



A STUDY OF HYPERTENSIVE DISORDER IN PREGNANCY AND ITS MATERNAL AND FETAL OUTCOME

Obstetric & Gynaecology

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ABSTRACT

Aims and objectives: To study the effect of hypertensive disorder in pregnancy and maternal outcome by;

1. Incidence of spontaneous labour or cesarean section
2. Incidence of morbidity by need of ICU admission
3. Incidence of mortality

To study the effect of hypertensive disorder in pregnancy and fetal outcome by;

1. Birth weight <2.5kg and >2.5kg
2. NICU admission
3. Perinatal mortality

Methodology: Prospective observational study of singleton pregnant women affected with hypertensive disorder of pregnancy at Civil Hospital Ahmedabad from MAY 2021 to OCTOBER 2021.

- Inclusion criteria-all patients with hypertensive singleton pregnancy irrespective of gestational weeks having blood pressure systolic >140mmhg and diastolic >90mmhg with or without proteinuria

Exclusion criteria-

- Chronic Hypertension
- Chronic kidney disease
- Cardiac disease
- twins pregnancy
- Altered Body mass index
- Diabetis Mellitus

Result: Out of 648 deliveries, there were 50 cases of hypertensive disorder in pregnancy (7.7%). Majority belongs to lower socioeconomic status (36%) and had rural background with minimal ANC visits. Predominant group were Pre eclampsia (64%) followed by gestational hypertension (28%). 62% neonates were fullterm. 36% had vaginal delivery, there were 3 maternal death and 9 near miss cases.

Conclusion: Majority of pregnancy with hypertensive disorder were uneventful with favourably good outcome for the mother and fetus if diagnosed and treated timely. Explaining risk factor, strengthening of pre pregnancy counseling, importance of routine ANC visits with better health facilities are the key component. Early diagnosis, timely referral and availability of obstetrician are crucial for developing countries.

KEYWORDS

INTRODUCTION

Hypertensive disorders represent the most common medical complication of pregnancy affecting between 7–15% of all gestations and account for approximately a quarter of all antenatal admissions (1). According to World Health Organization's (WHO) systemic review on maternal mortality worldwide, hypertensive disease remains a leading cause of direct maternal mortality. Together with haemorrhage and infection, hypertension forms the deadly triad that contributes to morbidity and mortality during pregnancy and child birth (2).

Although maternal mortality is much lower in high income countries than in developing countries, the incidence of preeclampsia has risen in US (3). In India the incidence of preeclampsia is reported to be 8–10% (National Health Portal of India, 2016). This might be related to an increased prevalence of predisposing disorders such as chronic hypertension, diabetes and obesity (4). Recent confidential enquiry into maternal deaths in UK found hypertensive disorders to be the second leading direct cause of maternal death (5). Hypertensive disorders are responsible for not only maternal deaths but also substantial morbidity for the pregnant women.

Hypertensive disorders also carry a risk for the baby. Hypertension and/or proteinuria is the leading single identifiable risk factor in pregnancy associated with stillbirth. In the most recent UK perinatal mortality report, 1 in 20 (5%) stillbirths in infants without congenital abnormality occurred in women with preeclampsia. Preeclampsia is strongly associated with fetal growth restriction, low birth weight, spontaneous or iatrogenic preterm delivery, respiratory distress syndrome and admission to neonatal intensive care (6).

Preeclampsia contributes significantly to overall preterm birth rate, both spontaneous and iatrogenic. About 1 in 250 primigravidas (0.4%) will give birth prior to 34 weeks as a consequence of preeclampsia and 8–10% of all preterm births result from hypertensive disorders. Half of

women with severe preeclampsia give birth preterm.

Although many risk factors are attributed to the developing pregnancy induced hypertension, most such patients are healthy nulliparous women with no obvious risk.

DEFINITIONS

Hypertension

The following thresholds, used by National High Blood Pressure Education Program Working Group (NHBPEP) and the American College of Obstetrician and Gynecologists (ACOG), to define "hypertension" have been accepted by most international organizations. (7,8) Hypertension in pregnancy is defined as:

- Systolic pressure level of 140 mmHg or higher
- Diastolic blood pressure of 90 mmHg or higher (Korotkoff V)

These measurements have to be confirmed on at least two occasions 4 to 6 hours apart but within a maximum of a week period.

The blood pressure level should be taken with an appropriate size cuff (length 1.5 times the upper arm circumference or a cuff with a bladder that encircles 80% or more of the arm) with the patients in an upright position with their right arm supported in horizontal position at the level of the heart, after a 10 minute or longer rest period.

Proteinuria

It is defined as the urinary excretion of 300 mg or more of protein in 24 hours urine collection or a urine protein/ creatinine ratio of ≥ 30 mg/mmol. This usually correlates with ≥ 30 mg/dl ($\geq 1+$ by qualitative estimation using reagent strips) in at least two random urine samples collected 4 to 6 hours apart, with no evidence of urinary tract infection. Although the visual dipstick test has a poor predictive value, it still remains an important screening test due to easy availability, convenience and low cost. Approximate equivalence is Trace=0.15 to

0.3 g/l, 1+= 0.3 g/l, 2+= 1g/l, 3+= 3g/l.

Classification Of Hypertensive Disorders In Pregnancy

The clinical classification adopted by the International Society for the Study of Hypertension in Pregnancy (ISSHP):

- Gestational hypertension : New onset hypertension developing after 20 weeks of gestation, during labour, or in the first 24 hour postpartum, without proteinuria, or any other systemic features of preeclampsia, in a previously normotensive nonproteinuric woman and the blood pressure resolves within 3 months postpartum
- Preeclampsia: Hypertension associated with proteinuria greater than 0.3g/L in a 24-hour urine collection or 1+ by qualitative urine examination, after 20 weeks of gestation.
- HELLP syndrome: Severe form of preeclampsia characterized by hemolysis (abnormal peripheral blood smear, bilirubin 1.2 mg/dL), thrombocytopenia (100,000/mm³) and elevated liver enzymes (AST . 70 U/L, LDH . 600 U/L). Development of this severe form of pre eclampsia is associated with increased risk of maternal morbidity and mortality.
- Eclampsia : Convulsions occurring in a patient with preeclampsia are known as eclampsia.
- Chronic hypertension: is defined as hypertension present before 20th week of pregnancy or that is diagnosed preconceptionally. Hypertension should be documented on at least two occasions, measured at least 4 hours apart. Blood pressure elevation that persists . 12 weeks postpartum is also retrospectively considered as chronic hypertension
- Essential hypertension is diagnosed when there is no apparent underlying cause for chronic hypertension.
- Secondary hypertension may be caused by renal parenchymal disease or scarring, renovascular disease, endocrine disorders or coarctation of aorta.
- Preeclampsia superimposed on chronic hypertension: It is diagnosed when one or more features of preeclampsia (e.g. elevated liver enzymes, low platelets, proteinuria) develop for first time during pregnancy after 20 weeks, in a woman with pre-existing chronic hypertension.

As per the NICE guidelines, for the purpose of management, hypertension is further divided as per the severity into mild, moderate and severe hypertension.(7)

- **Mild hypertension:** Systolic blood pressure 140– 149 mmHg, diastolic blood pressure 90–99 mmHg.
- **Moderate hypertension:** Systolic blood pressure 150– 159 mmHg, diastolic blood pressure 100–109 mmHg.
- **Severe hypertension:** Systolic blood pressure 160 mmHg or greater, diastolic blood pressure 110 mmHg or greater.

Risk Factors

Couple related risk factors:

- Primipaternity
- Limited sperm exposure
- Pregnancy after donor insemination, donor egg, donor embryo
- Dangerous male partner

Maternal or pregnancy related risk factors:

- Extremes of age
- Obesity and insulin resistance/gestational diabetes
- Smoking
- Multifetal pregnancies
- Preeclampsia in previous pregnancy
- Maternal low birth weight
- Family history of preeclampsia

Pre-existing Medical Disease:

- Pre-gestational diabetes
- Chronic hypertensive or renal disease
- Maternal immunological disease
- Preexisting thrombophilia, antiphospholipid antibody syndrome
- Obstructive sleep apnea

Severe Complications

- **Pulmonary Oedema:** Pulmonary oedema is a rather common complication of severe preeclampsia and eclampsia, affecting approximately 3% of these patients. Most cases are the results of aggressive use of crystalloid solutions for intravascular volume expansion. Treatment consists of propped up position, administering oxygen by nasal prongs or a rebreathing mask,

restriction of intravenous and oral fluids, and furosemide 20–40 mg IV every 6 hours.

- **Acute Renal Failure :** Oligouria is not uncommon in patient with severe preeclampsia. Oligouria in women with severe preeclampsia most of the time is pre-renal in origin and respond to fluid. Establishment of adequate urinary output is an important priority because the longer the low urinary output persists, the greater the possibility that the patient will develop severe or irreversible renal damage. Hence, if vaginal delivery cannot be anticipated to occur in a few hours, it is better to perform a caesarean section.
- **Intracranial Bleeding :** Intracranial bleeding is the leading cause of death in preeclampsia. Under estimation of the severity of the disease, extended outpatient treatment, failure to use antihypertensive drugs to treat extreme elevations of blood pressure, and discharge from the hospital before obtaining adequate control of the hypertension are the most frequent errors found in the analysis of those deaths.
- **Visual Disorders :** Blindness may occur in patients with severe preeclampsia and eclampsia and may persist for several days, although quick recovery after delivery is the rule. In most cases, examination of the optic fundi does not show severe retinopathy, since the problem is usually caused by multiple microhaemorrhages and microinfarcts occurring in the occipital lobe.
- **Abruptio Placenta:** About 7% of all patients with eclampsia will have premature separation of the placenta and they are managed on the lines of abruptio with DIC.

Aims and objectives:

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To study the effect of hypertensive disorder in pregnancy and fetal outcome by;

- Birth weight <2.5kg and >2.5kg
- NICU admission
- Perinatal mortality

Study place and Period

This study was conducted in Department of Obstetrics and Gynecology , Civil Hospital, B. J. Medical College, Ahmedabad . The study was carried out between the periods of May 2021 to OCTOBER 2021.

METHOD AND MATERIALS

- In this study all patients with hypertensive singleton pregnancy irrespective of gestational weeks were identified having Blood pressure systolic>140mmhg and diastolic>90 mmhg with or without presence of proteinuria were included
- Sample size – total 50 cases than fulfilling the above condition
- Method of data collection- Data was collected from Wards, OPD , Labour Room, OT records, ICU cabin.

Study Design- Prospective Observational Study

RESULTS:

Table – 1 : Distribution of cases based on age

AGE (In years)	NO.OF CASES (50)	(%)
20-25	29	58%
26-30	17	34%
31-35	2	4%
>35	2	4%

In this study as per the distribution of age, 58% younger female are more affected than the elderly ones. The risk of preeclampsia and eclampsia rise in teenage pregnancy whereas risk of hypertensive disorder of pregnancy gradually increase with age. Extrimities of age is risk factor for hypertensive disorder

Table – 2 : Distribution of cases based on Parity

GRAVIDA	NO.OF CASES(50)	%
Primigravida	28	56%
Multigravida	22	44%

As per study primigravida involved is 56% ; which shows that hypertensive disorder affects more 1st pregnancy .Also preeclampsia is a disease of 1st pregnancy.

Table – 3 : Distribution of cases based on socio economic status

Modified Kuppuswamy scale	NO.OF CASES (50)	%
UPPER CLASS	04	8%
UPPER MIDDLE	06	12%
LOWER MIDDLE	11	22%
UPPER LOWER	11	22%
LOWER	18	36%

Thus 36% belongs to lower socioeconomic class , while 22% from upper lower class and another 22% from lower middle.

Table – 4: Distribution of cases based on clinical classification

CLASSIFICATION	NO.OF CASES (50)	%
Gestational hypertension	14	28%
Pre eclampsia	32	64%
Eclampsia	3	6%
Preeclampsia superimposed on chronic hypertension	1	2%

As per the above study incidence of preeclampsia is 64%(n=32) among the all other hypertensive disorder as preeclampsia is more common and is in rising trend over last two decades due to higher prevalence of predisposing factors such as hypertension, diabetes, obesity, delayed childbearing and use of artificial reproductive technologies .Thereafter gestational hypertension leads to 28%(n=14),and in 50% cases it will eventually develop proteinuria or other end organ damage, consistent with the diagnosis of preeclampsia.

Table – 5: Distribution of cases based on mode of delivery

MODE OF DELIVERY	NO. OF CASES (50)	PERCENTAGE
VAGINAL DELIVERY	18	36%
CESAREAN	32	64%

Among 50 patients of hypertension,64% under went C section as there were obstetrical indication along with hypertension and 36% patients delivered vaginally. During intrapartum period fetal heart sound were continuously monitored .

Table – 6: Distribution of cases based on outcome of mother

OUTCOME	NO.OF CASES (50)	PERCENTAGE
STABLE	38	76%
ICU REQUIRE MENT	09	18%
MMR	03	6%

ICU requirement in 18% cases in terms of blood pressure monitoring, acute renal failure(urine output monitoring), postictal phase, development of pulmonary edema. Out of 50 patients, 3 patients died in postpartum duration within 24-48 hrs as a consequences of severe preeclampsia which lead to DIC, AKI, multiple organ dysfunction (MODS), HELLP syndrome and MMR.

Table – 7: Distribution of cases based on fetal birth weight

WEIGHT	NO.OF CASES (50)	PERCENTAGE
<2000 gms	16	32%
2000-3000 gms	28	56%
>3000 gms	06	12%

56% babies delivered having weight between 2kg and 3kg which is average Indian birth weight .32% of babies delivered among 50, shows birth weight less than 2kg and most of them need NICU admission.

Table – 8: Distribution of cases based on outcome of baby

OUTCOME	NO.OF CASES (50)	PERCENTAGE
VIGROUS BABY	32	64%
NICU ADMISSION	10	20%
PERINATAL MORTALITY	08	16%

64% of babies delivered of hypertensive mother, were healthy and cried soon after birth and breast feeding initiated. 8% perinatal mortality because of multiple reason like extreme prematurity, hyaline membrane disease, meconium aspiration syndrome and septicemia. 10% NICU admission for respiratory distress , low birth weight, prematurity and IUGR because of severe preeclampsia and doppler changes due to high resistance to blood flow and decreased nutrition of intervillous space.

DISCUSSION:

This study has been conducted in a tertiary care teaching hospital and 50 participants were enrolled. In this study most of participants were in

age group of 20-25 years(58%), similar to this study the study done by Khosaravi et al, shows the HDP was most common seen in the age group of 20-25 years (55.6%) whereas in the study by Ghandi et al, the participants were in mostly 21-25 years(48.42%).[9]

In this study most of participants belongs to lower socioeconomic status(36%),similar to the study done by Youssef AA et al, showed the prevalence of HDP was more common in patients with very low socioeconomic status(42.9%).[10]

This study observed that the patients of HDP were mainly primigravida (56%) which is similar to study done by Youssef AA et al, which showed HDP the incidence was seen mainly in primigravida (67.6%) and study done by Parmar et al which shows that the incidence is more common in primigravida (55%).7.9 In contrast this study observations studies done by Gandhi et al (56.84%) Khosravi et al (67.2%) reported the incidence of PIH being more common in multi gravida.[11,12]

Out of 50 patients in this study, 3 cases (6%) presented with features of eclampsia. A study by Gandhi et al only 12% of the patients had eclampsia and another study by Singh V et al, showed an incidence of 14.3% of eclampsia showed more incidence than this study.[13,14]

In the present study, 32(64%) of 50 patients underwent LSCS, 18(36%) had vaginal delivery . In a study by Gandhi et al rate of caesarean was 46.3% and vaginal delivery was 53.4% among the PIH patients.[8] In a study by Parmar et al 63% had vaginal delivery and 37% underwent caesarean section.[9]

In this study, most of the babies born were of the normal weight (56%) followed by low birth weight (32%).The NICU admission was seen in 20% of the participants and 16% of the babies shown perinatal mortality . A study by Patel R et al, out of 64 delivery 18.75% of babies were required NICU admission for various causes with 1.56% were IUFD and 1.56% of neonatal death.8 A study by Khosravi S et al had 9 cases of IUFD and/or neonatal deaths, all of which took place in hypertensive mothers who had proteinuria. [15]

In the present study ,on near miss data analysis by expert group shows that there were patient related avoidable factors like- patients were unbooked, booked late, did not have regular ANC visit, nutritional deficiency anemia, lack of awareness .

Conclusion and recommendation

The result of our study indicate that hypertensive disorder in pregnancy forms a major proportion of medical illness complicating pregnancy. Not only the mother but the neonates are also affected. Timely diagnosis and management is the only way to prevent further damage and complication.

As the risk of recurrence of gestational hypertension ranges between 16–47% and chance of the patient developing preeclampsia in future pregnancy is 2%–7%(ref-16).Thus from early ANC visits such patients identified and preventive strategies must be recommended like administration of low dose aspirin, calcium supplementation and plenty of antioxidants along with lifestyle modification and regular well supervised prenatal exercise.

Based on the above mentioned results, it is recommended to intervene at three levels so as to improve the maternal and fetal outcomes of hypertensive disorders and to ensure the safety of a pregnant woman and her baby. Giving the above mentioned fact of poor antenatal care (ANC) service utilization, community based health education can be one possible level of intervention to improve the health outcomes of women with HDP by improving maternal health service utilization.

The second possible level of intervention could be early detection and early referral of pregnant women with hypertensive disorder. Policies and strategies that may enhance the health professionals' capacity should be advocated. The other possible level of intervention could be, optimizing the quality of care that a pregnant woman with hypertensive disorders receives. Additionally, it is recommended to have easily available and affordable laboratory testing; frequent maternal and fetal monitoring; increase accessibility of antihypertensive and anticonvulsive drugs; increase preparation for neonatal resuscitation; and, improving quality of neonatal intensive care units. It is also recommended to develop a uniform systematic

registration system of maternal and perinatal outcomes of HDP in the country.

All these efforts will lead to healthy mother and healthy child with less burden on health care system.

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