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Original Article

To Assess Outcome of Neonates Born to Mothers with Hypertension Disorder of Pregnancy at Tertiary Care Hospital

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ABSTRACT

Background: Gestational hypertension and preeclampsia are common disorders during pregnancy, with the majority of cases developing at or near term. The development of mild hypertension or preeclampsia at or near term is associated with minimal maternal and neonatal morbidities. In contrast, the onset of severe gestational hypertension and/or severe preeclampsia before 35 weeks' gestation is associated with significant maternal and perinatal complications

Materials and Methods: The present study was a single-center, observational Study conducted on patients admitted with newborns born to mother with hypertensive disorder of pregnancy, Irrespective of treatment in the department of Paediatrics, Sri Siddhartha Medical College hospital and Research Centre, Tumkur from January 2020 to July 2022. Prior initiation of the study obtained Ethical and Research Committee clearance from Sri Siddhartha Medical College hospital and Research Centre, Tumkur. During present study total 200 neonates were reviewed in OPD/IP, among 125 patients were enrolled into the study according present study inclusion criteria and 75 patients were excluded according exclusion criteria.

Results: Majority subjects were in the age group of 21-25 years (45.60 %).Most subjects were in their primi (48%).The above table gives data on distribution of subjects based on diagnosis. Most subjects were diagnosed with preeclampsia, i.e.73 (58.4%); followed by 27 subjects (21.6 %) with eclampsia HTN and 25 subjects (20%) with gestational HTN .Most subjects were not with any complications (87.2%). Most of the neonates were males (52%).There were 50.40 % neonates with low birth weight and 49.60 % with normal birth weight. 41.60 % neonates had morbidities. The morbidities observed in our study were resuscitation (33.60%); hypothermia (31.20%); hypoglycemia (28.00%); icterus (24.80 %); sepsis (14.40%); Transient tachypnea of the newborn (16 %); birth asphyxia (11.20%) and respiratory distress syndrome (57.60%). Majority of neonates required admission into Intensive Care Unit (54.4%).

Conclusion: Pregnancy Induced Hypertension is a maternal pathology involving placental modification which is associated with fetal complications. Fetal morbidity and mortality are serious concerns in preeclampsia and are attributable to poor management. Neonatal adverse events such as asphyxia, low birth weight, prematurity, Intrauterine growth restriction, NICU admission, and neonatal death were more prevalent if the mother had a hypertensive disorder during pregnancy.

Key Words: *Gestational hypertension, Preeclampsia, Pregnancy*

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INTRODUCTION:

Gestational hypertension and preeclampsia are common disorders during pregnancy, with the majority of cases developing at or near term. Maternal hypertensive disorders are more likely to cause significant adverse perinatal outcomes in LMIC. It is estimated that 2.6 million stillbirths occur each year, and 98% occur in LMIC[1]. In today's world, preeclampsia is the cause of many preterm births and perinatal mortality in women and neonates. There are many papers discussing the effects of preeclampsia on infants' birth status and its impact on the occurrence of various preterm birth complications that develop in the neonate during hospitalization in a neonatal care unit[2,3]. First of all, it should be remembered that compared with children born to healthy mothers, these infants more often demonstrate complications such as body weight below the 10th percentile, neutropenia, thrombocytopenia, and complications typical of preterm births including infections, newborn respiratory distress syndrome, and the associated need for hospitalization in a neonatal intensive care unit, intraventricular hemorrhage, necrotizing enterocolitis, bronchopulmonary dysplasia, retinopathy of prematurity, or even death[4,5,6]. Conditions of maternal gestational hypertension include pre-eclampsia, eclampsia, and HELLP syndrome (hypertension, elevated liver enzymes, and low platelets) are associated with low infant birth weight, and pre-eclampsia has been independently associated with growth restriction. Recent studies suggest that

mothers with pre-eclampsia have elevated levels of circulating antiangiogenic factors, such as the soluble fms-like tyrosine kinase 1 (s-flt1)and endoglin (a co-receptor of TGFβ1) and reduced levels of bioactive proangiogenic factors, such as vascular endothelial growth factor (VEGF), and placental growth factor (PIGF)[7,8]. In addition, prospective studies have demonstrated that altered concentrations of angiogenic factors were sensitive predictors of pre-eclampsia. Since the intrauterine environment is essential for the developing fetus, uteroplacental insufficiency in conditions such as pre-eclampsia may lead to altered fetal vascular programming and both short- and long-term complications. The pathophysiological mechanisms and the influence of hypertension is still unclear and thus, this study is conducted to analyse the outcomes of hypertension in neonates born to hypertensive mothers.

AIM:

Outcome of neonates born to mothers with hypertension disorder of pregnancy at tertiary care hospital

OBJECTIVES OF THE STUDY:

1. To assess the outcome of hypertensive disorder of pregnancy on mode of delivery, gestational age, and clinical status of these babies including need for NICU admission.
2. To assess the outcome of hypertensive disorder of pregnancy on neonatal anthropometry.

Materials and Methods:

The present study was a single-center, observational Study conducted on patients admitted with newborns born to mother with hypertensive disorder of pregnancy. Irrespective of treatment and in the department of Paediatrics, Sri Siddhartha Medical College hospital and Research Centre, Tumkur from January 2020 to July 2022. Prior initiation of the study obtained Ethical and Research Committee clearance from Sri Siddhartha Medical College hospital and Research Centre, Tumkur .During present study total 200 neonates were reviewed in OPD/IP, among 125 patients were enrolled into the study according present study inclusion criteria and 75 patients were excluded according exclusion criteria.

Inclusion Criteria:

Neonates born to pregnant women with hypertensive disorder of pregnancy (Gestational hypertension, preeclampsia, eclampsia) born at Sri Siddhartha Medical College and Hospital.

Exclusion criteria:

Any medical illness such as severe anaemia, chronic essential hypertension, renal disease, gestational diabetes, heart disease, connective tissue disorders, thyroid and other endocrine disorders, Mothers who has TORCH infections, Multiple gestations, Neonates with congenital malformations, Not giving consent

The collected data was entered into Microsoft Excel Worksheet-2010 and data was taken into IBM SPSS Statistic for windows, version 24(IBM Corp., Armonk, N.Y., USA) software for calculation of frequency, percentage, mean, standard deviation and Probability value.

Observations and Results:

Table 1: Subjects were distributed according to Age Group

Age Group	No. of Patients	Percentage
≤ 20	24	19.20
21-25	57	45.60
26-30	39	31.20
31-35	5	4
Total	125	100

The above table gives data on age wise distribution of subjects. In the present study, the subjects were categorized into four age groups. More subjects were found in the age group of 21-25 years i.e., 57 (45.60 %); followed by 39 subjects (31.20 %) in the 26 - 30 years age group, 24 subjects (19.20 %) in the ≤ 20 years age group and finally 5 subjects (4 %) in the 31 - 35 years age group.

Table 2: Subjects were distributed according to Gravida

Gravida	No. of Patients	Percentage
G2	47	37.6
≥G3	18	14.4
Primi	60	48.00

The above table gives data on gravida wise distribution of subjects. Most subjects were in their primi, i.e., 60 (48 %); followed by 47 subjects (37.6 %) in G2 and 18 subjects (14.4 %) in ≥G3.

Table 3: Subjects were distributed according to Diagnosis

Diagnosis	No. of Patients	Percentage
Preeclampsia	73	58.4
Eclampsia	27	21.6
Gestational HTN	25	20

The above table gives data on distribution of subjects based on diagnosis. Most subjects were diagnosed with preeclampsia, i.e., 73 (58.4 %); followed by 27 subjects (21.6 %) with eclampsia HTN and 25 subjects (20%) with gestational HTN

Table 4: Subjects were distributed according to gestational age

Gestational Age	No. of Patients	Percentage
Preterm	73	58.40
Term	52	41.60

The above table gives data on distribution of subjects based on gestational age. Most subjects had pre term gestational age, i.e., 73 subjects (58.40 %); followed by 52 subjects with term gestational age (41.60 %).

NEONATAL OUTCOME

Table 5: Subjects were distributed according to weight

Weight	No. of Patients	Percentage
Low	63	50.40
Normal	62	49.60

The above table gives data on weight wise distribution of neonates. There were 63 neonates (50.40 %) with low birth weight and 62 neonates (49.60 %) with normal birth weight.

Table 6: Subjects were distributed according to Morbidity

Morbidity	No. of Patients	Percentage
Yes	52	41.60
No	73	58.40

The above table gives data on morbidity wise distribution of neonates. Morbidity was absent in most of the neonates, i.e., 73 neonates (58.40 %). Morbidity was present in 52 neonates (41.60 %)

Table 7: Subjects were distributed according to Morbidity list

Morbidity list	No	Yes
Resuscitation	83 (66.40%)	42 (33.60%)
Hypothermia	86 (68.8%)	39(31.20%)
Hypoglycemia	90 (72.00%)	35(28.00%)
Icterus	94 (75.20%)	31 (24.80 %)
Sepsis	107 (85.60%)	18 (14.40%)
TTNB	105 (84.00)	20 (16.00%)
Birth asphyxia	111 (88.80%)	14 (11.20%)
Respiratory Distress syndrome	53 (42.40%)	72 (57.60%)

The above table gives data on distribution of neonates basing upon morbidity present.
Resuscitation was required in 42 neonates (33.60%) and not required in 83 neonates (66.40%).
Hypothermia was present in 39 neonates (31.20%) and absent in 86 neonates (68.8%).
Hypoglycemia was present in 35 neonates (28.00%) and absent in 90 neonates (72.00%).
Icterus was present in 31 neonates (24.80) and absent in 94 neonates (75.20%).
Sepsis was present in 18 neonates (14.40%) and absent in 107 neonates (85.60%).
TTNB was present in 20 neonates (16.00) and absent in 105 neonates (84 %).
Birth asphyxia was present in 14 neonates (11.20%) and absent in 111 neonates (88.80%).
Respiratory distress syndrome was present in 72 neonates (57.60%) and absent in 53 neonates (42.40%).

Table 8: Subjects were distributed according to ICU admission

ICU admission	No. of Patients	Percentage
Yes	68	54.4
No	57	45.6

Majority of neonates were admitted in ICU, i.e., 68 (54.4 %) while 57 neonates did not require ICU admission (45.6 %).

Table 9: Subjects were distributed according to anthropometric parameters:

Anthropometric Parameters	Normal	Abnormal
Length	107 (85.6%)	18 (14.4%)
Head circumference	114 (91.2%)	11 (8.8%)
Chest circumference	109 (87.2%)	16 (4.8%)
Mid arm circumference	99 (79.2%)	26 (20.8%)
Mid thigh circumference	97 (77.6%)	28 (22.40 %)
Foot length	116 (92.8%)	9 (7.2%)

Length was normal in 107 neonates (85.6%) and abnormal in 18 neonates (14.4%).
Head circumference was normal in 114 neonates (91.2%) and abnormal in 11 neonates (8.8%).
Chest circumference was normal in 109 neonates (87.2%) and abnormal in 16 neonates (4.8%).
Mid arm circumference was normal in 99 neonates (79.2%) and abnormal in 26 neonates (20.8%).
Mid thigh circumference was normal in 97 neonates (77.6%) and abnormal in 28 neonates (22.40 %).
Foot length was normal in 116 neonates (92.8%) and abnormal in 9 neonates (7.2%).

DISCUSSION:

Globally, maternal and perinatal morbidity and mortality due to maternal hypertension in pregnancy is a significant public health threat in low-and middle-income countries (LMIC) and high-income countries[9].

In the present study, the subjects were categorized into four age groups. More subjects were found in the age group of 21-25 years i.e., 45.60 %, The results of our study were in co-relation with the past studies conducted by **Vousden N et al**[9].

Most subjects were in their primi, i.e., 48 %; followed by 37.6 % subjects in G2 and 14.4 % subjects in ≥G3,which are in co-relation with the past studies conducted by **Subki AH et al**[1].

Most subjects were diagnosed with preeclampsia, i.e., 73 (58.4 %),The results of our study were in co-relation with the past studies conducted by **Obsa MS et al**[10]

Most subjects had pre term gestational age, i.e., 58.40 %; followed by 41.60 % subjects with term gestational age,the results of our study were in co-relation with the past studies conducted by **Kiondo P et al**[11].

There were 50.40 % neonates with low birth weight and 49.60 % neonates with normal birth weight.The results of our study were in co-relation with the past studies conducted by **Perry JS et al[**12].

Resuscitation was required in 33.60% neonates, Hypothermia was present in 31.20 % neonates, Hypoglycemia was present in 28.00 %, Icterus was present in 24.80 % neonates. The results of our study were in co-relation with the past studies conducted by **Subki AH et al**[1]**, Siromani SM et al**[13]**, Seyom E et al**[14].

Majority of neonates were admitted in ICU, i.e., 54.4 % while 45.6 % neonates did not require ICU admission.The results of our study were in co-relation with the past studies conducted by **Subki AH et al**[1].

Length was normal in 85.6 % neonates, Head circumference was normal in 91.2 % neonates, Chest circumference was normal in 87.2 % neonates, Mid arm circumference was normal in 79.2% neonates. The results of our study were in co-relation with the past studies conducted by **Perry JS et al**[12].

CONCLUSION

Pregnancy Induced Hypertension is a maternal pathology involving placental modification which is associated with foetal complications. Foetal morbidity and mortality are serious concerns in preeclampsia and are attributable to poor management. Neonatal adverse events such as asphyxia, low birth weight, prematurity, Intrauterine growth restriction, NICU admission, and neonatal death were more prevalent if the mother had a hypertensive disorder during pregnancy.
Since babies born to hypertensive mothers are prone to develop several complications, close monitoring of these babies should be undertaken in an attempt to provide these babies with decreased morbidity and improved growth development

and survival. Significant efforts should be directed to close monitoring and management of mothers with hypertensive disorders to save the lives of mothers, fetuses, and neonates. Moreover, maternal and child HCPs at all levels need to identify women at risk, by optimizing management of pre-existing maternal medical conditions such as hypertension, diabetes, and obesity; and offer counseling, closer monitoring, and refer as needed to a hospital for antihypertensive medications that are considered safe in pregnancy. Public health awareness, education of the primary health care workers and improvement of socio-economic circumstances can help to improve the neonatal prognosis.

Conflict of Interest and Financial Support – NIL
Ethical approval -- The study was approved and ethical clearance taken from the Ethics committee, Sri Siddhartha Medical College, Tumkur, Karnataka.

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