

OUTCOME OF NEONATES BORN TO MOTHERS WITH HYPERTENSION INDUCED IN PREGNANCY

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STUDY PROTOCOL

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ABSTRACT:

Background: Pregnancy-induced hypertension causes around 15-20% of maternal deaths. The incidence of pregnancy-induced hypertension is around 6-10%. The goal of this study is to learn more about the neonatal outcomes of moms who have PIH and to compare neonatal outcomes by gestational age and delivery method. PE is classified as severe when many organs are involved, such as thrombocytopenia (platelet count less than 100,000/uL), pulmonary edema, or oliguria (less than 500 mL per day). A systolic blood pressure of less than 160 mm Hg and a diastolic blood pressure of less than 120 mm Hg, as well as proteinuria of more than 300 mg but less than 5 g per day, are all signs of mild PE.

Methods:

122 Pregnant mothers who have high blood pressure will be treated. On neonatal outcomes, the effects of mode of delivery, birth weight, APGAR score, and intrauterine growth restriction will be studied. The data will be analyzed based on several newborn outcomes such as birth weight, delivery style, APGAR score, restriction of intrauterine growth, and gestational age.

Conclusions: PIH is a major cause of neonatal fetal, maternal, and neonatal morbidity and mortality. We will be able to recognize the risk of IUGR, LBW, NICU hospitalization, and preterm births in babies born to PIH moms as a result of this study. To reduce maternal and newborn morbidity and mortality, early detection of abnormalities is critical.

Keywords: Pregnancy-induced hypertension, low birth weight, APGAR score, intrauterine growth restriction.

INTRODUCTION:

PIH refers to one of four conditions: a) pre-existing increased BP, b) increased BP of gestational and preeclampsia (PE), c) pre-existing

Increased BP of proteinuria with superimposed gestational increased BP, and d) unclassifiable increased BP.^[1] increased BP induced by pregnancy is a risk factor for gestational hypertension.

Maternal and neonatal morbidities and mortality accounted for about 15-20 percent. PIH incidence is 6-10 percent.^[2-4]

Preeclampsia is defined as hypertension occurring after 20 weeks of gestational age with proteinuria. Preeclampsia incidence is about 1% and incidence of eclampsia is around 0.1%. Effective management plays a vital role in maternal and fetal outcomes. PIH mostly occurs in primigravida mothers and is seen mostly near the term.

PIH classification:^[2]

Hypertension and preeclampsia in childbirth (PE, Two to eight percent)->Twentieth gestational week resolves within 42d Postpartum days, +/- considerable proteinuria, Bad perfusion of organs

Pre-existing hypertension (1-5 percent)-

< 20th gestational weekly duration more than 42 days postpartum, +/- proteinuria

Unclassifiable hypertension->20th week of gestation, +/- systemic hypertension-

Manifestations are important for reassessment at Or after a postpartum period of 42 d

Preexisting increased

BP plus superimposed proteinuria gestational hypertension (previously referred to as superimposed preeclampsia chronic hypertension)-

>twentieth gestational week, further deterioration of blood pressure and protein excretion, up to three g/twenty-four-hour.

Preeclampsia is a multisystem, highly variable pregnancy-related condition that causes maternal and fetal/neonatal morbidity and mortality. Preeclampsia affects 6–10% of all pregnancies in the United States, but the prevalence is considered to be much higher in underdeveloped countries. Preeclampsia is a substantial cause of neonatal morbidity and death, according to recent studies, accounting for 15.9% of all maternal deaths in the United States. As a result, when making management decisions, clinicians must carefully consider the hazards to both the mother and the unborn. As a result, adequate treatment choices are still being developed, leaving doctors with insufficient data to guide their patient care practices. Preeclampsia-related pregnancies have a higher rate of perinatal morbidity and death, which is mostly attributable to the need for premature birth and uteroplacental insufficiency, which, despite being convoluted and multivariate, limits blood flow to the infant.

Preeclampsia is diagnosed antepartum when it occurs after 20 weeks of pregnancy and meets a set of defined criteria. Mild, moderate, and severe preeclampsia are diagnosed antepartum based on a set of established criteria that occur after 20 weeks of pregnancy. Severe PE is defined as a blood pressure reading of more than 160 mm Hg (systolic) or 110 mm Hg (diastolic) paired with proteinuria of more than or equal to 5 grams per day.

PE is classified as severe when many organs are involved, such as thrombocytopenia (platelet count less than 100,000/uL), pulmonary edema, or oliguria (less than 500 mL per day). A systolic blood pressure of less than 160 mm Hg and a diastolic blood pressure of less than 120 mm Hg, as well as proteinuria of more than 300 mg but less than 5 g per day, are all signs of mild PE. The clinical and laboratory manifestations of preeclampsia serve as a common endpoint for a variety of maternal disease states during pregnancy, so the ongoing debate over how to classify the disorder's severity is most likely due to a lack of understanding of the disorder's underlying pathophysiology.

Objectives:

1. To study the admission rate in NICU of neonates born to mothers with PIH.

2. To study the immediate complications in neonates born to mothers with PIH.
3. To equate gestational hypertension, preeclampsia, and eclampsia with the outcome of neonates born to mothers.
4. To research the brief-term outcome of neonates born to PIH mothers.

Methods:

Study design: Prospective study

Jawaharlal Nehru Medical College and the Rural Hospital of Acharya Vinobha Bhave, Sawangi, Wardha

Study Population: Neonates born to mothers with PIH.

Duration: 2 YEARS

Institutional Ethical Committee clearance will be taken before the start of the study.

Sample Size:

Sample size approximate

For comparison

of single-sample proportions

Value hypothetical

Ho Test: $p = 0.1000$,

where p is the population proportion

Hypotheses:

Alpha = 0.0500 00 (two-sided)

Electricity = 0.9000

Alternative $p = 0.2000$

Required sample size estimated: $N = 122$.

Inclusion Criteria:

- Neonates born to mothers with PIH delivered in our hospital
- Mothers with PIH who come for at least 2 ANC visits in our hospital

Exclusion criteria:

- Neonates born to mother with chronic hypertension, kidney disease, heart disease and connective tissue disease.

The neonate's father/nearest relative will give his or her informed consent.

The newborn's weight will be documented as soon as possible following birth.

The number of days between the date of delivery and the first day of the previous menstrual cycle will be used to calculate the infant's gestation age (LMP). If the mother is unsure about the LMP, the New Ballard score will be used, as well as the 1st-trimester scan (if available).

Preterm (37 completed weeks), term (37 weeks-40 weeks), post-dated (over 40 to 42 weeks), and post-dated (>42 weeks) will be the gestation era classifications.

Normal birth weight (2.5 to 4 kg), low birth weight (2.5 kg), extremely low birth weight (1.5 kg), very low birth weight (1.0 kg), and very low birth weight (0.5 kg) are the birth weight numbers (1.0 kg).

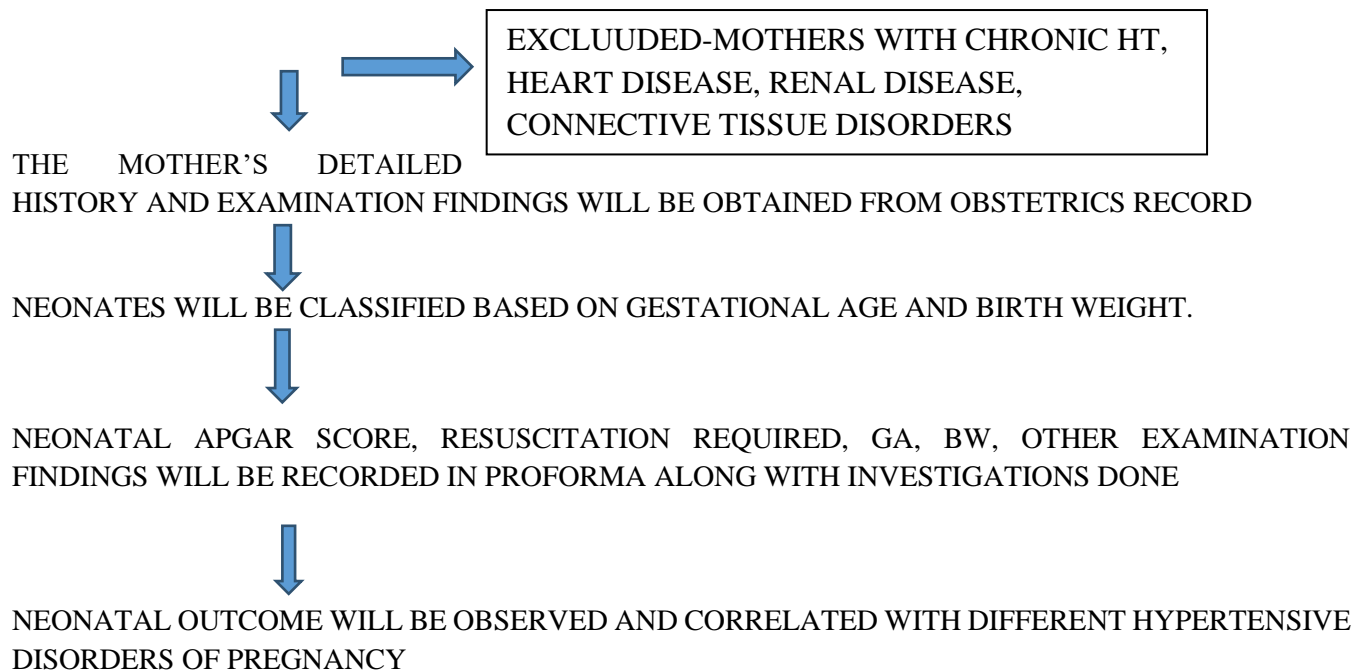
In post-natal wards, the mothers will be questioned using a pre-designed structured Proforma, and additional relevant data will be gathered from the mothers' obstetric records. Babies will be assessed for immediate outcomes during the early neonatal period.

The outcomes of hypertensive women at various phases of a pregnancy will be compared (gestational hypertension, preeclampsia, severe preeclampsia, and eclampsia).

In Proforma, all observations will be recorded. Investigations will be conducted by protocol. Neonates who require NICU admission will be admitted and handled according to protocol. Statistical techniques: The data will be entered into an excel spreadsheet, then transferred and analyzed using the Statistical Package for Social Services. Measures of central tendency and dispersion will be used to analyze quantitative data, whereas categorical variables will be reported as frequencies and percentages. The Chi-square and Fischer exact tests, as well as the independent sample T or Mann Whitney U test, will be used to compare quantitative values.

FLOW CHART

PIH MOTHER



Discussion:

Despite being complex and multivariate, the greater incidence of perinatal morbidity and death reported in pregnancies affected by PIH is mostly owing to the requirement for preterm delivery and uteroplacental insufficiency, which restricts blood flow to the fetus. Abnormal placentation is caused by a shallow invasion of maternal arteries, which reduces uterine blood supply at the expense of the developing placenta and fetus. Hypoxia and ischemia in the womb can stifle fetal growth. IUGR is a medical disorder that causes slow fetal growth and has been linked to an increased risk of perinatal death. Preeclampsia is a substantial risk factor for the development of IUGR, and it is the most common cause of IUGR in non-anomalous newborns, according to previous research. However, there are still some doubts concerning the link between preeclampsia severity and IUGR. Only pregnancies complicated by severe preeclampsia resulted in reduced birth weight, according to some research, while pregnancies with mild preeclampsia had no effect. PIH was revealed to be an independent risk factor for IUGR in our research. This study, however, did not stratify the severity of pre-eclampsia because it included hypertension disorders caused by pregnancy.

Neonatal thrombocytopenia is a complication of maternal preeclampsia that manifests at delivery and usually resolves within the first ten days of life. Only a small fraction of newborns have severe or clinically significant

thrombocytopenia, which necessitates platelet transfusions. The reason for thrombocytopenia in babies born to moms who have preeclampsia is unknown. One theory is that PIH, which promotes hypoxia in the fetus, directly decreases megakaryocyte proliferation. Platelet generation is governed by a more complex set of rules, which may or may not be influenced by erythrocyte precursor proliferation seen during intrauterine hypoxia. In such cases, the marrow's proclivity for erythropoiesis may result in a reduction in platelet synthesis. In our investigation, the link between thrombocytopenia and elevated hemoglobin was discovered to be consistent with earlier research. Neutropenia (defined as a neutrophil count of less than 500/L) is another hematologic consequence of PIH. The mechanism is also linked to uteroplacental insufficiency, which reduces neutrophil production by limiting myeloid lineage proliferation in the fetal bone marrow. The number of neutrophils in our study was quite low. We looked at the rates of leukopenia in preterm babies born to PIH mothers and discovered that they had a higher rate. In addition, greater research into the mechanism is required. NRDS is the most common cause of respiratory failure in premature neonates on their first day of life. A lack of pulmonary surfactant and anatomical immaturity induce it. With increasing gestational age, the incidence declines, from over 50% in babies delivered at 26–28 weeks to around 25% in children born at 36–38 weeks. With increasing gestational age, the incidence declines, from over 50% in kids born at 26–28 weeks to around 25% in children born at 30–31 weeks. It is strongly linked to the mother's gestational age. The children of premature twins and diabetic moms are particularly in danger. PIH was revealed to be an independent protective factor of NRDS in our investigation, which agrees with earlier findings. A fetus with maternal hypertension was likely stressed during pregnancy, which could lead to complications. In contrast, the authors of a recent cohort study were unable to find any links between PIH and respiratory disease. BPD is another frequent and dangerous respiratory ailment. Preeclampsia has been linked to a higher chance of BPD developing. This could be linked to the fact that fetal angiogenesis is hampered by intrauterine hypoxia. There is no link between PIH and BPD, according to our research. BPD is a condition that affects newborns whose moms have preeclampsia, but only when the condition is severe enough to induce prenatal growth restriction, which could explain why.

A two-year prospective study in Maharashtra's Department of Pediatrics will be undertaken in a rural tertiary hospital.

The goal of this research is to learn more about the neonatal outcomes of moms who have been diagnosed with pregnancy-induced hypertension.

Con Consecutivempling is used to select a sample size of 122.

The total number of expected deliveries in our study period is 1500. Out of these babies born to a mother with PIH expected is 142(9.5%). This study will show the various outcomes like LBW, NICU admissions, Birth asphyxia, and IUGR. In this study only those mothers will be taken who have at least 2 ANC visits.

1. A prospective cohort study was performed by Abadi

Kidanemariam Berhe on a group of 782 pregnant women in Tigray, Ethiopia hospitals. Women with pregnancy-induced hypertension had a higher risk of low birth weight (aRR (95 percent CI) = 5.1(3.4,7.8), birth asphyxia (aRR = 2.6(1.9,3.8), low gestational age (aRR = 3.3(2.3,4.6), preterm delivery (aRR = 5.2(3.4,7.9), stillbirth (aRR = 3.46(1.40,8.54)), NICU admission (aRR = 5.1(3.1,8.4)

2. Phoibe Uwizeyimana conducted a retrospective analysis on neonates born to moms with PIH, finding that the majority of the babies were premature (59.6%) and that term births were the exception (29.8 percent). Intrauterine Growth Restriction affected nearly a third of infants (32.4 percent). Over half of newborns (50.4%) were admitted to the NICU, and nearly a quarter of them died (22.8 percent). At 1 minute s/o, a third of neonates experienced severe asphyxia (38.6%), at 5 minutes (30.7%), and 10 minutes (30.7%). (28.9 percent). At the 1st, 5th, and 10th

minutes after birth, neonates with no asphyxia were 34.2 percent, 43.9 percent, and 50.0 percent, respectively. LBW (75.4%), preterm (59.6%), admission to the neonatal critical care unit (50.4%), intrauterine growth restriction (32.4%), and neonatal death were among the neonatal outcomes (22.8 percent). Preeclampsia affected nearly two-thirds of moms (62 percent).^[5-6]

3. Ramya conducted a study in which 58 neonates born to women with gestational hypertension, preeclampsia, and eclampsia served as tests (group A), whereas 100 seemingly healthy babies delivered to normotensive mothers served as controls (group B). In terms of mode of birth, preterm delivery, newborn weight, APGAR score, intrauterine growth retardation, and early neonatal problems, the outcome characteristics were compared between groups. In group A, 33 persons (56.89 percent) had LBW, while group B had 18 people with LBW (18 percent). Preterm births were more common in Group A than in Group B. (p VP-value05, A-43.10 percent compared. B-1 to 7 percent).^[7]

4. In the Kathmandu Medical College Teaching Hospital, Shrestha S conducted a prospective, similar study. Hundreds of expectant moms with high blood pressure due to pregnancy were enrolled in the study.

Eighty-three percent of the study results showed, according to the findings. In terms of neonatal outcomes, the newborns were of typical weight. The majority of the babies (82%) were born on time for their gestational age.

After the first minute of life, half of the infants (50%) had moderate asphyxia, while the majority of the infants (93%) had no asphyxia at five minutes of life. In terms of perinatal outcome, 13% of babies were delivered prematurely, 7% suffered birth asphyxia, 5% were born with low birth weight and stillbirth, and just 1% had early neonatal death.^[8]

5. Mohammed Obsa conducted a cross-sectional study of neonates born in hospitals in the Wolaita region of Southern Ethiopia from June 20 to November 20, 2014.

Sixty-seven percent (n=141) of the 225 fetuses were male.

Within 37-42 weeks of gestation, 72 percent of the neonates were delivered. There were no post-term neonates present, either.

The Apgar score of thirty-seven percent and forty-three percent of newborns, respectively, is less than three and greater than six.

Newborns' babies.

At delivery, 25.8% of babies had an Apgar score of 3-6.

Extreme preeclampsia and eclampsia were shown to have six and four times worse fetal and newborn outcomes than gestational hypertension in the study.

Similarly, another study(22) found that pregnant women are indeed pregnant.

Moms with preeclampsia and eclampsia were more likely than mothers without preeclampsia and eclampsia to have a poor outcome that could be caused by extremely high blood pressure.

This demonstrates that high blood pressure alters uteroplacental blood flow, which can have an impact on the health of fetuses.

According to the findings of the current study, preterm delivery has harsher impacts than a term birth.

Accordingly,

According to another study, preterm birth is the most important driver of neonatal morbidity and mortality in underdeveloped countries. (23-24). This could be related to the fetal system's immaturity, which makes it difficult for intrauterine or extrauterine life to adapt. This could be due to complications during pregnancy or pre-existing medical conditions in the mother, both of which increase the risk of neonatal morbidity and fatality. (25-27). The study's flaw was that it omitted an ABG analysis to determine fetal acidity. As a result, the Apgar score is the best predictor of fetal hypoxia. The Apgar score can be used to identify the degree of birth asphyxia in the absence of arterial blood gas measurement. ^[9]

6. A prospective case-control retrospective study was undertaken in the Department of Obstetrics and Gynecology, Kasturba Hospital, New Delhi, by Dr. Kritika Vats. Between January twenty-fourteen and December twenty-fourteen, hundred pregnant women with hypertension were hospitalized as cases, compared to hundred pregnant women with hypertension.

Pregnant women had a better perinatal outcome than non-pregnant women (age and parity matched).

Intrauterine fetal mortality occurred in up to six cases of hypertensive pregnancy conditions, compared to two cases of intrauterine fetal death in controls. Sixty-eight percent of cases had a birth weight of more than two point five kilograms, twenty-five percent weighted one point five kilograms to two point five kilograms, six percent weighted two point five kilograms, thirteen percent weighted one point five kilograms to two point five kilograms, and two percent had as many as six hypertensive cases. Pregnancy condition had intrauterine fetal death as contrasted with 2 controls for intrauterine fetal death. Birth weight > 2.5 kg was reported in 68.4 percent of cases, while 25.5 percent weighed between 1.5 kg-2.5 kg and 6.1 percent weighed <1.5 kg compared to controls that had 85 percent > 2.5 kg, 13 percent weighed between 1.5 kg-2.5 kg and 2 percent weighed < 1.5 kg.

IUGR and/or preterm were to blame for the low birth weight. At 5 minutes after birth, 24.49 percent of babies with hypertensive pregnancy disease got an Apgar score of 7, compared to just 14 percent of control babies.

Case-born neonates were admitted to the NICU 25.53 percent of the time, but control-born neonates were admitted to the NICU only 11 percent of the time (p=.014). Early newborn mortality occurred in 4.3 percent of case-born neonates, whereas there was no early neonatal death in controls. ^[10]

Conclusion:

PIH causes major maternal, neonatal and fetal morbidity and mortality. Long term decreased blood flow to the placenta leads to intra, or antepartum loss of O₂ that causes fetal compromise. This leads to a large number of LBW, NICU admissions, IUGR, HMD, Sepsis, Birth asphyxia. Early identification of the individual with risk factor and early intervention will lead to decreased neonatal and mothers mortality and morbidity.

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