ERRATUM

1. Ibrahim SM, Mohammed B, Yahaya M, Audu BM, Ibrahim HA on the article "Prevalence of Vaginal Candidiasis among Pregnant Women with Abnormal Vaginal Discharge in Maiduguri" on Page Nig. J. Med 2013. 138-142. Should read: Ibrahim SM, Bukar M, Mohammed Y, Audu BM, Ibrahim HM.

2. Mohammad RJ, Gholam T, Zahed M on the article "Dislocation of the Zygomatic Bone into the Nasal Cavity" on Page Nig. J. Med 2013. 151-153. Should read: Jamalpour MR, Farhangi GR, Mohammadi Z.

3. Mbachu 1, Udigwe GO, Okafor CI, Umeonunihu OS, Ezeama C, Eleje GU on the article "The Pattern and Obstetric Outcome of Hypertensive Disorders of Pregnancy in Nnewi, Nigeria" on Page Nig. J. Med 2013. 117-122. Should read: Mbachu II, Udigwe GO, Okafor CI, Umeonunihu OS, Ezeama C, Eleje GU.

4. Olusola AS on the article "Profile of Ear Diseases among Elderly Patients in Sagamu, South-Western Nigeria" on Page Nig. J. Med 2013. 143-147. Should read: Sogebi OA.

5. Choriocarcinoma in Enugu, South east Nigeria: A Need for a Shift From Mortality to Survival by: Dim CC, Ezegwui HU. This has been re-published due to some missing signs in the result section of the abstract in Nig. J. Med vol. 22. No. 2, April-June 2013.

Original Article

The Pattern and Obstetric Outcome of Hypertensive Disorders of Pregnancy in Nnewi, Nigeria

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BACKGROUND:
Hypertension is a common medical complication of pregnancy. It is one of the leading causes of maternal and fetal mortality and morbidity worldwide. Early detection, close surveillance and timely delivery are necessary to reduce complications associated with the condition.

OBJECTIVES: To determine the pattern, risk factors, maternal and fetal outcomes in women with hypertensive disorders of pregnancy.

METHODOLOGY:This was a descriptive retrospective study of the pattern and obstetrics outcome of hypertensive disorders in Nnewi.. The Obstetric variables from 148 women with hypertensive disorders of pregnancy at the Nnamdi Azikiwe University Teaching Hospital Nnewi, from the 1st January 2004 to 31st December 2008 were analyzed. Stastical analysis was done using Epi Info version 3.3.2. The level of statistical significance was set at $P<0.05$.

RESULTS: of the 4021 deliveries in the hospital during the period under review, 148(3.7%) were managed for hypertensive disorders of pregnancy. Only 138 folders were used for analysis. The mean age of the women was 31.3±5.7years. Majority of the women were unbooked (57.2%). Pre-eclampsia was the commonest type of hypertensive disorder of pregnancy (46.4%) with the majority presenting with severe disease. The level of proteinuria was significant in 74.6% of cases of preeclampsia. The mean gestational age at delivery was 35.3±1.5weeks. The mean birth weight was 1.6±0.3kg. Twenty-four intra uterine deaths were recorded giving a stillbirth rate of 17.4%. The perinatal mortality rate was 20.9%. Diagnosis was made in the ante-partum period in 92.0% of the cases while 55.2% of the women delivered through Caesarean section. Eight maternal deaths were recorded, giving a case fatality rate of 5.8%.

CONCLUSION: Hypertensive disorders of pregnancy are associated with high maternal and fetal morbidity and mortality in Nnewi, Nigeria. Antenatal care will help in early diagnosis and timely intervention of the cases. There is need for strengthening of communication and referral systems in the healthcare.

KEY WORDS: Hypertensive disorders, pattern, obstetrics outcome.

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INTRODUCTION

Hypertensive disorders of pregnancy is one of the commonest direct causes of maternal mortality worldwide.[1,2] . The term is used to describe all forms of hypertension occurring during pregnancy. The prevalence varies among different district, regions, countries and hospitals[1]. It is estimated that it complicates about 10% of all pregnancies[2,3]. It accounts for 12% and15-25% of the maternal death in Nigeria and Ghana, respectively[1,5]. Diagnosis of hypertension in pregnancy is by measuring the blood pressure and estimation of the level of proteinuria. The presence of proteinuria is the most reliable indicator of fetal morbidity and mortality[2,6 ,7]. Known predisposing factors include age <20≥40years,nulliparity,family history, past history, multiple pregnancy, diabetes mellitus and obesity[1,2].

There are a number of classifications of hypertensive disorders in pregnancy[7,8]. The *international Society* for the study of Hypertension in Pregnancy (ISSHP) classification is widely accepted.[7] This classification was used in this study. The first group is Gestational Hypertension and/ or proteinuria developing during pregnancy, labor or pueperium in a previously normotensive non-proteinuric woman. The second category comprises chronic hypertension (before 20th week of gestation), Chronic renal disease with or without hypertension and chronic hypertension with superimposed preeclampsia (new onset proteinuria).The third category is unclassified hypertension and proteinuria. The fourth group is Eclampsia.

Chronic hypertension is characterized by a history of high blood pressure before pregnancy, elevation of blood pressure during first half of pregnancy or high blood pressure that lasts longer than 12 weeks postpartum[7]. Around 90% of cases are considered as primary or essential[1,2]. Close surveillance is necessary for early diagnosis of superimposed preeclampsia and other complications. Generally, chronic hypertension is associated with more maternal and neonatal morbidities and mortality than normotensive state[9].

Pre-eclampsia is one of the leading causes of maternal mortality worldwide[10]. World Health Organization estimated that 100,000 women die from preeclampsia and Eclampsia yearly[3]. Pre-eclampsia is considered severe if there is severe gestational hypertension in association with abnormal proteinuria, or if there is hypertension in association with severe proteinuria (at least 5g per 24hour period)[12]. In addition, pre-eclampsia is considered severe in the presence of multiple organ dysfunction. Preeclampsia is a progressive disease that

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requires prompt diagnosis and delivery to limit maternal and fetal complications. However, for pregnancies less than 34 weeks but greater than 28weeks conservative management maybe employed in well selected cases[7,14].

Eclampsia is defined as occurrence of generalized convulsions usually associated with signs of preeclampsia during pregnancy, labor, or within seven days of delivery not caused by epilepsy or other convulsive disorders[9,10]. Although it is rare in developed countries, it is one of the leading cause of maternal and perinatal mortalities in developing countries[11-15]. Randomised control trials have shown that magnesium sulphate is effective as seizure prophylactic in pre-eclamptic patients and prevention of recurrent seizure in eclamptic patients[16-17].

Most of the mortality associated with hypertensive disorders in pregnancy is caused by pre-eclampsia and eclampsia. There is no previous work on hypertensive disorders of pregnancy in Nnewi. Regular review of the incidence, pattern and maternal and fetal outcomes will help to optimize management. This study determined the incidence, pattern, maternal and fetal outcome in women with hypertensive disorders in pregnancy in Nnewi, Nigeria.

MATERIALS AND METHOD

This was a descriptive retrospective review of women with hypertensive disorders in pregnancy that delivered at the Nnamdi Azikiwe university teaching hospital Nnewi, South- eastern Nigeria from January 2004 to December 2008 (A 5 year period).

Nnewi is the second largest city in Anambra State, Southeastern Nigeria. It comprises four autonomous villages Otolo, Uruagu, Umudim and Nnewichi. Together, Nnewi and its satellite towns have a population of 2.1 million, with Nnewi itself having an estimated population 204,252 (2007 estimate). Nnamdi Azikiwe University Teaching Hospital (NAUTH) is a tertiary referral hospital that is conveniently located near the major business areas of Southeastern Nigeria. It is a renowned teaching hospital in Nigeria with clinical departments and services for both medical undergraduates and post-graduates and a referral centre serving Anambra, Imo, Delta, Enugu and Abia States, Nigeria.

The deliveries at the Nnamdi Azikiwe University Teaching Hospital, Nnewi accounts for 30% of all deliveries that take place in Nnewi town every year (an average of 800 deliveries annually). The majority of deliveries in Nnewi occur in private hospitals and maternity homes, where over 70% of the annual deliveries in Nnewi occur. This is currently a problem because most deliveries that are reffered to the teaching hospital are usually mis-managed cases from these centres, especially from the traditional birth attendants.

The study population included pregnant women who had hypertensive disorders in Nnewi within the study period. One hundred and forty eight cases were reviewed. Women that booked but did not deliver in the hospital were excluded from the analysis.

The folders were retrieved from medical records department after compiling the cases from antenatal clinic, labour ward, prenatal and post natal wards. Demographic data including age, parity, booking weight, highest educational attainment, booking status, gestational age at delivery, clinical and laboratory findings were retrieved from the folders.

Additional information including type, time of diagnosis, delivery route, fetal and maternal complications and birth weight were retrieved. Ethical clearance was obtained from the ethical committee of the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria prior to the collection of the case notes.
Statistical analysis was done using Epi info version3.3.2 software. The level of statistical significance was set at $P<0.05$.

The *international Society* for the study of Hypertension in Pregnancy classification was used in this study. Significant proteinuria using urine dipstick is described as 2+ or more of proteinuria(1gram albumin/litre)in two random clean catch or catheter urine specimens or 1+ (0.3gram albumin/litre) if the specific gravity is less than 1030 and ph less than 8.

RESULTS

Four thousand and twenty six deliveries were recorded in the hospital during the study period. One hundred and forty eight of the women were managed as hypertensive disorders in pregnancy, giving an incidence of 3.7% .Only 138 of the folders were available for the analysis.

The mean age of the women was 31.3±5.7years. The median age was 32years while the modal age was 30years. The highest educational qualification was secondary in 57.7%,(n=77/138). Only 26.1% (n =36/138) had post secondary education. Majority of the women were unbooked (57.2%, n=79/138) and their booking weights were not documented. Only 7.2% had booking weight ≥90kg. The mean parity was 1.6±2.1 with majority of the women being nulliparous 51.4 %,(n=71/138).

Table 1

This shows the socio demographic characteristics of the women. The commonest type of hypertensive disorder of pregnancy was preeclampsia (46.4%, n=64/138) with

50 out of the 64 women presenting with severe disease. Eclampsia was seen in 20.3% (n=28/138). Of the women while chronic hypertension alone and chronic hypertension with superimposed preeclampsia was seen in 5.1%(n=7) and 10.1%(n=14/138) respectively. Unclassified hypertension accounted for 12.3% (n=17/138).

TABLE 1:
SOCIODEMOGRAPHIC CHARACTERISTICS

AGE RANGE [in years]	N=138	%
<20	4	2 9
20 24	12	8 7
25 29	37	26 8
30 34	39	28 3
35 39	35	25 4
≥ 40	11	7 8
THE HIGHEST EDUCATIONAL ATTAINMENT		
Primary	25	18 1
Secondary	77	55 8
Post secondary	36	26 1
BOOKING WEIGHT		%
<50	0	0
50 59	2	2 1
60 69	9	6 5
70-79	18	13 0
80-89	20	14 5
≥90	10	7.2
Not Documented	79	57.2
PARITY		
0	71	51 4
1 2	27	19 5
3 4	27	19 5
≥ 5	13	9.6

Table 2 shows the pattern of Hypertensive disorders in pregnancy

TABLE 2: THE PATTERN OF HYPERTENSIVE DISORDERS OF PREGNANCY

TYPE	FREQUENCY(N=138)	%
Gestational Hypertension	6	4.3
Gestational Proteinuria	2	1.4
Proteinuric Hypertension(Preeclampsia)	64	46.4
Chronic Hypertension with superimposed preeclampsia	14	10.1
Chronic Hypertension	7	5.1
Chronic renal disease	0	0
Eclampsia	28	20.3
Unclassified	17	12.3

The distribution of patients based on known risk factors is shown in **Table 3**.

TABLE 3:
DISTRIBUTION OF THE KNOWN RISK FACTORS

RISK FACTOR	N=138	%
Smoking	0	0
Alcohol	28	20.3
Previous history of preeclampsia	29	21.0
Family history of preeclampsia	12	8.7
Past history of chronic hypertension	21	15.2
Diabetes mellitus	7	5.1
Multiple Pregnancy	5	3.6
Renal disease	0	0

The mean gestational age at delivery was 35.34weeks± 3.54.The majority, 53.6 % (n=74) delivered before term while 46.4% (n=64) delivered at term.

The diagnosis was made in ante-partum period in 92.0% (n=127) of cases, intra-partum in 4.3% (n=6) of cases and post-partum in 3.6% (n=5) of cases. Majority of the women delivered through Caesarean section (55.2%, n=76)) while 47.8% (n=62) delivered through the vagina.

The distribution of maternal complications showed that abruptio placentae occurred in 7.2% (n=10), acute renal failure was seen in 10.9% (15) of the cases, one patient each had cerebrovascular accident and HELLP syndrome and six(4.3) had pulmonary oedema.

Eight maternal deaths were recorded, giving a case fatality rate of 5.4%. Four were due to pulmonary edema while two were secondary to disseminated intravascular coagulopathy. Cerebrovascular accident and HELLP syndrome contributed to one maternal death each.

The mean birth weight was 1.6kg. A total 143 babies

were delivered. Low birth weight was seen in 60.0% (n=87) of cases.

Table 4 Birthweight Distribution

Birth weight	N=138	%
Extremely low birth weight	20	14.5
Very low birth weight	18	13.04
Low birth weight	43	31.16
Normal birth weight	57	41.3
Macrosomia	0	0

Table 4 shows the birth weight distribution. Intrauterine fetal growth restriction, birth asphyxia and prematurity were recorded in 21.7%, 30.1% and 27.8% of cases respectively. Twenty-four intra-uterine fetal deaths were recorded out of the 143 babies delivered giving a stillbirth rate of 16.8%.Thirteen of the deaths occurred in the ante-partum period while eleven died intra-partum. The perinatal mortality rate was 20.9%.

DISCUSSION

The incidence of hypertensive disorders in pregnancy in this study was 3.7% (37/1000). This is comparable to 5.3% reported from Ethiopia[20]. A higher incidence of 11.6% and 12% were reported from Benin, South-south and Ibadan south west Nigeria respectively respectively[4,5] . The high incidence recorded in this study may not be unconnected to the fact that our hospital is a referral centre and hence a pool for most of these cases. This is supported by the fact that most of the cases were unbooked. Also, the mean maternal age of 31.3± 5.7yrs may well be responsible as age of optimum obstetric performance is 22 to 29yrs. Although extremes of age has been identified in studies as risk for development of hypertensive disorder of pregnancy[1,4] , the same cannot be deduced from our findings as our mean age of 31.3 ± 5.7yrs cannot be confidently accepted as extreme age.

This study also found that majority of the patients were nulliparous. This in keeping with other studies that nulliparity is a risk factor for hypertensive disorders in pregnancy in general and preeclampsia in particular.[5,15,16]

The Socio-demographic characteristics showed that most of the women with hypertensive disorders have low level of education. Both low socioeconomic status and poor educational level has been noted to be associated with higher rate of hypertensive disorders in pregnancy[21,22]. The modal parity was nulliparity. This is in keeping with other studies that nulliparity is a risk factor for hypertensive disorders in pregnancy especially preeclampsia[5,15,16].

A strong relationship between booking status and severity of disease in hypertensive disorders have been observed by many workers in developing countries[4,5,15]. Ekele et al noted that 90% of women that had Eclampsia in Sokoto Nigeria were unbooked[17]. This study was in agreement with this observation. The role of antenatal care and comprehensive obstetrics care in early diagnosis and prompt management of hypertensive disorders in pregnancy cannot be over emphasized especially in developing countries. There is need to educate health care givers in primary and secondary health centres on early referral of severe cases.

The commonest type of hypertensive disorders in pregnancy was preeclampsia. A similar pattern has been reported by different workers[4,15]. This underscores the need for early diagnosis and prompt management. Known risk factors noted in this study include nulliparity, low educational level, previous history of preeclampsia, and family history of preeclampsia, diabetes mellitus and multiple pregnancies. Nevertheless, we cannot conclusively say from our study design that these factors were responsible for the disease.

The mean birth weight of 1.5kg recorded in this study coupled with high percentage of low birth weight babies may be attributed to high rate of iatrogenic preterm delivery occasioned by severe maternal disease. Intrauterine growth restriction could have contributed. However, it is very difficult to make the deduction from this study. This warrants establishment of neonatal intensive care units in tertiary and secondary healthcare centres in developing countries. Preterm delivery rate of 48.6% for all cases of hypertensive disorders in pregnancy was reported from Ethiopia[20].

It has been estimated that Preeclampsia and Eclampsia are the commonest cause of iatrogenic prematurity and accompanying complications[21]. Onyiruka et al also reported higher incidence of birth asphyxia, neonatal seizures, neonatal polycythemia and hyperbilirubinamia among babies born to mothers with hypertensive disorders in pregnancy when compared to those born to normotensive mothers in Benin-city Nigeria[23].

A stillbirth ratio of 16.8% of intrauterine with majority occurring in the ante-partum period is high. This calls for increased fetal surveillance and timing of delivery to optimize the outcome. Hypertensive disorders in pregnancy are associated with higher perinatal mortality when compared to normotensive women.

The diagnosis was made in antepartum period in majority of cases which agrees with by several workers [1,4,16,24] . Majority of the women delivered through caesarean section .This is in keeping with findings of other workers[4,5]. It is higher than Cesarean section rate (19.0%) of the centre [25]. This may be due to urgent need to deliver the fetus by the fastest route in severe disease,

failed induction and suspected fetal compromise.

Maternal complications in this study include Abruptio placentae, acute renal failure, cerebrovascular accident, disseminated intravascular coagulopathy, HELLP syndrome and pulmonary edema. Similar observation have been reported in different centres[1,20]. High maternal morbidity noted in the study could be due to late presentation and referral of cases from primary and secondary health centres.

A total of 8 maternal deaths were recorded giving a case fatality of 5.6%.This is less than maternal death rate of 10-15% being quoted for developing countries[1,20]. Though hospital based study is a better assessor of the case fatality, there is need for collaboration from all referral centres to determine the case fatality.. A rate of 19.1% was reported from south Africa[21] and a low rate of 1.2% from Turkey.[24]

Eclampsia and severe preeclampsia accounted for all the maternal deaths. Eclampsia has been found to be the leading cause of maternal mortality in Sokoto Nigeria[17]. It is also one of the five leading causes of maternal mortality in developing countries. [26-27] The commonest cause of death was pulmonary edema secondary to intravascular space contraction. This is in contrast to observation by several workers that cerebral hemorrhage is the commonest cause of death in hypertensive disorders in pregnancy.[28,29]

The two important determinants of maternal and neonatal outcome in this study were booking status and severity of disease. As prediction and prevention of preeclampsia remains inconclusive, the best options are early identification and prompt management to avert associated complications. There is need to strengthen the primary and secondary health care system to promote early identification and referral of cases. Provision of critical care obstetrics and neonatology will also help in limiting the associated complications. The mortality and morbidity associated with this condition can be reduced by making antenatal care affordable, accessible and instituting a recall system for defaulters. Continuous education of healthcare professionals and use of clinical guidelines on the management of severe disease will also decrease the disease burden. Early referral of high-risk cases will go a long way in reducing the complications associated with this condition.

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