EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH
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THE SERUM CHOLESTEROL AND BLOOD PRESSURE OF SELECTED ADULTS IN BAYELSA STATE, NIGERIA

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ABSTRACT

This study investigated the level of serum cholesterol and blood pressures of selected adults in Yenagoa, Bayelsa State. The study subjects comprises One hundred and eighty adults, 94 were males and 86 were females between the age ranges of 20 to 70years selected randomly. The parameters measured where blood pressures, mean arterial pressures and serum cholesterol. The auscultatory, palpatory, enzymatic hydrolysis and oxidative methods were employed in this study. The analysis from the results indicate mean ± standard deviation of blood pressure (mmHg), cholesterol (mmol/L), and mean arterial pressure (mmHg) to be 141.84±17.49/ 87.29±11.64, 5.31±1.56, and 105.47±12.88 respectively for male subjects and 133.90±17.16/82.67±11.22mmHg,4.94±1.55mmol/L, and 99.75±12.50mmHg for systolic and diastolic blood pressure, cholesterol and mean arterial pressure for the female subjects respectively. The systolic and diastolic blood pressure were significantly higher in males than their female counterpart. Observation from this study reveal a positive correlation of the blood pressures of both male and female subjects with their cholesterol level and age. Findings from this study also reveals an increase in the blood pressures of both middle and older aged adults of the male and female subjects in Bayelsa State which may be due to lack of exercise, consumption of cholesterol rich foods etc. We recommend that more research be done with calcium inclusive and their Physiological status on other vital organs such as the heart and the liver.

KEYWORD: Cholesterol, Blood Pressure, Age, Adults.

INTRODUCTION

Cardiovascular diseases (CVD) are among the top most causes of death and disability in adults and one of the main reasons for morbidity with an inverse correlation between the serum cholesterol level and incidence of cardiovascular events – (Ravi et al 2014).Cholesterol is a steroid from animal products usually found in the blood, nerve fibers, and other organs of the body. One of the physiologic functions of cholesterol include its role in forming many hormones to keep the cell membrane insoluble in water and in forming bile salts. Cholesterol is synthesized by the liver from saturated fat in the diet. The richest dietary sources includes liver, whole milk, egg yolk, beef, pork as well as hereditary, and various metabolic conditions such as type III diabetes, can influence individual level of cholesterol. Hence high cholesterol level usually leads to an in-build of excess cholesterol level by macrophages that cannot be easily metabolized thereby creating an early beginning for the formation of artheromatous plaque. (Bronner et al 1993).The build-up of plaque or fatty deposits develop in arterial walls over a period of time harden and narrow arteries and restrict blood flow to the heart and vital organs in the body. When a diet contains too much cholesterol especially saturated fat on a regular basis, serum cholesterol is likely to be elevated which is a contributing factor to coronary heart disease. Outcome from most investigators pointed out that excessive intake of dietary saturated fat with regards to cholesterol usually elevate the serum cholesterol level creating an avenue for the genesis of cardiovascular diseases (Kwiterovich and Ye 2000 and Whitemore 2003). It has been proposed that the low density lipoprotein cholesterol in particular account for about 60% of total cholesterol in the blood and is usually taken up by macrophages. At high cholesterol levels, the macrophages take up more cholesterol than necessary and due to their inability to metabolize them from cells formation result leading to an early stages of plaque formation within the intima of blood vessels (Go Relic et al 1997, Bronner et al 1995, and War low et al 1996).

AIM OF THE STUDY

The present study is aimed at determining the possible relationship "between' blood pressure and serum cholesterol among adults in Bayelsa state.

OBJECTIVES OF THE STUDY

To determine the mean values of serum cholesterol levels, and blood pressures of adults in Bayelsa state.

MATERIALS AND METHOD

Location of Study
The participant were interviewed in Yenezue-gene, Otuogidi, Igbogene, and Yenegwe communities in Bayelsa State of Nigeria.

Sample Size and Tecnique
The serum cholesterol and blood pressure of selected adult males and females numbering one hundred and eighty between the age ranges of 20 to 70 years in a randomized population sample in Yenagoa local Government Area of Bayelsa State of Nigeria. The Method employed to obtain samples needed for the research as well as the benefit to be derived by those who participated as voluntary subjects in the research was clearly stated in the consent form and the parameters obtained from the prospective subjects were documented in the space provided in the questionnaires.

Inclusion Criteria
Only males and females residing in Bayelsa State were selected. The Method employed to obtain samples needed for the selection of subjects for this study was based on age (20-70 years) and residency.

Exclusion Criteria
Subjects with known cardiovascular problems such as cardiac arrhythmias, myocardial infarction, family history of hypertension, and those on diuretic therapy were excluded from the study.

Measurement of Blood Pressure
The blood pressures of the participants were measured in the left brachial artery with Acuson (England) mercurial sphygmomanometer twice. The cuff was wrapped around the arm over the brachial artery and inflated which create a pressure on the artery. The inflation continued until the pressure of the cuff exceed the pressure in the artery. At this point the walls of the brachial artery were tightly compressed againsed each other and no blood can flow through. The deflation of the cuff continue gradually until the maximal artery is reached opens the flow of blood creating a sound heard through the stethoscope due to the turbulence of blood flow. When this sound was heard a reading on the mercury column was made. This sound corresponds to systolic blood pressures due to ventricular contraction. As the cuff pressure was further reduced the sound suddenly muffled out as the blood turbulent reduces significantly. This sound called the diastolic blood pressure which correspond to ventricular relaxation.

Colllection of Blood Samples
Blood samples were collected in the morning while observing the following procedures:
1 A sterile lancet was used to prick the tip of the thumb after cleansing with swab
2 The punctured site was cleansed with a spirit soaked swab and allowed to dry.
The blood samples were introduce into the test line of the test strip for serum cholesterol determination

Materials for Total Serum Cholesterol Determination
1 Kernel International cooperation (Taiwan) Multi check Machine
2 Cholesterol test strip
3 puncturer's tip adjusted to the best depth of skin penetration
4 A sterile swab for cleansing of the thumb and a sterile lancet inserted into the puncturer's tip
5 Code number check strip
6 Male and Female subjects' voluntary participant blood

Materials for Blood Pressure Determination
1 A mercurial Sphygmomanometer (Acuson England) and a stethoscope was used to determine the blood pressures after about ten minutes rest twice while the mean of the two measurement was taken. The pulse rate was also taken after the voluntary participant had been interviewed. (John et al 1982).

RESULTS AND DISCUSSION

Table 1: Comparism of Mean Values For Male And Female Subjects.

Parameters	Males(N=94)	Females (N=86)	Anova Significance (p<0.05)
Age/Years	46.25±13.91 (20-70)	43.24±13.55 (20-70)	0.11 Not significant
SBP (mmHg)	141.84±17.49	133.90±17.16	0.01Significant
DBP (mmHg)	87.29±11.64	82.67±11.22	0.01Significant
CHOL (mmol/L)	5.31±1.56	4.94±1.55	0.06 Not significant

NB: Results are given as mean ± standard deviation and range in parenthesis.

Table 2: categorization of male subjects according to age group with other parameters.

Parameters	n=44 18-44 years (young adults)	n=39 45-64 years (middle age adults)	n=11 >64 years (older adults)	Anova Significance (p<0.05)
SBP (mmHg)	134.52±12.34	147.80±19.54	150.00±17.13	0.00 Significant
DBP (mmHg)	82.96±8.71	90.69±11.57	92.55±16.32	0.00 Significant
MAP	100.14±8.91	109.73±13.50	111.70±16.04	0.00 Significant
CHOL (mmol/L)	5.16±1.56	5.46±1.58 (2.60-8.80)	5.36±1.62 (3.10-8.70)	0.69 Not significant

NB: Results are given as mean ± standard deviation and range in parentheses.

Table 3: Classification of serum cholesterol according to age and blood pressures for male subjects (nhlbi 2007 and nhfa2016).

Parameters	Desirable (<5.1)mmol/L	Borderline High (>5.1-6.1)mmol/L	High (>6.1)mmol/L	Anova Significance p<0.05
Age/Years	44.35±14.94	47.91±11.79	48.20±13.78	
SBP (mmHg)	135.07±12.88	146.30±13.45	150.20±23.00	0.00 Significant
DBP (mmHg)	83.72±10.01	91.30±6.68	90.16±15.73	0.01 Significant
MAP	100.83±10.38	109.64±8.54	110.17±16.96	0.00 Significant

NB: Results are given as mean ± standard deviation and range in parenthesis

Table 4: Classiffication of blood pressure (mmhg) according to age and serum cholesterol for male subjects (who 2014).

Parameters	Normal(99-119/60-79)	Pre-hypertension (120-139/80-89)	Hypertension (>140/90)	Anova Significance P<0.05
Age (years)	44.35±14.94	47.91±11.79	43.20±13.78	0.01 significant
CHOL (mmol/L)	4.87±3.33	4.96±1.38	5.62±1.56	0.11 Not significant

NB: Results are given as mean ± standard deviation and range in parenthesis

Table 5: Categorization of female subjects according to age group with other parameters.

Parameters	n=51 18-44 years (young adults)	n=2, 45-64years (middle age adults)	n=9 >64 years (older adults)	Anova Significance (p<0.05)
SBP (mmHg)	128.41±15.43	141.96±14.83	141.67±21.98	0.01Significant
DBP (mmHg)	79.43±11.22	88.58±7.76	84.00±13.44	0.00 Significant
MAP(mmHg)	95.76±12.07	106.37±9.40	103.22±14.67	0.00 Significant
CHOL (mmol/L)	4.90±1.66	5.20±1.48	4.39±1.01	0.38 Not significant

NB: Results are giving as mean ± standard deviation and range in parenthesis.

Table 6: Classification of serum cholesterol according to age and blood pressure for female subjects   (n.h.l.b.i 2007).

Parameters	Desirable(<5.1) mmol/L	Borderline high (>5.1-6.1) mmol/L	High (>6.1)mmol/L	Anova Significance p<0.05
Age/Years	42.20±14.58 (20-70)	47.60±12.03 (30-70)	42.75±10.79 (27.00-63.00)	0.39 Not significant
SBP (mmHg)	131.69±18.16	134.00±11.77	141.38±16.59	0.13 Not significant
DBP (mmHg)	81.53±11.69	81.93±9.36	87.31±10.5	0.18 Not significant
MAP(mmHg)	98.25±13.05	99.29±9.11	105.33±12.36	0.13 Not significant

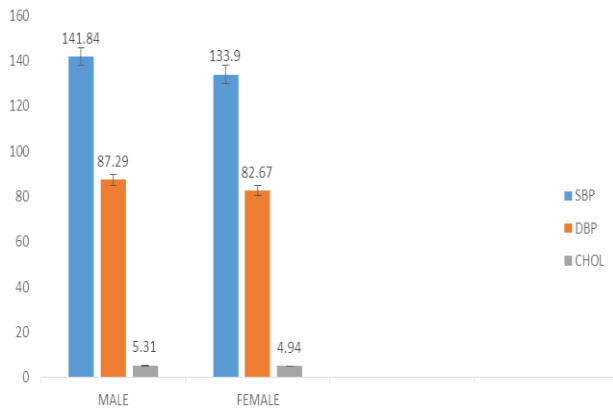NB: Results are giving as mean ± standard deviation and range in parenthesis

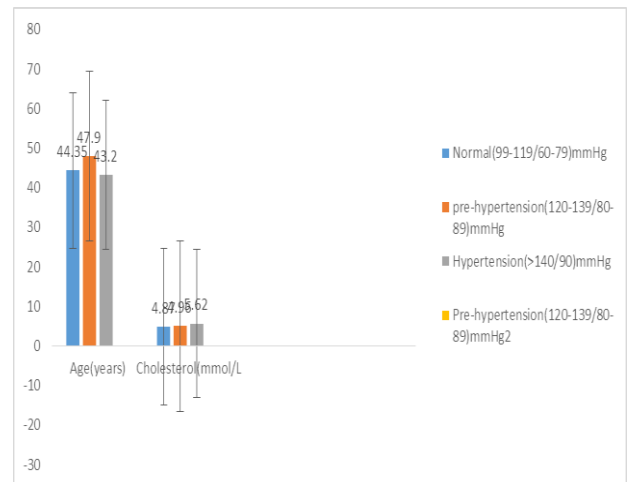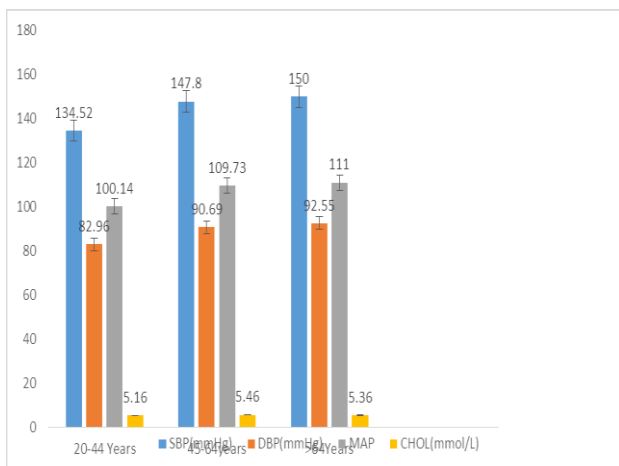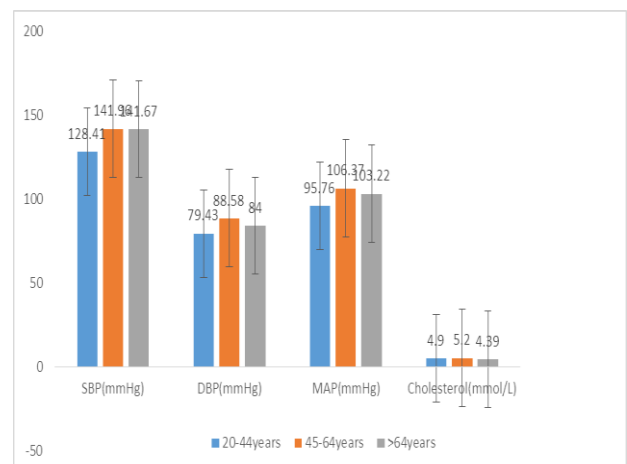Figure 1: Distribution of male and female subject's blood pressures with cholesterol.

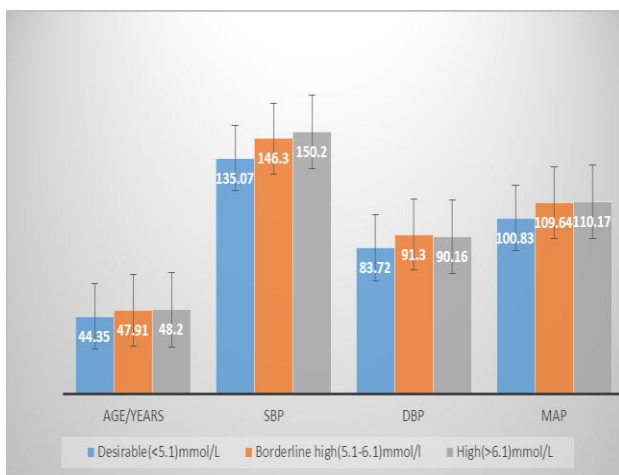Figure 2: Distribution of male subject's blood pressures with cholesterol according to age.

Figure 3: Distribution of male adult subjects cholesterol according to age and blood pressure.

Figure 4: Distribution of male subject's blood pressure according to age and cholesterol.

Figure 5: Distribution of female adult subject's blood pressure with cholesterol according to age.
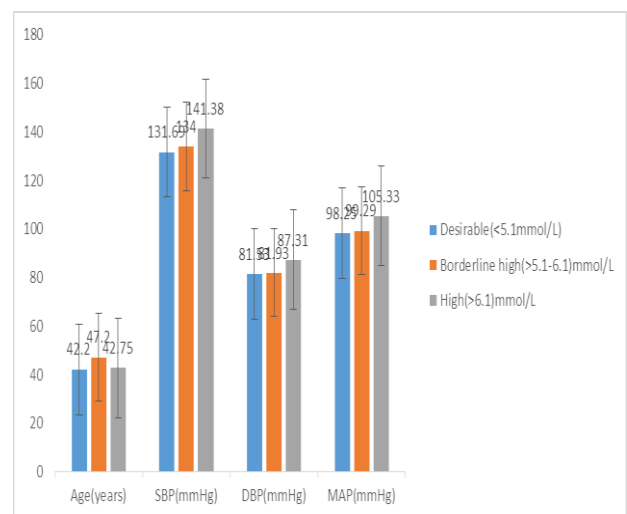

Figure 6: Distribution of female adult subjects cholesterol level according to age and blood pressure.

DISCUSSION

The result of the present study indicate that the mean systolic and diastolic blood pressure of the middle and older aged adults were found to be statistically higher compared to the younger adults (0.00).(Ovuakporaye *et al* 2016 and Oni *et al* 2008).This increase in blood pressure with age occurs as a result of the arteries becoming stiffer due to formation of plaque within the intima of the blood vessels that create an abnormally high systolic blood pressure (Michael *et al* 2011).Findings from this study observed a positive correlation between serum cholesterol, blood pressure, and mean arterial pressure of male subjects in Bayelsa state. A sustained increased in blood pressure is a public health challenge because of its high frequency and concomitant risk of cardiovascular and renal diseases (Kearney *et al* 2005).Hypertension has contributed extensively to the burden of cardiovascular diseases and Several risk factors are Increasing in their frequencies among population in develop countries. Aging, and serum cholesterol is among the risk factors of high blood pressure as re-observed by this study (Victor et al 2011). This increase in blood pressure may be due to lack of exercise, aging, consumption of food rich in cholesterol such as miracle foods etc. The male subjects tend to have a significantly high serum cholesterol values than their female counterpart which may also be a contributing factor to the differences in their blood pressures.

CONCLUSION

We have observed from this study that the increased level of serum cholesterol by the male subjects might be attributed to the influence of genetic factors, related environmental influence on eating behavior and sedentary life style among adults in Bayelsa state.

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