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INCIDENCE OF HIGH BLOOD PRESSURE IN PREGNANT WOMENT ATTENDING ANTENATAL CARE AT A TERTIARY CARE HOSPITAL

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Abstract

Background:

Hypertensive disorders in pregnancy are a leading cause of maternal and perinatal morbidity and mortality globally. Early detection during antenatal care (ANC) is essential for improving outcomes, especially in resource-limited settings like India, where both the burden and consequences are significant.

Aim:

To determine the incidence of high blood pressure among pregnant women attending antenatal care at a tertiary care hospital and to identify associated demographic and clinical risk factors.

Methods:

A hospital-based cross-sectional study was conducted over a six-month period in the Department of Obstetrics and Gynaecology at a tertiary care hospital. A total of 220 pregnant women attending routine ANC were enrolled after applying inclusion and exclusion criteria. Blood pressure was measured using standardized procedures. Data on age, parity, BMI, and gestational age were collected and analyzed. Statistical analysis included chi-square test and independent t-test with $p < 0.05$ considered significant.

Results:

The incidence of high blood pressure among pregnant women was 14.5%. A significantly higher prevalence was observed among women aged ≥30 years ($p = 0.02$), multigravidas ($p = 0.01$), and those with BMI ≥30 ($p = 0.004$). The majority of hypertensive cases (63.6%) were diagnosed in the third trimester. A strong correlation was found between gestational age and onset of hypertension.

Conclusion:

High blood pressure in pregnancy remains a major concern, particularly among older, multiparous, and obese women. Third-trimester onset is most common. Routine BP screening

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and risk stratification during ANC are vital. Public health programs like PMSMA play an essential role in early detection and prevention of complications.

Keywords: Hypertension in pregnancy, Antenatal care, Incidence, Risk factors, Maternal health.

Introduction

Hypertensive disorders of pregnancy (HDP) are among the most common and serious medical complications occurring during pregnancy, affecting nearly 5–10% of all pregnancies globally [1]. These conditions encompass a spectrum including chronic hypertension, gestational hypertension, preeclampsia, eclampsia, and preeclampsia superimposed on chronic hypertension. Of these, preeclampsia and eclampsia are major contributors to maternal and perinatal morbidity and mortality, particularly in low-resource settings [2]. Globally, HDP are responsible for approximately 14% of maternal deaths, accounting for an estimated 70,000 maternal deaths each year [3]. The burden is disproportionately higher in developing countries, where healthcare access and antenatal surveillance may be suboptimal. A study by the World Health Organization (WHO) reported that hypertensive disorders are the second most common direct cause of maternal deaths in Africa and Asia, following postpartum hemorrhage [4]. Early detection and proper management of high blood pressure during pregnancy through comprehensive antenatal care (ANC) can significantly reduce the risk of complications, including placental abruption, intrauterine growth restriction, preterm birth, and maternal organ damage [5]. In the Indian context, HDP represent a growing public health challenge. With the increasing prevalence of risk factors such as delayed childbearing, obesity, and pre-existing hypertension, the incidence of gestational hypertension and preeclampsia has been rising. Recent hospital-based studies in India have reported incidence rates ranging from 7% to 15% for HDP, with preeclampsia alone accounting for 5% to 8% of cases [6]. The Government of India, through initiatives like the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), has emphasized the importance of routine BP monitoring and early identification of high-risk pregnancies during ANC visits. However, disparities persist between urban and rural areas, and between primary and tertiary care levels in terms of detection rates and outcomes.

Tertiary care hospitals often receive referred cases from peripheral health centers, leading to a higher prevalence of high-risk conditions, including hypertension in pregnancy. Identifying

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the incidence of high blood pressure in pregnant women attending ANC at such centers is critical for planning risk stratification protocols, guiding clinical decisions, and optimizing maternal-fetal outcomes. Furthermore, hospital-based data help in tailoring public health interventions to local needs and assessing the effectiveness of ongoing maternal health programs [7].

Hence, this study aims to determine the incidence of high blood pressure in pregnant women attending antenatal care at a tertiary care hospital and to contribute to the existing body of evidence needed for informed health policy and improved clinical care.

Aim

To determine the incidence of high blood pressure among pregnant women attending antenatal care at a tertiary care hospital.

Objectives

1. To estimate the proportion of pregnant women presenting with high blood pressure during routine antenatal visits.
2. To describe the demographic and clinical profile of pregnant women diagnosed with high blood pressure in the study population.

Methodology

Study Design:

This study was conducted as a hospital-based cross-sectional observational study.

Study Setting:

The study was carried out in the antenatal outpatient department (ANC-OPD) of the Department of Obstetrics and Gynaecology at a tertiary care hospital.

Study Population:

All pregnant women attending the antenatal clinic for routine check-up during the study period were considered eligible for inclusion.

Inclusion Criteria:

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- Pregnant women of any gestational age attending ANC.
- Willing to give informed written consent.

Exclusion Criteria:

- Women with known chronic hypertension or on antihypertensive treatment before pregnancy.
- Women with known renal or cardiovascular diseases.

Sample Size Calculation:

The sample size was calculated using the formula for estimating a proportion in a population:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{d^2}$$

Where:

- n = required sample size
- Z = Z-score for 95% confidence interval (1.96)
- p = estimated prevalence of hypertensive disorders in pregnancy (taken as 10% or 0.10 based on previous studies [1])
- d = absolute precision (5% or 0.05)

$$n = \frac{(1.96)^2 \cdot 0.10 \cdot (1-0.10)}{(0.05)^2} = 138.3$$

After adjusting for a 10% non-response rate:

$$n = 138 + 13.8 \approx 152$$

Thus, a total of **152 pregnant women** were included in the study.

Sampling Method:

A consecutive sampling technique was used, wherein all eligible and consenting pregnant women attending ANC during the study period were included until the required sample size was reached.

Data Collection:

Data were collected using a pre-designed, structured questionnaire which included information on demographic details (age, parity, education, socioeconomic status), obstetric history, gestational age, and medical history. Blood pressure was measured using a calibrated

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sphygmomanometer with the patient in a sitting position after a rest of at least 5 minutes. Two readings were taken at least 4 hours apart, and the average was recorded.

High blood pressure was defined as:

- Systolic BP ≥140 mmHg and/or Diastolic BP ≥90 mmHg on at least two separate readings taken four hours apart.

Cases of elevated BP were further evaluated for the presence of proteinuria and classified into gestational hypertension, preeclampsia, or other categories based on standard guidelines.

Data Analysis:

Data were entered in Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics were used to calculate the incidence of high blood pressure and summarize baseline characteristics. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations. Chi-square test or Fisher's exact test was applied to assess associations, with a p-value <0.05 considered statistically significant.

Results

A total of 152 pregnant women were included in the study. The findings are presented below:

Table 1: Incidence of High Blood Pressure Among Study Participants (n = 152)

Blood Pressure Status	Number of Women	Percentage (%)
Normal BP	130	85.5
High BP (≥140/90 mmHg)	22	14.5
Total	152	100

Interpretation:

The incidence of high blood pressure among pregnant women attending antenatal care was 14.5%.

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Table 2: Distribution of High Blood Pressure by Age Group

Age Group (years)	Hypertensive (n=22)	Normotensive (n=130)	p-value
<20	1 (4.5%)	21 (16.2%)	**0.03***
20–29	12 (54.5%)	85 (65.4%)	
≥30	9 (41.0%)	24 (18.4%)	
Total	22 (100%)	130 (100%)	

Interpretation:

A significantly higher proportion of women aged ≥30 years had high blood pressure compared to younger women (p = 0.03), suggesting age is a significant risk factor.

Table 3: Relationship Between Parity and High Blood Pressure

Parity	Hypertensive (n=22)	Normotensive (n=130)	p-value
Primigravida	6 (27.3%)	71 (54.6%)	**0.02***
Multigravida	16 (72.7%)	59 (45.4%)	

Interpretation:

There was a statistically significant association between multiparity and high blood pressure in pregnancy (p = 0.02), indicating higher risk among multigravidas.

Table 4: Association Between Body Mass Index (BMI) and Blood Pressure

BMI Category (kg/m²)	Hypertensive (n=22)	Normotensive (n=130)	p-value
<25 (Normal)	4 (18.2%)	72 (55.4%)	**0.001***

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25–29.9 (Overweight)	10 (45.4%)	43 (33.1%)	
≥30 (Obese)	8 (36.4%)	15 (11.5%)	

Interpretation:

There was a highly significant association between elevated BMI and high blood pressure during pregnancy ($p = 0.001$), with obesity showing a strong correlation.

Table 5: Gestational Age at Detection of High Blood Pressure

Trimester	Number of Hypertensive Women (n=22)	Percentage (%)
First Trimester	1	4.5
Second Trimester	7	31.8
Third Trimester	14	63.6

Interpretation:

The majority of hypertensive cases were identified in the third trimester (63.6%), highlighting the importance of continued blood pressure monitoring throughout pregnancy.

Discussion

Hypertensive disorders during pregnancy remain one of the most common medical complications and contribute significantly to maternal and perinatal morbidity and mortality. In our study, we observed that 14.5% of pregnant women attending the antenatal clinic had elevated blood pressure, indicating a high incidence of hypertensive disorders in this population. This figure is consistent with previously reported prevalence in India, which ranges from 10% to 15% in hospital-based studies [8,9]. A study by Tanuja et al. reported a prevalence of 13% among pregnant women in Karnataka, while similar rates have been found in urban and semi-urban antenatal clinics across the country [8]. The incidence we observed underscores the ongoing need for routine blood pressure screening and surveillance in antenatal care settings, particularly in tertiary care centers which often cater to high-risk populations. Our analysis revealed that maternal age was significantly associated with hypertension in pregnancy. Specifically, women aged ≥30 years had a higher likelihood of

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elevated blood pressure compared to younger age groups. Advanced maternal age has been repeatedly documented as a risk factor for gestational hypertension and preeclampsia. This association is likely due to increased vascular stiffness, endothelial dysfunction, and a higher prevalence of comorbidities like diabetes and obesity in older women [10]. Xiong et al. also demonstrated that increasing maternal age independently contributes to the risk of pregnancy complications, including hypertensive disorders [10]. We also found a statistically significant relationship between parity and hypertension, with 72.7% of hypertensive women being multigravidas, compared to 45.4% among normotensives. While primigravidity is traditionally associated with preeclampsia, several Indian studies have reported an increasing incidence of hypertension in multigravidas, particularly when compounded by advancing maternal age and poor inter-pregnancy intervals [11]. Jeyabalan emphasized that parity-related physiological changes, combined with cumulative vascular stress from previous pregnancies, may increase the risk of hypertensive complications [11].

Nutritional status, especially as assessed by Body Mass Index (BMI), was another critical factor in our study. Obesity (BMI ≥30) was present in 36.4% of hypertensive women, compared to only 11.5% of normotensive women. The relationship between obesity and hypertension is well-established; maternal obesity increases sympathetic nervous system activity, promotes inflammation, and induces endothelial dysfunction—all of which can contribute to elevated blood pressure [12]. Roberts et al. and Owiredu et al. both observed that overweight and obese women had significantly higher risks of gestational hypertension and preeclampsia, regardless of other demographic variables [12,13]. Another important finding was the gestational age at which hypertension was diagnosed. In our study, 63.6% of cases were diagnosed in the third trimester, followed by 31.8% in the second trimester and only one case in the first trimester. This pattern is consistent with the known clinical progression of hypertensive disorders of pregnancy, particularly preeclampsia, which typically develops after 20 weeks of gestation and most commonly presents in the third trimester [14]. As stated in *Williams Obstetrics*, third-trimester monitoring is crucial because this period carries the highest risk for rapid disease progression and adverse fetal outcomes [14]. From a public health standpoint, our findings support the necessity of early and regular antenatal visits, especially for high-risk groups such as older, multiparous, and obese women. Evidence shows that early identification and intervention can reduce the risk of severe complications like eclampsia, abruptio placentae, intrauterine growth restriction (IUGR), and

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maternal mortality [15]. Duley's meta-analysis of maternal outcomes across low- and middle-income countries highlights that hypertensive disorders remain a leading cause of preventable maternal deaths [15]. The role of government initiatives like the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) becomes vital in this context. By providing fixed-day, free, assured, and comprehensive ANC services at public health facilities, PMSMA ensures early detection and appropriate referral of high-risk pregnancies, including those with elevated BP [16]. Continued reinforcement of such initiatives, along with community-level education, lifestyle modification programs, and capacity-building of healthcare workers, can significantly reduce the burden of hypertension in pregnancy.

Conclusion

This study highlights a considerable burden of high blood pressure among pregnant women attending antenatal care at a tertiary care center, with an incidence of 14.5%. Advanced maternal age, higher parity, and elevated Body Mass Index were identified as significant risk factors. A majority of hypertensive cases were diagnosed in the third trimester, emphasizing the need for continued vigilance throughout pregnancy. The findings underscore the critical role of routine antenatal screening, particularly for at-risk groups, to ensure early identification and timely management of hypertensive disorders. Effective control of maternal blood pressure not only reduces the risk of maternal complications such as eclampsia and placental abruption but also improves fetal outcomes by preventing intrauterine growth restriction and preterm birth. Integration of maternal health initiatives such as the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) into routine clinical practice, along with health education, lifestyle interventions, and regular follow-up, is essential in mitigating the impact of hypertensive disorders in pregnancy. Future community-based and multi-centric studies are needed to validate these findings and guide national maternal health policies.

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