EVALUATION OF LIPID PROFILE OF HYPERTENSIVE PREGNANT WOMEN ATTENDING MGBAKWU PRIMARY HEALTH CARE CENTRE, ANAMBRA STATE

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ABSTRACT

Hypertension is a serious global public health problem. Serum lipid alteration is a pivotal factor that births hypertension during pregnancy and has been implicated in diverse deleterious health outcomes. Thus, the aim of this study was to evaluate the lipid profiles of hypertensive pregnant women attending Mgbaukwu Primary Health Care (PHC) Centre. A total of 70 pregnant women who had consented were recruited to participate. While thirty five (35) pregnant women were hypertensive, the other remaining 35 pregnant women were not hypertensive (normotensive) and thus, were considered the control group. Socio-demographic characteristics of the participants were generated using structured questionnaire, while lipid profiles of the participants were determined using standard procedures. Results obtained from this study shows that 80% and 34.28% of the hypertensive and normotensive pregnant women respectively were within the age range of 32-37 years old, while 68.6% and 48.57% of the hypertensive and normotensive pregnant women respectively were traders and had completed only secondary school education. The value recorded on Total Cholesterol (TC), Very Low Density Lipoprotein (VLDL), Low Density Lipoprotein (LDL), and Triglycerol (TG) in Hypertensive Pregnant Women (HYPW) were significantly ($p<0.05$) higher than those reported for their normotensive counterparts. In conclusion, it can be deduced from this study that pregnant women who are within 32-37 years of age are prone to hypertension during pregnancy, while social determinants of health (SDOH) can support incidence of hypertension.

Keywords: Health, Hypertension, Lipid, Participants, Pregnancy, Women

INTRODUCTION

Hypertension is health challenge characterized by an elevated blood pressure in the arteries in excess of 140 over 90 mmHg (Seham *et al*., 2015). It is a modifiable risk factor for cardiovascular impairment (NCD-RisC, 2021). An estimated 5-10% of pregnancies, childbirth or postpartum complications are associated with hypertensive disorder (WHO, 2016). Reports affirm that it is the second leading cause of maternal death in developing countries (Patel and Patel, 2023). The pathogenesis of pregnancy induced hypertension (PIH) which accounts for a plethora of deleterious health outcomes revolves around altered lipid metabolism (Say *et al*., 2014).

The enhanced estrogen production that characterizes pregnancy induced hypertension, triggers increased endogenous synthesis of triacylglycerol and Very High Density Lipoprotein in the liver, all of which translates to endothelial accumulation of triacylglycerol and consequent damage of the accumulating endothelial organ. In addition, TAG is also deposited in the walls of the uterine spiral arteries by generating small dense Low Density Lipoprotein (LDL) particles which also plays a role in endothelial damage in pregnancy induced hypertension (Stadler *et al*., 2023).

The chances of occurrence of independent risk factors in cardiovascular diseases such overweight, dyslipidemia, insulin resistance and endothelial dysfunction in women with pregnancy induced hypertension is high (Stadler *et al*., 2023). However, budget made by the health sector to address this menace has always been considered low probably as a result inadequate data on the prevalence which can be better captured from a community based prevalence study such as this.

MATERIALS AND METHODS

Study location

The study was conducted at the Primary Health Care (PHC) Center, Mgbakwu, Awka North Local Government Area, Anambra state, Nigeria. Awka North has a population of 124, 850 dwellers who are predominantly indigenes of the respective communities that form the local government.

Study design

The study commenced on the 10th of June and ended on the 30th of August, 2023. It was a case control study involving 70 participants thirty five (35) of which were hypertensive pregnant women and the remaining thirty five (35), normotensive pregnant women aged 44-49 years old attending Primary Health Care Centre (PHC), Mgbakwu, Awka North Local Government Area, Anambra state, Nigeria for ante-natal purposes. A written consent was obtained from the Anambra State Ministry of Health. Furthermore, the consent of the pregnant women were also sought and obtained at the facility. Details of the socio-demographic characteristics of the study population were generated using structured questionnaire. Lipid profile was also evaluated across the stages of pregnancy i.e., 1st, 2nd, and 3rd trimesters.

Sample collection and lipid profile determination

Exactly 5 mL of blood sample (n=35) drawn from each of the categories of participant was introduced into plain tubes, and

subsequently centrifuged at 4,000 rpm for 15 min. The resulting serum was used for lipid profile determination. High-density lipoprotein (HDL), total cholesterol (TC), low-density lipoprotein (LDL), VLDL and triglycerides (TG), were assessed with the aid of AU2700/5400 Beckman Coulter Analyzers. Total cholesterol was measured using the cholesterol oxidase/hydrogen peroxide (CHO-POD) method. Albumin was estimated using Bromocresol Green method (Hill, 1985).

Data Analysis
Data obtained on lipid profiles at the three (3) stages of pregnancy were analysed with the aid of the Statistical Package for the Social Sciences (SPSS) Version 23. Mean variations between Hypertensive and Normotensive Pregnant Women were compared using unpaired T-test. *P-values* less than 0.05 were statistically significant.

RESULTS AND DISCUSSION
The socio-demographic characteristics of the study population indicates that 28(80%) and 7(20%) of pregnant women were aged between 32-37 and 38-43 years respectively. It was also discovered that while 24(68.6%) of the study population attended secondary school, 11(31.4%) of them attended only primary school. None in the study population had tertiary education. 26(74.3%) of the pregnant hypertensive women had husbands who attended secondary school, while 9(25.7%) of them had husbands who had tertiary education. None of them had a husband who was uneducated or had only primary secondary school education. 21(60%) of them had husbands who were self employed, while 14(40%) of them had husbands who were traders. None of them had a husband who was unemployed, student or civil servant. It was observed that 24 (68.6%), 5 (14.3%), 3(8.6%), 1(2.8%), and 2 (5.7%) of the study population were traders, were self employed, house wives, 1(2.8%) and civil servants respectively.

Figure 1 shows the lipid profile at different stages of pregnancy in both hypertensive and normotensive pregnant women attending Mgbaukwu Primary Health Care (PHC) Centre indicating that serum Total Cholesterol (TC), Low Density Lipoprotein (LDL), Triacylglycerol (TG), and Very Low Density Lipoprotein levels in Hypertensive Pregnant Women (HYPW) were significantly ($p<0.05$) higher than those reported for their normotensive counterpart. However, a contrary observation was made on High Density Lipoprotein and Albumin as there was no significant ($p>0.05$) difference in the serum levels in the aforementioned lipids in both HYPW and NMTPW across the three stages of pregnancy i.e. 1st -3rd trimester.

Table 1: Socio-demographic Characteristics of the Study Population

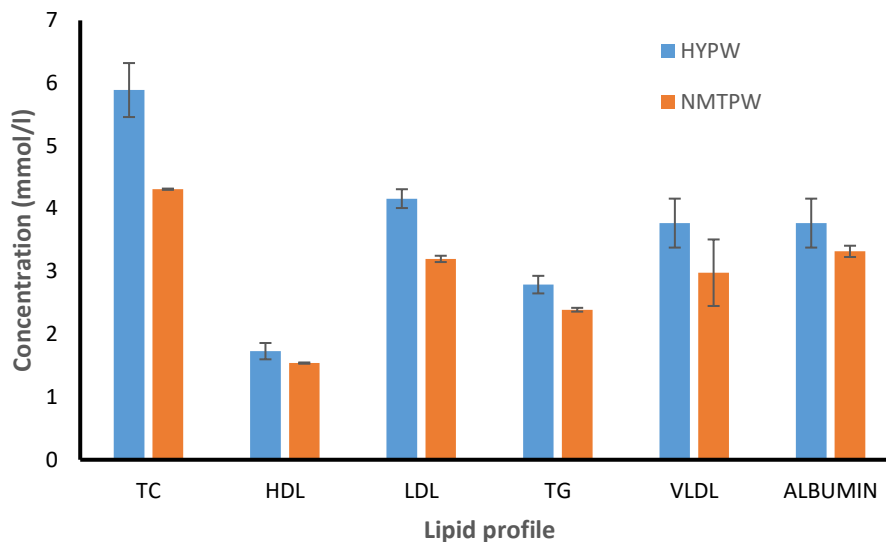| Age	No. of HYP pregnant women	Percentage HYP pregnant women	No. of NM pregnant women	Percentage of NM pregnant women
20-25	0	0	1	2.85
26-31	0	0	17	48.57
32-37	28	80	12	34.28
38-43	7	20	5	14.28
44-49	0	0	0	0
Educational Level				
Uneducated	0	0	0	0
Primary	11	31.4	4	11.42
Secondary	24	68.6	17	48.57
Tertiary	0	0	14	40
Occupation				
House wife	3	8.6	0	0
Student	1	2.8	1	2.85
Trader	24	68.6	16	45.71
Self employed	5	14.3	12	34.28
Civil servant	2	5.7	6	17.14
Husband's Educational Status				
Uneducated	0	0	0	0
Primary	0	0	0	0
Secondary	26	74.3	22	62.85
Tertiary	9	25.7	13	37.14
Husband's Occupation				
Unemployed	0	0	0	0
Student	0	0	10	28.57
Trader	14	40	6	17.14
Self employed	21	60	9	25.71
Civil Servant	0	0	10	28.57

Figure 1: Lipid profile of Hypertensive and Normotensive pregnant women
HYPW [Hypertensive pregnant women], NMTPW [Normoensive pregnant women]. Difference in the lipid profile of HYPW and NMTPW is considered significant at $p<0.005$
TC [p=0.0032], HDL [p=0.0771], LDL [p=0.0005], TG [p=0.0084], VLDL [P=0.0005], Albumin [p=0.1248].

Discussion

The relationship between changes in lipid profile and hypertension is adequately documented. A distorted lipid metabolism occupies a critical position in the pathogenesis of pregnancy induced hypertension (Ojule *et al*., 2005). Research efforts have established a relationship between age and occurrence of hypertension in pregnant women (Partar and Acharjee, 2023). A greater proportion (80%) of the study population (hypertensive pregnant women) was within the age range of 32-37 year old. This is substantiated by research outcomes which established that age above 35 years predisposes pregnant women to hypertension (Partar and Acharjee, 2023). This study aligns with findings made by Suryo *et al*. (2017) which affirms that hypertension in pregnancy is more common in persons over 35 years old. Education is a pivotal social determinant of health (SDOH) affecting people throughout their lifetime (Djannah *et al*., 2019). The outcome of this research showed that more (14%) normotensive pregnant women attained tertiary education contrary to the observation made on their hypertensive counterpart (0%). This observation contradicts a report from a recent prospective Urban Rural Epidemiological study which points out, that persons with minimal levels of education are less likely to be hypertensive than their highly educated counterparts (Djannah *et al*., 2019). The relationship between distorted lipid profiles and hypertension abounds. A decline in Prostaglandin 12: Thromboxane A2 (PG12:TXA2) ratio orchestrated by altered lipid synthesis is critical to the pathogenesis of pregnancy induced hypertension (Ojule *et al*., 2005). Increased Total Cholesterol (TC), Very Low Density Lipoprotein, Triacylglycerol (TG) levels observed on the Hypertensive Pregnant Women (HYPW) shown in Figure1 could be attributed to a distortion in lipid metabolism that characteristically follows hypertension characterized by the accumulation over maternal vascular endothelium precisely those of uterine and renal vessels. This is finding is in tandem with the outcome of the work by Teichmann *et al*. (1985) which affirms that VLDL is increased PIH. The disparity in the Total Cholesterol (TC), Triacylglycerol (TAG) and albumin reported for hypertensive pregnant women in comparison to their normotensive counterparts may be due to increased estrogen production which brings about enhanced synthesis of triglyceride. The observed TG increase in this study is consistent with the finding of De *et al*. (2006) which reported a rise in TG in preeclampsia patients.

CONCLUSION

Through this study, it has been established that majority of the pregnant women attending Mgbaukwu Primary Health Center have distorted lipid profile resulting from pregnancy induced hypertension. .

ETHICS APPROVAL

Anambra State Ministry of Health issued an approval notice to the execution of the research protocol titled "Evaluation of Lipid Profile of Hypertensive Pregnant Women attending Mgbakwu Primary Health Care Centre, Anambra State." on the 23rd day of September, 2022.

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