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Estimation of Anthropometric, Demographic, Diet and Past Medical History of Normotensive and Hypertensive Women during Pregnancy in Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: This study sought to estimate the anthropometric, demographic, diet and past medical history of normotensive and hypertensive women during pregnancy in Nigeria.
Methodology: The study was a prospective cohort study. The participants were pregnant women attending the clinics for antenatal care in four different tertiary health facilities in Nigeria. Participants involved women at first visit (booking day) without hypertension in their first or second trimester of pregnancy and were followed up to delivery. Socio-demographic characteristics of the study population- age, place of residence, marital status, educational background, occupation, ethnic group, diet history, social history, family history, past medical history/medication and gynaecological/obstetrical history were obtained from each participant through a semi pretest questionnaire. Physical indices were determined and recorded.
Results: The results showed that body weight, body mass index, waist circumference and hip circumference were increasing from first to third trimesters of pregnancy. Most of the hypertensive women were between the ages of 29 and 46 years while the normotensive women were aged between 17 and 34 years with the normotensive getting married at a slightly younger age. Systolic and diastolic blood pressure decreased in second trimester and peaked in third trimester. It was observed that women who were married at late age range 35-42 years were 23 times likely to

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develop hypertensive disorders of pregnancy (HDP) when compared with those who married at lower age range of 13-25 years.

Conclusion: Increased age is associated with greater risk of development of HDP. It was also observed that being married is associated with lower risk of development of HDP and therefore longer survival than being single. Observations from this study revealed that previous history of hypertension contributed to HDP. Pregnant women who are not married were more predisposed to HDP than their married counterpart.

Keywords: Age; body mass index; family history; hypertension disorders of pregnancy; marital status.

1. INTRODUCTION

Approximately 1,000 women die from preventable causes related to pregnancy and childbirth with disparity in maternal mortality rate existing within and across countries and regions. It has been reported that 99% of all maternal deaths occur in developing countries in Sub-Saharan Africa and South Asia, of which one third of these deaths occur in just two countries: almost 20 percent of deaths (56,000) occur in India and 14 percent (40,000) in Nigeria [1]. Globally 500,000 women die from complications arising during pregnancy, delivery or puerperium. The chances of a woman dying from complications during child birth in Europe, North America and Africa are 1/1895, 1/3750 and 1/15 respectively. A total of 55,000 women die in Nigeria which accounts for 10% of world's total death [2].

During the past centuries, a number of etiologies of hypertension in pregnancy have been reported, but most have not stood the test of time. Preeclampsia appears to be a culmination of a number of maternal, placental and foetal factors [3]. Poon and colleagues [4] proposed a new screening method by combination of factors in maternal history, mean arterial pressure, uterine artery pulsatility index, and pregnancy associated plasma protein A and placenta growth factor at 11-13 weeks of gestation which identify greater than 90% of cases of early preeclampsia. This appears superior to the traditional approach of screening pre-eclampsia which is based on maternal characteristics and medical history which identify only approximately 30% of cases destined to develop pre-eclampsia.

It has been shown that early treatment decreases not only the frequency of hypertensive crisis, but also the rate of neonatal complications [5]. Despite all efforts, there are no reliable tests to predict the development of hypertension in pregnancy and there are no effective therapeutic methods to prevent preeclampsia. As a result, gestational hypertension and preeclampsia remain a major obstetric problem, accounting for a large percentage of maternal and perinatal morbidities/mortalities [3]. In their study, Ye et al. [6] reported an increase in prevalence of hypertension disorders of pregnancy (HDP) with increasing maternal age. Peter et al. [2] in their studies of blood pressure changes during pregnancy in Nigerian women observed a significant positive correlation of blood pressure with maternal age. In contrast, a study in India reported young age ≤26 years for the development of preeclampsia, [7]. A previous study by others reported higher incidence of HDP in nulliparous compared with multiparous [6-9]. This study sought to estimate the anthropometric, demographic, diet and past medical history of normotensive and hypertensive women during pregnancy in Nigeria.

2. MATERIALS AND METHODS

2.1 Study Design

The study was a prospective cohort study. The participants were pregnant women attending the clinics for antenatal care in four different tertiary health facilities in Nigeria, namely: Ekiti State University Teaching Hospital, Ado-Ekiti, Federal Medical Centre, Ido-Ekiti, University College Hospital, Ibadan and Adeoyo Maternity Hospital, Ibadan. The hospitals are the major referral centres and therefore attract people from different part of the area. Participants were recruited from June 2011 to October 2012 and involved women at first visit (booking day) without hypertension in their first or second trimester of pregnancy and were followed up to delivery.

2.2 Inclusion Criteria

Inclusion criteria include women first seen at first or second trimester (< 20 weeks at booking) with systolic blood pressure below 140 mm/Hg and

diastolic blood pressure below 90 mm/Hg and participants that gave consent.

2.3 Exclusion Criteria

Exclusion criteria include pregnant women first seen at ≥20 weeks of pregnancy, women who are already hypertensive at entry into the study or had proteinuria by the dipstick measurement greater than 300 mg/L (1+).

2.4 Study Population

A total of 521 participants were enrolled in the study out of which 34 developed different types of HDP. From the remaining 487 which were referred to as censored (those who did not develop HDP till the end of the study period, those whose outcome of pregnancy were not known till the end of the study period, those who were lost for follow up and those who dropped out from the study for reasons unrelated to the study), 50 were lost for follow-up whose outcomes of pregnancy were not known. The remaining 437 were normotensive till the end of the study period. The various trimester of follow-up for both hypertensive and normotensive women are shown in Table 1.

Socio-demographic characteristics of the study population- age, place of residence, marital status, educational background, occupation, ethnic group, diet history and social history, family history, past medical history/medication and gynaecological/obstetrical history were obtained from each participant through a semi pretest questionnaire.

2.5 Determination of Physical Indices

2.5.1 Height

The height of each participant was measured in meters against a pre-graduated flat vertical surface with the subjects standing barefooted as upright as possible on a firm level ground. The weight of the participants was ensured to be evenly distributed on both feet. The heels of the feet were placed together with both heels touching the face of the vertical board. The feet while together were placed pointed slightly outward at 60 degree angle. The buttocks, scapulae and head were positioned in contact with the vertical backboard and the arms hanging freely by the side of the trunk with the palms facing the thighs.

2.5.2 Body weight

Body weight was taken with an Omron (Bf 400) weighing scale placed on a flat surface. The subjects while on light clothing and without shoes stood on the pre-zeroed scale and the readings were recorded in kilograms (kg).

2.5.3 Body Mass Index (BMI)

This was calculated as the ratio of weight (kg) to the square of height (m). It was calculated mathematically as:

$$\text{BMI} = \frac{\textbf{Body weight (kg)}}{\textbf{Height } (\textbf{m}^2)}$$

2.5.4 Waist circumference

Waist circumference (in centimeters) was measured while subject was standing using a measuring tape placed in a horizontal plane at the umbilical level.

2.5.5 Hip circumference

Hip circumference (in centimeters) was measured while the subject was standing. The subject was made to stand erect with the feet together and weight evenly distributed on both feet. A non- stretchable measuring tape was held snug but not tight at the maximum extension of the buttocks. The tape was adjusted and the front and sides checked so that the plane of the tape was horizontal. The zero end of the tape was held under the measurement value. The measurement was taken from the right side and the value recorded to the nearest 0.1cm.

2.5.6 Waist Hip Ratio (WHR)

This was calculated by dividing the waist circumference by the hip circumference.

$$\text{WHR} = \frac{\textbf{Waist circumference (cm)}}{\textbf{Hip circumference (cm)}}$$

2.5.7 Percentage body fat

The percentage body fat was measured using bioelectrical impedance method (Omron BF 400). The values were recorded in percentage.

2.5.8 Blood pressure

The diastolic and systolic blood pressure were taken with the use of mercury sphygmomanometer by a Physician after the

Table 1. Summary of participant's recruitment

Event	Normotensive n=487	Hypertensive n=34	Total n=521
Yes	0	34 (100.0%)	34
No (Normotensive)	437 (89.7%)	0	437
Lost for follow-up	50 (10.3%)	0	50
Trimester			
1, 2 & 3	69 (14.2%)	9 (26.5%)	78
2 & 3	64 (13.1%)	8 (23.5%)	72
1 & 2	26 (5.3%)	3 (8.8%)	29
1 & 3	69 (14.2%)	4 (11.8%)	73
1	158 (32.4%)	0	158
2	101 (20.7%)	10 (29.4%)	111

Values are in number of participants with percentage in parenthesis, % = percent, n= number of participants, HDP = hypertensive disorders, 1= first trimester, 2= second trimester, 3= third trimester

patients have rested for at least fifteen minutes and in a sitting position at booking and subsequent visits. The values were recorded in mmHg according to the standard procedures.

2.6 Statistical Analysis

Statistical Package of Social Sciences (SPSS) software version 22.0 (SPP, Inc, Richmond, CA) was employed for analysis of data from study population. Paired student's t-test was used to test the significance of difference between mean values. Analysis of variance (ANOVA) was used to test the significance of variations among group means. Post-Hoc was used for comparison of multiple variable. The relationship between all the variables was assessed by Pearson correlation coefficient. Chi square analysis was used for comparison of means for qualitative (non- quantitative) variables. Survival analysis (time to event analysis) was employed using Cox proportional hazard regression model analysis as the technique to measure the survival and hazard function. A two sided probability value $p<0.05$ was considered statistically significant. Values are reported as mean ± standard deviation or standard error of mean as appropriate.

3. RESULTS

The results of the comparison of anthropometric, demographic, diet and past medical history of the study participants are shown in Table 2. More of the hypertensive women were between the ages of 29 and 46 years while the normotensive women were aged between 17 and 34 years with the normotensive getting married at a slightly younger age. In table 3, the mean maternal age for hypertensive women was 32.3 ± 5.5 years while that of normotensive was 30.5 ± 4.5 years ($p<0.03$). No statistical differences were observed in the age at menarche and gestational age.

Table 4 shows physical indices in the first, second and third trimester among the women with HDP. All the variables were significantly different when the three trimesters were compared using ANOVA. Body weight, body mass index, waist circumference and hip circumference were increasing from first to second and third trimesters of pregnancy. Significant differences were observed in all the parameters except waist to hip ratio and percentage body fat, when first and second trimesters were compared and first with third trimesters compared. Also only diastolic blood pressure was not statistically significant when second and third trimesters were compared.

Table 5 shows the physical indices among the normotensive women in the first, second and third trimester of pregnancy. All the variables were significantly different when the three trimesters were compared using ANOVA. Body weight, body mass index, waist circumference, hip circumference and percentage body fat were increasing from first to second and third trimesters of pregnancy. Systolic and diastolic blood pressure decreased in second trimester and peaked in third trimester. Diastolic blood pressure was observed not to be statistically significant when first and second, second and third with first and third trimesters were compared. Table 6 shows adjusted cox regression of anthropometric and demographic indices in women with HDP. After controlling or adjusting for maternal age, occupation, marital status, parity, body mass index and waist to hip ratio, it was observed that women who were

married at late age range 35-42 years were 23 times likely to develop HDP when compared with those who married at lower age range of 13-25 years. Increased age is associated with greater risk of development of HDP and therefore shorter survival (B coefficient = 3.127, Hazard ratio (HR) = 22.808, p = 0.009). On the other hand, development of HDP is reduced by 95.1% [100%- (100% X 0.049)] for married compared with single women during pregnancy (p=0.000, HR =0.049). The B coefficient for married women is negative meaning that being married is associated with lower risk of development of HDP and therefore longer survival than being single (B coefficient = -3.015).

Table 7 shows un-adjusted cox regression of anthropometric and demographic indices in women with HDP. After individual analysis significant differences were observed in age at marriage, previous history of hypertension, previous history of HDP, BMI at second and third trimester and %body fat 1 (p=0.004, 0.000,0.003, 0.004, 0.002 and 0.028). An increase in age at marriage (age range 35-42 years) of one year will be associated with 8.4 fold increase in risk of development of HDP (HR =8.437, B coefficient = 2.133). Previous history of hypertension and previous history of HDP are associated with greater risk of development of HDP and therefore shorter survival (HR =10.440 and 4.196, B coefficient = 2.346 and 1.434). One unit increase in BMI at second and third trimester will be associated with a 1.1 and 1.1 fold increase in risk of development of HDP (HR= 1.093 and 1.106, B coefficient = 0.088 and 1.101). One unit increase in %body fat at first trimester of pregnancy will be associated with 1.0 fold increase in risk of development of HDP (HR = 1.011, B coefficient = 0.011).

Table 2. Anthropometric, demographic, diet and past medical history in normotensive and women with hypertensive disorders in pregnancy

Index	Non hypertensive	Hypertensive	X^2	p-value
Vegetable/fruits intake	n=473	n=34		
Daily	270 (57.1%)	13 (38.2%)	5.560	0.135
Weekly	176 (37.2%)	17 (50.0%)		
Occasionally	26 (5.5%)	4 (11.8%)		
Never	1 (0.2%)	0 (0.0%)		
Refined carbohydrate products intake	n=463	n=34		
Daily	118 (25.5%)	14 (41.2%)		
Weekly	193 (41.7%)	15 (44.1%)	6.462	0.091
Occasionally	141 (30.5%)	5 (14.7%)		
Never	11 (2.4%)	0 (0.0%)		
Previous hypertension	n=481	n=34		
No	472 (98.1%)	26 (76.5%)	46.666	0.000*
Yes	9 (1.9%)	8 (23.5%)		
Previous pregnancy with HDP	n=476	n=34		
No	460 (96.6%)	29 (85.3%)	10.344	0.001*
Yes	16 (3.4%)	5 (14.7%)		
Age at marriage (coded)	n=360	n=28		
13-25	113 (31.4%)	5 (17.9%)	9.405	0.009*
26-34	240 (66.7%)	20 (71.4%)		
35-42	7 (1.9%)	3 (10.7%)		

*Values are in number of participants with percentage in parenthesis, % = percent, n= number of participants, *= significant at p<0.05, p= significant level, X^2 = Chi-square test.*

Table 3. Anthropometric, demographic and gynaecological history in normotensive and women with hypertensive disorders in pregnancy

Index	Non hypertensive	Hypertensive	t- test	p-value
Age at marriage (years)	27 2 ± 3.7 (n=360)	28.9 ± 4.3 (n=28)	-2.253	0.025*
Maternal age (years)	30.5 ± 4.4(n=483)	32.4± 5.0(n=34)	-2.392	0.017*
Height (m)	1.6 ± 7.9 (n=476)	1.6 ± 6.6 (n=34)	-0.711	0.477
Age at menarche (years)	14.4 ± 2.0 (n=447)	14.1 ± 1.8 (n=31)	0.887	0.375
Gestational age (weeks)	36.6 ± 7.1 (n=437)	35.5 ± 3.5 (n=34)	0.877	0.381

*Values are reported as means ± standard deviation, n = number of participants, * = significant at p<0.05*

Table 4. Physical indices in women with hypertensive disorders in pregnancy

Index	N	1st trimester	2nd trimester	3rd trimester	P1	P2	P3	P4
SBP (mmHg)	11	115.5±3.9	142.7±4.7	161.8±5.7	0.000*	0.002*	0.028*	0.000*
DBP(mmHg)	11	74.5±2.8	96.4±2.4	98.2±2.6	0.000*	0.000*	0.617	0.000*
BW (Kg)	11	80.5±5.6	85.6±5.5	91.0±5.3	0.000*	0.001*	0.000*	0.000*
BMI(Kg/m^2)	11	32.1±2.8	34.2±2.8	36.3±2.8	0.000*	0.000*	0.000*	0.000*
WC (cm)	11	98.8±4.4	105.1±4.4	112.9±3.7	0.000*	0.040*	0.000*	0.000*
HC (cm)	11	107.5±3.5	111.0±3.5	114.8±3.9	0.000*	0.039*	0.016*	0.014*
WHR	11	0.9±0.02	1.0±0.02	1.0±0.02	0.000*	0.361	0.026*	0.063
%BF	10	43.4±2.6	42.6±1.6	45.2±2.3	0.000*	0.628	0.035*	0.201

*Values are reported as means ± standard error of mean, P1 =values obtained from ANOVA, P2=values compared between 1st and 2nd trimester, P3=values compared between 2nd and 3rd trimester, P4=values compared between 1st and 3rd trimester, SBP =systolic blood pressure, DBP = diastolic blood pressure, BW = Body weight, BMI = Body mass index, WC = Waist circumference, HC = Hip circumference, WHR = Waist to hip ratio, %BF = percentage body fat, n = number of participants, * = significant at p<0.05 (2-tailed)*

Table 5. Physical indices in normotensive women

Index	N	1st trimester	2nd trimester	3rd trimester	P_1	P_2	P_3	P_4
SBP (mmHg)	83	107.9±1.2	105.2±0.8	107.3±0.9	0.000*	0.015*	0.021*	0.603
DBP(mmHg)	83	66.9±1.0	65.1±1.0	66.4±0.9	0.000*	0.098	0.233	0.666
BW (Kg)	74	66.4±1.5	70.1±1.6	74.7±1.7	0.000*	0.000*	0.000*	0.000*
BMI(Kg/m^2)	74	25.5±0.6	27.6±0.6	28.6±0.6	0.000*	0.000*	0.001*	0.000*
WC (cm)	73	89.3±1.4	96.5±1.7	103.4±1.1	0.000*	0.000*	0.000*	0.000*
HC (cm)	73	98.1±1.2	100.2±1.2	103.0±1.2	0.000*	0.047*	0.000*	0.000*
WHR	73	0.9±0.01	1.0±0.01	1.0±0.01	0.000*	0.003*	0.003*	0.000*
%BF	71	35.1±1.0	37.7±1.0	38.7±0.8	0.000*	0.001*	0.132	0.000*

*Values are reported as means ± standard error of mean, P_1 =values obtained from ANOVA, P_2=values compared between 1st and 2nd trimester, P_3=values compared between 2nd and 3rd trimester, P_4=values compared between 1st and 3rd trimester, SBP =systolic blood pressure, DBP = diastolic blood pressure, BW = Body weight, BMI = Body mass index, WC = Waist circumference, HC = Hip circumference, WHR = Waist to hip ratio, %BF = percentage body fat, n = number of participants, * = significant at p<0.05 (2-tailed)*

Table 6. Adjusted cox regression of anthropometric and demographic indices in women with hypertensive disorders in pregnancy

Index	B coefficient	Hazard ratio	Confidence interval		p-value
			Lower	Upper	
Age at marriage					
13-25					
26-34	0.882	2.416	0.665	8.773	0.180
35-42	3.127	22.808	2.156	241.287	0.009*
Marital status					
Single					
Married	-3.015	0.049	0.012	0.195	0.000*
Occupation					
Health professionals					
Civil servant	0.517	1.676	0.292	9.618	0.562
Artisan/business	-0.038	0.962	0.145	6.373	0.968
Unemployed/student/others	0.372	1.450	0.207	10.140	0.708
Body mass index					
<18.5 Underweight					
18.5-24.9 Normal	-0.787	0.455	0.058	3.589	0.455
25.0-29.9 Overweight	-0.295	0.745	0.095	5.822	0.779
≥30.0 Obese	-0.418	0.659	0.083	5.243	0.693
Waist to hip ratio					
Normal					
Abnormal	0.189	1.209	0.490	2.980	0.681

** = significant at p<0.05, p= significant level, Maternal age and marital age are in years, Body mass index is in Kg/m^2*

Table 7. Un-adjusted cox regression of anthropometric and demographic indices in women with hypertensive disorders in pregnancy

Index	B coefficient	Hazard ratio	Confidence interval		p-value
			Lower	Upper	
Age at marriage					
13-25					
26-34	0.534	1.706	0.640	4.544	0.286
35-42	2.133	8.437	2.013	35.353	0.004*
Marital status:					
Single					
Married	-0.888	0.412	0.145	1.171	0.096
Occupation:					
Health professionals					
Civil servant	0.331	1.392	0.318	6.090	0.660
Artisan/business	0.218	1.244	0.272	5.677	0.778
Unemployed/student/others	0.167	1.182	0.229	6.097	0.842
Previous Hypertension					
No					
Yes	2.346	10.440	4.723	23.077	0.000*
Previous HDP					
No					
Yes	1.434	4.196	1.623	10.852	0.003*
Family history of hypertension	0.271	1.311	0.624	2.755	0.475
Body mass index					
Body mass index 2	0.088	1.093	1.028	1.161	0.004*
Body mass index 3	0.101	1.106	1.038	1.179	0.002*
Percentage body fat 1	0.011	1.011	0.949	1.078	0.028*

**= significant at p<0.05, p= significant level, Maternal age and age at marriage are in years, 1= first trimester, 2= second trimester, 3= third trimester*

4. DISCUSSION

The incidence of hypertensive disorders of pregnancy (HDP) varies widely ranging from 1-35% among different populations, probably due to variations in the definitions, classification and target population studied [10]. In a population-based study, Ye et al. [6] examined HDP in 112,386 pregnant women with prevalence of 5.22%. Another study conducted in Latur, Maharasthra, India on 1566 deliveries, the prevalence was found to be 6% [1]. Studies in Zambia and Pune also reported prevalence rates of 17.7% [11] and 7.8 % [5] respectively. The variations can be attributed to racial differences, ethnic background, socioeconomic status, age distribution and some other parameters like parity and gravidity [5,6]. Oladele et al. [12] reported the prevalence of hypertensive disorders in pregnant Nigerians and their related factors.

In this study, previous medical history of hypertension and previous HDP were found to be significant risk factors and predictors of developing HDP (table 2). This is similar to the findings of other studies [13-15]. Pregnant women with previous history of hypertension and HDP in this study were 10 and 4 times at risk of developing HDP than women without previous history of hypertension and HDP respectively. Gongora and Wenger [16] and Karakilic and Karakilic [17] "in their respective studies described previous history of HDP as a principal risk factor in the development of HDP. This is consistent with the hypothesis that immune maladaptation might play a role in triggering the development of HDP" [10].

It has been reported that women with a body mass index (BMI) greater than 30 Kg/m^2 had a significantly increased risk of developing HDP [18-20]. In this study, women with HDP had BMI greater than 30 Kg/m^2 which significantly increased from first to third trimester of pregnancy (31.1± 9.4, 33.3 ± 9.2, 35.4 ± 9.4). The percentage mean differences in the three trimesters were 7.1, 6.3 and 13.9 respectively. As compared with the normotensive women in this study, BMI from first to third trimester of pregnancy is less than 30 Kg/m^2. Some studies suggest that for each increase of 5-7 Kg/m^2 in pregnancy, BMI doubles the risk of developing HDP [6,11,21].

In this study, development of HDP is reduced by 95.1% in married women than single pregnant women (Table 6). In other word, being unmarried is a risk factor and predictor of HDP as observed in this study. Our observation is in line with the study of Singh et al. [10] "in northern Nigeria. Although marital status is rarely reported as a risk factor in the literature, a possible explanation in a resource poor country like ours could be due to anxiety due to the financial burden of single parenting in an environment that lacks any form of child welfare support. Moreover the stigma of having a child outside wedlock is a potential source of concern and anxiety for the women which can eventually lead to raised blood pressure" [10]. "In addition, a study in Ibadan highlighted immunological intercourse as the prevention of this maternal-foetal conflict called pregnancy induced hypertension" [22]. "There is a correlation of pregnancy-induced hypertension with duration of sexual co-habitation before the first conception. It was observed that increased length of sexual cohabitation prior to conception reduced the risk of gestational hypertension. Male ejaculate is said to help protect a woman if she has been repeatedly exposed to it" [22]. In our environment, being a single mother could be by chance, viz, a single intercourse. Thus, the single mother, because of short duration of the relationship may develop HDP. This might have contributed to the increased HDP in single pregnant women observed in this study.

As observed in this study, after adjustment for anthropometric indices, BMI became a risk factor and predictor of HDP in the first and second trimesters of pregnancy. An increase in BMI of one unit will be associated with a 1.450 and 1.093 fold increase in development of HDP in the first and second trimesters of pregnancy ($p<0.05$). The greater the value of BMI, the higher the risk of development of HDP (B coefficient = 0.372 and 0.088). This finding is in line with the study of Shaba and Siziya [11], who reported that pregnant women became 1.17 times more likely to develop HDP with a unit change of BMI.

From the findings of this study, other anthropometric indices (body weight, waist circumference, hip circumference and waist to hip ratio) were significantly increased from first to third trimesters of pregnancy. As observed in the study, the baseline values from first trimester and rate of increment to third trimester were higher in the women who developed HDP when compared to normotensive women in all the anthropometric indices except waist to hip ratio. When statistical relationship in these indices was performed individually and when adjusted for among others anthropometric indices, none was observed to be a predictor of HDP in the three trimesters of pregnancy.

5. CONCLUSION

Observations from this study revealed that previous history of hypertension contributed to HDP. Pregnant women who are not married were more predisposed to HDP than their married counterpart. Again, women who were married at late age (35-42 years) were 23 times likely to develop HDP when compared with those who married at younger age of 13-25 years. Increased age is also associated with greater risk of development of HDP. Obese pregnant women and those with high percent body fat at early weeks should be given more attention for proper management in order to prevent subsequent development of hypertensive disorders in pregnancy. Pregnant women with previous history of hypertensive disorders in pregnancy, hypertension, delayed marriage and pregnancy at old age need to be given special attention from the first antenatal booking as these groups have a higher risk of developing hypertensive disorders in pregnancy. Single mothers should be provided with social and economic welfare as these may reduce their risk of developing hypertensive disorders in pregnancy.

ETHICAL APPROVAL AND CONSENT

The ethical approval for the study was obtained from the University of Ibadan/University College Hospital (UI/UCH) Joint Ethics Committee Ibadan, Oyo State, Nigeria. (UI/UCH EC Registration Number: NHREC/05/01/2008a; UI/UCH Ethics Committee assigned number: UI/EC/10/0195) A written informed consent was obtained from each participant before recruitment into the study.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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