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Original Research Article

A study on fetomaternal outcome of hypertensive disorders of pregnancy

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ABSTRACT

Background: Hypertensive disorders of pregnancy are one of the most common medical disorders seen during pregnancy. Early diagnosis of hypertensive disorders in pregnancy by regular antenatal checkup can help in proper management, thus decreasing the maternal and fetal complications related to it. Ensuring timely and effective care requires appropriate use of evidence-based clinical and nonclinical interventions, strengthened health infrastructure, and motivated and competent health care providers. The objective of this study was to study the fetomaternal outcome of hypertensive disorders of pregnancy and complications related to them.

Methods: A study was conducted in the department of obstetrics and gynecology at JJ Group of hospitals, Mumbai, India for a duration of 18 months from January 2020 to June 2021. This study had a sample size of 500 antenatal patients. Necessary information such as their detailed clinical, and obstetric history, clinical examination, investigations was noted.

Results: In our study, the incidence of hypertensive disorders of pregnancy was 10.2%, being most common in age group of 21-25 years (45.1%) and Primigravida patients (47.1%). The most common type of hypertensive disorder in our study was non severe preeclampsia with incidence of 74.50%. The most common complication was oligohydramnios (11.76%), followed by preterm delivery (9.80%) and IUGR (9.80%). The most common drug used in the management of hypertensive disorder was labetalol. Most common neonatal complication in PIH group was low birth weight, followed by fetal distress (19.6%), prematurity (9.8%) and IUGR (9.8%).

Conclusions: Hypertensive disorders of pregnancy are one of the medical conditions affecting pregnancy. Hypertensive disorders of pregnancy are more prevalent in younger and nulliparous mothers. Early diagnosis and appropriate timely management of hypertensive disorders in pregnant women can prevent the maternal and fetal complications and improve the outcome of pregnancy. These women should be monitored carefully to prevent maternal morbidity and mortality.

Keywords: Blood pressure, Fetal outcome, Hypertensive disorders

INTRODUCTION

Hypertensive disorders represent the most common medical complication of pregnancy affecting between 7% and 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 childbirth.²

The World Health Organization systematically reviews maternal mortality worldwide, and in developed countries, 16 percent of maternal deaths were attributed to

hypertensive disorders.² In the United States from 2011 to 2013, 7.4 percent of 2009 pregnancy-related maternal deaths were caused by preeclampsia or eclampsia.³ Importantly, more than half of these hypertension-related deaths were deemed preventable.⁴

Hypertensive disorders are responsible for not only maternal deaths but also substantial morbidity for the pregnant women.⁵ One-third of severe maternal morbidity was a consequence of hypertensive conditions in the United Kingdom.⁵ Five per cent of women (1 in 20) with severe pre-eclampsia or eclampsia were admitted to intensive care.⁶

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. Pre-eclampsia is strongly associated with fetal growth restriction (FGR), low birth weight, spontaneous or iatrogenic preterm delivery, respiratory distress syndrome (RDS), admission to neonatal intensive care and cerebral palsy.⁷

METHODS

An observational study was conducted in the department of obstetrics and gynecology at JJ Group of hospitals, Mumbai, India for a duration of 18 months from January 2020 to June 2021. 500 antenatal patients who were registered in first trimester and were meeting the inclusion and exclusion criteria, were enrolled for the study after obtaining consent. Pregnant women were screened and monitor properly for development of hypertensive disorders using criteria that hypertension is diagnosed empirically when appropriately taken blood pressure exceeds 140 mmHg systolic or 90 mmHg diastolic on two occasions taken 4-6 hours apart.

Inclusion criteria

Pregnant women willing to take part in study.

Exclusion criteria

Patient not willing to participate in the study.

Target sample size was minimum 500 cases.

Study participants or their family members gave consent to be part of this study. Approval of ethical committee was taken. A detailed history was taken, vitals of patients were noted, clinical examination and relevant laboratory investigation were performed on admission. Information about complications 1 was noted. Microsoft Office Excel software was used to analyse the data.

RESULTS

According to our study, the incidence of hypertensive disorders of pregnancy in patients during 18 months

duration from January 2020 to June 2021 at a tertiary care centre is 10.2% which included gestational hypertension, preeclampsia and eclampsia (Figure 1).

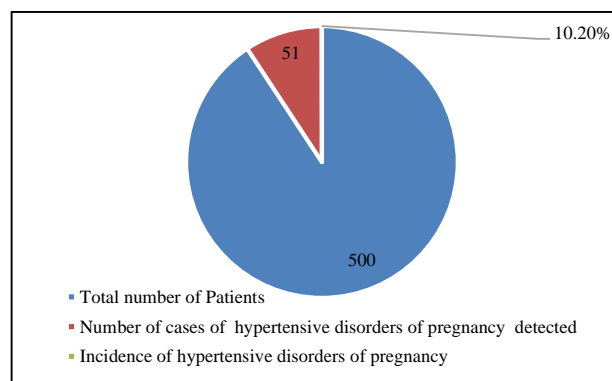


Figure 1: Incidence of hypertensive disorders of pregnancy in study population

Hypertensive disorder of pregnancy was most common in age group of 21-25 i.e. 45.1% followed by age group less than equal to 20 years i.e. 23.5% (Table 1).

Table 1: Distribution according to age (in years).

Age	No. of patients with hypertensive disorders of pregnancy	Percentage
≤20	12	23.5
21-25	23	45.1
26-30	9	17.6
31-35	6	11.8
36-40	0	0
>40	1	2

Hypertensive disorders were most common in primi patients (47.1%) followed by G2 patients (27.5%) (Table 2).

Table 2: Distribution according to gravida/parity.

Parity/gravida	No. of patients with hypertensive disorders of pregnancy	Percentage
Primi	24	47.1
G2	14	27.5
G3	7	13.7
G4 and above	6	11.8

Overall, rate of lower segment caesarean section was 43.13% in hypertensive group and 34.52% in normotensive group. The rate of vaginal delivery was 56.89% in hypertensive group and 64.30% in normotensive group. The rate of lower segment caesarean section was higher in hypertensive group (43.13%) as compared to normotensive group (34.52%) (Table 3).

Table 3: Mode of delivery.

Mode of delivery	No. of patients with hypertensive disorders of pregnancy	Percentage	No. of normotensive patients	Percentage
Vaginal	29	56.89	289	64.30
LSCS	22	43.13	155	34.52
VBAC	0	0	1	0.22
Instrumental	0	0	4	0.89

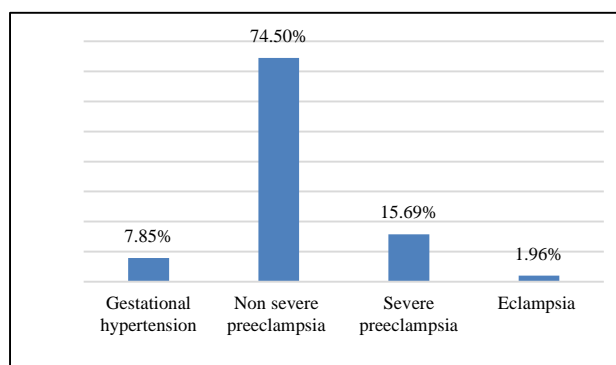


Figure 2: Distribution of patients on the basis of hypertensive disorders.

Out of 51 hypertensive patients, there were 4 cases of gestational hypertension (7.85%), 38 cases of non-severe preeclampsia (74.50%), 8 cases of severe preeclampsia (15.69%) and 1 case of eclampsia (1.96%) in our study (Figure 2).

Table 4: Clinical features in hypertensive group.

Clinical features	No. of patients	Percentage
Epigastric pain	1	1.96
Visual problems	6	11.76
Pedal oedema	23	45.09
Abdominal wall edema	2	3.92
Headache	11	21.57

The most common clinical feature in patients with hypertensive disorders of pregnancy was pedal edema (45.09%), followed by headache (21.57%), visual disturbances (11.76%) (Table 4).

According to our study, the most common complication was oligohydramnios (11.76%), followed by preterm delivery (9.80%) and IUGR (9.80%) (Table 5).

The incidence of placenta abruption and eclampsia was found to be 5.88% and 1.96% respectively (Table 5).

The incidence of intrauterine fetal demise and neonatal mortality was 9.80% and 1.96% respectively (Table 5).

The incidence of HELLP syndrome was 1.96% in our study (Table 5).

Table 5: Complications in hypertensive group.

Complications	No. of patients with hypertensive disorders of pregnancy	Percentage
NND	1	1.96
Preterm delivery	5	9.80
Eclampsia	1	1.96
HELLP syndrome	1	1.96
Abruptio placenta	3	5.88
Oligohydramnios	6	11.76
IUGR	5	9.80
Stillbirth	2	3.92
Pulmonary oedema	0	0

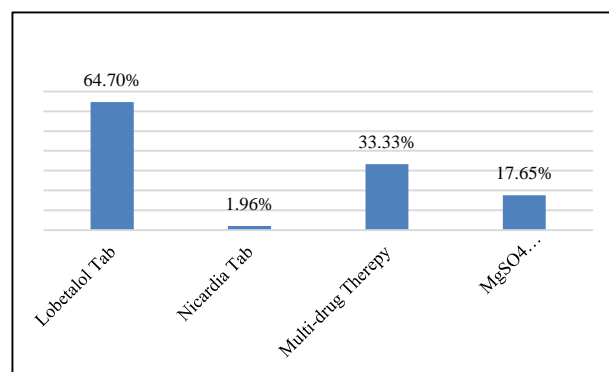


Figure 3: Management of patients with hypertensive disorders of pregnancy.

In our study, 64.70% patients were managed by oral labetalol alone and only 1.96% were managed by oral nicardipine alone. In 17.65% of patients, MgSO₄ prophylaxis was given. In 33.33% of patients, multitherapy therapy with oral labetalol, oral nicardipine and parenteral labetalol was used for management (Figure 3).

Table 6: Number of ICU admission.

No. of patients with hypertensive disorders admitted to ICU	Percentage
5	9.80

In our study, 9.80% of patients with hypertensive disorders of pregnancy were admitted to ICU for management (Table 6).

Neonatal characteristics in the study population

45.1% of neonates in hypertensive group and 24% of neonates in normotensive group had birth weight less than 2.5 kg. 47.1% of neonates in hypertensive group and 71.2% of neonates in normotensive group had birth weight between 2.5 to 3.5 kg. The incidence of low birth weight is higher in hypertensive group (45.1%) as compared to

normotensive group (24%). There was negative association between birth weight of neonate and hypertensive disorders of pregnancy in mother (p value =0.002826). The incidence of low birth babies was more in hypertensive group as compared to normotensive group (Table 7).

Table 7: Distribution according to birth weight.

Birth weight	Hypertensive group	Normotensive group	Percentage of hypertensive group	Percentage of normotensive group
<2.5 kg	23	108	45.1	24
2.5-3.5 kg	24	320	47.1	71.2
>3.5 kg	04	21	7.8	4.6

Significance: The chi-square statistic is 11.738. The p value is 0.002826. The result is significant at p<0.05

Table 8: Neonatal complications in the study.

Neonatal complications	No. of normotensive patients	Percentage	No. of hypertensive patients	Percentage
IUGR	8	1.7	5	9.8
Respiratory distress (RD)	10	2.2	4	7.8
Prematurity	34	7.5	5	9.8
Still birth	7	1.5	2	3.9
NND	6	1.3	1	1.9
Fetal distress	51	11.3	10	19.6
Low birth weight	108	24	22	43.1

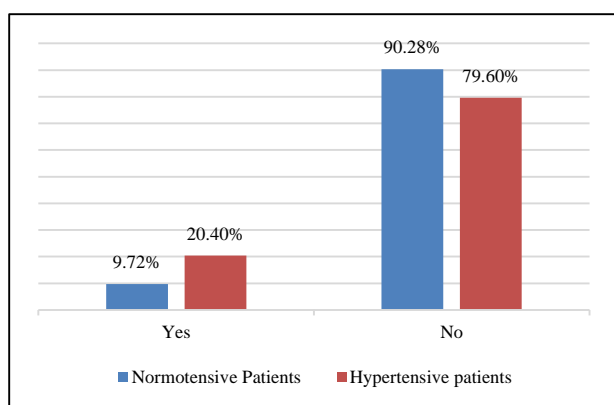


Figure 4: NICU admission.

The rate of NICU admission in hypertensive group (20.40%) was more as compared to NICU admission in normotensive group (9.72%) (Figure 4).

Most common neonatal complication in Hypertensive group was low birth weight, followed by fetal distress (19.6%), prematurity (9.8%) and IUGR (9.8%). The incidence of neonatal complications was more in hypertensive group as compared to normotensive group. The incidence of stillbirth was 3.9% in hypertensive group as compared to 1.5% in normotensive group.

The incidence of respiratory distress was 7.8% in neonates born in hypertensive group as compared to 2.2% in normotensive group.

The incidence of IUGR neonates was 9.8% in hypertensive group as compared to 1.7% in normotensive group (Table 8).

DISCUSSION

Out of 500 patients, 51 were detected to have hypertensive disorders of pregnancy. Incidence of hypertensive disorders of pregnancy was found to be 10.2% which included gestational hypertension, preeclampsia and eclampsia. About 10% of pregnancies globally are complicated by hypertensive diseases.⁸ In a study by Sengodan and Sreeprathi, the prevalence of hypertensive disorders in pregnancy is 10.4%.⁹

Hypertensive disorder of pregnancy was most common in age group of 21-25 i.e. 45.1% followed by age group less than equal to 20 years i.e. 25.5%, age group between 26-30 years i.e. 17.6%. The incidence of hypertensive disorders of pregnancy was least in age group of 36-40 years. Similar results were found in a study conducted by Patel et al at GMERS medical college and hospital, Valsad where higher prevalence of hypertensive disorders of

pregnancy was found in 18-22 years age group (51.56%), followed by 23-27 years age group (28.12%), and 28-32 years of age group (17.18%).¹⁰ Gandhi et al in their study found that 48.42% of mother with hypertensive disorders of pregnancy was 21-25 years of age group, followed by greater than 30 years of age (25.26%), 14.73% in 26-30 years of age group and 11.57% in less than 20 years of age.¹¹

Hypertensive disorder of pregnancy was most common in primi patients (47.1%) followed by G2 patients (27.5%), G3 patients (13.7%). In our study, it is observed that the incidence of pregnancy induced hypertension is decreasing with increase in parity. Similar results found in a study conducted by Patel et al where the prevalence of pregnancy induced hypertension was noted more among nulliparous (57.81%) as compared to multiparous (42.18%).¹⁰ Similar finding was reported by Parmar et al in their study conducted at NHL Municipal College, Ahmadabad 55.0% in primipara as compared to multipara (45.0%).¹²

The rate of lower segment cesarean section was 43.13% in hypertensive group and 34.52% in normotensive group. The rate of vaginal delivery was 56.89% in hypertensive group and 64.30% in normotensive group. The rate of lower segment cesarean section was higher in hypertensive group (43.13%) as compared to normotensive group (34.52%). It was observed that there are more chances of lower segment cesarean section in hypertensive patients as compared to normotensive patients. The most common indication for section in hypertensive patients was fetal distress (54.54%) as compared to normotensive patients in which fetal distress was indication in 31.61% of cases. Similarly in a study conducted by Jayaraman, LSCS was observed to be a more common mode of delivery.¹³

Out of 51 PIH patients, there were 4 cases of gestational hypertension (7.85%), 38 cases of non-severe preeclampsia (74.50%), 8 cases of severe preeclampsia (15.69%) and 1 case of eclampsia (1.96%) in our study. In 4 cases of gestational hypertension, all 4 cases belong to mild variety. The most common type of hypertensive disorder in our study was non severe preeclampsia with incidence of 74.50%.

The most common clinical feature in patients with hypertensive disorders of pregnancy was pedal oedema (45.09%), followed by headache (21.57%), visual disturbances (11.76%). Other clinical features include abdominal wall oedema and epigastric pain. In a study by Patel et al it was found that 48.44% had lower abdominal pain, 18.75% had vomiting/epigastric discomfort followed by headache (12.50%), convulsion (10.94%), no any complain (10.94%), oedema feet (9.37%), dizziness (7.81%).¹⁰

Pregnancies complicated by hypertension are associated with increased risk of adverse fetal, neonatal and maternal outcomes, including preterm birth, intrauterine growth restriction (IUGR), perinatal death, acute renal or hepatic

failure, antepartum haemorrhage, postpartum hemorrhage and maternal death.¹⁴ According to our study, the most common complication was oligohydramnios (11.76%), followed by preterm delivery (9.80%) and IUGR (9.80%). The incidence of placenta abruption and eclampsia was found to be 5.88% and 1.96% respectively. The incidence of intrauterine fetal demise and neonatal mortality was 9.80% and 1.96% respectively. The incidence of HELLP syndrome was 1.96% in our study. In a study by Patel et al, 53.12% of babies are low birth weight, 07.81% were IUGR, 1.56% were IUFD and 1.56% of neonatal death.¹⁰

In our study, 64.70% patients were managed by oral labetalol alone and only 1.96% were managed by oral nicardipine alone. In 17.65% of patients, MgSO₄ prophylaxis was given. In 33.33% of patients, multitherapy therapy with oral labetalol, oral nicardipine and parenteral labetalol was used for management. Hence the most common drug used in the management of hypertensive disorder was labetalol. The incidence of MgSO₄ prophylaxis using Pritchard regimen was 17.65% in our study. In study conducted at Bharati Hospital, Pune showed that overall, 32.69% of patients were treated with a single antihypertensive drug, and 67.31% of patients were treated with antihypertensive drug combinations.¹⁵

In our study, 9.80% of patients with hypertensive disorders of pregnancy were admitted to ICU for management.

45.1% of neonates in hypertensive group and 24% of neonates in normotensive group had birth weight less than 2.5 kg. 47.1% of neonates in hypertensive group and 71.2% of neonates in normotensive group had birth weight between 2.5 to 3.5 kg. The incidence of low birth weight is higher in hypertensive group (45.1%) as compared to normotensive group (24%). There was negative association between birth weight of neonate and PIH in mother (p value =0.002826). The incidence of low birth babies was more in hypertensive group as compared to normotensive group. Similar results found in study conducted by Patel et al where 53.12% of outcome was low birth weight.¹⁰

The rate of NICU admission in hypertensive group (20.40%) was more as compared to NICU admission in normotensive group (9.72%). Similarly in a study conducted by Patel et al, 18.75% of babies required NICU admission.¹⁰

Most common neonatal complication in hypertensive group was low birth weight (24%), followed by fetal distress (19.6%), prematurity (9.8%) and IUGR (9.8%). The incidence of neonatal complications was more in hypertensive group as compared to normotensive group. The incidence of stillbirth was 3.9% in hypertensive group as compared to 1.5% in normotensive group. The incidence of respiratory distress was 7.8% in neonates born in hypertensive group as compared to 2.2% in normotensive group. The incidence of IUGR neonates was 9.8% in hypertensive group as compared to 1.7% in

normotensive group. In a study by Ramya et al, showed that there was increased risk of low birth weight, preterm delivery, NICU admission, birth asphyxia and intra uterine growth retardation in PIH cases compared to controls.¹⁶ In this study the percentage of IUGR in babies born to hypertensive mother is 18.96%, while 5% babies are IUGR in control group.¹⁶ Fetal complications in preeclampsia are directly related to gestational age and the severity of maternal disease and include increased rates of preterm delivery, intrauterine growth restriction, placental abruption, and perinatal death.¹⁷

CONCLUSION

Hypertensive disorders of pregnancy are one of the medical conditions affecting pregnancy. Hypertensive disorders of pregnancy are more prevalent in younger and nulliparous mothers. Hypertensive disorders of pregnancy are associated with increased incidence of maternal and fetal complications like abruption placenta, HELLP syndrome, IUGR, IUFD, prematurity and oligohydramnios in our study. Early diagnosis and appropriate timely management of hypertensive disorders in pregnant women can prevent the maternal and fetal complications and improve the outcome of pregnancy. These women should be monitored carefully to prevent maternal morbidity and mortality.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. James PR, Nelson-Piercy C. Management of hypertension before, during, and after pregnancy. *Heart.* 2004;90(12):1499-504.
2. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. *Lancet.* 2006;367(9516):1066-74.
3. Creanga AA, Syverson C, Seed K, Callaghan WM. Pregnancy-related mortality in the United States, 2011-2013. *Obstet Gynecol.* 2017;130(2):366.
4. Berg CJ, Harper MA, Atkinson SM, Bell EA, Brown HL, Hage ML, et al. Preventability of pregnancy-related deaths: results of a state-wide review. *Obstet Gynecol.* 2005;106(6):1228-34.
5. Arias F, Bhide AG, Arulkumaran S, Damania K, Daftary SN, eds. *Arias' Practical guide to High-Risk Pregnancy and Delivery.* 5th edn. Elsevier India; 2019:172.
6. National Institute of Health and Clinical excellence. Hypertension in pregnancy: The management of hypertensive disorders during pregnancy. CG no. 107. London, UK: National Institute of Health and Clinical excellence; 2010.
7. Milne F, Redman C, Walker J, Baker P, Bradley J, Cooper C, et al. The pre-eclampsia community guideline (PRECOG): how to screen for and detect onset of pre-eclampsia in the community. *BMJ.* 2005;330(7491):576-80.
8. WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia. 2011. Available from: <https://www.who.int/publications/i/item/9789241548335>. Accessed on 21 February 2023.
9. Sengodan SS, Sreepathi N. Prevalence of hypertensive disorders of pregnancy and its maternal outcome in a tertiary care hospital, Salem, Tamil Nadu, India. *Int J Reprod Contracept Obstet Gynecol.* 2020;9:236-9.
10. Patel R, Baria H, Patel HR, Nayak S. A study on pregnancy induced hypertension and foetal outcome among patient with PIH at tertiary care hospital, Valsad. *Int J Community Med Public Health.* 2017;4(11):4277-81.
11. Gandhi MR, Jani PS, Patel UM, Kakani CR, Thakor NC, Gupta N. Perinatal outcome in pregnancy induced hypertension cases at GMERS Medical College, Dharpur-Patan, North Gujarat region, India: a prospective study. *Int J Adv Med.* 2015;2(2):152-5.
12. Parmar MT, Solanki HM, Gosalia VV. Study of risk factors of perinatal death in pregnancy induced hypertension. *Nat J Community Med.* 2012;3:703-7.
13. Jayaraman L, Khichi SK, Singh A, Goel S, Karkala J, Goyal P, et al. Pattern of fetomaternal outcome and complications in pregnancy induced hypertension from a tertiary level health care teaching institution of Tamil Nadu, India. *Int J Res Med Sci.* 2016;4:1402-6.
14. Liu CM, Cheng P, Chang SD. Maternal Complications and Perinatal Outcomes associated with Gestational Hypertension and Severe Preeclampsia in Taiwanese Women. *J Formos Med Assoc.* 2008;107(2):129-38.
15. Sajith M, Nimbargi V, Modi A, Sumariya R, Pawar A. Incidence of pregnancy induced hypertension and prescription pattern of antihypertensive drugs in pregnancy. *Int J Pharm Sci Res.* 2014;5(4):163-70.
16. Ramya C, Kumari R, Chitneni C. An observational study of early neonatal outcome in babies born to mothers with pregnancy induced hypertension. *Int J Contemp Pediatr.* 2020;7:1781-6.
17. Zafar H, Naz M, Fatima U, Irshad F. Frequency of IUGR in pregnancy induced hypertension. *JUMDC.* 2012;3(2):8-13.

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