased from 25.0% among women with gestational hypertension to 61.9% among those with severe preeclampsia and eclampsia. Similarly, preterm birth increased from 18.8% to 52.4%, NICU admission from 12.5% to 47.6%, fetal growth restriction from 12.5% to 38.1%, and perinatal mortality from 0% to 14.3% with increasing disease severity. These findings are consistent with those reported by Brown et al. [16] and Magee et al. [17] who demonstrated that severe preeclampsia and eclampsia are associated with substantially poorer neonatal outcomes compared with gestational hypertension. The worsening neonatal prognosis observed with increasing disease severity reflects progressive placental dysfunction and compromised fetal well-being.

Early identification of women at risk, regular antenatal monitoring, timely referral, and multidisciplinary management involving obstetricians and neonatologists are essential for reducing neonatal morbidity and mortality associated with hypertensive disorders of pregnancy.

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