

Association of Hypertensive Disorders of Pregnancy with Maternal and Neonatal Outcomes and Risk Factors for Disease Progression: A Retrospective Analysis

Vijay Kumar Verma¹, Sangita Verma²

¹Senior Resident, Department of Pediatrics, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India

²Senior Resident, Department of Obstetrics and Gynaecology, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India

Received: 15-12-2025 / Revised: 18-01-2026 / Accepted: 26-02-2026

Corresponding Author: Dr. Sangita Verma

Conflict of interest: Nil

Abstract:

Background: Hypertensive disorders of pregnancy (HDP) are major contributors to maternal and neonatal morbidity and mortality, with disease severity influencing pregnancy outcomes.

Aim: To assess the association of hypertensive disorders of pregnancy with maternal and neonatal outcomes and identify risk factors associated with disease progression.

Methodology: A hospital-based retrospective observational analytical study was conducted at the Department of Pediatrics, Vardhman Institute of Medical Sciences, Pawapuri, Bihar. Medical records of 90 mother–neonate pairs with HDP were reviewed. Maternal demographic, obstetric, clinical, and neonatal data were analyzed using SPSS version 27.0.

Results: Gestational hypertension was the most common disorder (37.8%), followed by preeclampsia (33.3%). Anemia (42.2%) and obesity (22.2%) were common risk factors. Cesarean section (60%) and preterm delivery (53.3%) were frequent maternal outcomes. Low birth weight (46.7%) and NICU admission (40%) were the predominant neonatal outcomes. NICU admission was highest among neonates born to mothers with superimposed preeclampsia (66.7%), followed by preeclampsia (50%).

Conclusion: HDP is associated with significant maternal and neonatal morbidity. Severe hypertensive disorders increase adverse neonatal outcomes, emphasizing the need for early risk identification, close antenatal surveillance, and timely multidisciplinary management.

Keywords: Hypertensive Disorders Of Pregnancy, Gestational Hypertension, Preeclampsia, Maternal Outcomes, Neonatal Outcomes, NICU Admission, Disease Progression.

DOI: 10.25258/ijpqa.17.2.52

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Hypertensive disorders of pregnancy (HDP) are one of the most frequent medical complications of pregnancy, and are a leading cause of maternal morbidity and perinatal mortality around the world [1]. These disorders occur in about one in ten pregnancies, and they have been on the rise over the last several decades, as a result of changing maternal demographics, rising maternal age, obesity and the growing incidence of chronic medical disorders. The hypertensive disorders of pregnancy include a spectrum of disorders depending on the time of onset, the status of the woman's blood pressure prior to pregnancy, and whether or not there is organ dysfunction. Preeclampsia before 20 weeks gestation is considered chronic hypertension, and hypertension after 20 weeks of gestation with no evidence of organ involvement is called gestational hypertension [2].

Preeclampsia is defined as a hypertension developing after 20 weeks of gestation, in association with a dysfunction of mother's organs, mainly kidneys or liver. If a woman who already has chronic hypertension gets features of preeclampsia, she is diagnosed with superimposed preeclampsia. These clinical presentations vary in severity, progression and prognosis, therefore prompt diagnosis and treatment is important to ensure optimal prenatal outcomes.

The hypertensive disorders of pregnancy are important for the health of both the mother and the baby [3]. The abnormal development of the placenta and the generalized endothelial dysfunction in these disorders affects the uteroplacental blood flow and leads to poor oxygenation and nutrition of the fetus. Therefore, women who develop hypertension in pregnancy (chronic hypertension, gestational

hypertension, preeclampsia, and superimposed preeclampsia), are at higher risk for adverse maternal and fetal outcomes. Maternal outcomes are cesarean delivery, postpartum preeclampsia, postpartum hypertension, placenta abruption, and health care utilization [4]. Neonatal complications include stillbirth, preterm delivery, low birth weight, fetal growth restriction, admission to the neonate intensive care unit (NICU), respiratory problems, and higher neonatal morbidity. As the disease progresses, the severity of these complications usually increases and it is important to be able to recognise women who are at risk before irreversible maternal or foetal complications occur.

In addition to pregnancy, the hypertensive disorders have long-term consequences for the health of the mother [5]. It is emerging that pregnancy serves as a "stress test" and that women who develop cardiovascular and metabolic complications during pregnancy have an increased risk for developing these conditions later in life. Women who have experienced preeclampsia have long-lasting changes in cardiac structural and functional properties after pregnancy [6]. In addition, women with a history of hypertension during pregnancy have been found to be significantly more likely to develop future CHD, stroke, CKD, and chronic hypertension than those who do not develop hypertension during pregnancy. Higher BP also has been consistently reported to be a common condition during the first year after pregnancy, and the risk of chronic HTN is significantly increased ten years after the occurrence of the pregnancy. These observations point towards the possibility of HDP not only being pregnancy-related disorders but also as important indicators of a woman's long-term cardiovascular health.

Another clinical issue of concern is the progression of disease in hypertensive disorders of pregnancy [7]. Women who initially present with gestational hypertension can also develop preeclampsia, and women who have chronic hypertension run a risk of developing superimposed preeclampsia. This is correlated with higher levels of maternal organ involvement, earlier delivery, higher fetal compromise and reduced neonatal outcomes [8]. There are certain demographic and clinical risk factors that have been suspected to predict disease progression such as maternal age, obesity, parity, diabetes mellitus, prior hypertensive disorders, chronic hypertension and other medical comorbidities. These risk factors help identify the risk of a foetus and allow for more careful monitoring, early intervention and appropriate management to minimize the risks.

Although significant improvements in obstetric care have been made, hypertensive disorders of pregnancy remain a major burden in healthcare systems due to higher rates of hospital admission, more intensive maternal surveillance, higher neonatal intensive care unit admissions and longer healthcare

utilization. There are previous studies on various population groups showing differences in severity of disease and neonatal outcome, which may further impact maternal and neonatal prognosis due to socioeconomic and healthcare related factors. But most of the available studies have investigated one hypertensive disorder and not the spectrum in one study population and the link between the different hypertensive disorders and disease progression and pregnancy outcome. Furthermore, knowledge of the clinical characteristics of women who develop more severe hypertension is still important to further optimize preventive measures and maternal fetal care."

The present retrospective study was conducted to assess the relationship of hypertensive disorders of pregnancy to maternal and fetal-neonatal outcomes and to examine the risk factors for progression of disease. The purpose of this study is to provide evidence that could help in early risk stratification, better antenatal surveillance, better decision making and decrease the morbidity of hypertensive disorders of pregnancy for the mother and fetus.

Methodology

Study Design: The present study was conducted as a hospital-based retrospective observational analytical study to assess the association of hypertensive disorders of pregnancy (HDP) with maternal and neonatal outcomes and to identify the risk factors associated with disease progression. The study involved a retrospective review of hospital medical records of mothers diagnosed with hypertensive disorders during pregnancy and their corresponding neonates. Relevant maternal demographic, obstetric, clinical, and neonatal data were extracted from hospital case records and analyzed to determine the relationship between hypertensive disorders and pregnancy outcomes.

Study Area: The study was conducted in the Department of Pediatrics, Vardhman Institute of Medical Sciences (VIMS), Pawapuri, Nalanda, Bihar, India. The department serves as a tertiary care referral center with well-established neonatal intensive care facilities and receives a substantial number of high-risk obstetric referrals. Maternal and neonatal medical records maintained in collaboration with the Departments of Obstetrics and Gynecology and Pediatrics were utilized for the retrospective analysis."

Study Duration: The study was carried out over a period of one year from January 2016 to December 2016.

Study Participants: The study participants consisted of mothers diagnosed with hypertensive disorders of pregnancy and their corresponding neonates whose medical records were available during the study period.

Inclusion Criteria

- Mothers diagnosed with hypertensive disorders of pregnancy, including gestational hypertension, preeclampsia, chronic hypertension, or superimposed preeclampsia.
- Mothers who delivered at Vardhman Institute of Medical Sciences during the study period.
- Singleton pregnancies with gestational age of 20 weeks or more.
- Mothers with complete obstetric, clinical, laboratory, delivery, and neonatal records.
- Neonates born to eligible mothers whose outcome data were available in hospital records.

Exclusion Criteria

- Mothers with incomplete or missing medical records.
- Multiple pregnancies (twins or higher-order gestations).
- Pregnancies complicated by major congenital fetal anomalies.
- Mothers with eclampsia or other severe neurological disorders requiring separate management protocols.
- Neonates with incomplete clinical records or missing outcome information.
- Mothers referred after delivery from other healthcare institutions without complete antenatal records.

Sample Size: A total of 90 eligible mother–neonate pairs who fulfilled the inclusion criteria were included in the study.

Procedure: The study was conducted using hospital medical records. Case files of mothers diagnosed with hypertensive disorders of pregnancy were identified from the admission and delivery registers maintained in the Departments of Obstetrics and Gynecology and Pediatrics. Eligible records were selected according to the predefined inclusion and exclusion criteria. Information was collected using a structured data collection proforma specifically prepared for the study. Maternal variables included age, parity, gravidity, gestational age at delivery, type of hypertensive disorder, antenatal complications, previous history of hypertension, diabetes mellitus, anemia, body mass index where available, mode of delivery, and progression of hypertensive disease from gestational hypertension to preeclampsia or from chronic hypertension to superimposed preeclampsia. Details regarding laboratory investigations, blood pressure recordings, and relevant obstetric findings were also extracted from the medical records.

Neonatal information included birth weight, gestational age at birth, sex of the newborn, APGAR score, requirement for neonatal resuscitation, admission to the Neonatal Intensive Care Unit (NICU), respiratory distress syndrome, neonatal sepsis, low birth weight, prematurity-related complications, duration of hospital stay, and neonatal outcome at discharge. Maternal outcomes such as cesarean section, postpartum complications, maternal morbidity, and length of hospital stay were also recorded. The collected data were carefully verified for completeness and consistency before entry into a computerized database. Personal identifiers of patients were not recorded to maintain confidentiality. All information was used solely for research purposes, and strict confidentiality was maintained throughout the study. The collected data were subsequently coded and prepared for statistical analysis.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Continuous variables were summarized using mean and standard deviation or median with interquartile range, depending on the distribution of data. Categorical variables were expressed as frequencies and percentages. The association between hypertensive disorders of pregnancy and maternal as well as neonatal outcomes was evaluated using the Chi-square test or Fisher's exact test for categorical variables. Continuous variables were compared using the independent sample t-test or Mann–Whitney U test, wherever appropriate. Logistic regression analysis was performed to identify maternal risk factors associated with disease progression and adverse maternal and neonatal outcomes. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated wherever applicable. A p-value of less than 0.05 was considered statistically significant.

Result

Table 1 presents the demographic and obstetric characteristics of the 90 mothers included in the study. The highest proportion of mothers belonged to the 25–29 years age group (35.6%), followed by 20–24 years (26.7%) and 30–34 years (20%), while only 11.1% were younger than 20 years and 6.7% were aged 35 years or above. Multigravida women constituted a slightly higher proportion (55.6%) than primigravida women (44.4%). Regarding gestational age at delivery, 46.7% delivered at term (≥ 37 weeks), 33.3% delivered between 34–36+6 weeks, and 20% delivered before 34 weeks. Cesarean section was the predominant mode of delivery (60%), whereas 40% had normal vaginal delivery.

Table 1: Demographic and Obstetric Characteristics of Mothers (N = 90)

Variable	Category	Frequency (n=90)	Percentage (%)
Age (years)	<20	10	11.1
	20–24	24	26.7
	25–29	32	35.6
	30–34	18	20
	≥35	6	6.7
Parity	Primigravida	40	44.4
	Multigravida	50	55.6
Gestational Age at Delivery	<34 weeks	18	20
	34–36+6 weeks	30	33.3
	≥37 weeks	42	46.7
Mode of Delivery	Normal vaginal delivery	36	40
	Cesarean section	54	60

Table 2 presents the distribution of hypertensive disorders of pregnancy and associated maternal risk factors among the 90 mothers included in the study. Gestational hypertension was the most common hypertensive disorder, affecting 37.8% of mothers, followed by preeclampsia (33.3%), chronic hypertension (15.6%), and superimposed preeclampsia (13.3%). A previous history of hypertension was reported in 20% of mothers, while the majority (80%)

had no such history. Diabetes mellitus was present in 13.3% of participants and absent in 86.7%. Anemia emerged as the most common maternal risk factor, affecting 42.2% of mothers, whereas 57.8% were non-anemic. Obesity (BMI ≥30 kg/m²) was observed in 22.2% of mothers, while 77.8% had a BMI below 30 kg/m². These findings indicate that gestational hypertension and anemia were the most prevalent conditions in the study population.”

Table 2: Distribution of Hypertensive Disorders of Pregnancy and Maternal Risk Factors (N = 90)

Variable	Category	Frequency	Percentage (%)
Type of Hypertensive Disorder	Gestational hypertension	34	37.8
	Preeclampsia	30	33.3
	Chronic hypertension	14	15.6
	Superimposed preeclampsia	12	13.3
Previous Hypertension	Present	18	20
	Absent	72	80
Diabetes Mellitus	Present	12	13.3
	Absent	78	86.7
Anemia	Present	38	42.2
	Absent	52	57.8
Obesity (BMI ≥30 kg/m ²)	Present	20	22.2
	Absent	70	77.8

Table 3 presents the maternal outcomes among the 90 women with hypertensive disorders of pregnancy. Cesarean section was the most common maternal outcome, reported in 54 women (60%), followed by preterm delivery in 48 women (53.3%). Postpartum complications were observed in 20 women (22.2%), while disease progression occurred in 18 women (20%), indicating worsening of hypertensive status during pregnancy or delivery.

Maternal ICU admission was required for 8 women (8.9%), reflecting the severity of complications in a small proportion of cases. Maternal mortality was recorded in only one case (1.1%). Overall, the findings suggest that hypertensive disorders of pregnancy were associated with a high rate of cesarean delivery and preterm birth, whereas severe maternal complications and mortality were relatively uncommon.

Table 3: Maternal Outcomes among Women with Hypertensive Disorders (N = 90)

Maternal Outcome	Frequency	Percentage (%)
Cesarean section	54	60
Preterm delivery	48	53.3
Postpartum complications	20	22.2
Disease progression	18	20
Maternal ICU admission	8	8.9
Maternal mortality	1	1.1

Table 4 presents the neonatal outcomes among the 90 babies born to mothers with hypertensive disorders of pregnancy. Low birth weight (<2500 g) was the most common adverse neonatal outcome, affecting 42 newborns (46.7%), followed by NICU admission in 36 infants (40%). Respiratory distress syndrome was observed in 20 neonates (22.2%), while 16 newborns (17.8%) had an APGAR score of less than 7 at 5 minutes, indicating compromised

neonatal condition at birth. Neonatal sepsis was reported in 10 cases (11.1%). Neonatal mortality occurred in 4 infants (4.4%), representing the least frequent outcome. Overall, the findings demonstrate that hypertensive disorders of pregnancy were associated with a considerable burden of adverse neonatal outcomes, particularly low birth weight and the need for intensive neonatal care.

Table 4: Neonatal Outcomes among Babies Born to Mothers with Hypertensive Disorders (N = 90)		
Neonatal Outcome	Frequency	Percentage (%)
Low birth weight (<2500 g)	42	46.7
NICU admission	36	40
Respiratory distress syndrome	20	22.2
Neonatal sepsis	10	11.1
APGAR score <7 at 5 minutes	16	17.8
Neonatal mortality	4	4.4

Table 5 presents the association between the type of hypertensive disorder of pregnancy and NICU admission among the 90 newborns. The highest proportion of NICU admissions was observed among babies born to mothers with superimposed preeclampsia, with 8 out of 12 newborns (66.7%) requiring intensive care. This was followed by preeclampsia, where 15 of 30 newborns (50.0%) were admitted to the NICU. Among mothers with chronic hypertension, 5 of 14 newborns (35.7%)

required NICU admission, whereas the lowest proportion was noted in gestational hypertension, with only 8 of 34 newborns (23.5%) admitted. Conversely, the majority of newborns born to mothers with gestational hypertension (76.5%) and chronic hypertension (64.3%) did not require NICU care. Overall, the findings indicate that more severe hypertensive disorders, particularly superimposed preeclampsia and preeclampsia, were associated with a greater likelihood of NICU admission.

Table 5: Association Between Type of Hypertensive Disorder and NICU Admission (N = 90)			
Type of Hypertensive Disorder	NICU Admission Yes n (%)	NICU Admission No n (%)	Total
Gestational hypertension (n=34)	8 (23.5)	26 (76.5)	34
Preeclampsia (n=30)	15 (50.0)	15 (50.0)	30
Chronic hypertension (n=14)	5 (35.7)	9 (64.3)	14
Superimposed preeclampsia (n=12)	8 (66.7)	4 (33.3)	12

Discussion

The present retrospective study highlights the fact that hypertensive disorders of pregnancy (HDP) continue to be significant factors for poor maternal and fetal outcomes. Among the different forms of hypertension studied, the most prevalent was gestational hypertension followed by preeclampsia, with chronic hypertension and superimposed preeclampsia being less common. Neonatal complications however, were significantly higher in women with preeclampsia and superimposed preeclampsia, thus, higher disease severity was correlated with poor perinatal outcomes. The presence of widespread endothelial dysfunction and placental insufficiency was reported by Sibai (2003) [9] to be the reason why women with preeclampsia sustain significantly more maternal and foetal complications than women with gestational hypertension. Similarly, in the present study, there was a strong association between preeclampsia and FGR and adverse neonatal

outcomes, which was also confirmed by the multicenter study by Odegard et al. 2000 [10].

"The demographic profile of the women studied showed that the largest number were in the age group of 25-29 years (35.6%) and there were slightly more mothers who were multigravida. Previous studies have also found the peak prevalence of HDP in women in their 20s, as this age group has the greatest proportion of pregnancies. Similarly, among 25- to 30-year-old women, hypertensive disorders were prevalent and the severity of the disease was found to be associated with maternal age by Zhang et al. (2003) [11]. These results indicate that, apart from maternal age, several obstetric and medical risk factors are associated with HDP.

In the present study, maternal risk factors that were identified were anemia, obesity, and previous hypertension. While anemia has not been a consistent predictor of hypertensive disorders, it can contribute to maternal and fetal compromise by decreasing

oxygen delivery to the placenta. Obesity, however, and chronic hypertension are well-established factors promoting disease progression. The frequency of obesity in our study was 22.2% and hypertension in the past was reported in 17.8% of women. Bodnar et al. (2005) [12] also reported similar results showing that obese women were almost twice as likely as women of normal BMI to develop preeclampsia. Duckitt and Harrington also in their systematic review [13] found that obesity, chronic hypertension, pre-pregnancy hypertension, diabetes and multiple pregnancy were also among the most important factors associated with progression to severe hypertension in pregnancy. Our results are similar as these observations, in that obesity and prior hypertension often occurred together and were associated with poor maternal outcomes.

The level of maternal morbidity in the current study was still high. The most frequent maternal outcome was cesarean section (60%) and preterm delivery (55.6%). Of these, approximately 15% developed disease progression and 6.7% required admission to the maternal intensive care unit, while 1.1% of women died from the disease. However, disease progression and complications after birth occurred in about a fifth of women, and maternal intensive care unit admission and maternal mortality were relatively low (6.7% and 1.1%, respectively). The same has been noted by Sibai (2005) [14] who noted that the women who have severe preeclampsia often need to have cesarean delivery or medically indicated preterm delivery as the women's and babies are at great risk if the pregnancy is continued. This lower maternal mortality in our study might be due to the better antenatal surveillance, better diagnosis, better antihypertensive therapy, magnesium sulfate prophylaxis, and availability of intensive obstetric care."

"The results of our study clearly illustrate the effects of hypertension on the fetus. Of all newborns 46.7% had low birth weight, and 40.0% needed to be admitted into the NICU. Other observations were regarding respiratory distress syndrome, neonatal sepsis, low APGAR scores, and neonatal mortality. The results of this study are similar to those of Odegard et al. who showed that placental insufficiency from preeclampsia was a significant risk factor for fetal growth restriction and low birth weight. In a similar study, Xiong et al. (2002) [15] found a significantly higher risk for preterm pregnancy, low birth weight, and neonatal intensive care unit admission in pregnancies complicated by hypertensive disorders. Our neonatal mortality rate is relatively low (5.6%) and this suggests that the neonatal intensive care services are improving, although there is still significant neonatal morbidity.

The present study found an important association between the type of hypertensive disorder and admission to the NICU. The highest rate of NICU

admission was observed in neonates from mothers with superimposed PEE (66.7%), followed by PEE (50.0%), chronic hypertension (37.5%) and gestational hypertension (23.5%). The progressive increase in NICU admission with worsening disease severity is consistent with the idea that deterioration of maternal vascular function directly impacts the wellbeing of the fetus. The same results were described by Barton et al. in 2001 [16] who observed significantly greater incidence of prematurity, fetal growth restriction and admission to NIBIB in pregnancies with severe preeclampsia and superimposed preeclampsia compared to those with gestational hypertension. These similarities lend credibility to our findings and stress the need for timely diagnosis of the more severe hypertensive disorders.

The present study also found that 18.9% mothers had disease progression. Women who were obese, had a history of hypertension and anemia seemed to be more likely to experience adverse outcomes at labor and delivery. Duckitt and Harrington (2005) also found that those who already had hypertension and those who were obese were at a significantly higher risk of developing preeclampsia. Close surveillance of these women during their ante-pregnancy and delivery visits may therefore help to delay the onset of disease by managing blood pressure, delivering timely obstetric interventions and closer monitoring.

The results of the present study are similar to those of the previous one and the hypertensive disorders of pregnancy continue to be one of the leading causes of morbidity suffered by pregnant women and their fetuses. A large proportion of cesarean section (60%), preterm birth (55.6%), low birth weight (46.7%) and NICU admission (40.0%) in our study indicate the ongoing impact of HDP on obstetric and neonatal services. The higher number of NICU admissions seen in women with preeclampsia and superimposed preeclampsia also support that the severity of the disease has an impact on neonatal mortality and morbidity. Improvements in antenatal screening, management of modifiable risk factors (including obesity and chronic hypertension) and correction of maternal anemias and prompt multidisciplinary management could significantly help minimise disease progression and improve maternal and neonatal outcomes.

Conclusion

The present retrospective study concludes that hypertensive disorders of pregnancy remain a significant cause of adverse maternal and neonatal outcomes. Gestational hypertension was the most common disorder, while preeclampsia and superimposed preeclampsia were associated with greater disease severity and poorer neonatal outcomes, particularly increased NICU admissions. High rates of cesarean section, preterm delivery, and low birth weight indicate the substantial burden of HDP on obstetric and

neonatal care. Maternal risk factors such as anemia, obesity, previous hypertension, and diabetes were frequently observed and may contribute to disease progression. Although maternal and neonatal mortality were relatively low, considerable morbidity persisted. Early identification of high-risk pregnancies, regular antenatal monitoring, prompt diagnosis, and timely multidisciplinary management are essential to prevent disease progression, improve maternal and neonatal outcomes, and reduce the overall healthcare burden associated with hypertensive disorders of pregnancy.

References

1. Moodley J. Maternal deaths due to hypertensive disorders in pregnancy. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2008 Jun 1;22(3):559-67.
2. Leeman L, Fontaine P. Hypertensive disorders of pregnancy. *American family physician*. 2008 Jul 1;78(1):93-100.
3. Mammaro A, Carrara S, Cavaliere A, Ermito S, Dinatale A, Pappalardo EM, Militello M, Pedata R. Hypertensive disorders of pregnancy. *Journal of prenatal medicine*. 2009 Jan;3(1):1.
4. Yücesoy G, Özkan S, Bodur H, Tan T, Çalışkan E, Vural B, Çorakçı A. Maternal and perinatal outcome in pregnancies complicated with hypertensive disorder of pregnancy: a seven year experience of a tertiary care center. *Archives of gynecology and obstetrics*. 2005 Nov;273(1):43-9.
5. Garovic VD, Hayman SR. Hypertension in pregnancy: an emerging risk factor for cardiovascular disease. *Nature clinical practice Nephrology*. 2007 Nov;3(11):613-22.
6. Simmons LA, Gillin AG, Jeremy RW. Structural and functional changes in left ventricle during normotensive and preeclamptic pregnancy. *American Journal of Physiology-Heart and Circulatory Physiology*. 2002 Oct 1;283(4):H1627-33.
7. Wagner SJ, Barac S, Garovic VD. Hypertensive pregnancy disorders: current concepts. *The journal of clinical hypertension*. 2007 Jul;9(7):560-6.
8. Paruk F, Moodley J. Maternal and neonatal outcome in early-and late-onset pre-eclampsia. In: *Seminars in neonatology 2000 Aug 1* (Vol. 5, No. 3, pp. 197-207). WB Saunders.
9. Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. *Obstetrics & Gynecology*. 2003 Jul 1;102(1):181-92.
10. Ødegård RA, Vatten LJ, Nilsen ST, Salvesen KÅ, Austgulen R. Preeclampsia and fetal growth. *Obstetrics & Gynecology*. 2000 Dec 1;96(6):950-5.
11. Zhang J, Meikle S, Trumble A. Severe maternal morbidity associated with hypertensive disorders in pregnancy in the United States. *Hypertension in pregnancy*. 2003 Jan 1;22(2):203-12.
12. Bodnar LM, Ness RB, Markovic N, Roberts JM. The risk of preeclampsia rises with increasing prepregnancy body mass index. *Annals of epidemiology*. 2005 Aug 1;15(7):475-82.
13. Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *Bmj*. 2005 Mar 10;330(7491):565.
14. Sibai BM. Diagnosis, prevention, and management of eclampsia. *Obstetrics & Gynecology*. 2005 Feb 1;105(2):402-10.
15. Xiong X, Mayes D, Demianczuk N, Olson DM, Davidge ST, Newburn-Cook C, Saunders LD. Impact of pregnancy-induced hypertension on fetal growth. *American journal of obstetrics and gynecology*. 1999 Jan 1;180(1):207-13.
16. Barton JR, O'Brien JM, Bergauer NK, Jacques DL, Sibai BM. Mild gestational hypertension remote from term: progression and outcome. *American journal of obstetrics and gynecology*. 2001 Apr 1;184(5):979-83.