

Study of the Spectrum of the Hypertensive Disorders in Pregnancy in a Tertiary Care Centre in South India

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Abstract

Background: Hypertensive disorders in pregnancy (HDP) are a spectrum of disorders which ranges from already existing chronic hypertension in the index pregnancy to complex multisystem disorders like preeclampsia which may lead on to the complications like eclampsia, HELLP syndrome, acute renal failure, pulmonary edema, stroke and left ventricular failure. This study was done to analyse the clinical spectrum of hypertensive disorders in pregnancy and also to determine the outcomes of pregnancies associated with hypertension in all patients who visited in the Department of Obstetrics and Gynaecology, Govt. Sivagangai Medical College and Hospital, Tertiary care centre, Sivagangai from Jan 2022 to Dec 2022.

Aim of Study: (1) To analyse the epidemiological factors, complications of Hypertensive disorders spectrum in pregnancy in a tertiary care centre. (2) To analyse the maternal and fetal outcomes of pregnancies associated with hypertension.

Materials and Methods: A prospective analysis was conducted in all antenatal women diagnosed with Hypertension and follow up was done in the puerperium at Govt. Sivagangai Medical College and Hospital (a tertiary care hospital) over a period of 1 year from January 2022 to December 2022. Inclusion criteria Antenatal women with BP more than 140/90 on two occasions six hours apart were included regardless of the Gestational age Exclusion criteria Antenatal mothers with normal Blood pressure irrespective of Gestational age.

Results: In our study it was found that, among the 4944 mothers who had delivered in the hospital during the period of Jan 2022 to Dec 2022, 476 had Hypertension (9.6%). In this study, 12.6% were aged under 20 years and 31.2% were aged over 30 years and majority were in the age group of 20 yrs to 30 yrs (56.2%). Among the maternal morbidity, 30.3% constitute imminent eclampsia. Because of immediate diagnosis and management, further complications were prevented in these patients About 4.1% patients had eclampsia, of which 2.52% constitute Antepartum Eclampsia and 1.6% Postpartum eclampsia. In all Eclampsia patients, MRI brain was taken and found to have PRES changes in about 1.6% of cases. 3.4% cases were HELLP syndrome. Out of 476 patients, we had only one maternal death which constitute about 0.21% due to HELLP syndrome. Regarding Perinatal outcome, 28.1% babies had IUGR, which is one of the expected complications of

hypertension disorders in early third trimester. 2.5% of babies were Intrauterine death occurred in 2.5%. 22.1% babies were delivered pre-term in view of hypertensive disorder to safeguard maternal life.

Conclusion: Our study shows that prevalence of Hypertensive Disorder in Pregnancy was 9.6% in Sivagangai district among 21 to 30 yrs with majority of primigravida. The knowledge of risk factors for hypertensive disorders in pregnancy will aid in prevention of morbidity in this population. Early diagnosis and treatment by regular antenatal check-up are a key to prevent hypertensive disorders of pregnancy and its complications.

Keyword: Hypertensive Disorders, Pre-Eclampsia, HELLP Syndrome, Maternal Morbidity.

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Introduction

Hypertensive disorders in pregnancy (HDP) are a spectrum of disorders which ranges from already existing chronic hypertension in the index pregnancy to complex multisystem disorders like preeclampsia which may lead on to the complications like eclampsia, HELLP syndrome, acute renal failure, pulmonary edema, stroke and left ventricular failure. Whether or not hypertension is truly gestational cannot, in fact, be known until nonpregnancy blood pressures have been defined in the remote puerperium. This study was done to analyse the clinical spectrum of hypertensive disorders in pregnancy and also to determine the outcomes of pregnancies associated with hypertension in all patients who visited in the Department of Obstetrics and Gynaecology, Govt. Sivagangai Medical College and Hospital, Tertiary care centre, Sivagangai from Jan 2022 to Dec 2022.

Preeclampsia and these complications are the major causes of maternal and perinatal morbidity and mortality. Among all maternal deaths 19 % deaths are due to hypertension in pregnancy despite the phenomenal numbers of mothers seeking hospital-based delivery care [1]. The incidence of all hypertensive disorders in pregnancy is about 6% [2]. Incidence of preeclampsia was found to be 10.3% (NER 2013). The incidence of eclampsia is 1.9% out of which more than 50% of the cases are antepartum, and approximately 13% of the cases occurred

post-partum. Maternal Mortality attributed to eclampsia is 4-6 %.(NER 2013).

Especially in low and middle-income group countries due to various myths and misconceptions surrounding pregnancy, challenges in transporting pregnant mothers on time , low socioeconomic status, lack of expert antenatal care requiring multidisciplinary approach at all healthcare centres, lack of accurate prediction methods and scarcity of Intensive Care Unit (ICU) availability, there is an unmet need in recognition and management of Hypertensive Disorders in Pregnancy and its complications. This study will help to fill these gaps in providing effective maternal care.

Aim of study

1. To analyse the epidemiological factors, complications of Hypertensive disorders spectrum in pregnancy in a tertiary care centre.
2. To analyse the maternal and fetal outcomes of pregnancies associated with hypertension.

Materials and Methods

A prospective analysis was conducted in all antenatal women diagnosed with Hypertension and follow up was done in the puerperium at Govt. Sivagangai Medical College and Hospital (a tertiary care hospital)

over a period of 1 year from January 2022 to December 2022.

Inclusion criteria

Antenatal women with BP more than 140/90 on two occasions six hours apart were included regardless of the Gestational age

Exclusion criteria

Antenatal mothers with normal Blood pressure irrespective of Gestational age.

Results

In our study it was found that, among the 4944 mothers who had delivered in the hospital during the period of Jan 2022 to Dec 2022, 476 had Hypertension (9.6%).

As shown in Table 1, in this study, 12.6% were aged under 20 years and 31.2% were aged over 30 years and majority were in the age group of 20 yrs to 30 yrs (56.2 %)

Table 1: Maternal age

Maternal age	N	Percentage
<20	60	12.6
21-30	268	56.2
>30	148	31.2

As per Table 2, 67.2% were primiparous and only 5.1% seen in women with over 3 pregnancies, which indicates that Hypertensive disorders are common in primigravida than in multigravida

Table 2: Parity

Parity	N	Percentage
1	320	67.2
2	88	18.5
3	44	9.2
>3	24	5.1

As shown in Table 3, majority of cases occurred in third trimester constituting about 73.9%. 13.4% of cases were in second trimester. 12.7 % cases in late third trimester and they were delivered immediately after evaluation.

Table 3: Gestational Age

Gestational age	N	Percentage
20 to 28	64	13.4
29 to 36	352	73.9
37 and above	60	12.7

As shown in table 4, Persistence of hypertension was noted in 9.66% patients in puerperium follow up.

Table 4: Puerperium follow up

Puerperium period BP	n	Percentage
Normal	430	90.33%
Persistent Hypertension	46	9.66%

As shown in table 5, 73.9 % of cases were delivered by LSCS, all cases were obstetric indications. 26.05% of cases were delivered by Labour natural.

Table 5: Mode of delivery

Mode of delivery	n	Percentage
Vaginal delivery	124	26.1
Lscs	352	73.9

In this study, as per Table 6, 79.1% of babies had apgar above 7 at 5 minutes.

Table 6: APGAR

5 min APGAR	n	Percentage
<7	64	20.9
7 and above	242	79.1

In this study, based on table 7 & 8, it was noted that about 96.3 % of patients were in non-severe preeclampsia as per parameter of systolic blood pressure. Based on table 7, 61.1% patients had diastolic pressure in range of non-severe pre-eclampsia of 90-110 mmHg.

Table 7: Distribution of systolic blood pressure values.

Systolic BP	n	Percentage
140-160	458	96.3
191-230	18	3.7

Table 8: Distribution of diastolic Blood pressure values

Diastolic BP	n	Percentage
90-110	290	61.1
110-140	186	38.9

In our study, it was observed that based on National High Blood Pressure Education Program Working Group in Pregnancy about 74.7% patients come under Gestational Hypertension, 2.9% of patients had pre-eclampsia superimposed on chronic hypertension.

Table 9: Types of Hypertensions

Type	n	Percentage
Gestational Hypertension	356	74.7
Preeclampsia-eclampsia	76	15.9
PE superimposed on chronic HTN	14	2.9
Chronic HTN	30	6.3

In this series, Table 10 shows the maternal and perinatal outcome. Among the maternal morbidity, 30.3% constitute imminent eclampsia. Because of immediate diagnosis and management, further complications were prevented in these patients.

About 4.1% patients had eclampsia, of which 2.52% constitute Antepartum Eclampsia and 1.6% Postpartum eclampsia. In all Eclampsia patients, MRI brain was taken and found to have PRES changes in about 1.6% of cases.

3.4% cases were HELLP syndrome. Out of 476 patients, we had only one maternal death which constitute about 0.21% due to HELLP syndrome. Patient was admitted with full-fledged HELLP and severe pre-eclampsia.

Regarding Perinatal outcome, 28.1% babies had IUGR, which is one of the expected complications of hypertension disorders in early third trimester. 2.5% of babies were Intrauterine death occurred in 2.5%. 22.1% babies were delivered pre-term in view of hypertensive disorder to safeguard maternal life.

Table 10: Maternal and Perinatal outcome

Complications	N	Percentage
HELLP	32	3.4
Abruptio placenta	20	4.2
Imminent eclampsia	144	30.3
Antepartum eclampsia	12	2.52
Postpartum eclampsia	8	1.6
PRES	8	1.6
Postop Ventilator support	6	1.26
Neurological sequelae (CVA with UMN facial palsy)	2	0.8
Maternal mortality	1	0.21
Perinatal Outcome		
Preterm labour	100	22.1
Operative delivery	376	78.9
LBW	100	21
IUGR	132	28.1
IUFD	12	2.5

Discussion

Hypertensive disorders in Pregnancy are the second leading cause of global maternal mortality next only to maternal haemorrhage [3] and also it contributes to significant short- and long-term maternal and fetal morbidity. Elevated systolic BP throughout pregnancy, even below the diagnostic threshold for hypertension, are associated with increased risk of preterm delivery and infants who are small for gestational age and have low birth weight [4,5]. Increase in chronic hypertension, gestational hypertension and pre-eclampsia occurred as a result of variations in maternal characteristics such as maternal age and pre-pregnancy weight, whereas declines in eclampsia occur due to effective antenatal care and use of prophylactic treatment regime of magnesium sulphate.

In the study period of one year from January 2022 to December 2022, 476 mothers found

to be hypertensive. Thus, prevalence of Hypertension in our study was 9.6% which is less than the general prevalence. As this is a hospital based study, the prevalence is different compared with community based study of Sachdeva *et al* [5]. Our study prevalence correlated the same with the study of vani *et al* [6].

In this study it was noted that about 56.2% were in age group of 20 to 30 yrs. as majority of pregnancy occurs in this age group in our country. About 31.2% of patients were aged more than 30 yrs, which indicates increase in age is one of the risk factor for hypertension in pregnancy as compared to the study Bakker *et al* [7]. Extremes of age are factors for Hypertensive Disorders in pregnancy. A short time of sperm exposure is the likely explanation for the high risk of preeclampsia among teenagers [8]. For the more advanced maternal age categories, the significant

positive relation between age and the incidence of hypertensive disorders probably denotes effect of “ageing” endothelium and the higher incidence of adverse factors, like increased booking BP and body mass index (BMI).

In 67.2 % of patients were Primi which correlates with historical review study of Eastman and Hellman [8]. When compared to historical review, primiparity increased risk factor theory is not yet changed. Our data of increased incidence in Primi is same as that of study compared to Vani *et al* [6].

Preeclampsia is a disease of primigravida within a couple (primipaternity). A previous abortion or healthy pregnancy with the same partner is associated with a reduced risk of hypertensive disorder, although this protective effect will be lost with a change of partner [9,10]. The risk increases in persons who have less sperm exposure with the same partner before conception [11]. Also, men who fathered one preeclamptic pregnancy are nearly twice as likely to father a preeclamptic pregnancy in a different woman, irrespective of whether or not she had already had a preeclamptic pregnancy. Advances in assisted reproductive technology have also increased the risk of preeclampsia.

In this study mean gestational age for hypertensive disorders was in early third trimester that is around 28 weeks to 36 weeks Gestational age constituting about 73.9% which is contrary to study of Manjusha *et al* where incidence was more in late third trimester at 37 weeks. This can be because of our effective high-risk tracking system in our state as per NHM Tamilnadu guidelines. All antenatal mothers are traced through our RCH ID and all antenatal mothers are visited regularly by our health worker teams, and routine blood pressure monitoring was done and thus many antenatal were referred for treatment in early third trimester itself.

Gestosis scoring is done for all patients who visit health care system in Tamilnadu.

In present study, it was noted that caesarean delivery was high in Hypertensive disorders. 79.1% babies had apgar more than 7 suggesting majority of babies didn't suffer from intrapartum or peripartum asphyxia. In this study, it was observed that based on National High Blood Pressure Education Program Working Group in Pregnancy about 74.7% patients come under Gestational Hypertension, 2.9% of patients had pre eclampsia superimposed on chronic hypertension which is comparable to multicentre trial of Matthys [13].

In this study, the maternal and perinatal outcome was evaluated. Among the maternal morbidity, 30.3 % constitute imminent eclampsia. Because of immediate diagnosis and management, further complications were prevented in these patients About 4.1 % patients had eclampsia, of which 2.52 % constitute Antepartum Eclampsia and 1.6 % Postpartum eclampsia. Our study results correlated with the study of Meghavihini *et al* [14].

Maternal and perinatal outcomes in hypertensive disorders are dependent on gestational age at time of onset, at time of delivery, severity of disease, quality of management, and presence or absence of preexisting medical conditions. Maternal and perinatal outcomes are favorable in women with mild preeclampsia developing beyond 36 weeks' gestation. In contrast, maternal and perinatal morbidities and mortalities are increased in women who develop preeclampsia before 33 weeks' gestation, in those with preexisting medical conditions, and in those from the developing countries.

In all Eclampsia patients, MRI brain was taken and found to have PRES changes in about 1.6% of cases.

3.4% cases had HELLP syndrome. Out of 476 patients, we had only one maternal death (0.21%) due to HELLP syndrome. Patient was admitted with full-fledged HELLP and severe pre-eclampsia

In Perinatal outcome, 28.1% babies had IUGR, which is one of the expected complications of hypertension disorders when occurred in early third trimester. Intrauterine death occurred in 2.5% of babies. 22.1% babies were delivered pre term in view of hypertensive disorder to safeguard maternal life.

Anti-Hypertensive drug Tablet labetalol 100 mg was started initially for all Hypertensive disorders in Pregnancy patients. If not controlled with single line drug, second line drug tablet Nifedipine 10 mg started. Pitchards regime of MgSO₄ was given for all severe pre-eclampsia, Imminent eclampsia and eclampsia patients. In our study, postpartum follow up was done up to 6 weeks after delivery. Requirement of antihypertensives postnatally was assessed based on blood pressure and drug titrated. In 9.66% of patients hypertension persisted and they required antihypertensives even after 6 weeks postpartum.

Conclusion

Our study shows that prevalence of Hypertensive Disorder in Pregnancy was 9.6% in Sivagangai district among 21 to 30 yrs with majority of primigravida. The knowledge of risk factors for hypertensive disorders in pregnancy will aid in prevention of morbidity in this population. Early diagnosis and treatment by regular antenatal check-up are a key to prevent hypertensive disorders of pregnancy and its complications. High risk tracking through unique RCH ID is done in our district and mentoring of all high-risk cases done by Obstetricians to prevent morbidity and mortality.

References

1. Abalos E, Cuesta C, Carroli G, Qureshi Z, Widmer M, Vogel JP, *et al.* Pre-eclampsia, eclampsia and adverse maternal and perinatal outcomes: A secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG*. 2014; 121(Suppl 1):14–24.
2. Zhang J, Meikle S, Trumble A. Severe maternal morbidity associated with hypertensive disorders in pregnancy in the United States. *Hypertens Pregnancy* 2003; 22:203–12.
3. Kassebaum NJ, Barber RM, Bhutta ZA, Dandona L, Gething PW, Hay SI, Kinfu Y, Larson HJ, Liang X, Lim SS, *et al.* Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016; 388:1775–1812.
4. Teng H, Wang Y, Han B, Liu J, Cao Y, Wang J, Zhu X, Fu J, Ling Q, Xiao C, *et al.* Gestational systolic blood pressure trajectories and risk of adverse maternal and perinatal outcomes in Chinese women. *BMC Pregnancy Childbirth*. 2021; 21:155.
5. Sachdeva PD, Patel BG, Bhatt MV. A study of incidence and management of pregnancy induced hypertension in central Gujarat, India. *Int J Univ Pharm Life Sci* 2011; 1:61-70.
6. B Vani, S Sabitha. Incidence and associated risk factors of pregnancy induced hypertension: A study at tertiary care hospital. *MedPulse International Journal of Gynaecology*. January 2020; 13(1): 05-09.
7. Bakker R, Steegers EA, Hofman A, Jaddoe VW. Blood pressure in different gestational trimesters, fetal growth, and the risk of adverse birth outcomes: the Generation R Study. *Am J Epidemiol*. 2011; 174:797–806.
8. Eastman NJ, Hellman LM. Williams obs

- tetrics. 13. New York, NY: Meredith Publishing Company; 1966. [Google Scholar]
9. Bridwell, M., Handzel, E., Hynes, M. *et al.* Hypertensive disorders in pregnancy and maternal and neonatal outcomes in Haiti: the importance of surveillance and data collection. *BMC Pregnancy Childbirth.* 2019; 19: 208.
 10. Mersha AG, Abegaz TM, Seid MA. *BMC Pregnancy Childbirth.* 2019 Dec 3; 19(1):458.
 11. Conde-Agudelo A, Villar J, Lindheimer M: Maternal infection and risk of preeclampsia: Systematic review and meta-analysis. *Am J Obstet Gynecol.* 2008; 198:7–22.
 12. Manjusha sajith, vandana nimbargi, amit modi, ronak sumariya, atmaram pawar. Incidence of pregnancy induced hypertension and prescription pattern of antihypertensive drugs in pregnancy. *International Journal of Pharma Sciences and Research (IJPSR).* 2014.
 13. Matthys LA, Coppage KH, Lambers DS, Barton JR, Sibai BM. Delayed postpartum preclampsia: An experience of 151 cases. *Am J Obstet Gynecol* 2004; 190:1464-6.
 14. Meghavini R. Parmar, Pradhyuman Vaja. Effect of pregnancy induced hypertension on maternal and perinatal outcome at tertiary care center in Ahmedabad, Gujarat, India. 2017.