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Occurrence of Pregnancy-Induced Hypertension in Selected Health Facilities in South East Nigeria

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Abstract: Hypertensive disorders complicating pregnancy (PIH) are common and form a deadly triad along with haemorrhage and infection which contribute greatly to maternal morbidity and mortality. This research was conducted to be able to identify and describe pregnant women who are likely to become hypertensive in the course of their pregnancy. Interview technique was used as well as laboratory parameters to obtain data from a random sample of 153 pregnant women ranging between 17 and 40 years old with pregnancies aged between 1 and 9 months from two health facilities in Imo State. A total of 103 pregnant women were found to have normal Blood pressure constituting 67.3% while 50 (32.7%) were found to be hypertensive. The findings show that pregnant women who were either older ($p<0.01$), obese ($p<0.01$) had five or more children ($p<0.05$) with impaired blood sugar ($p<0.05$) and high cholesterol levels were prone to PIH. The implications of these findings will lead to the identification of pregnant women that are likely to develop high blood pressure in pregnancy and hence the institution of prompt management that would lead to a decrease in maternal mortality rate and foetal wastage.

Key words: Pregnancy-induced, hypertension, health facilities, South East, Nigeria

INTRODUCTION

Pregnancy Induced Hypertension (PIH) is a form of high blood pressure characteristically, developed during pregnancy and it is operationally defined as obtaining a Blood Pressure (BP) of 140/90 mmHg at two separate blood pressure measurements and 1^+ (30 mg dL^{-1}) protein in urine. It occurs in about 5-8% of all pregnancies more often in young women with a 1st pregnancy, twin pregnancy, in women with pre-existing kidney problem, diabetic women and those who had a previous PIH and those who have been married for a short time. It is also more common in women younger than 20 years and older than 40 years.

Hypertensive disorders complicating pregnancy are common and form one deadly triad along with haemorrhage and infection which contribute greatly to maternal morbidity and mortality. According to Chan *et al.* (2003) between 1991 and 1999, pregnancy related hypertension caused 15.7% of maternal deaths in the United States. In 2001 according to the National Centres for Health Statistics; gestational hypertension was identified in 150,000 women or 3.7% of pregnancies (Chan *et al*., 2003). Eclampsia could be a severe form of PIH as women with eclampsia have seizures resulting from the condition which arises near the end of the pregnancy. Depending on its duration, chronic hypertension can lead to ventricular hypertrophy and cardiac decompensation, cerebrovascular accidents or renal damage. These complications are more likely during pregnancy if there is superimposed hypertension which develops in 25% of these women (Sibai *et al*., 1998). In a study of causes of maternal mortality in Nigeria, pre-eclampsia (PIH) and obstructed labour had a 27% mortality rate, haemorrhage 23%, infection 15% and abortion 13% (Nwosu *et al*., 2009). In another study on the causes of maternal mortality in Nigeria, haemorrhage was found to be 23%, Infection 17% while malaria, anaemia, abortion, pih, eclampsia and narrow pelvis all recorded 11% each (Nwosu *et al*., 2009).

Globally 500,000 women die from complications arising during pregnancy, delivery or puerperium. Total 55,000 die in Nigeria which accounts for 10% of world's total deaths while Nigeria is 2% of world's population (Nwosu *et al*., 2009). Chances of a woman dying from complications during birth in Africa is 1/15, Europe 1/1895 and North America 1/3750 (ICROSS, 2009).

In line with the Millennium Development Goals set by the United Nations in September 2000 in an effort to

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improve human lives across the globe, the 5th ambitious goal is to improve maternal health by reducing the maternal mortality rate by three-quarters (75%) by 2015. Many countries have 6-15 years to achieve this milestone. In the light of the foregoing, the purpose of this study is to be able to identify and describe the defining characteristics of pregnant women likely to develop PIH during the course of their pregnancy. Specifically, the study sought to determine the following: the relationship between age, parity, Body Mass Index (BMI), cholesterol levels, fasting blood sugar levels, serum creatinine levels, urinary protein levels, platelet levels and the likelihood of developing pregnancy-induced hypertension. Based on this, a null hypothesis suggesting that the likelihood of a woman to develop a blood pressure of 140/90 mmHg will not be significantly related to her age, parity, BMI, cholesterol values, fasting blood sugar level, serum creatinine level and urinary protein level.

This study is justified by its ability to ascertain the accuracy of previous research by others and to add to the body of existing knowledge on the degree of damaging effects of PIH on the life of a pregnant woman and putting her at the risk of early death along with her unborn child. Again the high maternal morbidity and mortality rate arising from pregnancy-induced hypertension from the foregoing information, makes it pertinent to look for premonitory clinical or laboratory indicators to identify women at risk of developing pregnancy-induced hypertension with a view to starting early and prompt treatment preventing the disease from getting worse and help prevent death or other complications. It will also help us to appreciate the usefulness of how ante natal care visits can be helpful in being able to detect disease onset early so that prompt management can be started or case referred to a centre better equipped to handle such cases.

MATERIALS AND METHODS

Two health facilities, Divine Clinic and Maternity, located at Egbeada community in Mbaitoli Local Government Area that provides health care services covering Egbeada, Ubomiri, Orodo and up to Umuaka and Holy Rosary Hospital at Emekuku in Owerri North Local Government Area that provides healthcare services for those around Owerri, Egbu, Awaka, Ezeoba, Emekuku and Azaraegbelu up to Enyiogugu were selected for this study. This descriptive survey design was adopted in this study in other to describe and identify a pregnant woman about to develop hypertension during the course of her pregnancy, using the clinical indices enumerated above. The study population comprised of all pregnant women that visited the antenatal clinics in the two designated hospitals. A total of 754 women visited these two facilities within the 3 months duration of this study (June to August, 2011). Based on sample size calculation (Devore and Peck, 1999), the researchers required a minimum sample size of 200 to reach a statistical significant result. Sample size selection was done using the inclusion criteria technique. All pregnant women that visited were screened with the standardized instruments such as: spirit swabs, syringes and needles, bottles for collecting specimens, weighing scale, sonicaid for monitoring foetal heartbeat, tape measure for height, reagents and centrifuge for spinning samples, spectrophotometer, sphygmomanometer and auto analyser. Sample collection and its standard procedure for analysis were done by qualified laboratory personnel. For example the tourniquet was applied over the forearm or arm and the surface of any visible vein was cleaned with spirit and punctured with the hypodermic needle 5-10 mL of blood collected for the analysis. The pregnant women were made to collect their urine in clean sample bottles and their height obtained with the use of a measuring tape. Their blood pressures were measured with use of the Sphygmomanometer making sure that 80% of the left upper arm was covered by the cuff of the instrument. Through this strict inclusion criterion, only 153 women were found qualified for further use for data analysis. Data obtained was organized in the form shown in the Table 1 while the Statistical Package for Social Sciences (SPSS), Version 6.0 was used to analyse the data.

RESULTS

A total of 153 pregnant women aged between 17-40 years were assessed with pregnancies between 1 and 9 months of gestation. A minimum fasting blood sugar of 37% mg and maximum level of 119% mg with a mean level of 71.923% mg and standard deviation of 17.03 mg dL^{-1} (Table 1). The body mass index has a minimum value of 20.1 and a maximum level of 49.4, a mean of 30.228 and a standard deviation of 5.9080 kg m^{-2}. A minimum systolic blood pressure of 90 mmHg and a maximum of 260 mmHg having a mean of 129.12 and a standard deviation of 28.614 mmHg. The diastolic blood pressure comes with a minimum of 60 mmHg and a maximum of 160 mmHg having a spread of 21.317 mmHg. Other parameters depicted in the table are protein in urine, serum uric acid, serum cholesterol, platelet count, number of previous birth, duration of marriage, serum creatinine and weight and height.

Concerning the Hypertension status, out of the total of 153 pregnant women, 103 (67.3%) were not hypertensive and 50 (32.7%) was found to be hypertensive (Table 2). On number of previous birth or

Table 1: Showing the spread of the variables

Descriptive statistics	Minimum	Maximum	Mean	SD
Age of pregnant woman (years)	17.00	40.00	27.8800	4.71700
Gestational age at Reg. (months)	1.00	9.00	5.2200	2.13400
Haemoglobin level (mg dL^{-1})	10.00	13.50	11.4120	0.77600
Fasting blood sugar (mg dL^{-1})	37.00	119.00	71.9230	17.03000
Protein in urine	1.00	2.00	1.0900	0.29200
Serum Uric acid level (mg dL^{-1})	2.40	8.70	5.0667	2.22102
Serum cholesterol level (mg dL^{-1})	105.00	408.00	193.1500	58.06500
platelet count (cells mm^{-3})	56000.00	290000.00	173609.7600	58973.54700
Body mass index (kg m^{-2})	20.10	49.40	30.2280	5.90800
Systolic blood pressure (mmHg)	90.00	260.00	129.1200	28.61400
Diastolic blood pressure (mmHg)	60.00	160.00	77.5100	21.31700
Number of previous birth	0.00	7.00	0.8800	1.46900
Duration of marriage (years)	1.00	15.00	3.3900	3.53100
Creatinine (mg dL^{-1})	0.30	1.40	0.7210	0.25720
Weight (kg)	51.00	125.00	82.1373	15.99005
Height (m)	1.52	1.83	1.6465	0.06790

parity, 87 (60.4%) of the women had no children previously, 39 (27.1%) had one child being pregnant with the second. Twelve (8.3%) had 2-4 children while 6 (4.2%) had 5 children or more. Concerning Body Mass Index (BMI), 27 (17.6%) of the women had normal weight (BMI 18.5-24.9), 54 (35.3%) were overweight (BMI 25-29.9) while 72 (47.1%) were obese (BMI≥30). When the serum cholesterol level was measured, 72 (60%) had below 199% (mg) and 48 (40%) had levels 200% (mg) and above. About 75or 96.2% of the women had normal blood sugar level of 60-110% (mg) while 3 (3.8%) had >111% (mg). All the 99 of the sample population that had serum creatinine checked all were below 1.5% mg. Out of the 153 of pregnant women no protein was found in 120 (76.4%) of them, 1+ (30 mg dL^{-1}) was found in 30 (19.6%) of the women while 2+ (60 mg dL) was found in only 3 (2%) of the women. Out of the 123 women that had platelet count estimation done, 15 (12.2%) of them had below 100,000 while 108 (87.8%) of the women had counts above 100,000.

The first hypothesis that the older the pregnant woman the more likely she is to develop high Blood Pressure (BP) of 140/90 was postulated. The Table 2 shows that $p<0.01$ and hence the result was found to be very significant. Again from the scatter gram using the line of best fit (Fig. 1 and 2) shows the tendency to developing high BP for both diastolic and systolic pressures as the woman gets older (note that R^2 is positive in both figures).

The second hypothesis was stated that the higher the parity or the number of previous birth of the woman, the more likely she is to develop high BP. Table 3 shows the hypertension status as against the number of previous birth. Out of a total of 87 women who were pregnant for the 1st time, 58 or 66.7% of them had normal BP while 29 (33.3%) of them were hypertensive. Out of 39 of the women who had one previous birth and pregnant with the second during the period of study, 30 (76.9%) of the women had normal BP and 9 (23.1%) were hypertensive. Of the twelve women who had 2-4 previous birth, 9 (75%) had normal BP and 3 (25%) were hypertensive. About 6 women had had 5 or more.

Table 2: Frequency of occurrence of normal and abnormal levels among the study variables

Sample variables	Frequency	Percentage
Hypertension status		
Normal BP	103.000	67.3
Hypertensive	50.000	32.7
Total	153.000	100.0
Parity		
0	87.000	60.4
1	39.000	27.1
2-4	12.000	8.3
5+	6.000	4.2
Total	144.000	100.0
BMI		
Normal weight (18.5-24.9)	27.000	17.6
Over weight (25-29.9)	54.000	35.3
Obese (>30)	72.000	47.1
Total	153.000	100.0
Serum cholesterol		
Desirable <199% (mg)	72.000	60.0
Abnormal >200% (mg)	48.000	40.0
Total	120.000	100.0
Fasting blood sugar		
Normal 60-110% (mg)	75.000	96.2
Abnormal >111% (mg)	3.000	3.8
Total	78.000	100.0
Serum creatinine		
Normal <1.5% (mg)	99.000	100.0
Urine protein		
None	120.000	76.4
1+	30.000	19.6
2+	3.000	2.0
Total	153.000	100.0
Platelet count		
Below 100,000 mm^3	15.000	12.2
Normal (100,000-400,000 mm^3)	108.000	87.8
Total	123.000	100.0
Age of pregnant woman and pregnancy outcome		
Systolic BP	0.333	
Diastolic BP	0.334	

Pearson correlation significant (2-tailed) = 0.000; n = 153

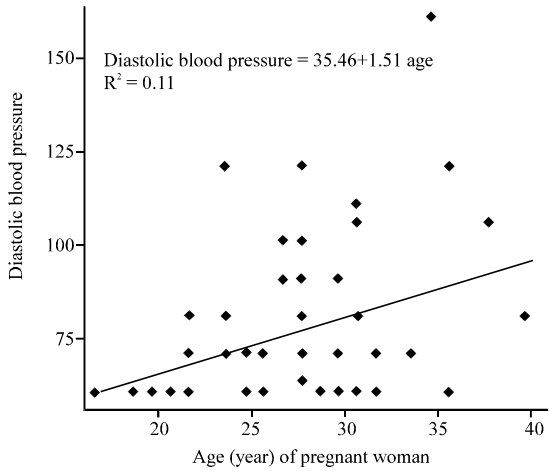

Fig. 1: Diastolic BP versus age of cyetic woman

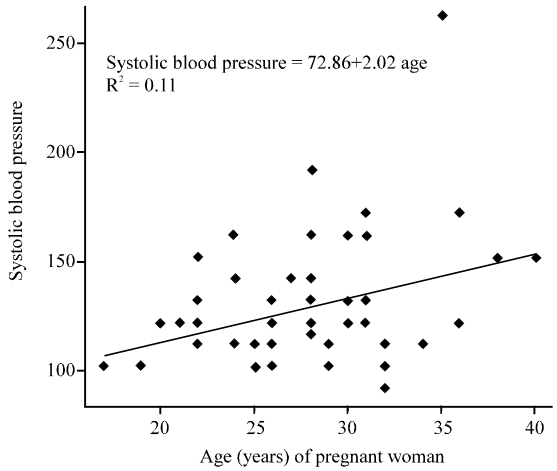

Fig. 2: Systolic BP versus age of cyetic woman

Table 3: Parity of pregnant woman and hypertension outcome

Parity	Normal BP (%)	Hypertensive (%)	Total (%)
0	58 (66.7)	29 (33.3)	87 (100)
1	30 (76.9)	9 (23.1)	39 (100)
2-4	9 (75.0)	3 (25.0)	12 (100)
5+	0 (0.0)	6 (100.0)	6 (100)
Total	97 (67.4)	47 (32.6)	144 (100)

$p<0.05$

Table 4: Relationship between the weight status and frequency of occurrence of normal or high BP

Body Mass Index (BMI)	Normal BP (%)	Hypertensive (%)	Total (%)
Normal weight (18.5-24.9)	21 (77.8)	6 (22.2)	27 (100)
Overweight (25-29.9)	39 (72.2)	15 (27.8)	54 (100)
Obese (>30)	43 (59.7)	29 (40.3)	72 (100)
Total	103 (67.3)	50 (32.7)	153 (100)

$p<0.01$; Pearson correlation (Systolic BP = 0.314, Diastolic BP = 0.293; Significant 2-tailed = 0.000, n = 153)

The third hypothesis (Table 4) postulates that the higher the BMI the more likely the pregnant woman is to develop high blood pressure. Out of 27 women with normal weight 21 (77.28%) had normal BP and 6 (22.2%) were hypertensive. Out of the 54 women who were overweight, 39 (72.2%) had normal BP while 15 (27.8%) were hypertensive. Of the 72 obese women, 43 (59.7%) had normal BP, 29 (40.3%) were hypertensive. It is obvious that majority of those obese were hypertensive. A Pearson correlation coefficient test showed that $p<0.01$ indicating a significant result. An illustrative line of best fit indicating that as BMI increases, BP rises for both diastolic and systolic is shown in the scatter gram (Fig. 3 and 4).

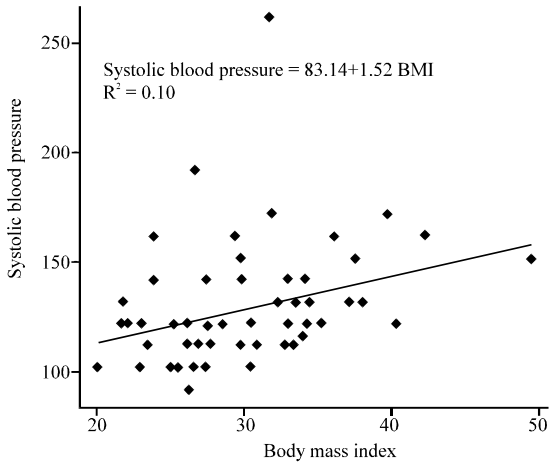

Fig. 3: Relationships between BMI and systolic BP

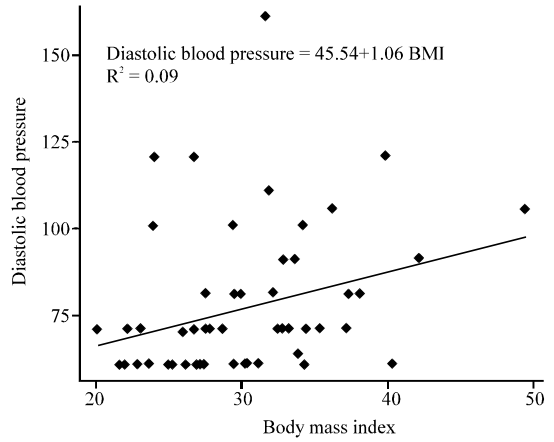

Fig. 4: Relationships between BMI and Diastolic BP

Table 5 is a cross tabulation of the hypothesis positing that the higher the cholesterol level the higher the BP. The table indicates that out of 72 women identified with serum cholesterol level <199% (mg), 43 (55.7%) had normal BP while 29 (40.3%) were hypertensive. Out of a total of 48 women identified with serum cholesterol level of 200% mg and above, 33 (68.75%) had normal BP while 15 (31.25%) had high BP. The χ^2-test was not found to be significant ($p>0.05$).

Table 5: Relationship between cholesterol level and BP

	Hypertension status		
Serum cholesterol level	Normal BP (%)	Hypertension (%)	Total (%)
<199% (mg)	43 (59.70)	29 (40.30)	72 (100)
>200% (mg)	33 (68.75)	15 (31.25)	48 (100)
Total	76 (63.30)	44 (36.70)	120 (100)

Table 6: Relationship between fasting blood sugar and blood pressure

	Hypertension status		
Fasting blood sugar	Normal BP (%)	Hypertension (%)	Total (%)
Normal (60-10% (mg))	46 (61.3)	29 (38.7)	75(100)
IGT >111% (mg)	0 (0.0)	3 (100.0)	3 (100)
Total	46 (59.0)	32 (41.0)	78 (100)

Table 7: Relationship between serum creatinine and hypertension

	Hypertension status		
Serum	Normal BP	Hypertension	Total
Serum creatinine	69.0	30.0	99
Level <1.5% (mg)	69.7%	30.3%	100%

Table 8: Relationship between urine protein and blood pressure

Urine protein	Normal BP	Hypertensive	Total
0	82 (68.30)	38 (31.7)	120 (100)
1+	18 (60.00)	12(40.0)	30 (100)
2+	3 (100.00)	0 (0.0)	3 (100)
Total	103 (67.33)	50 (32.7)	153 (100)

Table 9: Relationship between platelet count and hypertension

Platelet	Normal BP	Hypertensive	Total
<100,000 mm^3	6 (40.0)	9 (60.0)	15 (100)
>100,000 mm^3	70 (64.8)	38 (35.2)	108 (100)
Total	76 (61.8)	47 (38.2)	123 (100)

p>0.05

Table 6 tested the relationship between fasting blood sugar and blood pressure among 78 women of which 75 had normal blood sugar. Of this 75 women, 46 (61.3%) had normal BP while 29 (38.7%) were hypertensive. Only 3 women had impaired glucose level and all three were hypertensive. Chi-square statistical testing was found to be significant ($p<0.05$).

Out of 99 women tested all of them had serum creatinine level less than 1.5% mg (Table 7). Out of this, 69 women (69.7%) had normal blood pressure while 30 (30.3) had high blood pressure. The hypothesis that the higher the serum creatinine the more likely the pregnant woman is to develop high BP was statistically tested and was not found to be significant as none of the subjects had abnormal levels of serum creatinine.

Table 8 sought to find out association between urine protein and blood pressure. Out of the 153 women tested, 120 had no protein in urine and of these figure, 82 (68.3%) had normal BP while 38 (31.7%) had high BP. About 30 women had 1+ of urine protein out of which 18 (60%) had normal BP while 12 (40%) were hypertensive. Of the 3 that had 2+ or protein in urine all had normal blood pressure. Further statistical test of the hypothesis that the higher the urinary protein level the more likely the pregnant woman is to develop high BP was not found to be significant ($\chi^2 = p>0.05$).

The relationship between platelet count and pregnancy induced hypertension was sought for in Table 9. Out of the 15 women who had platelet count below 100,000, 9 (60%) were hypertensive and 6 (40%) had normal BP. Of the 108 of the women that had normal platelet count, 70 (64.8%) had normal BP while 38 (35.2%) were hypertensive.

DISCUSSION

The variables of age and development of PIH were cross tabulated to determine the relationship between age and the development of PIH, it was found that the older a pregnant woman became the more likely she is to develop high BP ($p<0.05$). In a systematic review of controlled studies by Duckitt and Harrington (2005), they reported that pre-eclamsia is more common in the first pregnancy, a family history of pre-eclamsia, the time between pregnancies if ≥10 years increases the risk of pre-eclamsia.

In determining the relationship between parity and the development of PIH, it was revealed that the higher the parity or the more the number of previous birth, the higher the likelihood of PIH developing. This study found out that PIH is more common in those multiparous women with 5 or more children who continued with pregnancies. For example 100% of those who had 5 or more previous deliveries had PIH while a third of primiparous women had PIH; a quarter of those who had a previous pregnancy had PIH and another quarter of those with two to four previous deliveries had PIH (Table 3). Other studies have claimed that it is more common in the 1st pregnancy. For example, Espilin (2001) opined that continued exposure to a partner's semen has a protective effect against pre-eclampsia and is largely due to the absorption of several immune modulating factors from the semen. Going by this assumption the longer the cohabitation between man and wife the lower should be the risk of PIH developing but the reverse is the case here hence, a multitude of factors definitely is at play. Such factors include obesity, family history, age, multiple pregnancy, body mass ≥35 and existing medical condition.

An association was also sought to determine the relationship between Body Mass Index (BMI) and the development of PIH. It was found that those with a BMI of ≥30 (43%) of them were hypertensive. Pregnancy in effect is a weight gaining condition and those who invariably had an excess weight were prone to high BP and these finding tallies with the researches of Sibai

(2003) who found out that in women with twin gestation compared with singletons, the incidence of gestational hypertension was (13 versus 16%) and the incidence of pre-aclamsia was (13 versus 5%).

The fourth specific objective sought to determine the relationship between cholesterol levels and the development of PIH. From the data analysis the Chi-square testing shows $p>0.05$ which is not significant as there was no direct relationship of high serum cholesterol levels on the BP of the pregnant women rather it is shown that those with high cholesterol levels had high body mass indices. However, from the records the pregnant women who were obese and with high BMI's had high cholesterol levels so it can indirectly be said that high cholesterol levels put a pregnant woman at risk of PIH although, not statistically proven from this study. Rister (2008) suggested that it is important to understand that everyone does not react to either cholesterol or high sodium by developing high blood pressure, rather a combination of factors of which cholesterol and sodium are only the major part that determine the condition. Pregnancy can cause previously normal cholesterol levels to rise. This normal development is not necessarily a cause for alarm. Women who had high cholesterol before becoming pregnant as opposed to normal rise during pregnancy has a heightened risk of preterm birth. Roth (2007) discussed the correlation between high maternal cholesterol levels and pregnancy induced hypertension from a study conducted and found that pregnant women with cholesterol levels of 279 mg dL^{-1} and raised insulin levels were more likely to develop PIH.

In line with the fifth specific objective which is to determine the relationship between Fasting Blood Sugar (FBS) level and PIH, it was found that all the women in this study with high FBS level of 111% (mg) or more had high blood pressure while one had intrauterine foetal death. The study revealed that the higher the fasting blood sugar the more likely the pregnant woman will become hypertensive. This finding was the same as that found by Vamberque *et al.* (2002) that concluded that PIH appears to be linked to the level of glucose intolerance during pregnancy independently of other known factors of hypertension such as obesity, previous history of hypertension, multiple pregnancy and older women.

The study cited above (Vamberque *et al.*, 2002) also sought for an association between the appearance of serum creatinine and development of PIH. Analysis revealed no valuable data for comparison as all subjects had normal levels of serum creatinine. An abnormal creatinine level would suggest an already existing kidney injury which may or may not co-exist with chronic hypertension. Chronic hypertension is associated with adverse pregnancy outcome regardless of superimposed pre-eclampsia. It predisposes to pre-eclampsia by about fivefold risk and small for gestational age babies by about two fold risk (Schrier, 2007).

Another specific objective sought to determine the relationship between urinary protein and PIH. From the analysis, it was not statistically established that women with PIH always had proteinuria at presentation. Subjects with PIH followed up till delivery only showed proteinuria with worsening high BP. An established control of the BP however cleared the proteinuria.

The last specific objective was to determine the relationship between platelet count level and PIH. Result only showed that majority of subjects with PIH started out with low platelet levels at presentation which worsened with uncontrolled high BP in pregnancy just like proteinuria. Bone marrow studies in pre-eclamptic women show that increased peripheral consumption and platelet turnover caused the decreased number of circulating platelets (Schrier, 2007). Platelets from humans with essential hypertension or pre-eclampsia show an exaggerated response to vasopressin while the activation and impaired calcium response of platelets antedate the increased vascular sensitivity of pre-eclampsia (Schrier, 2007).

CONCLUSION

This study concludes that the occurrence of PIH and its complications will be reduced if the pregnant woman is young, not diabetic and not obese has not more than four previous births and has a serum cholesterol and blood sugar levels within normal limits. In addition to this, the vigilance of the attending health care give with a high index of suspicion is of paramount importance in the overall assessment of the presentation and management of PIH and its complications. By updating the primary health care centres with newer methods of screening, data collection and documentation, better risk profiling and prompt referrals, researchers can preserve the sanctity of life as well as generate more valuable and accurate morbidity and mortality rates to help us appreciate the public health challenges researchers need to overcome.

LIMITATIONS

The present study identified some limitations that would have threatened the validity and reproducibility of this research endeavour. There was total reliance on the authenticity of the results generated through laboratory investigations on the pregnant women by the laboratory

facility. Again the small sample size and short duration of data collection would obviously create some doubts on the reproducibility of this research to future researchers.

RECOMMENDATIONS

It is recommended that from the preceding findings that the blood pressure remains the most important single measure in the diagnosis of hypertension in pregnancy. In the light of this finding, the sphygmomanometer should be made the instrument of first choice in every health facility. Other instruments of equal importance are the weighing scale and tape for measuring the height of the patients. The urine analysis, haemoglobin and blood sugar estimations should be made compulsory routine tests in all health facilities to enable health care givers to predict or detect early signs and symptoms of life threatening health conditions. Age of the woman intending to marry should be critically reviewed as expected child birth for older women between 35 and 42 comes at a price of PIH.

The training of attending health care givers should be properly structured to effectively carry out the examinations and use of symptoms to avoid misleading documentation of wrong patient data. For those health facilities owned by traditional birth attendants, local midwives in localities not easily accessible should be given orientation on the use of the instruments to help identify would be sufferers of PIH and make adequate arrangements for early referrals to higher centres equipped to deal with it. The government of Nigeria already advocates four children per couple for reasons of combating population explosion and economic down turn. This study has also corroborated the revelation that after four child births, the risk of developing PIH by a woman during pregnancy increases. Family planning activities can be extended to women of 4 previous births to promote their health and prevent further pregnancies. It is further suggested that since no one blood parameter is as of yet sufficient to label a pregnant woman a candidate for high BP in pregnancy, more research is needed to identify the almighty clinical indicator or PIH marker. However, locally well designed health care facilities with mini-labs can help to unravel latent diseases before symptoms are established.

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