**Pattern and Outcomes of Pregnancies Complicated by Hypertensive Disorders in Pregnancy: A Review of 504 Women Managed at Federal Teaching Hospital Gombe, Nigeria**

**ABSTRACT**

**BACKGROUND:**

Hypertensive disorders in pregnancy (HDP) represent a group of conditions associated with elevated blood pressure during pregnancy. It is an important cause of perinatal and maternal morbidity and mortality, particularly in developing countries.

**OBJECTIVES:**

The objectives of this study was to assess the pattern of HDP among patients managed in Federal Teaching Hospital Gombe (FTHG) and to describe maternal and perinatal outcomes and identify factors associated with the pregnancy outcomes.

**MATERIALS AND METHODS:**

This was a retrospective study of 504 consecutive women with HDP seen at FTHG from January 2022 to August 2022. Data obtained from patients’ case note on the e-folder entered into google form and then analyzed.

**RESULTS:**

The incidence of hypertensive disorders was 31.0% of all deliveries. Most women were booked outside FTH Gombe for antenatal care (59.3%). Majority of deliveries (69.2%) occurred between 37-42 weeks of gestation, and the mode of delivery was mostly caesarean section (49.8%) followed by spontaneous vaginal delivery (48.8%). The most common complication was abruptio placenta, occurring in 37.8% of the cases followed by Eclampsia which occurred in 30.4% of the cases. Women who were unbooked had a higher rate of fetal death (44.40%) compared to those booked elsewhere (20.40%) and at the hospital (3.0%). CHTN + SSPE and Eclampsia having higher rates of mortality (32.1% - 21.8%) compared to CHTN and PIH (4.2% - 11.5%). Preeclampsia was the most common subtype of HDP.

**CONCLUSION:**

Hypertensive disorders in pregnancy are common and associated with high maternal and perinatal mortality and morbidities in our centre. Booking status of women is a significant risk factor..

**KEY WORDS**: Hypertensive disorder pregnancy, perinatal outcomes, abruptio placenta, maternal morbidity and mortality

**INTRODUCTION**

Hypertension is defined as blood pressure of ≥140/90mmHg obtained on two occasions at least 4-6hours apart or an absolute blood pressure of 160/110mmHg or more on one occasion or a mean arterial blood pressure of >105. However, if systolic BP is ≥ 160 and diastolic BP ≥110 mmHg, the high BP should be confirmed within 15 minutes.1,2

There are various forms of classifying HDP, however, the modified classification by the International Society for the Study of Hypertension in Pregnancy (ISSHP), is widely accepted.1,3It classifies HDP into gestational hypertension (pregnancy induced hypertension), preeclampsia, eclampsia, chronic hypertension and chronic hypertension with superimposed severe preeclampsia.

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.1–4 In addition, HDP predisposes to potentially lethal 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.1,5–8 Globally, HDP is a major cause of maternal and perinatal morbidity and mortality. It accounts for about 12% of maternal death worldwide.9,10 The World Health Organization estimated that 100,000 women die from preeclampsia and eclampsia annually.2,4,10,11 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.12,13 In Nigeria, HDP was responsible for 15% of maternal death.1,4,7,11 To prevent adverse maternal and perinatal outcomes, prompt diagnosis and aggressive management are mandatory. In a nationwide analysis of 76,563 deliveries across Nigeria, HDP accounted for 32% of maternal deaths and most are preventable with timely and effective care.14–17

However, in Africa, a relatively higher prevalence of HDP is reported, as it affects 1 in 10 women.4,15,17 Furthermore, there is concern that recent reports on the global burden of HDP underrepresent sub Saharan African populations, indicating the importance of further research addressing HDP among this population.15 The burden of hypertension has been increasing over the past few decades in sub Saharan Africa; however, a large percentage of the population with hypertension remains untreated, ineffectively treated, or even undiagnosed, contributing to the growing cardiovascular disorder problem in this region.2,18

The objectives of this study was to assess the pattern of HDP among patients managed in Federal Teaching Hospital Gombe (FTHG) and to describe maternal and perinatal outcomes and identify factors associated with the pregnancy outcomes.

**METHODOLOGY**

This was a retrospective study of all cases of hypertensive disorders of pregnancy managed at FTHG between 1st January 2022 to 31st August 2022 who presented to the obstetric emergency or were admitted into the antenatal ward, labour room or postnatal ward. The patients were identified by reviewing the register of patients with hypertensive disorders in pregnancy and their folders retrieved and reviewed. Data was collected on google form and Statistical Package for Social Sciences (SPSS) software version 21.0 were used for data entry and analysis.

**RESULT**

From January 2022 to August 2022, 504 women with HDP managed at the FTHG were analyzed. The patients included all women who delivered at FTHG and those that delivered outside and presented in the puerperium with hypertensive disease.

Within the period of the study a total of 1624 obstetric cases were managed, 504 of them had HDP giving an incidence of 31.0%.

**Table 1: Age distribution of the patients with HDP**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=504)** | **Percent** |
| **Age group** |  |  |
| <20 | 54 | 10.7 |
| 20-24 | 103 | 20.4 |
| 25-29 | 113 | 22.4 |
| 30-34 | 105 | 20.8 |
| 35-39 | 87 | 17.3 |
| ≥40 | 42 | 8.3 |

The age distribution of women with hypertensive disorders in pregnancy (HDP) at the FTHG showed a significant proportion of women across various age groups. Majority of women with HDP were in the 25-29 age group, comprising 22.4% of the total, followed by those in the 30-34 age group, accounting for 20.8%. The 20-24 age group had 20.4% of the cases, while the 35-39 age group had 17.3%. The youngest age group (<20) had 10.7% of the cases, and the oldest age group (≥40) had 8.3%.

**Table 2: Obstetric characteristics of the patients with HDP**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percentage** |
| **Parity** |  |  |
| Nullipara | 142 | 28.2 |
| Primipara | 92 | 18.3 |
| Multipara | 142 | 28.2 |
| Grand multipara | 128 | 25.4 |
| **Booking status** |  |  |
| Booked | 169 | 33.5 |
| Booked Elsewhere | 299 | 59.3 |
| Unbooked | 36 | 7.1 |
| **Gestational age at delivery** |  |  |
| <28 | 7 | 1.4 |
| 28-36 | 137 | 27.2 |
| 37-42 | 349 | 69.2 |
| >42 | 11 | 2.2 |

The obstetric characteristics of women with HDP at the FTHG are presented in Table 2 above. Majority of the women were nulliparous (28.2%), and multiparous (28.2%) followed by grand multiparous women (25.4%). Most women were booked outside FTH Gombe for antenatal care (59.3%), while 33.5% were booked at the hospital. Majority of deliveries (69.2%) occurred between 37-42 weeks of gestation, and the mode of delivery was mostly caesarean section (49.8%) followed by spontaneous vaginal delivery (48.8%).

**Objective 1: To assess the pattern of HDP among the women in FTH Gombe**

Table 3: Pattern of HDP among the women in FTH Gombe

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percent** |
| **HDP subtypes** |  |  |
| PIH | 174 | 34.5 |
| PE/SPE | 176 | 34.9 |
| CHTN | 48 | 9.5 |
| CHTN + SSPE | 28 | 5.6 |
| Eclampsia | 78 | 15.5 |

The pattern of HDP among women at the FTH Gombe is presented in Table 3. Majority of cases were classified as either preeclampsia/severe preeclampsia (PE/SPE) or pregnancy-induced hypertension (PIH) accounting for 34.9% and 34.5% of the cases, respectively.

Chronic hypertension with superimposed preeclampsia (CHTN + SSPE) and Chronic hypertension (CHTN) were less common occurring in 5.6% and 9.5% of the cases, respectively. Eclampsia accounted for 15.5% of the cases.

**Objective 2: Feto-maternal outcomes of pregnancies among the HDP patients**

Figure 1: Fetal outcomes among women with HDP at the FTH Gombe

The fetal outcomes among women with HDP at FTH Gombe are presented in figure 1 above. Majority of the fetuses (83.7%) were alive, while 16.3% were stillborn or died shortly after birth.

Figure 2: Complications among women with HDP at the FTH Gombe

The outcomes among women with HDP at the FTH Gombe are presented in figure 2 above. Slightly less than a third (29.4%) of the women had complications, while 70.6% had none.

Figure 3: Mode of delivery among the women with HDP in FTH Gombe

Majority of the patients (49.8%) had CS this was closely followed by those that had spontaneous vaginal deliveries (48.8%). Only 1.4% of the patients had instrumental vaginal delivery

Table 4: Types of complications among women with HDP in FTH Gombe

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=148)** | **Percentage** |
| **Complications** |  |  |
| Abruptio placenta | 56 | 37.8 |
| Abruptio placenta, AKI | 1 | 0.7 |
| Abruptio placenta, HELLP syndrome | 1 | 0.7 |
| Abruptio placenta, Others | 1 | 0.7 |
| AKI | 1 | 0.7 |
| AKI, Death | 2 | 1.4 |
| AKI, Death, Others | 1 | 0.7 |
| AKI, ICU Admission, HELLP syndrome | 1 | 0.7 |
| AKI, Others | 2 | 1.4 |
| AKI, Pulmonary oedema | 1 | 0.7 |
| Death | 3 | 2 |
| Death, HELLP syndrome | 1 | 0.7 |
| Death, ICU Admission | 1 | 0.7 |
| Death, Others | 3 | 2 |
| Eclampsia | 45 | 30.4 |
| Eclampsia, AKI | 1 | 0.7 |
| thatEclampsia, AKI, Others | 1 | 0.7 |
| Eclampsia, Death, Others | 2 | 1.4 |
| Eclampsia, ICU Admission | 1 | 0.7 |
| HELLP syndrome | 4 | 2.7 |
| ICU Admission | 2 | 1.4 |
| ICU Admission, Others | 1 | 0.7 |
| Pulmonary oedema | 1 | 0.7 |
| Others | 15 | 10.1 |

Table 4 above depicts the types of complications experienced by women with HDP at FTH Gombe. The most common complication was abruptio placenta, occurring in 37.8% of the cases followed by Eclampsia which occurred in 30.4% of the cases. Other complications included acute kidney injury (AKI), HELLP syndrome, and death, which were less frequent but still significant. The presence of multiple complications was also observed, such as AKI with death or ICU admission.

**Objective 3: Demographic and obstetrics factors associated with fetal and maternal outcomes**

Table 5: Relationship between demographic and obstetrics characteristics with fetal outcomes (i.e., alive or dead)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Alive** | | **Dead** | |  |  |
| **Variables** | **Frequency** | **Percentage** | **Frequency** | **Percentage** | ***X*2** | **P-value** |
| **Age group** |  |  |  |  | 3.226 | 0.665 |
| <20 | 45 | (83.30) | 9 | (16.70) |  |  |
| 20-24 | 82 | (79.60) | 21 | (20.40) |  |  |
| 25-29 | 99 | (87.60) | 14 | (12.40) |  |  |
| 30-34 | 87 | (82.90) | 18 | (17.10) |  |  |
| 35-39 | 75 | (86.20) | 12 | (13.80) |  |  |
| 40+ | 34 | (81.00) | 8 | (19.00) |  |  |
| **Parity** |  |  |  |  | **12.455** | **0.006** |
| Nullipara | 124 | (87.30) | 18 | (12.70) |  |  |
| Primipara | 77 | (83.70) | 15 | (16.30) |  |  |
| Multipara | 126 | (88.70) | 16 | (11.30) |  |  |
| Grand multipara | 95 | (74.20) | 33 | (25.80) |  |  |
| **Booking status** | | |  |  | **46.706** | **<0.001** |
| Booked | 164 | (97.00) | 5 | (3.00) |  |  |
| Booked Elsewhere | 238 | (79.60) | 61 | (20.40) |  |  |
| Unbooked | 20 | (55.60) | 16 | (44.40) |  |  |
| **GA at delivery (weeks)** |  |  |  |  | **43.025** | **<0.001\*** |
| <28 | 0 | (0.00) | 7 | (100.00) |  |  |
| 28-36 | 100 | (73.00) | 37 | (27.00) |  |  |
| 37-42 | 312 | (89.40) | 37 | (10.60) |  |  |
| >42 | 10 | (90.90) | 1 | (9.10) |  |  |
| **Mode of delivery** |  |  |  |  | **38.332** | **<0.001** |
| SVD | 185 | (75.20) | 61 | (24.80) |  |  |
| Instrumental delivery | 3 | (42.90) | 4 | (57.10) |  |  |
| CS | 234 | (93.20) | 17 | (6.80) |  |  |
| **HDP subtypes** |  |  |  |  | **16.201** | **0.003** |
| PIH | 154 | (88.5) | 20 | (11.5) |  |  |
| PE/SPE | 142 | (80.7) | 34 | (19.3) |  |  |
| CHTN | 46 | (95.8) | 2 | (4.2) |  |  |
| CHTN + SSPE | 19 | (67.9) | 9 | (32.1) |  |  |
| Eclampsia | 61 | (78.2) | 17 | (21.8) |  |  |

\* Fishers exact test used because more than 20% of the cells have expected counts of less than five.

The table presents the relationship between demographic and obstetric characteristics and fetal outcomes among women with HDP at the FTH Gombe. The results show that parity, booking status, gestational age at delivery, mode of delivery and HDP subtypes were significantly associated with fetal outcomes. Nulliparas had a lower rate of fetal death (12.7%) compared to primiparas (16.3%) and grand multiparas (25.8%). Women who were unbooked had a higher rate of fetal death (44.40%) compared to those booked elsewhere (20.40%) and at the hospital (3.0%). Fetal outcomes were also influenced by gestational age at delivery, with a higher rate of fetal death among those delivered before 28 weeks (100.0%). The mode of delivery also played a significant role, with caesarean sections (93.2%) having a lower rate of fetal death compared to spontaneous vaginal deliveries (24.8%) and instrumental deliveries (57.1%). HDP subtypes were associated with fetal outcomes, with CHTN + SSPE and Eclampsia having higher rates of mortality (32.1% - 21.8%) compared to CHTN and PIH (4.2% - 11.5%).

Table 6: Relationship between demographic and obstetrics characteristics with maternal outcomes (i.e., absence or presence of complications)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **No** | | **Yes** | |  |  |
|  | **Frequency** | **Percentage** | **Frequency** | **Percentage** | ***X*2** | **P-value** |
| **Age group** |  |  |  |  | **19.883** | **0.001** |
| <20 | 33 | (61.10) | 21 | (38.90) |  |  |
| 20-24 | 60 | (58.30) | 43 | (41.70) |  |  |
| 25-29 | 81 | (71.70) | 32 | (28.30) |  |  |
| 30-34 | 79 | (75.20) | 26 | (24.80) |  |  |
| 35-39 | 74 | (85.10) | 13 | (14.90) |  |  |
| 40+ | 29 | (69.00) | 13 | (31.00) |  |  |
| **Parity** |  |  |  |  | 2.089 | 0.554 |
| Nullipara | 103 | (72.50) | 39 | (27.50) |  |  |
| Primipara | 60 | (65.20) | 32 | (34.80) |  |  |
| Multipara | 104 | (73.20) | 38 | (26.80) |  |  |
| Grand multipara | 89 | (69.50) | 39 | (30.50) |  |  |
| **Booking status** |  |  |  |  | **57.614** | **<0.001** |
| Booked | 156 | (92.30) | 13 | (7.70) |  |  |
| Booked Elsewhere | 179 | (59.90) | 120 | (40.10) |  |  |
| Unbooked | 21 | (58.30) | 15 | (41.70) |  |  |
| **GA at delivery (weeks)** |  |  |  |  | **19.321** | **<0.001\*** |
| <28 | 3 | (42.90) | 4 | (57.10) |  |  |
| 28-36 | 79 | (57.70) | 58 | (42.30) |  |  |
| 37-42 | 264 | (75.60) | 85 | (24.40) |  |  |
| >42 | 10 | (90.90) | 1 | (9.10) |  |  |
| **Mode of delivery** |  |  |  |  | 2.655 | 0.298\* |
| SVD | 176 | (71.50) | 70 | (28.50) |  |  |
| Instrumental delivery | 3 | (42.90) | 4 | (57.10) |  |  |
| CS | 177 | (70.50) | 74 | (29.50) |  |  |

\* Fishers exact test used because more than 20% of the cells have expected counts of less than five.

The table presents the relationship between demographic and obstetric characteristics and complications among women with HDP at the FTH Gombe. The results show that age, booking status, and gestational age at delivery were significantly associated with maternal complications.

The results show that the younger maternal age groups (<20 and 20-24 years) were significantly associated with a higher rate of complications (38.9% and 41.70% respectively), while the older age group (35-39 years) had the lowest rate (14.9%). Booking status was also found to be a significant factor, with unbooked and booked elsewhere patients having higher complication rates (41.7% and 40.1%, respectively) compared to booked patients (7.7%). Gestational age at delivery was another significant factor, with preterm deliveries (<37 weeks) having higher complication rates (42.3-57.1%). In contrast, parity and mode of delivery did not significantly impact complication rates.

**DISCUSSION**

The incidence of hypertensive disorders of pregnancy was 31.0% in this study. The incidence from this study is significantly higher than most other recent studies that have reported incidences of 11.6% and 9.4% respectively.6,8 The reason for the increased incidence rate may be because FTHG is a referral center hence a pool for most of these cases. This is supported by the fact that most of the cases were booked elsewhere and unbooked. The high incidence may however be a true reflection of the overall incidence of HDP at Gombe and this requires further studies. A study carried out in Gombe19 reported incidence of eclampsia of 3.7% compared to similar studies performed around the same time in Lagos and Kaduna that reported incidences of 0.25% and 1.18% respectively.19,20 The finding however showed a much higher incidence than most studies in Northern Nigeria have reported. One study in Jos, Plateau state reported an incidence of 8.8%.9 Most studies on HDP are streamlined to particular definitions especially severe preeclampsia/eclampsia. In this study all patients with hypertensive disorders in pregnancy ranging from pregnancy induced hypertension to preeclampsia, eclampsia and chronic hypertension occurring during the antepartum, intrapartum and postpartum periods were considered.

Preeclampsia was the most common presentation 176(34.92%) observed in women in this study. A similar pattern has been reported by different workers.6,8,17 Preeclampsia was closely followed up by PIH 174(34.52%). Perhaps, the relative predominance of nullipara (28.17%) may have been responsible since PIH has been reported to be more common among primigravidae. Other studies, however, reported PIH to be the most common form of HDP.11

The mean maternal age of 28.7years may be explained by the age of optimum obstetric performance of 22-29years.3,11 This was similar to report from a similar study at Bida with a mean maternal age of 27.6years.8

Majority of the patients were not booked in FTHG elsewhere. Being unbooked or booked elsewhere was associated with significantly worse maternal and perinatal outcome in this study. Similar findings were reported by several workers.6,8,9,12

In this study, about a half of the patients had a cesarean delivery. Other studies have also corroborated this finding.6,8,11,15 Timely delivery is an essential component of the management protocol in women with hypertensive disorders of pregnancy.6

At the time of delivery, a stillbirth rate of 16.27% was observed. This finding is similar to reports from studies conducted in Nnewi that reported a stillbirth rate of 17.4%.11

One hundred and forty-eight women developed at least one complication. Abruptio placenta was the commonest complication observed. This was closely followed up by eclampsia. The effect of booking status on the severity and complications of HDP has been observed by many workers.2,6,8,11 Maternal complications in this study include abruptio placentae, eclampsia, acute renal injury, maternal death, pulmonary edema, cardiovascular accident, and cardiac failure. Similar observation has been reported from other centers.6,8,11,14 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.

Women that delivered before the 37weeks of gestation had significantly more maternal complications.

Maternal death was record in seven patients giving a case fatality rate of 1.4%% this rate is similar to rates from other studies.3,6,11,19,21

**CONCLUSION**

Hypertensive disorders in pregnancy in this study were observed have a high incidence rate.

HDP is associated with increased maternal and fetal morbidities and mortalities in Gombe, Nigeria. There was a strong relationship between booking status and development of maternal and fetal complications therefore strengthening antenatal care services will enable early identification of cases. The provision of affordable and accessible prenatal care services would promote the early diagnosis and prompt treatment of the disease.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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