
Assessment of Cardiovascular Risk Factors of Civil Servants in Abeokuta, South West, Nigeria

¹Nupo Sunday Sedodo*;²Oguntona Clara Berstein & ³Oguntona Babatunde & ⁴Akinloye, Oluseyi.Adeboye

¹Department of Nutrition and Dietetics, Moshood Abiola Polytechnic, Ojere, Nigeria

^{2,3}Department of Nutrition and Dietetics, Federal University of Agriculture, Abeokuta, Nigeria

⁴Department of Biochemistry, Federal University of Agriculture, Abeokuta, Nigeria

Email: sundaynupo@yahoo.com

ABSTRACT

Cardiovascular diseases are now becoming dominant sources of morbidity and mortality worldwide. This study aimed at assessing the cardiovascular risks of civil servants. A cross sectional study was carried out among five hundred (500) randomly selected civil servants in Abeokuta. Venous blood sample of selected subjects were collected to determine their total cholesterol (TC), triglycerides (TG), low density lipoprotein (LDL) and high density lipoprotein (HDL). Information on food intake was obtained using 24- hour dietary recall techniques. Waist to Hip Ratio (WHR) was calculated from anthropometric measurements to determine abdominal obesity. Cardiovascular Risk was assessed using American Heart Diseases software Version 10.CIR.100.13.1481. LDL/ HDL ratio was calculated according to the method described by Fischbach, (2000). Hypertension prevalence among men was 3%, 2% of the male subjects had diabetes mellitus, 2% of women had hypercholesterolaemia and hypertriglyceridaemia. Twenty percent of the subjects consumed alcohol. Majority (99%) of the subjects had borderline at herogenic risk, out of which 50% were men. The cardiovascular risk predictive models adopted in the study showed that cardiovascular risk factors are at a primordial stage in the study population. Nutrition education should be given to the subjects on the needs for prevention of cardiovascular diseases and the importance of regular exercise should be emphasized to civilservants in the State.

Keywords: Cardiovascular Diseases, Abdominal Obesity, Serum Cholesterol, Hypercholesterolaemia, Civil Servants

INTRODUCTION

Worldwide, cardiovascular diseases (CVD) and the metabolic syndrome are major causes of morbidity and mortality, including sudden death [1,2,3]. CVD is emerging as a significant health problem in sub-Saharan countries such as Nigeria, with a population

of 140 million. These countries are undergoing epidemiological transition from communicable to non-communicable diseases (NCDs) [4,5]. Epidemiological transition has been closely linked to changes in the demographic, social and economic status of various populations, causing a global rise in chronic diseases, especially cardiovascular diseases (CVD) [4, 5].

CVD worldwide is largely driven by modifiable risk factors. These risk factors include smoking, lack of physical activity, low fruit and vegetable intake, high fat and salt intake, hypertension, abdominal obesity, dyslipidaemia, and excess alcohol intake [6]. The upward trend in CVD in sub-Saharan Africa is likely as a result of the increasing prevalence of some of these modifiable risk factors [6].

The continuing enormous burden of CVD, the concerning trends in cardiovascular risk profiles of adolescents and adults, and the emerging increases in CVD in developing countries underscore the crucial need to redouble treatment and prevention efforts [4]. This is particularly important in Nigeria (and by extension, Africa), where the health care expenditure per capita is \$23 (4.6% of total Gross Domestic Product) [6]. Therefore, this study sought to identify and determine the prevalence of cardiovascular risk factors of civil servants to provide epidemiological information on conventional cardiovascular risk factors and a useful reference for preventive strategies, policy formulation and implementation.

MATERIAL AND METHODS

A cross sectional study was carried out on civil servants in Abeokuta, Ogun State, Nigeria. A simple random sampling method was used to select Five hundred (500) subjects.

Prior to the commencement of the field work, permission was sought and obtained from the Department of Nutrition and Dietetics, the Ethical Committee of Civil Service Commission and Ogun State Ministry of Health. Waist to Hip Ratio (WHR) was calculated from anthropometric measurements to determine abdominal obesity.

Physical Activities Pattern

Each subjects' daily activity pattern was recorded through the use of questionnaire with a recall method [7]. This involved the pattern of activities right from the time they woke up till bedtime at night. The energy expended on each activity was calculated using FAO/WHO/UNU [7] table of energy expenditure. This was carried out on different three occasions.

24-Hour Dietary Recall

Using interview method, subjects were asked to recall what meals and drinks they had consumed in the previous 24-hour [8]. This information included details of amount of food consumed, which was estimated in household measures, estimated amounts, and other portion sizes of snacks consumed. The 24-hour dietary recall was carried out three (3) times on two (2) weekdays and one (1) weekend.

Food Intake Data

Food intake data collected through 24-hour dietary recall was converted to nutrient intake using the food composition table by Oguntona and Akinyele [9], West African Food Composition Table [10], Nigeria Food Consumption and Nutrition survey 2001-2003 food instruction booklet and United State Department of Agriculture (USDA)[11] Table. Nutrient intake was calculated for the respondents and compared with the daily recommended allowance.

Blood Pressure

Blood pressure of the subjects was measured with OMRON digital automatic blood pressure sphygmomanometer (Model HEM-712C). The blood pressure was measured on the left arm after the subjects have rested for 5 minutes in a seated position. The blood pressure reading was taken, the upper number represents the systolic pressure (the pressure at the peak of each heart beat) and the lower number represents the diastolic pressure (the pressure when the heart is resting between beats). The systolic blood pressure (SBP) and diastolic blood pressures (DBP) was recorded to the nearest 2mmHg.

The values of SBP and DBP were related to the reference standard [12]. The World Health Organization [13] criteria for classifying blood pressure measurement were adopted to determine the rate of the various categories of hypertension, both systolic and diastolic among respondents.

Sample Analysis

Fasting venous blood samples were obtained via the antecubital vein for biochemical assessment including fasting serum total cholesterol, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), triglycerides and fasting blood glucose levels [14,15,16].

Determination of Cardiovascular Diseases Risk

Cardiovascular Risk was determined using American Heart Diseases software Version 10. CIR.100.13.1481. Five (5) years cardiovascular risk level was calculated using American Heart Diseases multiple risk factor assessment equation software circulation version 100. LDL/HDL ratio was calculated according to the method described by Fischbach [17] and atherogenic risk index was calculated using serum cholesterol and HDL-C ratio as described by American Heart Diseases [18]. Diabetes was diagnosed either by a history of previously known diabetes or a fasting plasma glucose of ≥ 126 mg/dl, and impaired fasting glucose was defined as fasting plasma glucose of 100 to 125 mg/dl [15]. Hypercholesterolemia was defined as a total cholesterol level ≥ 200 mg/dl, HDL-C < 40 mg/dl for men or < 50 mg/dl for women, and/or triglyceride concentration ≥ 150 mg/dl.

RESULTS

Physical Activity Level

Table 1 presents the physical activity level of the subjects. The table shows that majority (68%) of the subjects were within sedentary category (PAL 1.4-1.69Kcal) over half of whom (38%) were women. Twenty seven percentage (27%) of the subjects were active

(PAL 1.7 – 1.99Kcal), while 5% of the subjects were vigorously active (PAL 2.2 – 2.39 Kcal).

Table 1: Physical activity level

Physical Activity Level	Men	%	Women	%
Sedentary (1.4 – 1.69 Kcal)	150	30	190	38
Active (1.7 – 1.99 Kcal)	38	8	95	19
Vigorously active (2.2-2.39 Kcal)	15	2	13	3

Table 2: Mean Intake of Various Sources of Fatty Acids

The table 2shows the sources of various fatty acids consumed by the subjects. Meats, poultry and fish provided $26 \pm 1.3b$ g/day and $14 \pm 0.4a$ g/day of saturated fatty acids for men and women respectively. Fats and oils supplied $15 \pm 0.6b$ g/day of saturated fatty acids for men and $6 \pm 0.8a$ g/day for women. Also, dairy products provided $9 \pm 1.0b$ g/day and $3 \pm 4.0a$ g/day of saturated fatty acids for men and women respectively.

Likewise legumes provided $2 \pm 0.5a$ g/day of saturated fatty acids for men and $0.8 \pm 2.0b$ g/day for women, while eggs supplied $0.9 \pm 0.1a$ g/day of saturated fatty acids for men and $0.8 \pm 0.1a$ g/day for women. Meats, poultry and fish provided $23 \pm 4.5b$ g/ day and $12 \pm 6.0a$ g/day of monounsaturated fatty acids for men and women respectively. Fats and oils supplied $21 \pm 1.2b$ g/day of saturated for men and $8 \pm 0.2a$ g/day for women.

Dairy products provided $4 \pm 0.2a$ g/day and $1 \pm 3.0a$ g/day of monounsaturated fatty acids for men and women respectively. Legumes provided $3 \pm 1.2a$ g/day of monounsaturated fatty acids for men and $2 \pm 0.4a$ g/day for women while eggs supplied $0.8 \pm 0.1a$ g/day of monounsaturated fatty acids for men and $0.8 \pm 0.1a$ g/day for women.

Meats, poultry and fish provided $12 \pm 6.0b$ g/day and $6 \pm 4.8a$ g/day of polyunsaturated fatty acids for men and women respectively. Fats and oils supplied $30 \pm 0.2b$ g/day of polyunsaturated for men and

12±0.5a g/day for women. Also, dairy products provided 0.9±2.0b g/day and 0.3±1.2a g/day of polyunsaturated fatty acids for men and women respectively.

Table 2: Sources of Fatty Acids

Foods (g/day)	Saturated		Monounsaturated		Polyunsaturated	
	Male	Female	Male	Female	Male	Female
Meats, poultry & Fish	26±1.3b	14±0.4a	23±4.5b	12±6.0a	12±6.0b	6±4.8a
Fats & Oils	15±0.6b	6±0.8a	21±1.2b	8±0.2a	30±0.2b	12±0.5a
Dairy products	9±1.0b	3±4.0a	4±0.2a	1±3.0a	0.9±2.0b	0.3±1.2a
Legumes	2±0.5a	0.8±2.0b	3±1.2a	2±0.4a	5±0.8 a	2±0.6a
Eggs	0.9±0.1a	0.8±0.1a	0.8±0.1a	0.8±0.1a	0.8±0.1a	0.8±0.1a

Means with different letters are significantly different

Table 3 Family history of diabetes, hypertension and lifestyle

Table 3 presents the family history of diabetes, hypertension and lifestyle of the subjects. A high proportion (55%) of women had no family history of diabetes mellitus; also a greater percent of women (57%) had no family history of hypertension. Only few (3%) of men were smokers while 20% men of consumed alcohol.

Table 3: Family history of diabetes, hypertension and lifestyle

Parameter	Men	%	Women	%
Family History of Diabetes				
Yes	15	3	25	5
No	187	37	273	55
Family History of Hypertension				
Yes	16	3	17	3
No	186	37	281	57
Smoking				
Yes	16	3	-	-
No	186	37	298	60
Alcohol				
Yes	100	20	3	1
No	102	20	295	59

Cardiovascular Disease Risk Factors of the Subjects

Figure 1 presents the cardiovascular risk factors of the subjects. Hypertension prevalence among men was 3% and 4% among women,

2% and 1% of male and female subjects had diabetes mellitus respectively, 2% of the women had hypercholesterolemia and hypertriglyceridaemia, 12% were obese. Most (66%) of the subjects were physically inactive, while 10% of women had abdominal fat accumulation. Twenty percent of the subjects consumed alcohol

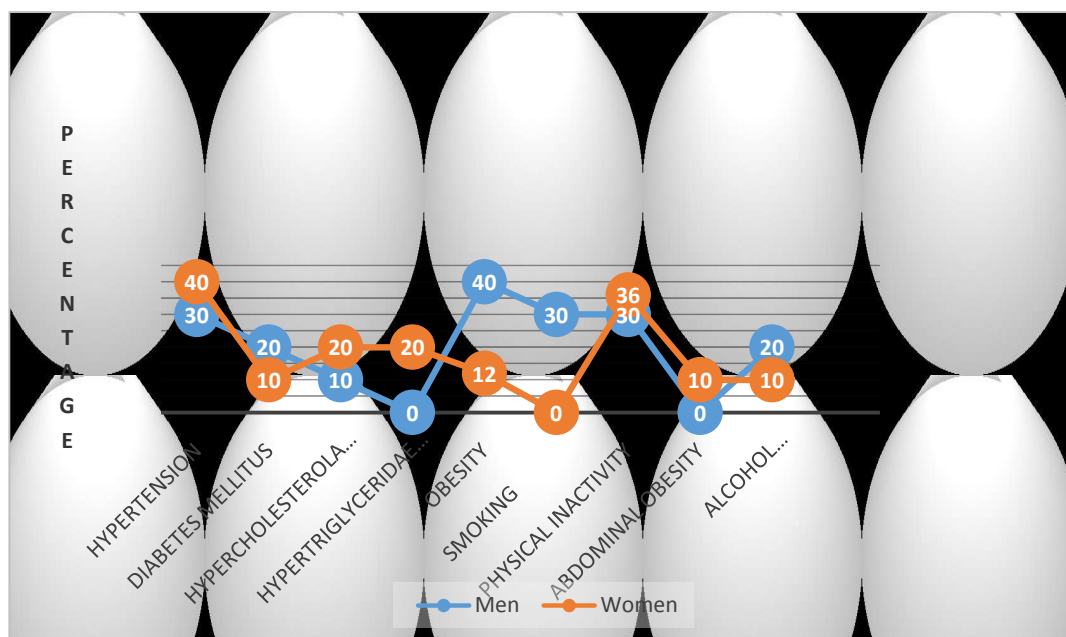


Figure 1: Cardiovascular Risk Factors

DISCUSSION

The result of the physical activity of the subjects revealed that most of the subjects were sedentary. This observation confirms the research of Awosusi and Adegun [19], which showed that work pattern in Africa countries is becoming sedentary due to improvement in technology and civilization.

Cigarette smoking and excessive alcohol intakes are two social habits that have been associated with increased risk of atherogenic cardiovascular diseases in the general population [20]. Cigarette smoking has been associated with the risk of the development of cardiovascular diseases. Both cigarette smoking and heavy alcohol consumption increase the risk of cardiovascular diseases and mortality in any population [21]. This study revealed that these two

social habits of smoking and drinking were present among men subjects in the study population. This observation on social habits were similar to the report of Kefee and colleagues in a related study. They reported that only a small percentage of men subjects smoked cigarettes, this is unlike what had been observed in South African, Cameroon and Ghana where both men and women had these two social habits [22], where high prevalence of smoking was observed among men and women. Also alcohol consumption was not a usual practice among the subjects as shown in the study. This finding is similar to the study carried out by Fadupin and Olayiwola [23] that reported similar findings in their study. The study revealed that consumption of saturated fatty acids foods that can predispose them to cardiovascular risks were not higher in the study population.

Hypertension is the most modifiable condition leading to coronary heart disease, which is one of the leading causes of mortality globally, stroke, end stage renal disease, and peripheral vascular disease. The study revealed that most of the subjects had normal blood pressure. Regulation of normal blood pressure is a function of cardiac output and peripheral vascular resistance; these variables are influenced by multiple factors such as excessive dietary energy, salt intake and sedentary lifestyle. All these factors may interact to produce hypertension and limit its controls [24].

However, few of the subjects had hypertension. There are inconsistent reports on the prevalence of hypertension in Nigeria, a survey of cardiovascular risk factors in Nigeria conducted 15 years earlier reported the age-adjusted prevalence of hypertension to be 11.2%, using a qualifying BP level of 160/95 mmHg [25]. Using the same qualifying BP level, other researchers found the prevalence of hypertension to be 12.4% in south western Nigeria [20]. Extrapolations from the Non Communicable Diseases data and from other studies suggest an urban prevalence rate of around 20% using the current cut-off point of 140/90 mmHg [26, 27]. In a survey of cardiovascular risk factors in Nigerians among adults,

hypertension prevalence was found to be 25% in males and 16.4% in females [6].

The results of the study showed that the prevalence of diabetes mellitus among men was 2% and 1% among women. This was similar to the findings of Oladapo and others in a related studies carried out in Egbeda in Ekiti State [6]. The national crude prevalence rate of 2.8% was recorded in Nigeria [6].

The prevalence of hypertension among the subjects in this study was 7%. The level of the prevalence obtained in our study was higher than what other researchers reported in other part of West African countries [28, 29]. However, the overall prevalence of hypertension in this study was an indication that hypertension rate is gradually emerging in the urban community of the state. This observation has been reported in India and Indonesia [6]. This risk factor will probably increase the burden of cardiovascular disease in the near future in the State if primordial and primary prevention are not instituted early enough.

Epidemiological studies have reported that there were no clear patterns of association between high blood pressure and gender; some studies reported higher prevalence among men than women [30], while others reported that hypertension was more common in women than men [31]. This study revealed that hypertension was more common in women than in men and was discovered that 2% of the women had hypercholesterolaemia and hypertriglyceridaemia which might be as a result of sedentary lifestyle observed among the women. This observation may also be due to higher percentage of abdominal obesity found among the women.

CONCLUSION

The cardiovascular risk predictive models adopted in the study showed that cardiovascular risk factors are at a primordial stage in the study population. The major cardiovascular risk identified in the study was physical inactivity, while abdominal obesity and alcohol

consumption were a little bit high. Thus, Nutrition education should be given to the subjects on the needs for prevention of cardiovascular diseases and the importance of regular exercise should be emphasized to civil servants in the State.

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