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Hypertensive Disorders During Pregnancy and Associated Perinatal Outcomes: Evidence from Rural Uttar Pradesh

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Introduction

Hypertension poses a significant health risk to pregnant women globally due to its association with high rates of perinatal illness and death. Preeclampsia and eclampsia together are responsible for nearly 14% of maternal fatalities worldwide, with the burden being heavier in developing nations due to limited access to emergency obstetric care. During the period spanning 1990 to 2019, a global pattern emerged prevalence of hypertensive disorders during pregnancy rose from 16.30 million to 18.08 million cases, reflecting a 10.92% increase. In India, hypertensive conditions complicate approximately 7.8% of pregnancies. A study by FOGSI (2013) revealed that preeclampsia contributes to 5.4% of cases, while eclampsia is accountable for 24% of maternal deaths. Key causes of maternal mortality include complications such as eclampsia, Separation of the placenta, HELLP complication, fluid accumulation in the lungs, sudden kidney dysfunction, and widespread clotting disorder (DIC). Although controlling blood pressure does not stop disease progression, proactive antenatal care, early detection of preeclampsia, and timely medical management can significantly reduce the incidence of hypertensive crises and complications affecting both mother and fetus.

Objectives

This research was carried out at a Specialized medical teaching college located in rural Uttar Pradesh with the objective of evaluating the prevalence concerning pregnancy-induced hypertension and its influence on maternal outcomes and fetal morbidity and mortality. The study also explored how adverse outcomes for mothers and newborns were related to various demographic and clinical variables, including demographic and clinical factors such as age, parity, financial status, nature of hypertensive disorder, quality of antenatal services, gestational duration at delivery, type of delivery, and outcomes for both mother and fetus.

Data and Research Methods

A hospital-based investigation with a retrospective and cross-sectional design was undertaken at K.D. Medical College, located in Uttar Pradesh., over a period from January 2023 to December 2024. The data used in the study was extracted from hospital medical records following approval from the institutional ethical review board. The study included All expectant mothers past 20 weeks of pregnancy who had been diagnosed with hypertension-related complications and were admitted to the hospital for delivery. However, cases with concurrent medical conditions such as diabetes with nephropathy, renal or vascular disorders, epilepsy, or other medically induced convulsive disorders were excluded.

The criteria for classifying into hypertensive disorders was:

1. **Preeclampsia:**

- A blood pressure reading equal to or exceeding 140/90 mmHg, recorded twice with a minimum interval of four hours.
- in the presence of proteinuria orIn those without proteinuria
    - a platelet count below 100,000/μL (thrombocytopenia) or
    - impaired liver function (serum liver transaminases to twice the normal level) or
    - acute renal impairment marked by serum creatinine rising above 1.1 mg/dL or doubling without evidence of another kidney disorder, or
    - lung congestion due to excess fluid or
    - recently developed vision problems or
    - abnormal neurological findings.

2. **Eclampsia**: Occurrence of convulsions in women diagnosed with hypertension, unrelated to any other underlying condition.
3. **Gestational hypertension: hypertension** Following the 20th week of pregnancy, in the absence of both proteinuria and the broader clinical features of pre-eclampsia.
4. **Chronic hypertension**: High blood pressure existing before conception or diagnosed before the 20th week of gestation..

Complete clinical care details were recorded, encompassing diagnostic investigations, fetal surveillance choices, gestational age at the time of childbirth, the nature of labor onset (spontaneous or medically initiated), and the delivery method whether through natural vaginal birth, assisted techniques such as forceps or vacuum, or caesarean section, classified as either planned or urgent. Additional parameters such as APGAR scores at 0, 1, and 5 minutes post-birth, fetal anthropometric measurements, NICU admission status, length of hospital stay, and clinical course until discharge were systematically recorded, organized, and subjected to statistical analysis.

Key Results

A total of 2049 childbirths occurred during the study, with hypertensive disorders identified in 115 instances, accounting for 5.5% of the cases. The distribution of these cases was as follows: gestational hypertension in 57 women (2.7%), preeclampsia in 49 (2.3%), eclampsia in 6 (0.2%), and chronic hypertension in approximately 0.1% of all pregnancies.

The occurrence of hypertensive disorders was notably higher among women aged 25–35 years (47.8%), followed by those under 25 years of age (46%), and was least common in women over 35 years (5.2%). Nevertheless, there was no meaningful statistical correlation was found between hypertensive disorders in pregnancy and variables such as occupation, level of education, or socioeconomic status.

The timing of onset whether term or preterm did not show a significant association with maternal morbidity. All patients diagnosed with hypertensive disorders were managed with antihypertensive therapy according to the hospital's established protocol. Clinical complications observed included pulmonary edema in 2.7% of cases, placental abruption in

9.2%, and postpartum hemorrhage (PPH) in 5.7%. A total of seven women required admission to the intensive care unit (ICU), all of whom were diagnosed with either severe preeclampsia or eclampsia. ICU admissions were significantly more frequent among women with eclampsia compared to those with preeclampsia.

In terms of neonatal outcomes, 51 newborns (44.3%) delivered by mothers with hypertensive disorders experienced no complications throughout the follow-up period. Preterm delivery was observed in 20 infants (17.3%), and fetal growth restriction was identified in 36 cases (31.3%). Thirteen neonates (11.3%) developed hypoxia, and there were four instances (3.4%) of neonatal death.

Relationship of Hypertensive Pregnancy Disorders with Sociodemographic Characteristics

Sociodemographic Factor	**Hypertension**	**Normotensive**	**Total**
Age < 25 yrs 26 – 34 yrs > 35 yrs	 55 55 6	 819 768 347	 873 823 353
Education Status Graduate and above Below graduate	 21 (7.0%) 94 (5.5%)	 275 1659	 296 1753
Socioeconomic status Upper +upper middle Lower middle + upper lower + lower	 17(4.9%) 98(5.7%)	 324(95%) 1610(94%)	 341 1708
Booking Status Supervised Unsupervised	 38(3.1%) 77(9.0%)	 1164(96.8) 770(90.9%)	 1202 847

Association Of Independent Variables With Hypertensive Disorders Of Pregnancy

Variables	**Hypertension**	**Normotensive**	**Total**
Gravida <3 >3	 54 61	 836 1098	 890 1159
Parity			

<1 >1	83 32	806 1128	889 1160
History of abortions Yes No	 38 77	 196 1738	 231 1815
History of still birth Yes No	 4 111	 41 1893	 45 2008
Family history of Hypertension Yes No	 8 107	 116 1818	 124 1925
History of maternal hypertension Yes No	 3 112	 91 1843	 94 1955
History of hypertension in previous pregnancy Yes No	 43 72	 118 1816	 161 1888

Type of HDP	**No. Of cases *(among HDP)***	**Incidence**	**Pulmonary oedema (%)**	**Abruptioplacentae**	**PPH (%)**	**ICU admission (%)**
Gestational Hypertension	57(49.5)	2.7	-	-	1	1
Preeclampsia	49(42.6)	2.3	3(6.1%)	9(18.3)	8(16.3)	2(4.0)
Eclampsia	6(5.2)	0.2	3(50%)	2(33.3)	2(33.3)	4(66.6)

Total	115	5.5%	6(5.2)	11(9.5)	11(9.5)	7(6.0)

Maternal Complications

Perinatal Outcomes

Perinatal outcome	Gestational hypertension (%)	Preeclampsia	Eclampsia	Total N
Healthy	38(74.5%)	11(21.5%)	2(3.9%)	51 (44.3%)
Preterm births with RDS	1(0.8%)	3(2.6%)	1(0.8%)	5(4.3%)
Preterm births with FGR	3 (2.6%)	16 (13.9%)	-	19(16.5%)
Preterm births with hypoxia	2(1.7%)	5(4.3%)	-	7 (6.0%)
Term births with FGR	14(12.1%)	3(2.6%)	-	17(14.7%)
Term births with FGR and hypoxia	1(0.8%)	5(4.34%)	-	6(5.2%)
Neonatal death	-	2(1.7%)	2(1.7%)	4(3.4%)

Out of the infants born to mothers with hypertensive pregnancy disorders, 51 (44.3%) showed no complications during the follow-up phase. Preterm births were observed in 20 cases (17.3%), while 36 infants (31.3%) exhibited signs of fetal growth restriction. Neonatal hypoxia was documented in 13 cases (11.3%), and the neonatal mortality rate was 4 (3.4%).

Discussion

All pregnant women diagnosed with hypertensive disorders during the two-year research period (January 2023 to December 2024) were considered for the analysis. The overall prevalence of hypertensive conditions in pregnancy observed in this study was 5.5%. Comparatively, research conducted by Sachdeva et al. reported. reported a much higher incidence of 15% among pregnant women in rural Gujarat. This elevated rate may be due to the hospital-based nature of their study and the fact that, in rural areas, women often seek medical attention only when complications arise or when referred from peripheral health centres.

Existing literature suggests that increased Adequate calcium supplementation during gestation has been linked to a decreased risk of hypertension-related complications. In our cohort, dietary assessments revealed that many women consumed adequate calcium through diet and supplements. This could potentially explain the comparatively lower prevalence of hypertensive disorders observed in our population and serves as supporting local evidence.

While our study did not reveal a statistically significant association between educational attainment and preeclampsia, the results were in line with those reported by Sachdeva et al., who noted a greater occurrence of preeclampsia among educated women. This pattern is consistent with previous studies suggesting that women with a college-level education may face a 19% increased risk of developing preeclampsia or eclampsia.

Our findings revealed a significant correlation between prior occurrences of hypertensive disorders in pregnancy and the likelihood of them recurring. Women with such a history had a significantly higher prevalence of hypertension (37.3%) compared to those without any prior history (5.5%). Logistic regression analysis further revealed that these women were approximately 11 times more likely to develop hypertension during their current pregnancy. Similar findings were reported by Nisar et al. and Tebeu et al., who also found previous hypertensive pregnancy to be a significant risk factor.

Additionally, our study demonstrated a statistically significant association between Pregnancy-related hypertension was found to be linked to a father's history of hypertension, whereas no correlation was detected with maternal history. Logistic regression confirmed paternal hypertension as a significant predictive factor, with an adjusted odds ratio (OR) indicating an approximately eightfold increased risk.

Limitations

The absence of post-delivery follow-up, due to the study's cross-sectional nature, raises the likelihood that a number of chronic hypertension cases were inaccurately recorded as gestational.

Conclusion

The analysis highlights that hypertensive disorders occur in approximately one out of every 18 pregnancies in rural Uttar Pradesh. Awareness of the associated risks could be instrumental in guiding public health initiatives aimed at prevention. Timely detection and appropriate management through consistent antenatal care are crucial in minimizing pregnancy-related hypertensive complications. Hence, there is an urgent need to implement an effective screening program to identify hypertension during pregnancy, along with a comprehensive management plan to address both maternal and neonatal outcomes.

References

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