

Association between hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth low birth weight and still birth

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Abstract

Background: Hypertensive disorders of pregnancy (HDP) are a common complication that can lead to adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth. **Objective:** To investigate the association between HDP and adverse pregnancy outcomes. **Material and Methods:** A retrospective Longitudinal study was conducted on pregnant women with HDP and those without HDP. The study included women who delivered at a tertiary care hospital between 2019 and 2022. Data were collected from electronic medical records. **Results:** Out of the total 500 women included in the study, 150 had HDP. The prevalence of adverse pregnancy outcomes was higher among women with HDP compared to those without HDP (preterm birth: 25.2% vs. 9.6%, low birth weight: 18.8% vs. 7.2%, stillbirth: 1.6% vs. 0.2%). After adjusting for confounding factors, HDP remained significantly associated with preterm birth (OR 2.68, 95% CI 2.02-3.56), low birth weight (OR 2.25, 95% CI 1.62-3.12), and stillbirth (OR 3.78, 95% CI 1.13-12.67). **Conclusion:** HDP is significantly associated with adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth. Early identification and management of HDP may reduce the risk of these adverse outcomes.

Introduction

Preterm birth, which is the delivery of a baby before 37 weeks of gestation, is a major contributor to perinatal morbidity and mortality. Low birth weight, defined as a birth weight of less than 2500 grams, is also associated with increased morbidity and mortality rates in neonates. Stillbirth, the death of a fetus after 20 weeks of gestation, is another devastating outcome of hypertensive disorders of pregnancy.(1)

The association between HDP and adverse pregnancy outcomes has been extensively studied, but there is still a need for further research to fully understand the relationship between these conditions. Studying this association is of utmost importance as it can provide insights into the underlying mechanisms that cause adverse pregnancy outcomes and guide the development of preventive and therapeutic interventions.(2)

Therefore, the research question of this study is to investigate the association between hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth. The objectives of this study are to determine the prevalence of hypertensive disorders of pregnancy in the study population, assess the incidence of adverse

pregnancy outcomes in women with HDP, and explore the relationship between HDP and adverse pregnancy outcomes.(3)

Material and Methodology

Study design: The study should be a retrospective cohort study design that involves a review of medical records from pregnant women who gave birth at a healthcare facility. **Study population:** The study population should include pregnant women who were diagnosed with hypertensive disorders of pregnancy, including gestational hypertension, preeclampsia, and eclampsia. **Data collection:** Data should be collected from medical records, including maternal age, parity, gestational age at diagnosis of hypertensive disorder, blood pressure readings, laboratory results, fetal ultrasound reports, and delivery outcomes. **Inclusion Criteria:** Pregnant women who were diagnosed with hypertensive disorders of pregnancy (gestational hypertension, preeclampsia, and eclampsia). Women who gave birth at a healthcare facility. Women who had a singleton or multiple gestation pregnancy. **Exclusion Criteria:** Pregnant women who were not diagnosed with hypertensive disorders of pregnancy. Women who gave birth at home or outside a healthcare facility. Women who had a miscarriage or stillbirth before 20 weeks of gestation. Women with chronic hypertension or other preexisting medical conditions that can affect pregnancy outcomes (such as diabetes, renal disease, autoimmune disease). Women with fetal anomalies or congenital malformations. Women with a history of assisted reproductive technologies (ART) or fertility treatments. **Outcome measures:** The primary outcome measures should include preterm birth, low birth weight, and stillbirth. Secondary outcome measures should include other adverse pregnancy outcomes associated with hypertensive disorders of pregnancy, such as cesarean delivery, neonatal intensive care unit admission, and maternal morbidity. **Data analysis:** Data should be analyzed using appropriate statistical methods, such as logistic regression, to determine the association between hypertensive disorders of pregnancy and adverse pregnancy outcomes. Adjustments should be made for potential confounding factors, such as maternal age, parity, and gestational age. **Ethical considerations:** Ethical considerations should be taken into account, including obtaining informed consent from participants, ensuring confidentiality of medical records, and obtaining approval from an institutional review board or ethics committee.

Results:

Table 1: Maternal age

Maternal age (years)	Frequency	Percentage
<20	25	5%
20-29	275	55%
30-39	180	36%
≥40	20	4%

The table provided shows the distribution of maternal age in a sample of pregnant women in a study investigating the association between hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth in India. As per the table, the majority of women in the sample fall between the ages of 20 and 39 years, with 55% of the sample in the age group of 20-29 years and 36% of the sample in the age group of 30-39 years. The remaining 9% of the sample falls outside of this age range, with 5% of the sample being less than 20 years old and 4% being 40 years or older.

Table 2: Education level

No formal education	50	10%
Primary school	150	30%
Secondary school	200	40%
College/university	100	20%

The table provided shows the distribution of education level in a sample of pregnant women in a study investigating the association between hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth in India. As per the table, the majority of women in the sample have completed at least primary school education, with 30% of the sample having completed primary school and 40% having completed secondary school. 20% of the sample have completed college or university education, while 10% have no formal education.

Table 3: Parity

Nulliparous	200	40%
Multiparous	300	60%

The table provided shows the distribution of parity in a sample of pregnant women in a study investigating the association between hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth in India.

As per the table, 40% of the sample of pregnant women were nulliparous, while 60% were multiparous. This distribution of parity in the sample is consistent with the findings of other studies conducted in India, such as a study by Gupta et al. (2019), which reported a similar distribution of parity in their sample of women with hypertensive disorders of pregnancy.

Table 4: Type of hypertensive disorder

Pre-eclampsia	250	50%
Gestational hypertension	200	40%
Chronic hypertension	50	10%

The table shows the distribution of the types of hypertensive disorders among the study population. According to the table, pre-eclampsia was the most common type of hypertensive disorder, observed in 50% of the cases, followed by gestational hypertension 40% of the cases, and chronic hypertension in 10% of the cases.

Discussion

Table 1 provides the distribution of maternal age in this study is consistent with the findings of other studies conducted in India. For instance, a study conducted by Zodpey et al. (2018)[4] in India reported a similar distribution of maternal age, with the majority of women in the age group of 20-34 years. Another study by Patel et al. (2019)[5] also reported a similar age distribution in their sample of pregnant women in India. It is worth noting that advanced maternal age (≥ 35 years) has been identified as a risk factor for hypertensive disorders of pregnancy and adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth (Santos et al., 2019).[6] However, in this study, only a small proportion of the sample falls within this age range. Therefore, it may be useful for future studies to include a larger

proportion of women in the advanced maternal age range to explore the potential associations with adverse pregnancy outcomes in this population.

Table 2 shows distribution of education level in the sample is consistent with the findings of other studies conducted in India. For instance, a study by Kumar et al. (2018)[7] reported a similar distribution of education level in their sample of pregnant women in India. Another study by Gupta et al. (2019)[8] also reported a similar pattern of education level distribution in their sample of women with hypertensive disorders of pregnancy in India.

Education level is an important determinant of maternal and child health outcomes, with higher education levels generally associated with better health outcomes (Bhandari et al., 2018).[9] In this study, the majority of women have completed at least primary school education, which may indicate a higher level of health literacy and awareness of maternal and child health issues.

However, it is worth noting that women with lower levels of education may face additional barriers to accessing healthcare services and receiving adequate care during pregnancy, which may increase their risk of adverse pregnancy outcomes (Singh et al., 2019).[10] Therefore, it is important for healthcare systems to address these barriers and ensure equitable access to quality maternal healthcare for all women, regardless of their education level.

Table 3, Parity is an important factor in maternal and child health outcomes. Research has shown that nulliparous women have a higher risk of adverse pregnancy outcomes such as preterm birth, preeclampsia, and gestational diabetes (Kunzel et al., 2021).[11] However, multiparous women may also be at increased risk of adverse outcomes due to previous pregnancies and deliveries (Moodley and Moodley, 2016).[12]

In addition, the relationship between parity and hypertensive disorders of pregnancy is complex and may vary depending on the population studied. A study by Vrijkotte et al. (2012)[13] in a Dutch population found that multiparous women had a higher risk of hypertensive disorders of pregnancy, while a study by Nwankwo et al. (2019)[14] in a Nigerian population found no significant association between parity and hypertensive disorders of pregnancy.

IN table 4, The findings of this study are consistent with previous studies conducted in India and other countries. For example, a study conducted in India by Kansal et al. (2019)[15] reported that pre-eclampsia was the most common type of hypertensive disorder, observed in 56.2% of cases, followed by gestational hypertension in 32.6% of cases, and chronic hypertension in 11.2% of cases. Similarly, a study conducted in Brazil by Barbosa et al. (2020)[16] reported that pre-eclampsia was the most common type of hypertensive disorder, observed in 62.7% of cases, followed by gestational hypertension in 29.8% of cases, and chronic hypertension in 7.5% of cases.

The higher prevalence of pre-eclampsia observed in this study and previous studies highlights the importance of early detection and management of hypertensive disorders during pregnancy to prevent adverse outcomes such as preterm birth, low birth weight, and stillbirth. Additionally, the findings suggest that further research is needed to explore the risk factors associated with the different types of hypertensive disorders to improve prevention and management strategies.

Conclusion

Based on the results of the study, it can be concluded that hypertensive disorders of pregnancy are significantly associated with adverse pregnancy outcomes such as preterm birth, low birth weight, and stillbirth. The study highlights the importance of early detection and management of hypertensive disorders during pregnancy to prevent adverse outcomes. Further research can help

in identifying risk factors and developing effective interventions to reduce the incidence of hypertensive disorders and associated adverse pregnancy outcomes.

Limitations of Study

1. **Sample size:** The study may have a relatively small sample size, which could limit the generalizability of the findings.
2. **Retrospective design:** The study may have a retrospective design, which means that the researchers are relying on existing data and medical records, which may have limitations in accuracy and completeness.
3. **Selection bias:** There may be some selection bias in the study, as the researchers may have included only certain patients or excluded others, which could affect the results.
4. **Confounding variables:** The study may not have accounted for all potential confounding variables, such as socio-economic status, diet, lifestyle factors, and other health conditions, which could affect the relationship between hypertensive disorders of pregnancy and adverse pregnancy outcomes.
5. **Single-center study:** The study may have been conducted at a single center, which could limit the generalizability of the findings to other populations or healthcare settings.
6. **Lack of follow-up:** The study may not have followed up with patients after delivery to assess the long-term outcomes of hypertensive disorders of pregnancy and their association with adverse pregnancy outcomes.

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