Prevalence of Cardiovascular Disease Risk Factors among Public Secondary School Teachers in Udenu Local Government Area, Enugu State

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ABSTRACT

Background: *There is a sudden increase in cardiovascular risk in developing countries which has been attributed to economic transition, urbanization, industrialization and globalization that brought about changes in people's lifestyle.*

Objective*: The study was conducted to ascertain the prevalence of cardiovascular disease risk factors among public secondary school teachers in Udenu L.G.A. in Enugu state, Nigeria.*

Methods: *Cross-sectional design was adopted for this study. The population for this study was five hundred and sixty-five teachers while the sample for this study consisted of four hundred and seventy-seven teachers. Questionnaire was used to ascertain information on the sociodemographic characteristics, dietary habit, physical activity level and lifestyle characteristics of the respondents. Body mass index, blood pressure, blood glucose and lipid profile of the respondents were obtained using standard proceduresData was analyzed using Statistical Product and Service Solutions (SPSS) version 21.*

Results: *The results of the study showed the occurrence of some cardiovascular disease risk factors among teachers. They included obesity (28.60%), hypertension (20.30%), diabetes (10.00%), dyslipidemia (23.33%) and metabolic syndrome (10.00%). A good number of the respondents fall between the age range of 30-39years (46.70%) and earned between ₦18,000 to ₦30,000 per month (54.30%). Majority (83.00%) of the respondents were females. Female teachers were significantly more obese than the males. Marital status showed a significant relationship with stress. BMI was significantly associated with age. Diastolic blood pressure showed significant relationship with age.*

Conclusion: *The prevalence of cardiovascular disease risk factors was high among the study participants. Nutrition education is important among this group to help in preventing these risk factors and their associated morbidities and consequent mortalities.*

Keywords: Cardiovascular Disease, Risk Factor, Teachers

INTRODUCTION

Cardiovascular diseases (CVDs) are a group of vascular and heart disorders which include coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism (1). They are usually associated with a build-up of fatty deposits inside the arteries known as atherosclerosis and an increased risk of blood clots (2). A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (3). Majority of CVDs are caused by risk factors that can be controlled, treated, or modified (modifiable risk factors), however, there are also some major CVD risk factors that cannot be controlled (4).

According to WHO (3), the non-modifiable risk factors include age, gender, family history and ethnicity while the modifiable risk factors are primarily behavioural/lifestyle in nature and include tobacco use, harmful alcohol use, physical inactivity, and unhealthy diet. Other modifiable risk factors are cardio-metabolic and include overweight/obesity, hyperglycaemia, high cholesterol and high blood pressure (5). Cardio-metabolic risk factors are direct indicators of metabolic syndrome, a cardiovascular risk of public health significance constituting of five variables namely, abdominal obesity, raised triglyceride, low levels of high density lipoprotein cholesterol, raised fasting blood glucose and elevated blood pressure (6). According to WHO (7), cardiovascular diseases were the cause of 17.5 million deaths (31% of all death) around the world in 2012, of which 80% occurred in low and middle-income countries, and 85% of all global disability arose from CVDs.

This sudden increase in CVD risk in developing countries has been attributed to economic transition, urbanization, industrialization and globalization which bring about changes in lifestyle (8). Popkin (9) stated that in developing countries like Nigeria, traditional diets are being replaced with energy-dense and processed foods coupled with increasing physical inactivity. In Nigeria, the prevalence of physical inactivity among adults was found to be 31.4% (10). Consequently, low physical activity and, or sedentary lifestyle has resulted in increased prevalence of obesity which poses a great risk to both the quality and quantity of one's life. That is to say, obese individuals have a shorter life expectancy and greater risks for the development of cardiovascular diseases (11) and its intermediate risk factors such as hypertension, insulin resistance and dyslipidemia. Cardiovascular diseases pose a great burden to the populace in the sense that it affects the nation's workforce (as it mostly occurs among the middle age group), the cost of treating/managing it is too expensive and hence it is capable of dragging people below the poverty line and it is even worse in an already poor setting.

Owing to the indispensable role played by teachers in the education sector and economy of a nation, a high prevalence of CVD among them is a big threat to their general productivity and ultimately affect the health and the economy of the nation adversely. There is dearth of information on the prevalence of cardiovascular risk factors among teachers in the Udenu. Early detection of these risk factors among the study population will expedite the management process and improve their general wellbeing. Hence, this study was conducted to determine the prevalence of risk factors of cardiovascular diseases among secondary school teachers in Udenu L.G.A of Enugu state.

Materials and methods

Study design: The study employed cross sectional survey design.

Study area: The study was carried out in Udenu Local Government Area, Enugu State. Udenu is situated in Enugu North Senatorial zone of Enugu State, Nigeria. It is made up of 3 developmental units (Udenu, Udenuedem and Orba). Udenu has 16 public secondary schools; 7 in Udenu development unit, 6 in Udenuedem development unit and 3 in Orba development unit.

Sample size and sampling technique: The sample size was derived from the formula described by Daniel (12) ($Z^2P(1-P)/d^2$). Obesity prevalence of 18% at 95% confidence interval was used. A design effect of 2 and 0.5% non-response rate were added and the value rounded up to 477. Ten percent of the sample size was used for biochemical (blood glucose and lipid profile) studies. The respondents were selected using multistage sampling technique; (a) 10 schools were selected out of 16 public schools (in all the three developmental units) in the study area using proportionate sampling, (b) determination of sample size per school using proportionate sampling and (c) the respondents were selected from each school using simple random sampling without replacement.

The research protocol for this article was approved by the Health Research Ethics Committee, Ministry of Health, Enugu State. The informed consent of the respondents was obtained after a thorough explanation of the research protocol and they agreed to participate in the study.

Methods of data collection:

Questionnaire

A validated and pretested questionnaire was used to elicit the basic characteristics of the respondents which included socioeconomic and lifestyle characteristics and dietary habits. The questionnaires were self-administered since they were all literate enough to fill them after explaining the contents to them.

Anthropometry
The weight of the respondents was measure with a bathroom (Hanson's salter) scale with a capacity of 120kg. The respondents were asked to stand at the center of the scale with no shoes on, and with minimal clothing. Without leaning or touching anything, with head held erect and hands hanging by the side and reading was taken to nearest 0.5kg. Microtoise height meter rule was used to measure the heights of the respondents. Each respondent was asked to stand erect, with no shoes on, on a plane surface with feet together. With head erect and arms by the sides, buttocks and back of the head touching the measuring stick on which the tape is firmly attached, the headpiece was lowered gently to come in direct contact with the head. Then the readings were taken to the nearest 0.5cm.

The body mass index (BMI) of each respondent was calculated as the respondent's weight in kilogram divided by his/her height in meter squared. The BMI values were compared to WHO (13) classification standards.

Biochemical analyses
The fasting blood glucose of each respondent was determined using Accu-chek active glucometer with a capacity of 600 mg/dl (33.3 mmol/l). A fasting blood glucose between 110 mg/dl and 126 mg/dl was classified as pre diabetes and values above 126 mg/dl were classified as diabetes. Lipid profile of the respondents were analyzed (using Randox kit by Randox Laboratories Ltd). The values were judged according to the Lipid Research Clinic Program (14) classifications.

Blood pressure measurement
The blood pressure of the respondents was measured using Accoson sphygmomanometer whose lowest and highest calibrations were 0 mmHg and 300 mmHg respectively. The blood pressure of subjects was classified according to National High Blood Pressure Education Program (15).

Statistical analysis
Data obtained from the study was analyzed using Statistical Product for Service Solution, SPSS (version 21). The general characteristics of the respondents were analyzed using descriptive statistics and results presented as frequencies and percentages. ANOVA was used to compare means. Chi square was used to ascertain relationship among variables. Significance was accepted at $p<0.05$.

Results
Table 1 shows the general characteristics of the respondents. More females (83.02%) participated in the study than males (16.98%). About 31% of the respondents had HND/B.Ed/B.Sc and more than half (54.30%) of the respondents had ₦18000 and ₦30000 as their average monthly income. Majority (92.66%) of the respondents ate two meals per they and the most skipped meal was breakfast. The reasons for skipping meals ranged from 'no time to eat' to 'weight loss' with the greatest number (45.02) of them reporting that they skipped meal due to lack of time

Table 2 shows the respondents' blood pressure according to sex. About 15% of the respondents had systolic hypertension. More females had both stage 1 (13.21%) and stage 2 (4.40%) systolic hypertension than the males (2.10% and 0.63% for stage 1 and stage 2 systolic hypertension respectively). There was no significant ($P>0.05$) difference between diastolic blood pressure of the females and the males.

Table 3 shows the lipid profile classification of the respondents. Less than half (37.50%, 15.58 and 27.08%) of the respondents had higher levels of total cholesterol, triglyceride and low density lipoprotein cholesterol than normal respectively. Twenty-eight point eight three percent of the respondents had lower levels of high density lipoprotein cholesterol than normal.

Table 4 shows the prevalence of coexistent risk factors among the respondents. About 13% of the respondents had hypertension and obesity while a few (1.05%) had hypertension, obesity and dyslipidemia occurring together.

Table 1: general characteristics of the respondents

Variables	Frequency	Percentage
Respondent's gender		
Male	81	16.98
Female	396	83.02
Total	477	100.00
Respondent's Highest level of education		
OND/NCE	324	67.92
HND/B.Ed/B.Sc	148	31.03
Masters	5	1.05
Total	477	100.00
Respondent's Average monthly earnings		
₦18 000 - ₦30 000	259	54.30
> ₦31 000 - ₦50 000	172	36.06
> ₦51 000 - ₦80 000	33	6.92
> ₦81 000 - ₦100 000	8	1.67
> #100 000	5	1.05
Total	477	100.00
Number of meals eaten daily		
2 meals	442	92.66
3 meals	22	4.61
>3 meals	13	2.73
Total	477	100.0
Most frequently skipped meal		
Breakfast	265	59.95
Lunch	102	23.08
Supper	75	16.97
Total	442	100.00
Reasons for skipping meal		
No time to eat	199	45.02
Not hungry	103	23.30
No appetite	46	10.41
No food	43	9.73
Too/tied to cook/eat	14	3.17
Religion	13	2.94
Weight loss	24	5.43

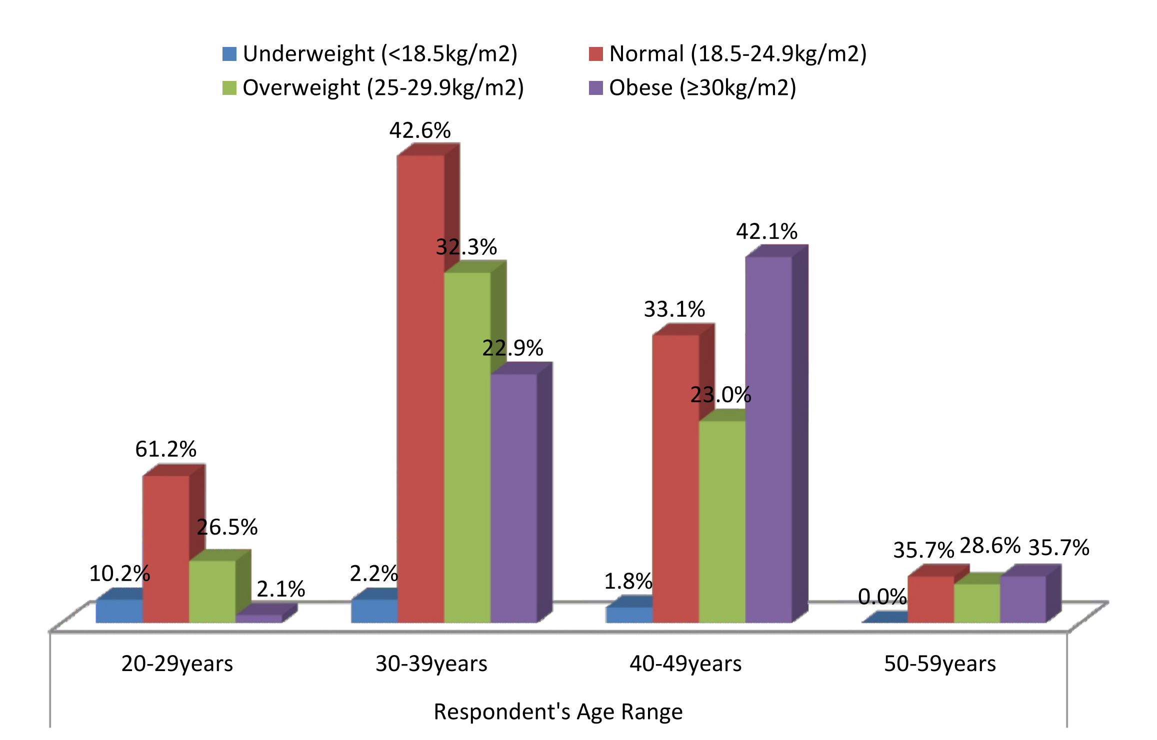

Figure 1: BMI of the respondents according to age.

Table 2: Respondents' Blood Pressure according to Sex.

		Normal	Pre-hypertension	Stage 1 Hypertension	Stage 2 Hypertension	Total
Systolic blood pressure		**(<120 mmHg)**	**(120-139 mmHg)**	**(140-159 mmHg)**	**(≥160 mmHg)**	
	Sex	N(%)	N(%)	N(%)	N(%)	N(%)
	Male	22(4.61)	46(9.64)	10(2.10)	3(0.63)	81(16.98)
	Female	113(23.69)	199(41.72)	63(13.21)	21(4.40)	396(83.02)
	Total	135(28.30)	245(51.36)	73(15.31)	24(5.03)	477(100.00)
			Systolic: X^2=2.258, df=3, P=0.521			
Diastolic Blood Pressure		**(<80 mmHg)**	**(80 – 89 mmHg)**	**(90 – 99 mmHg)**	**(≥100 mmHg)**	
	Male	36(7.56)	30(6.27)	10(2.10)	5(1.05)	81(16.98)
	Female	140(29.35)	172(36.06)	44(9.22)	40(8.39)	396(83.02)
	Total	176(36.91)	202(42.33)	54(11.32)	45(9.44)	477(100.0)
			Diastolic: X^2=1.036, df=3, P=0.713			

Table 3: Lipid profile classification of the respondents, N = 48.

Variables	Normal (%)	Abnormal N (%)
Total cholesterol	62.50	37.50
Triglyceride	84.42	15.58
High density lipoprotein cholesterol	79.17	28.83
Low density lipoprotein cholesterol	72.92	27.08

Table 4: Prevalence of the coexistence of the risk factors.

Variables	N(%)
Presence of Hypertension and Diabetes	0(0.0)
Presence of Hypertension and Obesity	64(13.42)
Presence of Hypertension, Diabetes and Dyslipidemia	0(0.00)
Presence of Hypertension, Diabetes and Obesity	0(0.00)
Presence of Hypertension, Obesity and Dyslipidemia	5(1.05)
Presence of Diabetes and Obesity	0(0.00)
Presence of Diabetes and Dyslipidemia	0(0.00)
Presence of Obesity and Dyslipidemia	5(1.05)

Discussion

Obesity, hypertension, impaired fasting blood glucose/diabetes mellitus and dyslipidaemia were prevalent among the respondents. Obesity prevalence recorded in this study is higher than the findings of Anoshirike, Eme, Ibeanu and Uzodinma (16) who reported 6.7% obesity among University of Nigeria, staff but lower than 42.5% reported by Ejim et al. (17) although the latter combined overweight and obesity as generalized obesity. The prevalence of obesity was highest among those aged 40 to 49 years and declined with age. Overweight and obesity have been implicated as the leading predisposing factors for diabetes, hypertension and cardiovascular diseases in adult population. It was observed that more females had central obesity than males in this study.

About one quarter of the respondents had hypertension (stage 1 and stage 2 combined). This was lower than 44.3% prevalence reported by Effiong, Udeme, Aniema and Bassey (18) in a rural community in Akwa Ibom state. This study was conducted on middle aged adult and the implication is that more people are likely to become hypertensive in the future owing to the prevalence of overweight and obesity amongst them. Vasan et al (19) stated that blood pressure values between 130–139/85–89 mmHg are associated with a more than twofold increase in relative risk from cardiovascular disease (CVD) as compared with those with BP levels below 120/80 mmHg.

A good number of them had abnormally high level of total cholesterol and low levels of high density lipoprotein cholesterol. The values were less than the report of Odenigbo et al. (20). According to WHO (21), dyslipidemia accounted for 18% of ischemic heart disease, 56% of stroke, and more than 4 million deaths per year globally. It has been observed that even people with very low LDL cholesterol levels are exposed to increased risk of cardiovascular diseases if their HDL cholesterol levels are not high enough (22)

The coexistence of obesity and hypertension found in this study is not a surprise. The development of hypertension caused by obesity can occur via multiple mechanisms: insulin resistance, adipokine alterations, inappropriate sympathetic nerve function and renin-angiotensin-aldosterone system activation, structural and functional abnormalities in the kidney, heart and vascular changes, and immune maladaptation (23,24). According to Sabbatini, Fontana and Laurent (25), adipokines, such as adiponectin, leptin and resistin, may result in arterial stiffness and predispose individuals to endothelial dysfunction and hypertension.
Although, few of the respondents had a combination of obesity, hypertension and dyslipidemia, their coexistence has a synergistic effect of heightening the risk of cardiovascular events. The combined effects of hypertension and dyslipidemia have been shown to be multiplicative, which implies that the risk of coronary heart disease is greater than the sum of the risks of each component occurring alone (26).

Conclusion: More females participated in the study than the males. More than half of the respondents had OND/NCE as their highest level of educational qualification and hence had their monthly income between ₦18,000:00 to ₦30,000:00. Majority of them ate two meals per day and the meal skipped most was breakfast. The prevalence of obesity was highest among those aged 40 to 49 years of age. Hypertension (both stage 1 and stage 2) was recorded more in females than in males. The major form of dyslipidemia recorded in this study were high levels of total cholesterol and low levels of high density lipoprotein cholesterol. Although a few of the respondents had three of the parameters assessed in coexistence, it is of great concern as the simultaneous presence of these parameters will heighten their risk for cardiovascular events and possibly death. The Post Primary School Management Board should organize periodic seminars where nutrition education could be given to them on the appropriate diet for prevention and management of these conditions. The Board should also, map out activities that will engage the teachers physically to help lessen the burden of overweight and obesity amongst the teachers.

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Conflict of interest: We declare that we have no conflict of interest.

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