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To Study the Prevalence of Hypertension Disorders in Pregnancy and their Feto-Maternal Outcomes in Tertiary Care Centre

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Abstract: ***Background: In areas with limited resources, hypertensive disorders of pregnancy are frequent and constitute one of the three deadly triads—along with bleeding and infection—that considerably increase the risk to both the mother and the fetus. The purpose of this study was to establish the prevalence of hypertensive disorders during pregnancy and their impact on feto-maternal outcomes. Aim: To study the prevalence of hypertensive disorders in pregnancy and their feto-maternal outcomes. Objective: 1) To study the prevalence of hypertensive disorders in pregnancy in tertiary care center. 2) To assess the feto-maternal outcomes of hypertensive disorders during pregnancy in tertiary care center. 3) To describe the incidence and trends of hypertensive disorders of pregnancy and adverse pregnancy outcomes in recent years. Methods: The prospectivecross-sectional study was conducted in a tertiary care hospital from May 1 2022 to Dec 1 2022 in department of Obstetrics & Gynaecology, with informed consent from patients. All consecutive patients who presented to Department of OBGY in a tertiary care hospital, Rajahmundry. were screened for hypertension disorder and included in their study and subjected to thorough history and general examination followed by investigations like complete blood picture, complete urine examination, liver and renal function tests, fundus examination of both eyes using ophthalmoscope, Ultrasonographic evaluation of foetus. Fetal evaluations like low birth weight, APGAR, NICU admission. All the results were in tabulated and analysed by using SPSS version 22 software. Chi-square test was used to predict the significance. Results: A total of 80 female patients were included in the study, of which the mean age was 25.43 + 5.04, with minimum age of 18yrs and maximum being 36yrs. The mean POG of study participants was 35.63 + 2.36. Out of 80 patients, 14 (17.5%) are of chronic hypertension group, gestational hypertension and pre-eclampsia has 28 (35%) in each group, while the rest 10 (12.5%) were in eclampsia group. All the results were in tabulated and analysed by using SPSS version 22 software. Chi-square test was used to predict the significance. Conclusion: Maternal and fetal outcomes of pregnancy are complicated by the high frequency of hypertensive disorders of pregnancy in the research area. Antenatal surveillance needs to be increased to enable early detection, strict follow-up, and prompt intervention in seriously afflicted pregnancies in order to prevent its detrimental consequences on both feto and mother outcomes of pregnancy.***

Keywords: preeclampsia-eclampsia, gestational hypertension, chronic hypertension, HEELP syndrome

1. Introduction

Hypertension is the most common medical problem encountered during pregnancy. And form one of the deadly triads along with hemorrhage and infection, contributing greatly to maternal mortality, preterm birth, small for gestational age newborns, still birth and neonatal death. Affected women are also at increased risk for cardiovascular disease later in life. Hypertension disorders during pregnancy are classified in 4 categories 1) chronic hypertension 2) preeclampsia-eclampsia 3) preeclampsia super imposed on chronic hypertension 4) gestational hypertension. [(1)] This is defined as SBP>140mmhg and DBP>90mmhg. These are classified into mild, moderate, severe. Mild SBP140-149 and DBP 90-99mmhg, moderate SBP 150-159 and DBP 100-109mmhg, severe SBP >160 and DBP >110mmhg. Pregnancy induced hypertension women are at greater risk of developing abruptio placenta, cerebrovascular events, multi organ failure, disseminated intravascular coagulation, HELLP syndrome, PPH.

Chronic hypertension in pregnancy:

Chronic hypertension is high blood pressure that either precedes pregnancy, is diagnosed with in the first 20 weeks of pregnancy or does not resolve by the 12-week postpartum checkup. Two categories of severity are recognized: mild 179/109mmHg, and severe >180/110mmhg. Medication should be reviewed when the pregnancy is first diagnosed. Methyldopa is the most studied of all antihypertensive medications and generally the first choice of drug in pregnancy because it has limited effect on uteroplacental blood flow. In our hospital we commonly use labetalol, a combined alpha blocker and beta blocker, because this drug is well tolerated and has an easier dosing schedule than methyldopa, and labetalol is the first alternative to methyldopa. Calcium channel blockers, particularly nifedipine, are being used more frequently, probably because their use to stop premature labor. Other anti hypertensives like atenolol and other pure beta blockers should be avoided due to babies born small for gestational age. Angiotensin converting enzyme inhibitors are

contraindicated in second and third trimester because there are associated with congenital anomalies, including renal failure, oligohydramnios, renal agenesis, reduced ossifications, pulmonary hypoplasia, fetal and neonatal deaths. All the hypertensive patients should undergo increased surveillance, serial laboratory tests throughout pregnancy, serial ultrasound scans to follow growth, and antenatal testing.

Gestational hypertension:

Gestational hypertension, formerly known as pregnancy-induced hypertension or PIH, is the new onset of hypertension after 20 weeks of gestation. The diagnosis requires that the patient have:

Elevated blood pressure (systolic ≥ 140 or diastolic ≥ 90 mm Hg, the latter measured using the fifth Korotkoff sound)
Previously normal blood pressures No protein in the urine

No manifestations of preeclampsia eclampsia. Also known as transient hypertension, gestational hypertension is actually diagnosed retrospectively when the patient does not develop preeclampsia and if blood pressure returns to normal by the 12-week postpartum visit. Fifty percent of women diagnosed with gestational hypertension between 24 and 35 weeks develop preeclampsia [(2).] The diagnosis of gestational hypertension mandates increased surveillance. Women who progress to severe gestational hypertension based on the degree of blood pressure elevation have worse perinatal outcomes than do women with mild preeclampsia, and require management similar to those with severe preeclampsia [(3).] A diagnosis of hypertension in pregnancy warrants closer monitoring, particularly if it is diagnosed after 20 weeks' gestation.3, 12 Home blood pressure recording is being examined as a means of improving monitoring during this period and detecting white coat hypertension, masked hypertension, and sustained hypertension. The first role of home blood pressure monitoring is in confirming the diagnosis of hypertension. While the exact prevalence of white coat hypertension, elevated blood pressure in the office not present at home, is not known, the ACOG recommends ambulatory blood pressure monitoring for those patients in whom we suspected.

Pre-eclampsia

Preeclampsia is a multiorgan disease process of unknown etiology [(4)] characterized by the development of hypertension and proteinuria after 20 weeks of gestation. There are various theories of pathogenesis of preeclampsia. The most popular theory is immunologic. During a normal pregnancy, fetal syncytial trophoblasts penetrate and remodel maternal spiral arteries, thisremodelling accommodates the vast, increased maternal circulation needed for adequate placental perfusion. This remodelling is somehow prevented in preeclamptic pregnancies: the placenta is unable to properly burrow into the maternal blood vessels, leading to intrauterine growth restriction and other fetal manifestations of the disorder. Investigators speculate that this incomplete placentation is due to maternal immunologic intolerance of foreign fetal genes. Evidence in support of this theory is that the risk of preeclampsia is highest in a first pregnancy and decreases with the length of time a woman has lived with the father before becoming pregnant. Furthermore, risk is also increased in multiparous women who are pregnant by a new partner. [(5)] Other theories of pathogenesis of preeclampsia are angiogenic factors (cardiovascular maladaptation and vasoconstriction, genetic predisposition (maternal, paternal, thrombophilia) [(6, 7)] immunologic intolerance between fetoplacental and maternal tissue [(8),] platelet activation, vascular endothelial damage or dysfunction [(8).] Several factors are associated with preeclampsia and they are antiphospholipid antibody syndrome, chronic hypertension, chronic renal disease, elevated body mass index, maternal age older than 40 years, multiple gestation, nulliparity, preeclampsia in a previous pregnancy (particularly if severe or before 32 weeks of gestation), pregestational diabetes mellitus. Prevention through routine calcium supplementation reduces the risk of developing preeclampsia [(9).]

Eclampsia

Eclampsia is the development of convulsions in a pre-existing pre-eclampsia or it may appear unexpectedly in a patient with minimally elevated blood pressure and no proteinuria. The exact cause is unknown but cerebral ischaemia and oedema were suggested [(1).]

HELLP Syndrome

HELLP Syndrome is a type of preeclampsia with severe features that involves increased hemolysis, increased liver enzymes, and low platelet levels. While most women with HELLP syndrome have high blood pressure and proteinuria, up to 20% of HELLP syndrome cases do not present with these classical signs of preeclampsia. However, like pre-eclampsia, HELLP syndrome can also lead to low birth weight and premature birth of the fetus/neonate.

Table 1 ACOG Classification of Hypertension in Pregnancy[3]

Condition	Definition	Prevalence, %
GH	De novo BP elevations (>140/90 mm Hg) after 20 wks of gestation without other organ system dysfunction	6–7
Preeclampsia	De novo BP elevations after 20 wks of gestation coupled with proteinuria or other end-organ dysfunction	5–7
Chronic hypertension	Elevated BP before 20 wks of gestation or persisting beyond 12 wks postpartum	1–5
Chronic hypertension with superimposed preeclampsia	Increased BP and new-onset proteinuria or other end-organ dysfunction in addition to preexisting hypertension	0.2–1

ACOG indicates American College of Obstetricians and Gynecologists; BP, blood pressure; GH, gestational hypertension.

Reference [(10)]

2. Methodology

Inclusion Criteria:
- Pregnant women
- HELLP syndrome
- Abruptio placenta
- Eclampsia
- Gestational hypertension
- Chronic hypertension

Exclusion Criteria
- Placenta previa
- Uterine anomalies
- Molar pregnancy

Study Setup And Design:
It was a prospective, descriptive, cross-sectional study that used information from the hospital records of expectant mothers who gave birth at l between MAY 1, 2022, and DECEMBER 1, 2022, when the study was conducted. The study was carried out in TERITARY CARE CENTRE, at the Gynaecology and Obstetrics division. Because of this, women who have already signed up for ANC follow-up at the hospital due to a poor obstetric history, and also pregnant women who have been referred by nearby rural areas and other hospitals.

Study Participants
All qualified women admitted to hospital and delivered at our hospital between MAY 1, 2022, and DECEMBER 1, 2022, were included in this study.80 patients were randomly chosen from each month of the study period, resulting in a total of 80 samples from all women who gave birth in the facility throughout the time period. The exclusion criteria include women with missing or incomplete data, or women who were moved to other hospitals after being admitted to the research hospital.

Data Sources for the Investigation
Data was gathered from the study subjects' medical records in order to evaluate the effects of hypertensive diseases on the mother and the foetus. The maternal data collected included the following: the primary complaints are mother's age, her vital signs, her parity, the gestational age, the number of foetuses, and additional maternal risk factors for HDP (such as a history of a comparable illness, diabetes, or chronic kidney disease), among others. Highest recorded systolic and diastolic pressure, type of HDP, timing of HDP start, severity of symptoms, and kind of anticonvulsant and antihypertensive administered. Also, information on labour onsets, delivery styles, and obstetric problems was gathered. Proteinuria, haemoglobin, platelet, and were among the laboratory results. Fundoscopy is examined in all women with hypertensive disorders.

Newborn outcome variables. Data was gathered from the study subjects' medical records in order to evaluate the effects of hypertensive diseases on the mother and the foetus. the gestational age, birth outcome (alive or not), birth weight, APGAR scores at 1 and 5 minutes, requirement for resuscitation, and need for NICU admission were the maternal Neonatal outcome data that were gathered.

3. Results

A total of 80 female patients were included in the study, of which the mean age was 25.43 + 5.04, with minimum age of 18yrs and maximum being 36yrs. The mean POG of study participants was 35.63 + 2.36. Out of 80 patients, 14 (17.5%) are of chronic hypertension group, gestational hypertension and pre-eclampsia has 28 (35%) in each group, while the rest 10 (12.5%) were in eclampsia group. On urine microscopy, majority 38 (47.5%) had no proteinuria, 16 (20%) had 1+, 18 (22.5%) has 2+ while the rest 8 (10%) had 3+ proteinuria. On fundoscopy, 46 (57.5%) had normal fundus while the rest had grade 1 hypertensive retinopathy. (Table 1)

Out of 40 patients who are less than 24years majority 16 (40%) are of gestational hypertension group, of 34 patients in 25-34 years group majority belong to chronic hypertension and eclampsia group, out of 6 patients with age more than 35 years, they are equally distributed among four hypertensive groups which is statistically significant (P value 0.043) (Table2). Similarly, out of 14 patients with POG <34, majority 8 (28.6%) were in pre-eclampsia group, majority of patients in more than 37weeks POG belong to

gestational hypertension group which is statistically significant (p value 0.015) (Table 3).

Gestational hypertension was seen in 28 patients of which 16 (57.1%) underwent LSCS, while out of 28 patients with pr eclampsia 18 (64.3%) underwent LSCS which had no statistical significance (p value 0.562) (Table 4). Chronic and Gestational Hypertension were seen in 42 patients of which 32 (76.2%) had no albuminuria, 32 (76.2%) had normal fundus, while Preeclampsia and Eclampsia were seen in 38 patients, of which 16 (42.1%) had grade two albuminuria, 32 (76.2%) had hypertensive retinopathy which are statistically significant p value 0.003 and p value 0.019 respectively (Table 5 & 6).

According to my study good fetal outcomes with alive status of the baby are with gestational hypertension 28 (100%), and in chronic hypertension 12 (85.7%), and poor fetal outcomes are with eclampsia with 6 (60%) stillbirths are more common in chronic hypertension 2 (14.3%) & preeclampsia with 2 (7.1%) (Table 7).

Low birth weight <2.49 kg of which babies of chronic hypertensive mothers 4 (28.6%), gestational hypertension are 8 (28.6%), preeclampsia 16 (57.1%) and in eclampsia 6 (60%) (Table 8).

4. Discussion

Hypertensive disorders of pregnancy (HDP) are common and form one of the deadly triads, along with hemorrhage and infection, which contribute greatly to maternal morbidity and mortality, fetal, and neonatal outcomes. In our study, we have studied the prevalence of hypertensive disorders of pregnancy, with severe pre-eclampsiaand gestational hypertension was 35% in each group and eclampsia accounted for 12.5% and chronic hypertension for 17.5% of the total cases of hypertensive disorders. Women with HDP in this sample were more likely to have pregnancies that resulted in low birthweight babies, stillbirths, women with eclampsia were at greatest risk for these adverse maternal and neonatal outcomes.

1) Hypertensive disorders in pregnancy may contribute to maternal morbidity and mortality, fetal and neonatal jeopardy.
2) In this study, majority (100%) of eclampsia patients comes under the age group of less than 24 years and about 85.7% of chronic hypertensives are 25 to 34 years of age.
3) Elderly age group, chronic hypertensives, low socio-economic status, obesity, previous history of preeclampsia, chronic kidney disease and diabetes are the risk factors for preeclampsia in our study group.
4) The prevalence of eclampsia in our study group was only 12.5%. Whereas Nakimuli et al study of 403 women, 54.1% had severe preeclampsia, 42.7% are eclampsia and 13% had HELLP syndrome.
5) Majority of the women affected by the chronic hypertension with 85.7% of mothers are at most 29.5 years of age, Gestational hypertension was about 57.1% belonging to the age group of less than 24 years and preeclampsia is around 50% at less than 24 years of age and eclampsia is about 100% belonging to less than 24 years of age.
6) The rate of caesarean section was 85.7% in chronic hypertensives, 57.1% in gestational hypertension, 64.3% in preeclampsia and 60% in eclampsia cases. The rate of normal vaginal delivery is 14.3% in chronic hypertension, 42.8% in gestational hypertension, 35.7% in preeclampsia and 40% in eclampsia cases. In our study sample of about 21.1% of preeclampsia and eclampsia cases the urine albuminuria showed 3+.
7) Most of the women are 28.5%with hypertensive disorders had the systolic BP recordings of atleast170 mmHg and 15.7% had the highest diastolic BP recordings of at least 110mmHg
8) In this study, the rate of LBW Babies about 14.3% in chronic hypertension, 0% in gestational hypertension, 21.4% in preeclampsia, 60% in eclampsia and 94% of neonates required NICU support. The fetal outcome in my study is of high standard in gestational hypertensive cases of about 100% alive babies. The poor fetal outcome is seen in preeclampsia cases of about 35.7%.
9) The maternal mortality rate in our study group is 0% and this could be attributed to the fact that our hospital is having improved care facilities, well-staffed with appropriate professionals giving services for 24 hours a day-7days a week, early presentation of the mothers to the hospital and stringent interventions in the hospital including the termination of pregnancy have reduced the maternal mortality and morbidity with good neonatal and fetal outcome.
10) According to my study good fetal outcomes are with gestational hypertension and poor outcomes are with eclampsia, and stillbirths are more common in chronic hypertension & preeclampsia.

5. Conclusion

- Much of the obstetric researches in the past several decades have been directed at finding ways to prevent preeclampsia and eclampsia. However, there is no definitive preventive method for the hypertensive disorders of pregnancy to date apart from termination of pregnancy.
- Therefore, it is imperative to expand and strengthen the focused antenatal surveillance to early recognize the pregnant women with hypertensive disorders of pregnancy, provide them appropriate care and/or refer to the hospital with better care facilities.
- Up to date and goal-oriented training for lower and middle level health professionals at the health centers and in the Hospitals can further increase their capacity for early detection of high-risk pregnancies, and timely referral to advanced tertiary health facilities.

Table 1: Baseline characteristics of study population

Parameter	N= 80
Age	25.43 + 5.04
POG	35.63 + 2.36
Baby Weight	2.36 +0.79
APGAR 1	7.30 + 1.04
APGAR 5	8.45 + 0.81
Estimated Fetal Weight	2.37 + 0.81
Urine Albumin Nil 1+ 2+ 3+	 38 16 18 8
Fundoscopy Normal HTN changes	 46 34

Table 2: Association between Maternal age and various stages of hypertension

Age, Y	Chronic Hypertension N= 14	Gestational HTN N= 28	Pre-Eclampsia N=28	Eclampsia N=10	P value
<24	0 (0%)	16 (57.1%)	14 (50%)	10 (100%)	0.043
25-34	12 (85.7%)	10 (35.7%)	12 (42.9%)	0 (0%)	
> 35	2 (17.5%)	2 (7.1%)	2 (7.1%)	0 (0%)	

Table 3: Association between Maternal POG and various stages of hypertension

POG in weeks	Chronic Hypertension N= 14	Gestational HTN N= 28	Pre-Eclampsia N=28	Eclampsia N=10	P value
<34	2 (14.3%)	0 (0%)	8 (28.6%)	4 (40%)	0.015
25-34	8 (57.1%)	8 (28.6%)	8 (28.6%)	4 (40%)	
> 37	4 (28.6%)	20 (71.4%)	12 (42.9%)	2 (20%)	

Table 4: Association between Mode of delivery and various stages of hypertension

Mode of delivery	Chronic Hypertension N= 14	Gestational HTN N= 28	Pre-Eclampsia N=28	Eclampsia N=10	P value
NVD	2 (14.3%)	12 (42.8%)	10 (35.7%)	4 (40%)	0.562
LSCS	12 (85.7%)	16 (57.1%)	18 (64.3%)	6 (60%)	

Table 5: Association between Urine Albuminuria and various stages of hypertension

Urine Albuminuria	Chronic and Gestational Hypertension, N= 42	Pre-Eclampsia and Eclampsia N=38	P value
0	32 (76.2%)	6 (15.8%)	0.003
1	8 (19%)	8 (21.1%)	
2	2 (4.8%)	16 (42.1%)	
3	0 (0%)	8 (21.1%)	

Table 6: Association between fundoscopy findings and various stages of hypertension

Fundoscopy	Chronic and Gestational Hypertension, N= 42	Pre-Eclampsia and Eclampsia N=38	P value
Normal	32 (76.2%)	14 (36.8%)	0.019
HTN retinopathy	10 (23.8%)	24 (63.2%)	

Table 7: Association between various stages of hypertension and fetal outcome

Fetal Outcome	Chronic Hypertension N= 14	Gestational HTN N= 28	Pre-Eclampsia N=28	Eclampsia N=10	P value
Alive	12 (85.7%)	28 (100%)	16 (57.1%)	4 (40%)	0.021
Still	2 (14.3%)	0 (0%)	2 (7.1%)	0 (0%)	
Dead	0 (0%)	0 (0%)	10 (35.7%)	6 (60%)	

Table 8: Association between various stages of hypertension and baby weight

Baby Weight, kg	Chronic Hypertension N= 14	Gestational HTN N= 28	Pre-Eclampsia N=28	Eclampsia N=10	P value
<1.5	2 (14.3%)	0 (0%)	6 (21.4%)	6 (60%)	0.04
1.5-2.49	2 (14.3%)	8 (28.6%)	10 (35.7%)	0 (0%)	
>2.5	10 (71.4%)	20 (71.4%)	12 (42.9%)	4 (40%)	

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