MATERNAL AND PERINATAL OUTCOME OF PATIENTS WITH PREECLAMPSIA IN A TEACHING HOSPITAL IN SOUTHWEST NIGERIA

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SUMMARY

Background: Preeclampsia is a multisystemic disorder of pregnancy associated with significant maternal and foetal morbidity and mortality worldwide. Despite advances in medical practice, the aetiology of the condition and optimal management strategies are yet to be fully elucidated. Early detection, close surveillance and timely delivery are necessary to reduce complications associated with the condition.

Objectives: To determine the prevalence of preeclampsia and examine its influence on maternal and perinatal outcome at the Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu.

Methods: This was a descriptive retrospective study of outcome of pregnancies in patients with preeclampsia in OOUTH, Sagamu. Obstetrics and perinatal variables from 127 women who presented with preeclampsia from 1st January 2010 to 31st December 2013 were analysed. Statistical analysis was done using SPSS version 20. The level of statistical significance was set at P less than 0.05(<0.05).

Results: The prevalence of preeclampsia was 6.7%. The mean age of the women was 29.7 ± 6.5years. Seventy three (57.5%) women were unbooked and 67 (52.8%) were nulliparae. Ninety seven (76.4%) of the women presented with severe disease with admission systolic blood pressure of ≥160mmHg and 80 (63%) had diastolic blood pressure of ≥110mmHg. The level of proteinuria was ≥3+ in 76 (59.8%) of the cases. The mean gestational age at delivery was 34.9 ± 3.9 weeks and mean birth weight was 2.3 ± 0.9kg. Sixty three (52.5%) of the subjects had preterm deliveries, 66(83.5%) delivered babies with birth asphyxia while 60 (52.2%) had low birth weight babies. No maternal deaths were recorded among the subjects; however the still birth rate was 34.2%.

Conclusion: Preeclampsia still remains an important cause of adverse pregnancy outcome in Olabisi Onabanjo University Teaching Hospital, Sagamu. Early identification of cases at the antenatal clinic and timely intervention will help in reversing this trend.

Keywords: Preeclampsia, Maternal morbidity, perinatal outcome, early detection and management

INTRODUCTION

Preeclampsia is a pregnancy-associated syndrome occurring in the second half of pregnancy and characterised by hypertension and significant proteinuria[1]. Hypertension in pregnancy is defined as systolic blood pressure of 140mmHg or greater or diastolic blood pressure of 90mmHg or greater on 2 occasions at least four hours apart.[2] Significant

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proteinuria is the presence of 300mg of protein in the urine collected over 24 hours or 30mg/mmol on spot protein: creatinine ratio. In semi-quantitative assay this correlates with 2+ or more of protein in the urine[3]. Pre-eclampsia is considered severe if the systolic blood pressure is ≥ 160 mm Hg or diastolic ≥ 110 mm Hg. Other features of severe preeclampsia include proteinuria of 5gm or more in a 24 hours urine specimen, oliguria, cerebral or visual disturbances, pulmonary oedema, impaired liver function and thrombocytopenia.[4] Preeclampsia complicates about 5-10% of pregnancies.[1] Preeclampsia and eclampsia are important causes of maternal and perinatal morbidity and mortality both in Nigeria and internationally[5-7].

The aetiology of preeclampsia is not known. Various risk factors mostly bordering on genetics and immunologic factors have however been implicated. These risk factors can be broadly classified into general risk factors, pregnancy-related risk factors and those associated with underlying medical conditions.[3]

General risk factors include primigravidity, young maternal age, maternal age above 35 years, low socioeconomic class and family history.[8] Pregnancy-related risk factors include multiple pregnancy and molar pregnancy.[9] Medical conditions associated with preeclampsia include obesity, chronic hypertension, renal diseases, thrombophilia, gestation diabetes, vascular and connective tissue disease and systemic lupus erythromatosis.[3]

Maternal complications of preeclampsia are preterm labour, pulmonary oedema, cardiac failure, Hemolysis Elevated Liver enzymes Low Platelet syndrome (HELLP) and Disseminated Intravascular Coagulation (DIC). Others are renal failure, adult respiratory distress syndrome, cerebral haemorrhage, postpartum haemorrhage, antepartum haemorrhage and renal dysfunction.[9] Maternal death results mainly from complications such as abruptio placentae, hepatic rupture and eclampsia.

Foetal complications of preeclampsia are prematurity, low birth weight, birth asphyxia, foetal growth restriction, intrauterine foetal death and perinatal mortality.[9] Overall perinatal mortality is increased five-fold in patients with preeclampsia with iatrogenic prematurity being the main culprit.[4] Clinical studies of preeclampsia and eclampsia can be used for the evaluation of safe motherhood program at population level.[4]

The aim of this study is to determine the prevalence of preeclampsia and examine its influence on maternal and perinatal outcome at the Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu.

MATERIALS AND METHODS

This was a retrospective study of women who presented with preeclampsia at the Olabisi Onabanjo University Teaching Hospital, Sagamu from 1st January 2010 to 31st December 2013. The case files of these patients were retrieved from Medical Information Department of the hospital. Information was also obtained from labour ward and operation theatre records. Information abstracted included age, booking status, parity, mode of presentation, blood pressure at admission and discharge, maternal outcome, delivery outcome, Apgar scores and birth weight. These variables were recorded in data sheet prepared for the study. The diagnosis of severe preeclampsia was made in a woman with preeclampsia in line with standard protocols which include a diastolic blood pressure equal to or greater than 110mmHg or systolic blood pressure equal to or greater than 160mmHg or urine protein equal to or greater than 5g/24hours.

Patient with mild preeclampsia were treated on outpatient basis with oral antihypertensive and antenatal clinic visit were more frequent to allow for

closer monitoring. Patients diagnosed with severe preeclampsia were admitted for stabilization, blood pressure control, maternal and foetal surveillance aimed at preventing complications, and planning of delivery. Blood pressure control was with intravenous hydralazine or labetalol and followed up with oral nifedipine or methyl dopa singly or in combination as per the need. Magnesium sulphate was given to prevent eclampsia. Generally, patient with mild preeclampsia may be scheduled for delivery at term; however patient with severe preeclampsia may require termination of pregnancy as soon as foetal lung maturity is assured.

The ethical approval to conduct this study was given by the Health Research and Ethics Committee of Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria.

Data was analyzed using IBM-SPSS windows version 20. Continuous variables were summarized using descriptive statistics such as mean and standard deviation at 95% confidence interval. Categorical variables were summarized by frequencies and percentages. The influence of booking status, severity of blood pressures and severity of proteinuria on the foetal outcomes was assessed using Chi-square test and Fischer's exact test as appropriate. A p-value less than 0.05 ($p < 0.05$) was deemed statistically significant.

RESULTS

During the 48 months period, there were 149 cases of preeclampsia out of 2220 deliveries which gave a prevalence rate of 6.7%. Of all the cases of preeclampsia, only 127 case records were retrieved giving a retrieval rate of 85.2%. The mean age of the study subjects was 29.7 ± 6.5 years while the mean parity was 1.7 ± 1.7. The mean gestational age at presentation was 34.2 ± 4.2 weeks while the mean gestational age at delivery was 34.9 ± 3.9 weeks. The socio-demographic characteristics of the subjects are depicted in table 1. Sixty (47.2%) of the study participants were within the age range 31-40 years. The modal parity was para 0 accounting for 36.2% of the study participants. More than half of the subjects presented at gestational age range of 28-36 weeks. Majority (57.5%) of the subjects did not book the index pregnancy at O.O.U.T.H while the remaining 42.5% were booked.

The distribution of the systolic blood pressure of the subjects at admission and discharge is presented in table 2. Majority (76.4%) of the subjects had admission systolic blood pressures that were greater than 160mmHg, while at discharge, only 13.9% had systolic blood pressures that were greater than 160mmHg. The mean systolic blood pressure at admission and discharge were 179.6 ± 37.4 mmHg and 137.6 ± 15.3 mmHg respectively.

The distribution of the diastolic blood pressure of the subjects at admission and discharge is presented in table 3. Majority (63.0%) of the subjects had admission diastolic blood pressures that were greater than 110mmHg, while at discharge only 0.9% had diastolic blood pressures that were greater than 110mmHg. The mean diastolic blood pressure at admission and discharge were 114.1 ± 19.0 mmHg and 83.9 ± 8.6 mmHg respectively.

The distribution of proteinuria among subjects is presented in table 4. Fifty one (40.2%) of the subjects had 2+ proteinuria at presentation, 29(22.8%) had 3+ proteinuria while 47(37.0%) of the subjects had 4+ proteinuria. No maternal deaths were recorded among the subjects. However, there were 12 cases of women who discharged themselves against medical advice which resulted in 9.4% of subjects with unknown maternal outcome.

The foetal outcome of pregnancies complicated by preeclampsia is presented in table 5. Of the total of 127 subjects, only 120 women delivered their babies in OOUTH, the remaining 7 discharged against medical advice prior to delivery. Sixty-three

(52.5%) of the women had preterm births. Forty-one (34.2%) had still births while 79(65.8%) had live births. The mean Apgar score at one minute was 5.5 ± 1.7 while the mean Apgar Score at five minute was 8.1 ± 1.5. Sixty-six (83.5%) of the babies born to preeclamptic women had some form of asphyxia (Apgar score < 7 at one minute). Sixty (52.2%) of the babies had low birth weight. The mean birth weight was 2.3 ± 0.9 kg.

Table 6 shows the association between the booking status, admission blood pressure and level of proteinuria of subjects, and the foetal outcome. There was a higher proportion of still births among the unbooked subjects when compared to the booked subjects (43.8% versus 31.5%). This pattern was however not statistically significant. Similarly there was no statistically significant association between the severity of admission blood pressure and the incidence of still births. The incidence of still births was noted to increase in association with increasing severity of proteinuria. This pattern was statistically significant (p = 0.001).

Table 7 depicts the association between the booking status, admission blood pressure and level of proteinuria of subjects, and the birth weight of babies delivered. There was a higher proportion of low birth weight babies among the unbooked subjects when compared to the booked subjects (57.1% versus 46.2%). This pattern was however not statistically significant. The incidence of low birth weight babies was noted to decrease with increasing systolic blood pressure. This pattern was noted to be statistically significant (p < 0.0001). However in contrast to this, the incidence of low birth weight babies increased with increasing diastolic blood pressure. This pattern was also noted to be statistically significant (p= 0.001). The incidence of low birth weight babies was also noted to increase in association with increasing severity of proteinuria. This pattern was also statistically significant (p < 0.0001).

DISCUSSION

Hypertensive disorders are the most common medical complication occurring in 12-22% of all pregnancies.[4] Preeclampsia is leading cause of hypertension and has been stated to complicate about 10% of pregnancies.[4,10] However, the incidence of preeclampsia in this study was 6.7%. This is similar to the value reported at Benin where a prevalence of 5.6% was recorded.[11] The participants mean age was 29.7 + 6.5 years which was higher than the value reported in Enugu (24.5 ± 2.9 years)[1] but lower than the mean age reported in Nnewi (31.3 ± 5.7 years).[10] The mean gestational age at delivery was 34.9 ± 3.9 weeks which is comparable with 35.3 ± 1.5 weeks observed at Nnewi.[10] Preterm delivery is a known complication of preeclampsia.[9] Majority of the subjects were nulliparous. Similar findings were reported in other studies.[1,10,11] Nulliparity is a recognised risk factor for preeclampsia.[12] More than half of the subjects presented at gestational age below 36 weeks. Similar findings were also reported in Enugu.[1] Majority of the subjects with preeclampsia were unbooked (57.5%). This is similar to findings from a study done in Nnewi where 57.2% of patients with preeclampsia were unbooked.[10] This emphasizes the importance of antenatal care in the early detection of preeclampsia so as to prevent its complications and improve feto-maternal outcome.

Preeclampsia is associated with high perinatal morbidity and mortality. In this study, the still birth rate was 34.2% and this was similar to a still birth rate of 34% reported in Benin.[11,13] The incidence of low birth weight and still birth babies was noted to increase in association with increasing severity of proteinuria. This relationship was statistically significant in this study. Similar studies have also confirmed that presence of heavy proteinuria potentiated the adverse effect of preeclampsia on perinatal outcome.[2,3,11] The incidence of low birth

weight babies was also noted to increase with increasing diastolic blood pressure. This pattern was also noted to be statistically significant. Similarly the incidence of still births appeared to increase with increasing diastolic blood pressure although this was not statistically significant. Curiously however, the incidence of still births and low birth weight babies appeared to be higher in women with systolic blood pressure less than 160mmHg. Although this finding was not statistically significant, it may be a reflection of the proven risk of foetal growth restriction associated with blood pressure control in patients with mild to moderate pregnancy hypertension.[14] In this study, no maternal death was recorded. This may be due to the effective maternal surveillance protocol employed to identify and manage complications, and expedite delivery when indicated. Moreover, the use of prophylactic magnesium sulphate in patients with severe preeclampsia helped in preventing eclampsia. Studies have shown that seizure prophylaxis with magnesium sulphate in patients with severe pre-eclampsia is associated with lower incidence of maternal deaths.[1,15,16]

LIMITATIONS

The study is limited by its retrospective nature and its dependence on patients' record. It was assumed that patients' management was in line with hospital protocol but this may not be the case in all instances. In our environment where patients have to buy drugs and pay for investigations before such are used on them, financial constraints could have hampered some of the management and account for some of the cases of discharge against medical advice noticed in the study.

CONCLUSION

This study has shown that preeclamptic pregnancies are associated with adverse outcomes such as still births, low birth weight babies, birth asphyxia and preterm deliveries. Markedly elevated diastolic blood pressure and heavy proteinuria may potentiate these adverse foetal risks.

A well-structured maternal health care delivery system and a good referral system will allow for early diagnosis and timely intervention and this may result in better pregnancy outcome.

TABLE 1: SOCIODEMOGRAPHIC CHARACTERISTICS OF SUBJECTS

VARIABLES		N	%
Age (years)	<20	19	15
	21 – 30	44	34.6
	31 – 40	60	47.2
	>41	4	3.1
Parity	0	46	36.2
	1 – 2	40	31.5
	3 -4	31	24.4
	>5	10	7.9
Gestational age (weeks)	< 28	17	13.4
	28 – 36	64	50.4
	>37	46	36.2
Booking status	Unbooked	73	57.5
	Booked	54	42.5

TABLE 2: SYSTOLIC BLOOD PRESSURE AT ADMISSION AND DISCHARGE

Blood pressure(mmHg)	Admission n(%) n=127	Discharge n(%) n=115
120 – 139	11(8.7)	59(51.3)
140 – 159	19(15.0)	40(34.8)
>160	97(76.4)	16(13.9)
–	179.6 ± 37.4	137.6 ± 15.3

TABLE 3: DIASTOLIC BLOOD PRESSURE AT ADMISSION AND DISCHARGE

Blood pressure(mmHg)	Admission n(%) n = 127	Discharge n(%) n =115
< 90	15(11.8)	80(69.6)
90 – 109	32(25.2)	34(29.6)
>110	80(63.0)	1(0.9)
Mean ± S.D	114.1 ± 19.0	83.9 ± 8.6

TABLE 4: DISTRIBUTION OF PROTEINURIA AMONG SUBJECTS

Proteinuria	Frequency	Percentage (%)
++	51	40.2
+++	29	22.8
++++	47	37.0

TABLE 5: FOETAL OUTCOME

Variables		N	%
Gestational age at delivery	<28	15	12.5
	28-36	48	40.0
	= 37	57	47.5
Outcome of delivery	Live	79	65.8
	Fresh stillbirth	20	16.7
	Macerated stillbirth	21	17.5
Apgar score 1min	0-3	8	10.1
	4-5	42	53.2
	6-7	16	20.2
	=8	13	16.5
Apgar score 5min	0-3	3	3.8
	4-5	0	0
	6-7	19	24.1
	=8	57	72.7
*Birth weight (kg)	<1	13	11.3
	1-1.49	6	5.2
	1.5-2.49	41	35.7
	2.5-3.5	52	45.2
	>3.5	3	2.6

* The weights of five babies were missing from the case notes

TABLE 6: ASSOCIATION BETWEEN BOOKING STATUS, SEVERITY OF BLOOD PRESSURE AND PROTEINURIA OF SUBJECTS, AND FOETAL OUTCOME

FOETAL OUTCOME

VARIABLES		Live birth n(%)	Still birth n(%)	Chi-Square	P value
Booking status	Unbooked	41(56.2)	32(43.8)	**1.999	0.109
	Booked	38(69.1)	17(30.9)		
Systolic BP (mmHg)	120-139	5(45.5)	6(54.5)		
	140-159	8(42.1)	11(57.9)	5.454	0.065
	≥160	66(67.3)	32(32.7)		
Diastolic BP (mmHg)	<90	10(66.7)	5(33.3)		
	90-109	24(75.0)	8(25.0)	4.056	0.132
	≥110	45(55.5)	36(44.5)		
Proteinuria	++	41(80.4)	10(19.6)		
	+++	13(44.8)	16(55.2)	13.243	*0.001
	++++	25(52.1)	23(47.9)		

*p< 0.05- Statistically significant;
**Fisher's exact test

TABLE 7: ASSOCIATION BETWEEN BOOKING STATUS, SEVERITY OF BLOOD PRESSURE AND PROTEINURIA OF SUBJECTS, AND BIRTH WEIGHT OF BABIES DELIVERED

BIRTH WEIGHT

VARIABLES		< 2.5kg n(%)	≥ 2.5 kg n(%)	Chi-Square	P value
Booking status	Unbooked	36(57.1)	27(42.9)	**1.379	0.265
	Booked	24(46.2)	28(53.8)		
Systolic BP (mmHg)	120-139	11(100.0)	0(0.0)		
	140-159	13(68.4)	6(31.6)	15.379	*<0.0001
	≥160	36(42.4)	49(57.6)		
Diastolic BP (mmHg)	<90	10(66.7)	5(33.3)		
	90-109	8(25.0)	24(75.0)	13.239	*0.001
	≥110	42(61.8)	26(38.2)		
Proteinuria	++	13(25.5)	38(74.5)		
	+++	15(71.4)	6(28.6)	26.200	*< 0.0001
	++++	32(74.4)	11(25.6)		

*p< 0.05- Statistically significant;
**Fisher's exact test

REFERENCES

1) Ugwu E, Dim CC, Okonkwo CD, Nwankwo TO. Maternal and perinatal outcome of severe pre-eclampsia outcome in Enugu, Nigeria after the introduction of MgSO₄. Niger J Clinic Pract 2011; 14: 418-21.

2) Report of the National High Blood Pressure Education Program: Working group report on high blood pressure in pregnancy. Am J Obstet Gynecol 2000; 183: S1-S22.

3) Jido TA, Yakasai IA. Preeclampsia: a review of evidence. Ann Afr Med 2013;12(2):75-85.

4) Singhal SR, Deepika, Anshu, Nanda S. Maternal and perinatal outcome in severe pre-eclampsia and Eclampsia. South-Asian Federation of Obstetrics and Gynaecology 2009; 1(3): 25-28.

5) Duley L. The global impact of preeclampsia and eclampsia. Semin Perinatol 2009; 33(3):130-7.

6) Agida ET, Adeka BI, Jibril KA. Pregnancy outcome in eclamptics at the University of Abuja Teaching Hospital, Gwagwalada,

Abuja: a 3 year review. Niger J Clin Pract 2010; 13(4): 394-8.

7) Adamu AN, Ekele BA, Ahmed Y, Mohammed BA, Isezuo SA, Abdullahi AA. Pregnancy outcome in women with eclampsia at a tertiary centre in northern Nigeria. Afr J Med Med Sci 2012; 41(2): 211-9.

8) Guerrier G, Oluyide B, Keramarou M, Grais RF. Factors associated with severe preeclampsia and eclampsia in Jahun, Nigeria. Int J Womens Healh 2013; 5: 509-513.

9) Konar H. Hypertensive disorder in pregnancy. In: D.C. Dutta's Textbook of Obstetrics 7th Edition, Centra Educational Enterprises 2010: 219-230.

10) Mbachu II, Udigwe CO, Okafor CT. The pattern and obstetric outcome of hypertensive disorder of pregnancy in Nnewi, Nigeria. Niger J. Med 2013; 22(2):117-22.

11) *Onyiriuka AN, Okolo AA.* Perinatal Outcome in Patients with pre-eclampsia in Benin City, Nigeria. Trop J Obstet Gynaecol 2004; 21(2):148-52.

12) Sule-Odu AO, Olatunji AO. Outcome of pregnancy and labour in nullipara. Trop J Obstet Gynaecol 2003; 20(1): 56-58.

13) Ebeigbe PN, Aziken ME. Early onset pregnancy-induced hypertension/eclampsia in Benin City, Nigeria. Niger J Clin Pract 2010; 13(4): 388-93.

14) von Dadelszen P, Ornistein MP, Bull SB, Logan AG, Koren G, Magee LA. Fall in mean arterial pressure and fetal growth restriction in pregnancy hypertension: a meta-analysis. Lancet 2000; 355(9198): 87-92.

15) Olatunji AO, Sule-Odu AO. Presentation and Outcome of eclampsia at a Nigerian University. Niger. J Clin Pract 2007; 10(1) 1-4.

16) Sibai BM. Magnesium sulphate prophylaxis in preeclampsia. Lesson learned from recent trials. Am J Obstet Gynaecol 2004; 190(6):1520-6.