

Hypertensive Disorders in Pregnancy: Pattern and Obstetric Outcome in Bida, Nigeria

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Abstract

Context: Cases of hypertensive disorders in pregnancy (HDP) are an increase in developing economies. Identifying the pattern of HDP in a particular community and documenting their management outcome may allow for proper planning by all stakeholders. **Aims:** The objective was to determine the pattern and management outcome of hypertensive disorders among pregnant women. **Settings and Design:** This was a prospective cohort study involving 183 consecutive cases of HDP at Federal Medical Centre, Bida, Niger State, Nigeria, between September 2015 and August 2016. **Subjects and Methods:** Pregnant women with hypertension were recruited and managed according to the departmental protocol. They were followed up till 6 weeks after delivery; fetal and maternal outcomes were documented. **Statistical Analysis Used:** Data were analyzed using the SPSS software version 23. The level of statistical significance was set at $P < 0.05$. **Results:** A total of 1956 deliveries occurred during the study with 183 cases of HDP, giving an incidence of 9.4%. Pregnancy-induced hypertension alongside preeclampsia constitutes the majority of HDP during the study and had accounted for over 64%. Women who did not receive antenatal care in our center were at significantly greater risk of eclampsia ($P = 0.000$), abruption placentae ($P = 0.003$), maternal death ($P = 0.002$), very low-birth-weight (LBW) babies ($P = 0.002$), extremely LBW babies ($P = 0.03$), and perinatal death ($P = 0.000$). **Conclusion:** The need for prenatal screening that enables the early identification and prompt management of all expectant mothers with HDP is advised.

Keywords: Hypertensive disorders, obstetric outcome, pattern, pregnancy

INTRODUCTION

Hypertension is a common medical complication of pregnancy with significant maternal and perinatal morbidity and mortality in both developed and developing countries.^{1,2} Hypertensive disorders in pregnancy (HDP) are said to complicate 5%–10% of pregnancies; making it the second-most common medical condition in pregnancy.^{2,3} Although the incidence varies among different communities and hospitals, HDP has been shown to be common Among African descendants.³

There are various forms of classifying HDP, however, that based solely on the occurrence of hypertension and proteinuria, by the International Society for the Study of Hypertension in Pregnancy (ISSHP), is widely accepted.^{3,4} Pattern of HDP has been documented in some previous studies.⁵⁻⁷ This may have allowed for adjustment in the management approaches in such communities. Moreover, cases of out-of-stock of essential drugs are not uncommon in developing societies necessitating the identification of pattern in various settings such that

prior arrangement can be ensured.⁴⁻⁶ In a multi-center study, pregnancy-induced hypertension (PIH) and preeclampsia were responsible for 70% of cases of HDP, whereas 30% of cases were due to chronic hypertension.⁷

Hypertension in pregnancy is characterized by widespread vascular reactivity which predisposes to acute or chronic uteroplacental insufficiency, resulting in prenatal and intrapartum fetal hypoxia, which in turn is associated with several adverse outcomes such as intrauterine growth restriction (IUGR), premature birth with its attendant complications, and fetal demise or increased risk of perinatal death.⁸ In addition, HDP predisposes to potentially lethal

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maternal morbidities, including pulmonary edema, disseminated intravascular coagulopathy, abruptio placentae, acute renal injury, hemolysis, elevated liver enzymes, and low platelet count, cerebrovascular accident, and cardiac failure.⁷⁻¹⁴ Globally, HDP is a major cause of maternal and perinatal morbidity and mortality. It accounts for about 12% of maternal death worldwide.^{5,6} The World Health Organization estimated that 100,000 women die from preeclampsia and eclampsia annually.³ In South Africa, the incidence of HDP was found to be 12%, while HDP contributed about 20.7% to maternal mortality; making it the most common cause of maternal death in the country.⁷ In Nigeria, HDP was responsible for 15% of maternal death.² To prevent adverse maternal and perinatal outcomes, prompt diagnosis and aggressive management are mandatory.

In Bida, Northcentral Nigeria, anecdotal evidence suggested rising cases of HDP in the only tertiary health facility in the community. It becomes necessary, therefore, to understudy the pattern of HDP in this community and to enable adequate preparation that may facilitate the proper management of such cases. Therefore, it is hoped that our study would form the basis for stocktaking preparatory for such cases in the facility. This study aimed at determining the incidence, pattern, maternal, and perinatal outcome of HDP.

SUBJECTS AND METHODS

This hospital-based prospective cohort study was conducted in the Department of Obstetrics and Gynecology, Federal Medical Centre (FMC), Bida, Niger State, Nigeria, from September 2015 to August 2016. The hospital serves as a referral center for Niger state and its neighboring states. It has an annual average delivery rate of 1955/year.

A total of 183 pregnant women identified to have hypertension or with a history of hypertension were consecutively recruited from the antenatal clinic, labor room, and emergency unit of the Department of Obstetrics and Gynecology, FMC, Bida, over a 12-month period. The informed consent of each patient was obtained before entry into the study. The exclusion criteria were the presence of other chronic medical condition(s) and hypertensive women who delivered outside the study center. The Institutional Health Research Ethics Committee gave ethical approval for the conduct of the study.

Data were collected using semi-structured questionnaire. Some of the information collected included sociodemographic characteristics, booking status, symptoms and signs of hypertension at presentation, urine dipstick result for proteinuria, and patients' diagnosis. Other information gathered were the mode of delivery, maternal outcome, and perinatal outcome. Participants' blood pressure (BP) were taken after about 3 min of rest in a sitting position at each clinic visit or in a left lateral position for those on admission at the obstetric emergency, antenatal ward, and labor room. Both systolic BP and diastolic BP were recorded at Korotkoff sound Phase 1 and Phase 5, respectively, using the auscultation method. The diagnosis of hypertension was based on systolic

BP of 140 mmHg or more and diastolic BP of 90 mmHg or more, taken on two occasions at least 4 h apart. Systolic BP of 140–159 mmHg and/or diastolic BP 90–109 mmHg were considered as mild-to-moderate hypertension, while severe hypertension was taken as systolic BP \geq 160 mmHg and/or diastolic BP \geq 110 mmHg. Urinalysis was performed using spot clean catch urine or catheter specimen urine in those on catheter. Significant proteinuria using urine dipstick described as 2+ or more of proteinuria (1 g albumin/l) in two random clean catch or catheter urine specimens or 1+ (0.3 g albumin/l), if specific gravity is $<$ 1030 and pH $<$ 8. The classification of HDP by ISSHP was employed in this study.

The diagnosis of preeclampsia was based on new-onset hypertension after 20 weeks gestation and significant proteinuria. Severe preeclampsia was diagnosed based on severe proteinuria (urine dipstick \geq 3+) and/or headache, visual changes, pulmonary edema, thrombocytopenia, or liver dysfunction. Alpha-methyldopa (dosed 500 mg to 1.5 g/day orally in 2–3 divided doses) and/or nifedipine (dosed 20–60 mg/day orally in two divided doses) were used to control mild-to-moderate hypertension, while severe cases had intravenous hydralazine (dosed 5 mg initially, then 10 mg every 30 min) slowly over 15 min when diastolic BP \geq 110 mmHg. Hourly monitoring of BP was ensured to achieve a target BP of \leq 150 mmHg systolic and \leq 100 mmHg diastolic. Magnesium sulfate was administered according to the Pritchard regimen to prevent/control fits in cases of severe preeclampsia and eclampsia, respectively. Timely delivery was undertaken according to the standard protocol. Participants were followed up to 6-week postpartum.

Data were analyzed using the SPSS version 23 (IBM, Armonk, New York, USA). The mean \pm standard deviations and percentages were calculated where necessary. The influence of booking status on the fetal and maternal outcomes was analyzed using the Chi-square test and Mann–Whitney U-test. The level of statistical significance between two differences was set at $P < 0.05$.

RESULTS

During the 12-month study, there were 183 patients with HDP among 1956 total deliveries, giving an incidence of 9.4%. Six patients had other chronic medical conditions, eight that delivered outside the study center, as well as three patients who refused consent, and five that were lost to follow-up were excluded from the analysis. This leaves 161 patients for the final analysis. Table 1 shows the sociodemographic characteristics of the patients. The mean age of the women was 27.6 ± 6.4 years, majority (29.8%) in the 25–29-year age range. Fifty-seven (35.4%) of the patients were nulliparous, while 15.5% (25) of them were grandmultiparous women. Over one-third of the patients (37.9%) were of social class 5, and 51% of the women were booked.

Table 2 depicts the type of HDP. PIH and preeclampsia constituted 64.6%. Among women with eclampsia and

Table 1: Sociodemographic characteristics (n=161)

	n (%)
Age	
<20	8 (5.0)
20-24	42 (26.1)
25-29	48 (29.8)
30-34	30 (18.6)
35-39	25 (15.5)
40-44	6 (3.7)
≥45	2 (1.2)
Parity	
Nulli (0)	57 (35.4)
Primi (1)	30 (18.6)
Multi (2-4)	49 (30.4)
Grand multi (≥5)	25 (15.5)
Social classifications	
1	23 (14.3)
2	20 (12.4)
3	34 (21.1)
4	23 (14.3)
5	61 (37.9)
Booking status	
Booked	83 (51.6)
Unbooked	78 (48.4)

n – Frequency

Table 2: Pattern of hypertensive disorders in pregnancy (n=161)

Types of hypertension	n (%)
PIH	64 (39.8)
Preeclampsia	40 (24.8)
Mild preeclampsia	5 (3.1)
Severe preeclampsia	35 (21.7)
Eclampsia	36 (22.4)
Antepartum eclampsia	15 (9.3)
Intrapartum eclampsia	20 (12.4)
Postpartumeclampsia	1 (0.6)
Chronic hypertension	10 (6.2)
CH + PE	11 (6.8)

n – Frequency; PIH – Pregnancy-induced hypertension; CH + PE – Chronic hypertension with superimposed preeclampsia

intrapartum eclampsia constituting 12.4% were the most common variants. While mild and severe preeclampsia occurred in 3.1% and 21.7% of cases of preeclampsia. Chronic hypertension complicated 6.2% of pregnancies, and 6.8% of cases had chronic hypertension with superimposed preeclampsia.

Table 3 shows the pattern of HDP with the change in parity. PIH was dominant across parities: nulliparity 23 (14.2), primiparity 13 (8.1), multiparity 19 (11.8), and grand multiparity 9 (5.6). While the incidence of preeclampsia is higher among multiparous women 14 (8.7), majority of eclampsia occurred in women with no parous experience 20 (12.4). Chronic hypertension and chronic hypertension with superimposed

preeclampsia were more common among grand multiparous 5 (3.1) and multiparous 5 (3.1), respectively. Although there was no statistically significant association between parity and types of hypertension ($P = 0.10$). More cases of PIH 20 (12.4) and eclampsia 11 (6.8) were seen among women aged between 20 and 24 years. Preeclampsia 12 (7.6) was most common among women aged 30–34 years. However, there was no statistically significant association between women of various age groups and pattern of hypertension ($P = 0.21$).

Table 4 shows the effect of booking status on the mode of delivery, maternal complications, and perinatal outcome among the study cohort. The cesarean section rate was 46.0%. Eclampsia 36 (22.4) was the most common maternal complication. Women who did not receive antenatal care at the study center were at significantly greater risk of eclampsia ($P = 0.000$) and abruptio placentae ($P = 0.03$). The eight (5.0%) deaths recorded were from the unbooked patients. The maternal mortality ratio (MMR) was 438/100,000 live births, out of the overall MMR of 932/100,000 live births during the study. There were significant higher risks of very low birthweight ([VLBW] $\chi^2 = 9.415$; $P = 0.002$), extremely low birthweight ([ELBW] $\chi^2 = 4.588$; $P = 0.03$), and perinatal death ($\chi^2 = 16.913$; $P = 0.000$) among babies of the unbooked mothers. The rates of preterm delivery 51 (31.7), birth asphyxia 19 (11.8), and neonatal intensive care units admission 47 (29.2) were higher among the unbooked mothers, though there was no statistically significant difference between the booked and unbooked mothers ($\chi^2 = 1.003$; $P = 0.32$), ($\chi^2 = 0.080$; $P = 0.08$), and ($\chi^2 = 0.955$; $P = 0.33$), respectively. The perinatal mortality rate in this study was 236/1000 births.

DISCUSSION

Hypertensive disorders frequently complicate pregnancy in our environment and the most common been gestational hypertension or PIH. The cesarean section rate was found to be two-fold higher among unbooked mothers. Being unbooked for antenatal care resulted in significantly worse maternal and perinatal outcome in this study.

The 9.4% cumulative incidence of HDP found in this study is comparable to 9.8% reported from Ibadan,² South-West Nigeria and 7.2% in Benin City,⁸ South-South Nigeria. This was probably due to similarity in the study population, as all the three studies were hospital based. A much lower incidence of 3.7% was reported by Mbachu *et al.* from South-East Nigeria.³ Our finding also falls within the global incidence range of 5%–10% of HDP.⁷ There was a significant difference between the booked and unbooked patients ($P = 0.000$) raising suspicion that the recorded incidence may be reflective of the condition in the entire community. The mean maternal age of 27.6 ± 6 years may be explained by the age of optimum obstetric performance of 22–29 years.³ The incidence increases with age, plateaus in the age range 25–29 years, and then decreases as age increases. This finding appears to be in disagreement with advanced maternal age as a risk factor for the development of HDP.⁵

Majority of the patients in this study were nulliparous. This is similar to the report of Mbachu *et al.*,³ nulliparity, as noted in this study, has been reported by previous workers to be at increased risk of HDP.^{5,7,11} The incidence of HDP was much lower among grand multiparous women, probably because of

their fewer numbers seen in our study. This is at variance with the report of Ebeigbe *et al.*, who recorded remarkable increase in the incidence of HDP among grandmultiparous women.⁵

PIH was the most common type of hypertension seen among the study cohort and was closely followed by preeclampsia/eclampsia similar to what was reported from South Africa.¹³ Perhaps, the relative predominance of primigravida (35.4%) may have been responsible since PIH has been reported to be more common among primigravidae.⁵ Other studies, however, reported preeclampsia to be the most common form of HDP.^{3,7} About 12.4% of women with PIH progressed to severe preeclampsia. These cases were managed until prompt and timely delivery according to our departmental protocol. This underscores the need for the early diagnosis and prompt management of cases to curb morbidities and mortalities. This appears to hold better prognosis for the mother and consequent adverse effect of prematurity for the baby. Although conservative management of severe preeclampsia has been shown, in a Nigerian study,¹⁰ to be associated with increased maternal morbidity and mortality; a randomized controlled trial, did not find any significant difference in maternal outcome between women managed aggressively and those managed conservatively.¹⁰

Half of the cases of chronic hypertension in this study were initially diagnosed as either case of PIH or preeclampsia. These

Table 3: Pattern of hypertension among different parity and age group

	Types of hypertension <i>n</i> (%)					<i>P</i>
	GH	PE	ECLP	CHPT	CHPT + PE	
Parity						
Nulli	23 (14.2)	13 (8.1)	20 (12.4)	1 (0.6)	0	0.10
Primi	13 (8.1)	8 (5.0)	4 (2.5)	2 (1.2)	3 (1.9)	
Multi	19 (11.8)	14 (8.7)	9 (5.6)	2 (1.2)	5 (3.1)	
G/multi	9 (5.6)	5 (3.1)	3 (1.9)	5 (3.1)	3 (1.9)	
Age						
<20	2 (1.2)	2 (1.2)	0	2 (1.2)	2 (1.2)	0.21
20-24	20 (12.4)	9 (5.6)	11 (6.8)	1 (0.6)	1 (0.6)	
25-29	19 (11.8)	10 (6.2)	10 (6.2)	3 (1.9)	6 (3.7)	
30-34	9 (5.6)	12 (7.6)	8 (5.0)	0	1 (0.6)	
35-39	11 (6.8)	4 (2.5)	5 (3.1)	4 (2.5)	1 (0.6)	
40-44	1 (0.6)	3 (1.9)	2 (1.2)	0	0	
≥45	2 (1.2)	0	0	0	0	

GH – Gestational hypertension; PE – Preeclampsia; ECLP – Eclampsia; CHPT – Chronic hypertension; CHPT+PE – Chronic hypertension with superimposed preeclampsia; G/multi – Grandmultiparity

Table 4: Maternal and perinatal outcome

	<i>n</i> (%)	Booked (<i>n</i> =83)	Un-booked (<i>n</i> =78)	χ^2	<i>P</i>
Maternal outcome					
Pulmonary edema	3 (1.9)	0	3	3.419	0.07
CVA	4 (2.5)	1	3	1.272	0.25
Eclampsia	36 (22.4)	2	34	33.086	0.000*
Cardiac failure	3 (1.9)	0	3	3.419	0.06
Abruptio placentae	10 (6.2)	1	9	4.601	0.03*
DIC	0	0	0		
ARI	4 (2.5)	1	3	1.272	0.26
HELLP syndrome	0	0	0		
Transient blindness	0	0	0		
Maternal death	8 (5)	0	8	9.415	0.002*
IOL	24 (14.9)	17	7		
SVD	61 (37.9)	37	24	11.931	0.008*
Vacuum extraction	2 (1.2)	2	0		
Cesarean delivery	74 (46.0)	27	47		
Perinatal outcome					
Prematurity	51 (31.7)	24	27	1.003	0.32
LBW	40 (24.8)	23	17	1.579	0.21
VLBW	8 (5.0)	0	8	9.415	0.002*
ELBW	3 (1.9)	0	3	4.588	0.03*
IUGR	17 (10.6)	8	9	0.056	0.81
Perinatal asphyxia	19 (11.8)	7	12	0.080	0.08
NICU admission	47 (29.2)	20	27	0.955	0.33
Perinatal death	38 (23.6)	9	29	16.913	0.000*

*Significant relationship; Chi-square test and Mann–Whitney U-test were used. CVA – Cerebrovascular accident; DIC – Disseminated intravascular coagulopathy; ARI – Acute renal injury; IOL – Induction of labor; SVD – Spontaneous vertex delivery; LBW – Low birthweight (birth weight between 1500 g and 2499 g); VLBW – Very LBW (birth weight between 1000 g and 1499 g); ELBW – Extremely LBW (birth weight<1000 g); IUGR – Intrauterine growth restriction; NICU – Neonatal intensive care unit; HELLP – Hemolysis, elevated liver enzymes, and low platelet count

cohorts had their diagnosis changed to chronic hypertension after 6 weeks of follow-up postpartum. This highlights the significance of maternal follow-up postpartum, and hence that cases with chronic hypertension can be referred to the physicians.

Nonutilization of antenatal care services and late referral of complicated cases are responsible for high maternal morbidities and mortalities seen in developing countries like Nigeria. Evidence suggests that a preference for care by traditional birth attendants, difficulty in accessing affordable health-care facilities, poverty, and ignorance are also responsible.⁵ Unbooked status for antenatal care was associated with significantly worse maternal and perinatal outcome in this study. Similar to the findings by Ebeigbe *et al.*,⁵ this study shows that women who receive antenatal care were significantly more likely to have induction of labor and achieve vaginal delivery with better maternal and perinatal outcome. This was perhaps, because majority of the booked cohorts had early diagnosis and prompt management to avert the occurrence of severe disease and complications.

Furthermore, cesarean section rate was higher among women who did not receive prenatal care. This is corroborated by a study in Benin City.⁵ Probably, the urgent need to deliver the fetus in unfavorable cervix with severe disease, failed induction of labor, or fetal compromise was responsible for this higher cesarean rate. The rate of instrumental vaginal delivery was low in this study compared to findings by other workers.^{5,7,8} Could it be that the art of instrumental vaginal delivery is dying in this region! A further study may be needed to corroborate this assertion.

The effect of booking status on the severity and complications of HDP has been observed by many workers.^{3,5} Maternal complications in this study include eclampsia, abruptio placentae, maternal death, acute renal injury, cardiovascular accident, pulmonary edema, and cardiac failure. Similar observation has been reported from other centers.^{3,5,11} Majority of these complications were seen among unbooked women. Over 94% of women with eclampsia in this study were unbooked. This is similar to the work reported from Sokoto, Nigeria, by Ekele *et al.*,⁷ 90% of abruptio placentae seen in this study occurred among women who did not receive prenatal care. Furthermore, pulmonary edema and cardiac failure were only seen among the unbooked patients. Lack of careful and protocol-driven management may have been responsible for the development of these complications. The incidence of clinical acute renal failure was 2.5%, which is similar to the reported by Sachan *et al.*¹ High maternal morbidity noted in this study may be due to late referral of cases from primary and secondary health centers and interplay of various types of delay. Of particular interest in this environment is the delay in seeking healthcare because of interplay of some cultural factors and poverty.

Eclampsia was responsible for all maternal deaths in this study. This is in keeping with the findings of other workers.^{3,7} It is

one of the five major causes of maternal mortality globally. One each, of the case fatality, complicated by eclampsia also had pulmonary edema and cardiac failure, respectively, and probably, may have compounded their clinical state leading to their demise. Predictions and the prevention of preeclampsia are still a mirage. However, the prevention of eclampsia is much more realistic.

This dataset highlights that the risk of VLBW, ELBW, and perinatal death was significantly worse in unbooked hypertensive women compared to booked cases in conformity with the report from Benin.⁵ The cumulative effect of prematurity (31.7%) and IUGR (10.6%) might be responsible for the high incidence of low-birth-weight (LBW) infants seen in this study. Similarly, previous workers have found that lack of antenatal care and late presentations in labor were associated with worse maternal and perinatal morbidity and mortality in HDP.^{5,15} All cases of VLBW and ELBW infants were from unbooked mothers. Further study is required to investigate long-term complications of LBW babies such as poor postnatal growth, chronic lung disease, retinopathy, necrotizing enterocolitis, and intracranial hemorrhage. In the population studied, herein, the perinatal mortality rate was 21/1000 live births. Hypertensive disease of pregnancy can lead to stillbirth and early neonatal death primarily through placental insufficiency and abruptio placentae, mediated by severely elevated BP.

CONCLUSION

HDP is associated with increased maternal and fetal morbidities and mortalities in Bida, Nigeria. Being unbooked for antenatal care resulted in significantly worse obstetric outcome in this study. Therefore, the provision of affordable and accessible prenatal care services would promote the early diagnosis and prompt treatment of the disease.

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Conflicts of interest

There are no conflicts of interest.

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