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A CROSS-SECTIONAL STUDY TO ESTIMATE THE PREVALENCE OF HYPERTENSIVE DISORDERS OF PREGNANCY IN WOMEN PRESENTING WITH ANTEPARTUM HEMORRHAGE

Dr. Arushie Sadhwani* Junior Resident, Department Of Obstetrics & Gynecology, Bharati Vidyapeeth (DU) Medical College, Pune *Corresponding Author

Dr. Girija Wagh Head Of Department, Department Of Obstetrics & Gynecology, Bharati Vidyapeeth (DU) Medical College, Pune

ABSTRACT

Background: Antepartum hemorrhage (APH), defined as bleeding from the genital tract after 20 weeks of gestation and before the delivery of the fetus, remains a critical obstetric emergency. Common causes include placenta previa, placental abruption, and vasa previa—all of which can lead to significant maternal and fetal complications. When APH occurs in the context of hypertensive disorders of pregnancy (HDP), such as preeclampsia or eclampsia, the risk of adverse outcomes increases substantially. HDP independently contribute to high rates of maternal and perinatal morbidity and mortality, particularly in low-resource settings where timely and adequate obstetric care may be lacking. Early detection and aggressive management of hypertensive disorders in women presenting with APH are essential to minimizing the risk of severe hemorrhagic events and optimizing both maternal and neonatal outcomes. **Objective:** This study aims to estimate the prevalence of hypertensive disorders of pregnancy in women presenting with antepartum hemorrhage and to evaluate associated clinical patterns and outcomes. **Materials And Methods:** This hospital based, cross-sectional observational study conducted over a period of 18 months was carried out with 64 pregnant women who were presented with antepartum hemorrhage after 20 weeks of gestation up to term. Each woman underwent a detailed personal interview and clinical assessment. Data were coded and analyzed using SPSS version 20.0. Categorical variables were compared using statistical tests such as the chi-square test, with a p-value of less than 0.05 considered to indicate statistical significance. **Results:** The average age of the participants was 28.03 ± 5.04 years. Among the participants, 73.44% (n=47) were multigravida, while 26.56% (n=17) were primigravida, indicating that antepartum hemorrhage was more frequently observed in women with previous pregnancies. Among the 64 cases of APH, the most common cause was abruption, accounting for 71.88% (n=46) of cases. Placenta previa was the second most frequent type, occurring in 20.31% (n=13) of cases. Placenta accreta was identified in 1.56% (n=1) of cases, while other causes contributed to 6.25% (n=4) of cases. Among women with gestational hypertension, nearly half (46.15%) had live births, while 30.77% experienced intrauterine demise (IUD), and 23.08% had fresh stillbirths (FSB). Notably, vomiting and epigastric pain showed statistically significant associations with hypertensive ($p = 0.049$ and $p = 0.001$, respectively). Vomiting was observed amongst two females with preeclampsia and one with gestational hypertension, while none in the no hypertension group reported this symptom. **Conclusions:** The present study underscores the strong association between hypertensive disorders and antepartum hemorrhage (APH), particularly with placental abruption. These results reinforce the need for early identification and close monitoring of hypertension during pregnancy to minimize risks linked to APH.

KEYWORDS : Hypertension, Antepartum Hemorrhage (APH), Hypertensive disorders of pregnancy (HDP), Multigravida, Primigravida.

INTRODUCTION

Antepartum hemorrhage is bleeding from the genital tract after 20 weeks of gestation and before labor, is a significant obstetric emergency that can lead to maternal shock, disseminated intravascular coagulation (DIC), and neonatal hypoxia or stillbirth [6]. Placenta previa and placental abruption, are the two most common causes of APH with the latter being strongly linked with hypertensive disorders of pregnancy [7]. Placental abruption is the premature separation of the placenta from the uterine wall, is particularly concerning in women with chronic hypertension and preeclampsia, as vascular changes associated with these conditions increase the risk of placental detachment [8]. The severity of abruption correlates with maternal blood pressure levels, placental ischemia, and coagulation abnormalities, which are commonly observed in HDP [9, 10, 11, 12].

Hypertensive disorders of pregnancy (HDP) are amongst a severe complication affecting mother along with fetal health globally. These conditions add on drastically to mother and neonatal morbidity and mortality, especially where timely approach to obstetric care is restricted. [1] Hypertension in pregnancy is associated with vascular dysfunction, placental abnormalities, and a raised risk of placental abruption, a leading cause of antepartum hemorrhage (APH) [2]. Despite the well-established link between HDP and APH, [3] there is inadequate epidemiological data quantifying, prevalence of hypertensive disorders among women presenting with APH. Gestational hypertension, preeclampsia, eclampsia, and chronic hypertension are a part of HDP, each creating a distinct risk to maternal and fetal health [4]. Globally, hypertensive disorders complicate significant number of pregnancies, making them on of the most important medical conditions encountered in pregnancy [5].

The relationship between HDP and APH is primarily driven by vascular dysfunction and placental insufficiency. Normal pregnancy involves extensive modification of maternal spiral arteries to safeguard proper blood flow to the placenta as well as to the fetus [13, 14]. However, in HDP, this process is defective due to impaired trophoblastic invasion, leading to high-resistance, low-flow circulation and subsequent placental ischemia. Placental ischemia, in turn, triggers the circulation of antiangiogenic factors, like soluble fms-like tyrosine kinase-1 (sFlt-1) and soluble endoglin (sEng), which interrupts maternal endothelial function and contribute to hypertension, oxidative stress, and coagulation abnormalities. These changes significantly compound to the risk of placental abruption, preterm birth, and fetal growth restriction [12, 15].

Despite the established link between HDP and APH, most studies focus on these conditions separately, with none to very few addressing the prevalence of hypertensive disorders specifically in women presenting with antepartum hemorrhage [1]. Identifying women at highest risk of developing HDP in the context of APH can aid in early intervention and better obstetric surveillance [16]. Early identification and treatment of hypertensive disorders in pregnant women with APH may help decrease the incidence of

severe hemorrhagic complications and enhance neonatal results [17]. The aim of this study is to estimate the prevalence of hypertensive disorders of pregnancy in women presenting with antepartum hemorrhage and to evaluate associated clinical patterns and outcomes.

MATERIALS AND METHODS

A cross-sectional observational study conducted, at Bharati Hospital, over a period of 18 months, from June 2023 to December 2024. The study population included 64 pregnant women who were presented with antepartum hemorrhage after 20 weeks of gestation up to term. Informed and written consent was taken from all participants prior to inclusion in the study. Each woman underwent a detailed personal interview and clinical assessment.

Inclusion Criteria:

- Pregnant women with gestational age of 20 weeks or more up to term presenting with antepartum hemorrhage.

Exclusion Criteria:

- Pregnant women with gestational age less than 20 weeks.
- Women presenting with vaginal bleeding due to causes unrelated to antepartum hemorrhage, such as cervical polyp, cervical carcinoma, local vaginal or cervical infections.
- Multiple gestation pregnancies (twins or higher-order pregnancies) to avoid confounding factors.
- Women with known congenital uterine anomalies (e.g., bicornuate uterus) which could independently affect placental position and risk of bleeding.
- Women with known medical conditions unrelated to hypertensive disorders, such as cardiac disease, renal disease (pre-existing chronic kidney disease), autoimmune disorders etc.
- Patients who declined to give informed consent.

Relevant clinical data, including history, antenatal records, laboratory findings, and ultrasound results, were meticulously recorded in their case sheets. Data were coded and analyzed using SPSS version 20.0. Categorical variables were compared using statistical tests such as the chi-square test, with a p-value of less than 0.05 considered to indicate statistical significance.

RESULTS

The average age of the participants was 28.03 ± 5.04 years. The average pulse rate was 94.02 ± 14.27 beats per minute. Blood pressure levels showed a mean systolic pressure of 127.08 ± 28.68 mmHg and a mean diastolic pressure of 82.78 ± 16.85 mmHg. Hematological parameters revealed a mean hemoglobin level of 10.60 ± 1.67 g/dL, indicating the prevalence of mild anemia among the participants. The total leukocyte counts averaged 13,360.94 ± 4157.58 cells/mm^3, while the platelet count showed significant variability (8855.81 ± 22984.34 cells/mm^3). The biochemical parameters, including liver and kidney function tests and electrolyte levels, among the study participants are shown in table 1.

Table 1: Biochemical Parameters Of Study Participants

	Mean	SD
Total bilirubin	0.69	0.94
SGOT	24.41	13.91
SGPT	17.91	16.37
Total protein	5.60	1.03
Albumin	2.93	0.49
Globulin	2.63	0.72
Alkaline phosphatase	176.83	90.03
Lactate dehydrogenase	318.53	182.12
Urea	18.70	14.00
Uric acid	5.38	3.12
Creatinine	2.66	16.30
Sodium	131.44	16.90
Potassium	3.94	0.44
Chloride	109.47	4.44

Among the participants, 73.44% (n=47) were multigravida, while 26.56% (n=17) were primigravida, indicating that antepartum hemorrhage was more frequently observed in women with previous pregnancies. Regarding gestational age, the majority of cases (84.38%, n=54) were pre-term pregnancies (<37 weeks), while only 15.63% (n=10) reached term gestation (≥37 weeks). The relationship between gravida status and gestational age with the occurrence of gestational hypertension, no hypertension, and preeclampsia among the study participants is illustrated in Table 2.

Table 2: Association Of Gravida & Gestational Age With Hypertensive Disorders Of Pregnancy.

			Gestational	No hypertension	Preeclampsia	p value
Gravida	Multi	n	8	29	10	0.458
		%	17.02%	61.70%	21.28%	
	Primi	n	5	10	2	
		%	29.41%	58.82%	11.76%	
Gestation	Pre-term	n	10	34	10	0.674
		%	18.52%	62.96%	18.52%	
	Term	n	3	5	2	
		%	30.00%	50.00%	20.00%	

Among the 64 cases of APH, the most common cause was abruption, accounting for 71.88% (n=46) of cases. Placenta previa was the second most frequent type, occurring in 20.31% (n=13) of cases. Placenta accreta was identified in 1.56% (n=1) of cases, while other causes contributed to 6.25% (n=4) of cases. The relationship between different types of antepartum hemorrhage (APH) and HDP specifically gestational hypertension, no hypertension, and preeclampsia is illustrated in Table 3. Out of 64 cases, the majority of pregnancies (64.06%, n=41) resulted in live births. However, 21.88% (n=14) were classified as intrauterine demise (IUD), and 14.06% (n=9) were fresh stillbirths (FSB) as shown in Table 4.

Table 3: Association Between Types Of Antepartum Hemorrhage And Hypertensive Disorders Of Pregnancy.

APH	Gestational	No hypertension	Preeclampsia	p-value
Abruption	13	22	11	0.037
	28.26%	47.83%	23.91%	*
Placenta accreta	0	1	0	
	0.00%	100.00%	0.00%	
Placenta previa	0	13	0	
	0.00%	100.00%	0.00%	
Other	0	3	1	
	0.00%	75.00%	25.00%	

Table 4: Distribution Of Fetal Outcomes In Pregnancies Complicated By APH

Fetal outcome	Frequency	Percentage
FSB	9	14.06
IUD	14	21.88
LIVE	41	64.06
Total	**64**	**100**

Among women with gestational hypertension, nearly half (46.15%) had live births, while 30.77% experienced intrauterine demise (IUD), and 23.08% had fresh stillbirths (FSB). In contrast, females with no hypertension demonstrated the most favourable outcomes, with 74.36% resulting in live births and lower incidences of IUD (15.38%) and FSB (10.26%). The group with preeclampsia exhibited the highest proportion of IUDs (33.33%) and a relatively lower live birth rate (50%), indicating a more severe impact of preeclampsia on fetal survival in the setting of APH (Table 5).

Table 5: Association Between Hypertensive Status And Fetal Outcomes In Pregnant Women With Antepartum Hemorrhage.

	Gestational	No hypertension	Preeclampsia	p-value
FSB	3	4	2	0.306
	23.08%	10.26%	16.67%	
IUD	4	6	4	
	30.77%	15.38%	33.33%	
LIVE	6	29	6	
	46.15%	74.36%	50.00%	

Notably, vomiting and epigastric pain showed statistically significant associations with hypertensive ($p = 0.049$ and $p = 0.001$, respectively). Vomiting was observed amongst two females with preeclampsia and one with gestational hypertension, while none in the no hypertension group reported this symptom. Epigastric pain, a hallmark of severe preeclampsia, was reported exclusively in the preeclampsia group (23.08%), further supporting its diagnostic significance in hypertensive disorders of pregnancy. Blurring of vision also showed a significant association, being more prevalent among women with preeclampsia compared to those with no hypertension or gestational hypertension (Figure 1).

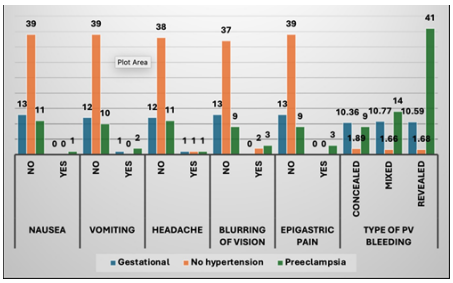

Figure 1: Association between hypertensive status and clinical symptoms

DISCUSSION

Hypertensive disorders during pregnancy are a major contributor to both maternal and perinatal complications and fatalities, with the highest impact seen in low- and middle-income nations [18]. These conditions, which contain gestational hypertension, preeclampsia, and eclampsia, contribute significantly to adverse maternal and fetal outcomes like preterm delivery, IUGR, placental abruption, and stillbirth [11]. APH, which refers to vaginal bleeding occurring after 20 weeks of pregnancy but before labor, is a serious obstetric issue that can significantly impact the health of both mother and baby [19]. Placental abnormalities associated with hypertensive disorders can predispose to complications like placental abruption a common cause of APH [20].

In present study the study population had an average maternal age of 28.03 ± 5.04 years, which aligns with previous studies indicating that hypertensive disorders of pregnancy predominantly affect women in the reproductive age group. Mathew R [21] et al described average maternal age of 26.34 ± 3.84 years in their study, showing similar findings. In addition, research by Walle TA et al. [22] revealed that hypertensive disorders during pregnancy were strongly linked to maternal age, a hereditary predisposition to hypertension, and alcohol use while pregnant. Hypertensive disorders were more common in women with increased maternal age, obesity, and a family history of hypertension in this study. This is in agreement with Fronek E [23] et al, who reported that hypertensive disorders were more frequent among obese women (PR 2.31 to 3.70).

Liver function tests in this study showed elevated bilirubin, SGOT, and SGPT levels, suggesting hepatic involvement, particularly in severe preeclampsia. Sun S [24] et al similarly reported liver dysfunction in hypertensive pregnancies. In this study there was high prevalence of preterm deliveries (<37 weeks) at 84.38%, steady with the finding of Walle TA [22] et al, identified prematurity as a significant complication of hypertensive pregnancies.

Placental abruption was the commonest cause of APH noted in this study (71.88%), followed by placenta previa (20.31%) and placenta accreta (1.56%). Kedar K [25] et al reported similar findings, with 51.91% of APH cases attributed to placental abruption and 45.80% to placenta previa. Moreover, Mathew R [21] et al found a significant association between hypertension and placental abruption ($p < 0.001$).

Other causes of APH were mostly observed in normotensive women (75%), with a smaller proportion (25%) linked to preeclampsia. These findings support the known pathophysiological association between hypertensive disorders and placental abruption, likely due to impaired placental vascular integrity and uteroplacental insufficiency. Fetal outcomes were significantly impacted by APH, with 21.88% of cases resulting in intrauterine demise (IUD) and 14.06% in fresh stillbirths (FSB). Fronek E [23] et al, reported increased risks of neonatal complications in hypertensive pregnancies and Kedar K [25] et al reported neonatal jaundice and prematurity to be the most common neonatal complications in APH cases, findings that are consistent with this study.

The elevated rates of IUD and fresh stillbirths (FSB) in hypertensive groups, especially with preeclampsia, point toward the deleterious impact of compromised uteroplacental perfusion, a hallmark of hypertensive disorders. Although not statistically conclusive, these findings align with existing evidence and emphasize the clinical importance of vigilant monitoring of hypertensive pregnant women with APH to optimize fetal outcomes.

Maternal symptoms such as vomiting ($p=0.049$), blurring of vision ($p=0.04$), and epigastric pain ($p=0.001$) significantly associated with hypertensive disorders in this study. Sengodan SS [26] et al also reported that epigastric pain and vision disturbances were key indicators of severe preeclampsia, supporting the diagnostic value of these symptoms in assessing disease severity. Vomiting, epigastric pain, and blurring of vision stood significantly associated with hypertensive status ($p = 0.049$, 0.001, and 0.04, respectively). Blurring of vision was noted in 25% of preeclamptic cases, underscoring its role as a warning sign. While nausea and headache were more common in the preeclampsia group, their associations were not statistically significant. These findings emphasize the value of systemic symptom assessment in identifying high-risk women with APH.

The increasing global prevalence of hypertensive disorders, as reported by Sun S [24] et al, underscores the need for early detection, prenatal care, and timely intervention to reduce perinatal complications. Understanding these associations is crucial for guiding obstetric care and improving outcomes for high-risk pregnancies.

CONCLUSION

The present study underscores the strong association between hypertensive disorders and antepartum hemorrhage (APH), particularly with placental abruption. The findings highlight raised prevalence of undesirable mother and fetus outcomes, like increased incidence of preterm deliveries, IUD, and neonatal complications. Hypertensive pregnancies were also linked to elevated inflammatory markers, anemia, and liver dysfunction, reflecting their systemic impact.

These results reinforce the need for early identification and

close monitoring of hypertension during pregnancy to minimize risks linked to APH. Given the rising global incidence of hypertension in pregnancy, implementing timely obstetric interventions, optimizing antenatal care, and ensuring multidisciplinary management are essential for improving maternal and neonatal outcomes.

Additional Information/Disclosures

Human Ethics: Consent was obtained by all participants in this study. Institutional Ethics Committee approval was taken from Bharati Hospital, Pune, Maharashtra, India with approval file BVDUMC/IEC/61.

Animal Ethics: All authors have confirmed that this study did not involve animal subjects or tissue.

Conflict of Interest: The authors declare no conflict of interest.

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