Section: Obstetrics and Gynecology

Original Research Article

HYPERTENSIVE DISORDER IN PREGNANCY: A RETROSPECTIVE STUDY ON OBSTETRICAL AND PERINATAL OUTCOME

Vikas Yadav[1], Mayuri Ahuja[2], Archana Mehta[3], Niharika Aggarwal[4]

[1]*Associate Professor & IVF Head, Department of Obstetrics and Gynecology, School of Medical Sciences and Research, Greater Noida, Uttar Pradesh, India.*
[2]*Associate Professor, Department of Obstetrics and Gynecology, School of Medical Sciences and Research, Greater Noida, Uttar Pradesh, India.*
[3]*Professor & Head of Department, Department of Obstetrics and Gynecology, School of Medical Sciences and Research, Greater Noida, Uttar Pradesh, India.*
[4]*Resident, Department of Obstetrics and Gynecology, School of Medical Sciences and Research, Greater Noida, Uttar Pradesh, India.*

Received *: 06/07/2025*
Received in revised form *: 23/08/2025*
Accepted *: 12/09/2025*

Corresponding Author:
Dr. Vikas Yadav,
Associate Professor & IVF Head, Department of Obstetrics and Gynecology, School of medical sciences and Research, Greater Noida, Uttar Pradesh, India.
Email: vikiyadav1789@gmail.com

DOI: 10.70034/ijmedph.2025.3.567

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (3); 3090-3095

ABSTRACT

Background: Hypertensive disorder of pregnancy (HDP) is a multisystem problem and a leading cause of both maternal and perinatal morbidity and mortality. It accounts for 18% of all maternal deaths globally. HDP has many obstetric and perinatal implications on pregnancy, including abruption, HELLP syndrome, convulsions, fetal growth restriction (FGR), premature delivery, and stillbirth.

Materials and Methods: This retrospective observational study was conducted on pregnant women diagnosed with hypertensive disorders of pregnancy (HDP) over a period of ten years, from 1st January 2012 to 31st December 2021, at a tertiary care referral center. The study parameters included maternal age, parity, gestational age at diagnosis, and associated obstetric as well as perinatal outcomes.

Results: During the study period, a total of 9,141 deliveries were recorded, among which 980 cases fulfilled the inclusion criteria for hypertensive disorders of pregnancy (HDP). The cumulative incidence of HDP between the years 2012 and 2021 was 6.86%. In the present study, 68.16% had preeclampsia and eclampsia, whereas eclampsia was observed in 16.32% of cases. HDP was more common in primigravidas, with 606 out of 980 cases (61.83%). Abruptio placenta was observed in 6.73% of cases, PPH in 5.51%, pulmonary edema in 1.02%, and HELLP syndrome in 0.81% of cases. In the present study, there was a significantly higher cesarean delivery rate (61.64%) in HDP cases.

Conclusion: In the present study, there was an increased risk of abruptio placenta, PPH, fetal growth restriction, and prematurity among patients with HDP. Timely and appropriate interventions, such as magnesium sulfate for convulsions, antihypertensives, and good obstetric care, help reduce mortality in both the mother and fetus.

Keywords: Hypertensive disorder of pregnancy, fetal growth restriction, Eclampsia, Chronic hypertension.

INTRODUCTION

Hypertensive disorder of pregnancy (HDP) is among the leading cause of both maternal and perinatal morbidity and mortality. HDP is a multi system problem that manifest as hypertension and proteinuria after 20 weeks of pregnancy. HDP includes four groups: Gestational hypertension, Chronic hypertension, Preeclampsia and eclampsia and Preeclampsia superimposed on chronic hypertension. Hypertensive disorders of pregnancy (HDP) is defined as the occurrence of systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg, measured on at least two occasions, after 20 weeks, period of gestation in previously normotensive woman. About 5 to 10% of pregnant

women worldwide have HDP and is one of the commonest cause of maternal death.[1] Although the cause is still not clear, it is hypothesized to be due to faulty invasion of trophoblastic tissue into spiral arteries which lead to abnormal activation of vascular endothelial cells and does damaging multiple organ system.

Hypertensive disorder of pregnancy account for nearly 18% of all maternal death globally with an expected 62,000 - 77,000 death per year. Among the estimated 2.6 million still birth annually, approximately 16% occurs in pregnancy complicated by hypertensive disorder of pregnancy. In a multi centric study by WHO, preeclampsia and eclampsia account for 1 out of 4 perinatal deaths and 10% of early neonatal death, is usually preceeded by HDP.[2] Study from India reported the rate of maternal mortality to be 5.5% and perinatal death occurred in 37.5% of the deliveries.[3]

HDP has many implication on pregnancy, obstetrical complications include abruption, HELLP syndrome, convulsions, retinal detachment, hepatic and renal failure. Fetal complications is due to abnormality in circulation and associated hypoxia leading to conditions like fetal growth restriction (FGR), premature delivery and stillbirth. Risk factors for HDP are teenage pregnancy, primigravida, extremes of age, obesity, multifetal gestation, pregnancy through assisted reproductive technique, history of HDP in previous pregnancy, known case of renal disease and connective tissue disorders like APLA syndrome.[4]

At present, there is no universally accepted, screening modality for the early prediction of pre-eclampsia, nor are there definitive strategies available for its primary prevention. Ensuring adequate and equitable access to antenatal services, prompt recognition of symptoms suggestive of impending signs of eclampsia, vigilant maternal and fetal surveillance, and timely referral to higher centers constitute the cornerstone in mitigating the morbidity and mortality associated with pre-eclampsia and eclampsia. Tertiary care centre handling such cases should have protocol for timely management after identification of such cases. Anti- hypertensive drugs and magnesium sulphate as anti -convulsant if started promptly can drastically reduce the adverse outcome. Pre-eclampsia has been linked to adverse maternal outcomes later in life that include cardiovascular risk, development of chronic hypertension. Women with preeclampsia have 7-8 times increased risk of coronary heart disease.[5] To minimise maternal and perinatal morbidity HDP is managed expectantly till 34 weeks till fetal lung maturity, if blood pressure is controlled then decision of delivery is advocated at 37 weeks of gestation.

Objective of this retrospective study is to know the prevalence of hypertensive disorders of pregnancy at our tertiary care referral centre and to evaluate maternal and fetal outcomes.

MATERIALS AND METHODS

The present study is a retrospective study conducted at a tertiary care center at Department of Obstetrics and Gynecology, School of Medical sciences and Research, Sharda hospital, Greater Noida, UP. The present study was conducted between first January 2012 to 31st December 2021 total of 10 years of study interval.

The data was retrieved from entry registers at the hospital labor room, after taking permission from the hospital authority. All the pregnant patients who were admitted with diagnosis of Hypertensive disorder of pregnancy (HDP) at time of birth were recruited.

Hypertensive disorder of pregnancy (HDP) -It included four types: Gestational hypertension, chronic hypertension, chronic hypertension with superimposed pre-eclampsia, Preeclampsia and eclampsia. BP reading of more than 140/90 with or without proteinuria post 20 weeks gestation was included and followed up from delivery details taken from medical records. Eclampsia was the presence of seizures in women with pre-eclampsia. All the pregnant women with chronic hypertension who developed new onset proteinuria or severe feature of pre-eclampsia were classified as chronic hypertension with superimposed pre-eclampsia.

Patient with pre existing chronic renal disease, connective tissue disorder, vascular disease and Diabetes mellitus were excluded.

Upon admission, a comprehensive evaluation was done, including documentation of demographic details, personal and family medical history, and complete obstetric history, as provided by the patient or her attendant. A thorough general physical, abdominal, and pelvic examination was performed. All patients with hypertensive disorders of pregnancy (HDP) underwent baseline investigations comprising complete blood count, liver function tests, renal function tests, coagulation profile, and urine analysis for proteinuria. Following hemodynamic stabilization, ultrasonography was conducted to assess overall fetal well-being and fetal growth parameters with fetal doppler.

Management of cases was carried out in accordance with the established departmental protocol. Corticosteroid – betamethasone 2 doses ,24 hr apart were given if period of gestation was less than 34 weeks. The decision on mode of delivery and timing was individualized based on clinical history and vitals. Pt with seizures, eclampsia were given injection magnesium sulphate by intamuscular regimen- Pritchard regimen. Blood pressure was controlled by starting immediately labetalol. obstetric management was done as per the labor suite protocols. And based on morbidity and vaginal favorability patient delivered either vaginally or by caesarean section. Neonatal care was done in liason with NICU unit of the hospital. In cases of hypertensive emergency and refractory high Blood pressure –critical care unit and on call anesthetist

were involved. All the parameters were documented in patient notes and data was taken from patient records. The statistical analysis was then done in Microsoft Excel.

RESULTS

In the present study record of 9141 pregnant women who delivered at between year 2012 to 2021 at our tertiary care centre were reviewed. Of these 980 were hypertensive disorder of pregnancy (HDP)cases.

Table 1, shows the subclassification of hypertensive disorder of pregnancy (HDP)cases. Out of 980 patients with HDP, there were 18 (1.8%) with chronic hypertension, 220 out of 980 (22.4%) with gestational hypertension 74 out of 980(7.55 %) with chronic hypertension with superimposed pre-eclampsia and highest being cases with pre-eclampsia and eclampsia that is 668 out of 980 (68.16%).

On reviewing the basal parameters of the patients with HDP. There were 64 out of 980 (6.53%) pregnant women with age less than 20 years and similarly 64 out of 980 (6.53%) with maternal age more than 35 years.

HDP were more common in primigravida, 606 out of 980 (61.83 %), whereas 314 out of 980 (32.04%) of patients were multipara. In the present study gestational age at delivery was less than 28 weeks in 66 out of 980 (6.73%), between 28 - 34 week in (17.75%) and gestational age at delivery of more than 34 weeks in 740 out of 980 (75.51 %).

Out of 980 cases of HDP, there were 344 out of 980 (35.1%) that were booked cases whereas 636 out of 980 (64.89%) that were unbooked. Out of 980 cases of HDP, 516 (52.65%) had male birth, whereas 464 out of 980 (47%) had female baby born.

Among 980 patients with HDP, 376 out of 980 (38.36%) had successful vaginal birth whereas, 604 out of 980 (61.64%) had to undergo LSCS for birth. Birth weight of all 980 pregnant women with HDP was analysed 136 out of 980 (30.87%) had birth weight less than 1500 gram, 406 (41.42%) had birth weight 1500 to 2500 gram and 438 out of 980 (44.69%) had birth weight more than 2.5 kg. Table 2 shows basic demographic details in cases of HDP.

On analyzing the associated maternal condition in cases with HDP as given in Table 3. 70 out of 980 (7.14%) had associated hypothyroidism, 28 out of 980 (2.85%) has gestational diabetes mellitus. Intra hepatic cholestasis of pregnancy (IHCP) was seen in 38 out of 980 (3.87%), anemia was present in 114 out of 980 (11.63%). There were 22 out of 980 (2.24%) patients with twin/triplets pregnancy.

Table 4 shows the maternal obstetrical complications associated with HDP in the present study. In the present study 66 out of 980 (6.75%) had abruptio placenta, 54 out of 980 (5.5%) had postpartum hemorrhage, 10 out of 980 (1.02 %) had pulmonary edema, 8 out of 980 (0.81%) had HELLP syndrome, 160 out of 980 (16.32%) had eclampsia, 78 out of 980 (7.95%) had meconium stained liquor. In the present study during the duration of study that is 10 years, 6 out of 980 (0.6%) had maternal mortality.

In the present study, perinatal outcome in patients with HDP were shown in Table 5.

858 out of 980 (87.55%) had live birth. 122 out of 980 (12.44%) had still birth. In the present study ,156 out of 980 (15.91%) required and NICU. Prematurity was present in 240 out of 980 (24.48%). In the present study fetal growth restriction was observed in 88 out of 980 (87%) patients with HDP.

Table 1: Categorization of cases according to type of HDP

TYPE OF HDP	Number (N)	Proportion (%) OUT OF TOTAL 980 CASES
CHRONIC HTN	18	1.80%
GESTATIONAL HTN	220	22.44%
PRECLAMPSIA AND ECLAMPSIA	668	68.16%
PREECLAMPSIA SUPERIMPOSED ON CHRONIC HTN	74	7.55%

Table 2: Basic parameters in cases of HDP

PARAMETERS	Number (N)	Proportion (%) OUT OF TOTAL 980 CASES
maternal age (IN YEARS)		
<20	64	6.53%
>35	64	6.53%
Parity		
PRIMI	606	61.83%
≥3	314	32.04%
Gestational Age		
≤28weeks	66	6.73%
28-34 weeks	174	17.75%
>34 WEEKS	740	75.51%
Booking Status		
Booked	344	35.10%
Unbooked	636	64.89%
Sex- Distribution		
Male	516	52.65%
Female	464	47%
Birth Weight		

<1500gm	136	13.87%
1500-2500gm	406	41.42%
≥2.5kg	438	44.69%
MODE OF DELIVERY		
VAGINAL	376	38.36%
LSCS	604	61.64%

Table 3: Associated maternal comorbidities in cases of HDP

Associated Maternal Conditions	Number (N)	Proportion (%)
HYPOTHYROIDISM	70	7.14%
Gestational Diabetes Mellitus	28	2.85%
IHCP	38	3.87%
Anemia	114	11.63%
Multiple Pregnancy	22	2.24%

Table 4: Maternal obstetrical complications associated with HDP

OBSTETRICAL COMPLICATIONS	Total Number of Cases (N)	PROPORTION (%)
ABRUPTIO PLACENTAE	66	6.73%
POST PARTUM HEMORRHAGE	**54**	5.51%
PULMONARY EDEMA	**10**	1.02%
HELLP SYNDROME	8	0.81%
ECLAMPSIA	160	16.32%
MORTALITY	6	0.61%
MECONIUM STAINED LIQUOR	78	7.95%

Table 5: Perinatal outcome in patients with HDP

PERINATAL OUTCOME	NUMBER (PERCENTAGE)	Proportion (%) OUT OF TOTAL 980 CASES
TOTAL PATIENTS WITH HDP	980	
LIVE BIRTH	858	87.55%
STILL BIRTH	122	12.44%
NICU ADMISSION	156	15.91%
PREMATURITY	240	24.48%
FGR	88	8.97%
BIRTH WEIGHT <1.5 KG	136	13.87%
BIRTH WEIGHT 1.5-2.5 KG	406	41.42%
BIRTH WEIGHT >2.5 KG	438	44.69%

DISCUSSION

Hypertensive disorders of pregnancy (HDP) is one of the most common medical complications encountered during pregnancy and remain a major contributor to obstetric and perinatal morbidity. These conditions are associated with considerable maternal and perinatal adverse outcomes, accounting for approximately 10% of all pregnancies worldwide. Pregnancies complicated by HDP carry a substantial risk of maternal, fetal, and neonatal complications, thereby posing a significant challenge in obstetric care. Morbidity comprising of fetal growth restriction, prematurity, antipartum and postpartum hemorrhage, multi organ failure like hepatic and renal failure and worst being maternal mortality.[6]

In developing countries the incidence of pre-eclampsia/eclampsia is 3.4%. In our study the cumulative incidence of HDP between year 2012 to 2021 was 6.86%.

Among various subtypes of HDP, In the present study 68.16% were pre-eclampsia and eclampsia whereas eclampsia was observed in 16.32 % cases. This was higher in comparison to study by Peter A et al,[7] (0.76%) and Ajah et al,[8] (0.47%). Higher incidence of eclampsia is attributed to being the only tertiary referral center for many rural peripheral centers. This study found a significant relationship between HDP ,maternal age and booking status.

More than half of patients in our study (64.89%) were unbooked, presenting first time at delivery. A finding that correlates with study done by Shaikh S et al who had 82% patients unbooked. Most of the patients in our study were in the age group 20 to 35 years. Similar findings were obtained from reports of hospital at Multan.[9] Another study done by Singhal SR et al,[10] showed that 90% patients were less than 30 years of age.

In the present study 61.83% of patients were primigravida. These findings are similar to retrospective observational study done by Shaikh et al.[11] Another study by ketz et at al,[12] reported 70% of primi patients in their study. In the present study, it was found that 75.51 % had gestational age more than 34 weeks. These findings were similar with 64% in study by Saxena N et al and Mohammad taria.

In the present study there was significant higher cesarean delivery rate (61.64%) and is same in percentage to previous similar studies. Higher c-section rate can be attributed to unfavourable bishop score and to prevent convulsion in cases of severe pre-eclampsia and patients presenting with signs and symptoms of impending
eclampsia. The maternal mortality was observed in six out of 980 (0.61%)., it was lower than another study from Nigeria,[13] where it was 9%.

In the present study abruptio placenta was observed in 6.73% of cases, it was similar to study by Kavya k

et al where abruption was seen in 6.6% of cases. It was higher than study by Chaitra S et al,[14] (1.74 %). In the present study, PPH was observed in 5.51 % patients, Pulmonary edema in 1.02 %, and HELLP in 0.81 % cases. HELLP was noted in 1.1% cases in study by Kavya K et al, it was higher in study by Prakash et al,[16] 7.5 % and 12.4% in study by Eshetuet et al.[15]

In the present study the incidence of preterm delivery was 55.3% which was much higher as seen by Chaitra S et and Yadav et al where the incidence was 28.67% and 28.5% respectively. Incidence of fetal growth restriction in the present study was 8.97%, whereas in another study by Chaitra S et al it was 14.68% of birth.

The determinants of maternal morbidity in hypertensive disorders of pregnancy are influenced by risk factors such as nulliparity, very advanced maternal age, anemia, pre-eclampsia, Gestational diabetes and a prior history of pre-eclampsia. Reported maternal complications vary across studies. In a study by Patel A.G. et al., postpartum hemorrhage was the most frequent complication, observed in total 15 cases (12.5%), renal dysfunction in (10 cases), HELLP syndrome (4 cases), disseminated intravascular coagulation (DIC) (3 cases), placental abruption (2 cases), pulmonary edema (2 cases), and maternal mortality in 2 cases. In contrast, Shaikh et al. and Murphy reported a higher incidence of placental abruption, with 9 cases documented. Conversely, Singhal et al. reported a single case of placental abruption in their study. Farid et al. observed 11% incidence of HELLP syndrome and a 10% incidence of abruptio placenta. Igberase et al. highlighted that in women with severe pre-eclampsia, the major contributor of mortality is acute renal failure.

CONCLUSION

Hypertensive disorders of pregnancy (HDP) continue to be a significant cause of maternal and perinatal morbidity and mortality worldwide. This study highlights the prevalence, maternal, and fetal outcomes associated with HDP in a tertiary care setting, showing a cumulative incidence of 6.86% over a 10-year period. The study underscores the importance of early detection, management, and timely interventions to mitigate the adverse effects of HDP on both the mother and fetus. Pre-eclampsia and eclampsia were the most common manifestations of HDP, with a notable incidence of cesarean deliveries, preterm births, and fetal growth restriction.

The high percentage of unbooked patients and the increased incidence of HDP during the COVID-19 pandemic call for strengthened antenatal care programs and improved follow-up, especially in rural and underserved populations. The presence of maternal complications like abruptio placenta, postpartum hemorrhage, and HELLP syndrome further emphasizes the need for vigilant monitoring and appropriate management protocols.

In conclusion, while advancements in the understanding and treatment of HDP have been made, there is still a need for better screening, preventive measures, and a multidisciplinary approach in managing these high-risk pregnancies to reduce the associated maternal and perinatal complications.

REFERENCES

1. Garovic VD, White WM, Vaughan L, Saiki M, Parashuram S, Garcia-Valencia O, Weissgerber TL, Milic N, Weaver A, Mielke MM. Incidence and Long-Term Outcomes of Hypertensive Disorders of Pregnancy. J Am Coll Cardiol. 2020 May 12;75(18):2323-2334. doi: 10.1016/j.jacc.2020.03.028. PMID: 32381164; PMCID: PMC7213062.
2. Jiang L, Tang K, Magee LA, von Dadelszen P, Ekeroma A, Li X, Zhang E, Bhutta ZA. A global view of hypertensive disorders and diabetes mellitus during pregnancy. Nat Rev Endocrinol. 2022 Dec;18(12):760-775. doi: 10.1038/s41574-022-00734-y. Epub 2022 Sep 15. PMID: 36109676; PMCID: PMC9483536.
3. Meh C, Sharma A, Ram U, Fadel S, Correa N, Snelgrove JW, Shah P, Begum R, Shah M, Hana T, Fu SH, Raveendran L, Mishra B, Jha P. Trends in maternal mortality in India over two decades in nationally representative surveys. BJOG. 2022 Mar;129(4):550-561. doi: 10.1111/1471-0528.16888. Epub 2021 Sep 15. PMID: 34455679; PMCID: PMC9292773.
4. Malik R, Kumar V. Hypertension in Pregnancy. Adv Exp Med Biol. 2017;956:375-393. doi: 10.1007/5584_2016_150. PMID: 27957708.
5. Alur A, Phipps JE, Simmons LA. Socioecological factors influencing the risk of developing hypertensive disorders of pregnancy in India: a rapid review. BMC Pregnancy Childbirth. 2024 Oct 12;24(1):669. doi: 10.1186/s12884-024-06879-0. PMID: 39395960; PMCID: PMC11471028.
6. Panda S, Das R, Sharma N, Das A, Deb P, Singh K. Maternal and Perinatal Outcomes in Hypertensive Disorders of Pregnancy and Factors Influencing It: A Prospective Hospital-Based Study in Northeast India. Cureus. 2021 Mar 18;13(3):e13982. doi: 10.7759/cureus.13982. PMID: 33880307; PMCID: PMC8053022.
7. Awoyesuku, P. A., John, D. H., John, D. H., Lebara, L. B., & Lebara, L. B. (2020). Maternal and perinatal outcome in severe preeclampsia and eclampsia at the Rivers State university teaching hospital, Nigeria. International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 9(11), 4389–4393. https://doi.org/10.18203/2320-1770.ijrcog20204784
8. Ajah LO, Ozonu NC, Ezeonu PO, Lawani LO, Obuna JA, Onwe EO. The Feto-Maternal Outcome of Preeclampsia with Severe Features and Eclampsia in Abakaliki, South-East Nigeria. J Clin Diag Res. 2016;10(9):QC18-21.
9. Naseer D, Ataullah K, Nudrat E. Perinatal and maternal outcome of eclamptic patients admitted in Nishtar Hospital, Multan. J Coll Physician Surg Pak. 2000;10:261-4.
10. Singhal S, Deepika, Anshu, Nanda S. Maternal and perinatal outcome in severe pre-eclampsia and eclampsia. South Asian Federation of Obstetrics and Gynecology. 2009;1(3):25-8.
11. Shaikh S, Ruby AJ, Piotrowski M. Pre eclampsia related chorioretinopathy with Purtscher's likefindings and macular ischaemia. Retina. 2003;23:247-50.
12. Katz VL, Farmer R, Kuller JA. Pre-eclampsia into eclampsia: toward a new paradigm. Am J Obstet Gynecol. 2000;182:1389- 96.
13. Okogbenin SA, Eigbefoh JO, Omorogbe F, Okonta PI, Ohihoin AG. Eclampsia in Irrua specialist teaching hospital: a five-year review. Niger J Clin Pract. 2010;13(2):149-53.
14. Chaitra S, Jayanthi, Sheth AR, Ramaiah R, Kannan A, Mahantesh M. Outcome in hypertension complicating

pregnancy in a tertiary care center. The New Indian Journal of OBGYN. 2017; 4(1):42-6
15. Prakash J, Pandey LK, Singh AK, Kar B. Hypertension in pregnancy: hospital based study. J Assoc Physicians India. 2006; 54: 273–78
16. Seyom E, Abera M, Tesfaye M, Fentahun N. Maternal and fetal outcome of pregnancy related hypertension in Mettu Karl Referral Hospital, Ethiopia. J Ovarian Res.2015; 8: 10.