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Full Length Research Paper

Cardiovascular risk among Undergraduates in a Nigerian University

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This study assessed the cardiovascular (CV) risk profile of undergraduate students of Obafemi Awolowo University, Nigeria. Seven hundred and ninety five copies of Framingham Heart study questionnaire were used to obtain information on CV risk factors; including smoking habit, sedentary lifestyle, diet, personality trait, age and gender. Participant's blood pressure was obtained in sitting observing standard precautions. Weights and heights were obtained and body mass indices (BMI) and CV risk levels calculated. Data were analyzed using descriptive statistics and inferential statistics at 0.05 α-level. The mean age, weight, height and BMI of participants were 27.65±6.49years, 62.10±11.78kg, 1.65±0.86m, 22.91±4.29kg/m2 respectively. Participants were mostly in the low and moderate risk categories with only 15 (1.9%) of the 795 participants in high level of CV risk. Participants in high CV risk level were mostly in year 4. There was significant difference in age, weight and BMI of participants in the different faculties studied ($p<0.05$) but there was no significant difference in their heights ($p>0.05$). The study concluded that the majority of participants were mostly at low CV risk level. An awareness of CV disease is therefore strongly warranted so as to maintain such low levels of CV risk.

Keywords: Young adults, cardiovascular risk, CVD, Nigerian University, Framingham questionnaire, BMI.

INTRODUCTION

Cardiovascular disease (CVD) is a leading cause of mortality and is responsible for one – third of all global deaths. It is a major cause of death in developing countries accounting for about 8-9 million deaths compared to about 5-3 million in developed countries (Reddy and Yusuf, 1998; Reddy, 2002). Cardiovascular diseases caused by unhealthy rise in hypertension develop early in life and average blood pressures are much higher in Africans (Wright, 1990). Cardiovascular disease has reached near epidemic proportions in Africa. According to the World Health Report (WHO, 2002 a,b), CVD accounted for 9.2% of total deaths in the African region in 2001, and hypertension, stroke, cardiomyopathies and rheumatic heart disease were the prevalent causes. Although, presentation of ischemic heart disease, such as myocardial infarction and angina is relatively uncommon in most parts of Africa, heart failure is often seen (Kadiri, 2005).

The World Health Organization has reported that the number of disability adjusted life years lost to CVD in Sub- Saharan Africa rose from 5.3 million for men and 6.3 million for women in 1990 to 6.5 million and 6.9 million in 2000 and could rise to 8.1 million and 7.9 million in 2010. According to WHO data published in April 2011 Hypertension Deaths in Nigeria reached 14,829 or 0.87% of total deaths with age adjusted death of 25.57 per 100,000 of people. Africans have a higher prevalence of hypertension, diabetes, stroke, and renal disease which are all predisposing factors to cardiovascular diseases (CVD) (James et al, 2002). This tendency is likely to escalate in developing countries like Nigeria where adoption of western life styles and the stress of urbanization both of which increase the morbidity associated with unhealthy life styles are not on the decline (Olayiwola et al., 2005).

Results from the few studies among Nigerians and elsewhere indicated hypertension is a major cardiovascular risk factor resulting in 5% of deaths (Kadiri, 2005). According to Adamu et al. (2006), the actual

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prevalence of cardiovascular disease in Nigeria is still not known. Although, the present high burden of CVD death is in itself an adequate reason for attention. A greater cause for concern is the early age of CVD death (WHO, 2002 a,b). Cardiovascular diseases affect individuals in the peak and mid-life years. The more the risk factors an individual present with, the greater the overall risk of cardiovascular disease (Blessey, 1985). The accurate estimation of risks to future disease event is therefore critical to the determination of the risk benefit ratio and the most cost effective means of preventive and curative therapies (Andrew et al., 2003). Favorable levels of all major cardiovascular risk factors and/or a healthy lifestyle at younger ages may encompass not only lower age, specific mortality, greater longevity and substantially lower health care costs but also higher quality of life with less illness in older ages (Martha et al, 2003). It is believed that as individuals continue to modify their lifestyle, and maintain an interest in personal health, incidence of coronary heart disease may continue to decrease (O'Sullivan and Schmitz, 2001).

Reliable data and health statistics in Nigeria on risk profile of cardiovascular diseases among younger ages are lacking. Adedoyin et al. (2006), had earlier carried out an assessment of cardiovascular risk among adults of a Nigerian University community and submitted that a routine assessment is warranted.

Furthermore, Adamu et al. (2006), reported scarcity of information on the prevalence of CVD in Nigeria. This study however assessed the cardiovascular risk profile of undergraduate students in Obafemi Awolowo University, Ile-Ife, Nigeria.

MATERIALS AND METHOD

Participants were undergraduate students of the Obafemi Awolowo University, Ile-Ife, Nigeria. Seven hundred and ninety five participants were randomly selected from seven randomly selected faculties over a period of three months. Ethical clearance was sought and obtained from Obafemi Awolowo University Teaching Hospital Complex Ethical Committee. Procedure for data collection was explained to participants subsequently after informed consent was sought and obtained.

Firstly, blood pressure was taken after about ten minutes of quiet sitting using the electronic sphygmomanometer. Participants' heights and weights were measured using standard measures. The Framingham heart study questionnaire as used by Blessey (1985), adapted for this study was subsequently administered to each participant. Information on age, sex, smoking, weight, height, stress, exercise, family medical history, diet and personal medical history were obtained. Scores were assigned to participants answers or responses based on the scoring design in the original questionnaire. The total score was then used to classify each participant into high risk, moderate risk and low risk groups accordingly.

Descriptive statistics of mean, percentage, graphs and bar charts were used to describe data obtained. Inferential statistics including independent t-test was used to compare the risk profiles of male and female participants. One way Analysis of Variance (ANOVA) was used to compare the risk between the different departments and to compare level of cardiovascular risk obtained from the different faculties. Significance was set at 0.05 □- level.

RESULTS

Physical Characteristics

Four hundred and fifty seven (57.5%) participants were males while 338 (42.5%) were females. Participants' mean age, weight, height and body mass index (BMI) were 27.65+6.49years, 62.10+11.78kg, 1.65+0.86m and 22.91+4.29kg/m2 respectively. It was observed that there were significant differences in the mean ages, weights, heights and BMI of males and females participants. Male participants were older, taller and heavier than their female counterparts but the females had greater BMI (Table 1).

Cardiovascular Risk Profiles

The majority 693 (87.2%) participants were in the low risk category, 87 (10.9%) were in the middle and 15 (1.9%) were in the high risk level. The cardiovascular risk profiles of male and female participants were calculated from the data obtained. Results showed that 396 (86.7%) male participants were in the low risk category, 50 (10.9%) in the middle category while 11 (2.4%) were in the high risk level, also 297 (87.9%) of female participants were in the low risk level, 37 (10.9%) in the middle category while only 4(1.2%) were in the high risk level, giving more percentage of females in the low and moderate risk categories and males were twice the percentage of females in the high cardiovascular risk level.

The cardiovascular risk profile of participants whose ages were less or equal to 35 years was calculated from the data obtained. Results showed that 687 (88.5%) of participants were in the low risk level, 77 (9.9%) in the moderate while 12 (1.5%) were in the high risk level (Table 2). The cardiovascular risk profile of participants whose ages were above 35 years was calculated from the data obtained. It was observed that more than half 10 (52.6%) of the few (19) participants that were above 35 years old were in the moderate risk level. while 3 (15.8%) were in the high risk level, giving a higher percentage of participants in the age bracket to be in the high risk level compared with their less than 35years counterparts.

Table 1. Physical characteristics of male and female participants .

N=796 Parameter	Male Mean± S.D	Female Mean ± S.D	t- value	p- value
Age (yrs.)	28.22±6.52	26.88±6.39	2.90	0.004*
Height (m.)	1.68 ±0.82	1.60±0.07	14.10	0.001*
Weight (kg.)	63.01±11.11	60.87±12.55	2.54	0.011*
BMI (kg/m2)	22.31±3.67	23.72±4.90	4.65	0.001*

Key: *= Significance at 0.05 α-level
Year 1: n=173 (21.7%) Year 2: n=156 (19.60%)
Year 3: n= 165 (20.7%) Year 4: n=207 (26.01%)
Year 5: n=82 (10.3%) Year 6: n= 13 (1.63%).

Table 2. Frequency percentage of participants less or equal to 35 years old at different cardiovascular risk levels .

n = 776	Cardiovascular risk level	Frequency	Percent
	Low risk	687	88.5
	Moderate risk	77	9.9
	High risk	12	1.5

Key-
High risk 40 and above
Moderate risk 20-39
Low risk 19 and below
Without answer to question 8
High risk 36 and above
Moderate risk 19-35
Low risk 18 and below

Comparisons of Cardiovascular Risk Profiles

Independent t-test was used to compare the risk scores of male and female participants. Result showed that there was no significant difference between the risk scores of male and female participants (P>0.05). Result of one way ANOVA comparing the risk scores of the different academic levels showed that there was no significant difference (P> 0.05) in risk scores across different academic levels. Years 1 and 4 students were mostly in the low and high risk groups respectively. The highest numbers of students in the high risk category were in years 1and 4 while there were no participants in the high risk category from years 5 and 6 (Figure 1).

DISCUSSION

This study was carried out to assess the cardiovascular risk profiles of undergraduate students of Obafemi Awolowo University, Ile-Ife. Assessing the risk for presence of major CVD risk factors in young adults is of particular importance, since it would enable us to promptly identify persons at high risk for development of clinical CVD and implement prevention. Adedoyin et al. (2006) had earlier carried out an assessment of cardiovascular risk among adults of a Nigerian University community and submitted that a routine assessment is warranted.

It was observed that male participants were bigger, taller and older than their female counterparts, although the measure of adiposity as measured by BMI was higher for female participants. Female participants in this study were shorter than their male counterparts, and this may account for higher BMI values among them. Gatzke (2005) reported that substantial anatomical, physiological and morphological differences exist between males and females. An increase in BMI has been reported in males and females in the last decade with higher BMI among females (Xi et al, 2012). Certain authors have reported on physical characteristics of males and females similar to that observed in this study (Ayanniyi et al, 2008; Mbada et al 2007; Mc Carthy et al 2001).

In a study among Nigerian adolescents, Johnson et al. (2009) reported that male participants were older and taller and their female counterparts had significantly higher weights and BMI. This trend of higher BMI among females appears to continue with advancement in age. The majority of participants were in the low risk level of CVD. This observation is consistent with the findings of

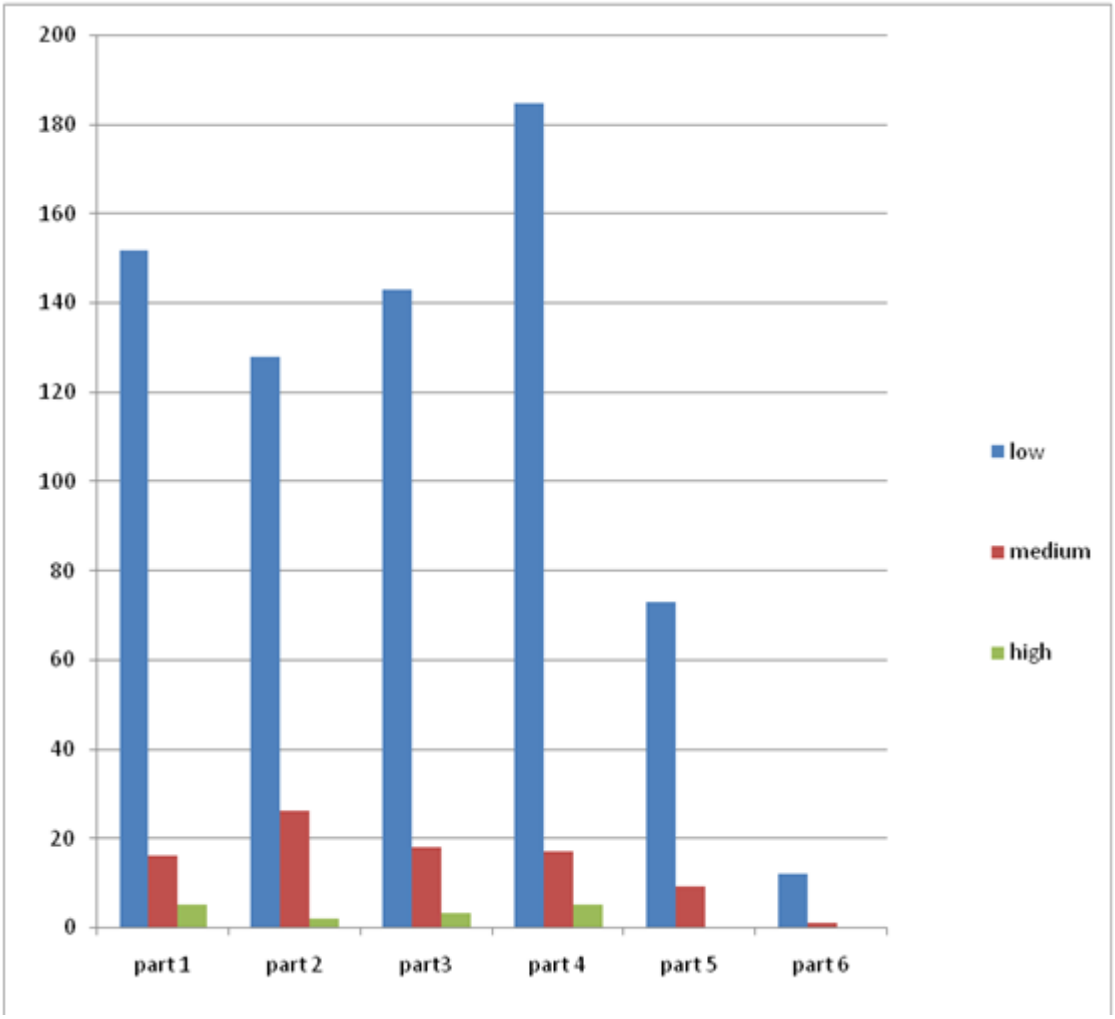

Figure 1. Bar chart showing participants in the different academic levels at the different cardiovascular risk levels **.**

Adedoyin et al. (2006). The majority of participants in this study were young with average age of 30years. They also live actively, walking a lot and get involved in recreation activities. Additionally age was an advantage, since the population studied was young adults; according (Ezeanyika et al, 2008) to a non-modifiable risk factor for CVD. Sedentary lifestyle is a modifiable risk factor for CVD and participants in this study appears to still be living active lives. This is predicated on the fact that they are students in a University community in Nigeria and they have to do a lot of walking, trying to get around doing lectures. The few participants in the high risk category were mostly year one and four students. Year four students are usually in their pre-ultimate or final year which is the peak of academic stress in the University. A relationship between work-related stress and CVD has been established (Asma et al 2003). Most of the participants in part four carry heavy academic workload and also have anticipations in preparation to being integrated into the larger society. The high number of year one participants observed in the high risk level could be because of the sudden academic demands posed on them by a change in their academic environment and the necessity to start building a strong academic grade point average from the scratch.

The study showed no significant difference between the risk scores of male and female undergraduate participants, although more male participants were in the high risk category. The observation that there was no significant difference between the risk scores of male and female participants is similar to that of Bertsias et al (2003), who found that a proportion of both male and female students of the University of Crete had the same values for overweight and obesity which are risk factors for CVD. Mendis et al (2004) reported higher mortality rate due to CVD among men. Few participants were in the

high risk categories as observed in this study and this may be responsible for lack of statistical evidence despite the higher percentage of male participants in the high risk category. Males tend to drink alcohol and smoke cigarettes more than females in the studied population, which may account for higher risk in CVD among males. Nevertheless, the gap between the level of risk for men and that of women developing and dying from CVD has become smaller in recent years as a result of the increase in the number of women smokers (Asma et al 2003; Mendis et al, 2004). Ezeanyika et al. (2005), used a risk score calculator to determine the risk of CVD death in a sub-urban population in Nigeria and concluded that risk of death from CVD increases with age in both genders but men were more likely to die from CVD. This present study however determined CVD risks among young adults.

The majority of participants in this study were in the normal category of BMI. Overweight and obesity are recognized as an escalating epidemic factor affecting both developed and developing countries. Of the 989 undergraduate medical students of the University of Crete studied, 73% of the total participants had BMI>25.0.These subjects above the obesity cut-off had significantly higher values of CVD risk factors (Ezeanyika et al, 2008). This study concluded that the majority of students in a Nigerian University are in the low risk category for CVD. Also males did not differ from their female counterparts in CVD risks and beginners and finalist were the most in the high risk category. A longitudinal study is warranted to follow-up individuals from young adulthood into adulthood, in order to be able to determine probable increase risk for CVD, especially in view of speculations of increase CVDs in the future Nigeria.

The low risk CVD levels observed in this study can be maintained through proper awareness and public enlightenment. Lynch et al. (2006), discovered that a level of awareness existed among young adults of the population studied for risk factors of CVD, and submitted that a decrease in prevalence of CVD in adult life could be encouraged through this. In view of this public enlightenment/awareness programs should be embarked upon to maintain this observed low incidence in the young adult population because as people age, they are prone to developing CVD as age is a major factor in CVD susceptibility.

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