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RISK FACTORS OF CARDIOVASCULAR DISEASES AMONG STAFF OF FEDERAL POLYTECHNIC, ILARO, OGUN STATE

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ABSTRACT
Background: Cardiovascular diseases (CVDs) are growing contributors to global diseases burden leading to death among adults. Few nutrition studies have focused on the health of working-class people particularly those in academic institutions.
Objective: The study identified the risk factors of cardiovascular diseases among staff of Federal Polytechnic Ilaro (FPI), Ogun State.
Methods: A descriptive cross-sectional study of 200 FPI staff (academic and non-academic staff) was conducted using multi-stage sampling. Information on socio-economic status was captured with validated self-administered questionnaire. Anthropometric measurements, blood pressure measurement and risk factors of CVDs such as BMI, systolic and diastolic blood pressure, WHR and lifestyle factors were identified. Body mass index (BMI) and Waist-hip ratio (WHR) were calculated while blood pressure compared to standards. Data were analyzed for descriptive – frequency and percentages and inferential statistics – Chi square and regression analysis where $p < 0.05$ are statistically significant using SPSS 20.
Results: The study had more (57.5%) male than (42.5%) female respondents with 31% aged 41-50years. The distribution of risk factors of CVDs showed (25.5% and 32%) as obese and overweight respectively. Abdominal fat accumulation indicated (50.5%) males at low risk compared to 64.5% females at high risk. The systolic (15%) and diastolic (12.5%) blood pressure were hypertensive. Majority (86%) do not engage in regular exercise while 1.5% and 24% respectively indulge in smoking and alcohol consumption. Daily consumption of fruits (24.5%) and vegetables (19%) was poor. However, significant relationship between BMI, WHR and risk factors of CVDs was observed at $p < 0.05$.
Conclusion: Overweight, obesity, poor intake of fruits and vegetables were identified as risk factors of CVDs among the respondents. Abdominal fat accumulation was higher in female than male respondents. This calls for intervention targeting regular physical exercise, unhealthy diet and awareness campaign on early detection of the risk factors.

Keyword: *Risk factors, cardiovascular diseases, polytechnic staff*

INTRODUCTION
Cardiovascular disease (CVD) is the common term for group of disorders or conditions of the heart and blood vessels and include; coronary heart disease (heart attack), cerebrovascular disease (stroke), peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease and cardiomyopathies (1, 2) while risk factors are conditions or habit that make a person more likely to develop a disease such as high blood pressure (hypertension), smoking, high cholesterol, diabetes, sedentary lifestyle, family history of CVD, age, gender, diet, alcohol and ethnic background (1). According to World Health Organization (3), CVD can affect people of any age and class. A century ago, it was responsible for less than 10% of all deaths whereas today, it accounts for approximately 30% deaths worldwide (4). It has been found to be the major cause of death among men and women though it is more predominant in men (5, 6). In developing countries even in Africa, CVD is basically due to unhealthy diet, smoking, decrease physical activity with South Africa recording a significant increase in mortality rates for CVD and diabetes (6).

In 2012, Okunola *et al* **(**7) reported a large percentage of medical admission at Teaching Hospital in Nigeria due to CVD. Over 80% of CVD deaths take place in low and middle-income countries and are mostly due to modifiable risk factors (8) however in Nigeria, reports on the prevalence of these modifiable CVD risk factors are scarce (9). Oguoma *et al* (9) further showed that the adult Nigerian population to which the subject of the study belongs bear a substantial burden of modifiable CVD risk factors. The World Health Organization approximates that there will be about 20 million CVD deaths in 2015 that will account for 30% of all deaths worldwide (10) and by the end of 2030, researchers estimate that non-communicable diseases (NCDs) will account for more than three-

quarter of deaths globally while CVD alone will be responsible for more deaths in low income countries than infectious diseases including HIV/AIDS, tuberculosis, malaria, maternal and perinatal conditions and nutritional disorders (11). CVDs account for most death (about 17 million people annually) followed by cancer (7.6 million), respiratory diseases (4.2 million) and diabetes (1.3 million). These cluster of diseases account for 80% of disease related deaths (12). The four major non-communicable diseases featuring prominently are CVDs, cancer, respiratory diseases and diabetes mellitus while the four main behavioral risk factors are; tobacco use, physical inactivity, alcohol and unhealthy diet (12). Also, there is an indication that increased urban migration and urbanization overtime encouraging lifestyle changes arising from improved income level is contributory to the increase prevalence of these risk factors (9). The level of exposure to risk factors of unhealthy diets, physical inactivity, undue stress and pressure, tobacco use and harmful use of alcohol and drugs had become higher in developing countries than in high-income countries where comprehensive interventions at prompting healthier behavior, affordable and accessible health care service for early detection, effective treatment and prevention of complications are in place (3). Thus, CVD is now considered as the largest single contributor to global mortality and will continue to control mortality drifts in the future (13). With this trend coupled with the scarcity of prevalence of modifiable CVD risk factors even among staff in industries or academic work place, there is the need to identify some of the major risk factors contributing to the development of CVDs in academic and non-academic study population. These group of population are exposed to different environmental conditions such as stress, inactivity and unhealthy eating pattern which can increase their risk of exposure to CVDs. It is believed that information obtained will provide basis for employers to see the need for continuous protection of the health of their employees so they will continue to be productive in contributing to the growth of the country.

MATERIALS AND METHODS

Study design

The study was descriptive and cross-sectional in design.

Area of Study

The study was conducted in Federal Polytechnic, Ilaro, Ogun State. It is a higher institution of learning established by decree No 33 of July 25, 1979 and became opened to students on November 15, 1979. It is located along Oja-Odan Road which is about 3km from Ilaro Township and about 60km from Idiroko, a Nigerian boarder town with the Republic of Benin. Ilaro town itself is an ancient town land locked between Lagos and Abeokuta, the capital of Ogun State.

Population of study: The target study population includes all the academic and non-academic staff of Federal Polytechnic, Ilaro, Ogun State. At the time of the study, the total population of staff of the institution was Eight Hundred and Forth-Seven (847) (FPI/CEST/SM/179). These comprised of Three Hundred and Twelve (312) academic staff and Five Hundred and Thirty-Five (535) non-academic staff.

Sample size and Sampling Technique

From the total population of the target of study (847), 25% of each category of staff was selected following Mugenda and Mugenda (14) procedure where a sample of 10-30% of the total population is considered to give a good reliability. Thus, the sample size was calculated as follows and respondents drawn from the population:

Table 1: Sample distribution of respondents

S/No	Staff Category	Population	Sampling ratio	Sample Size
1.	Academic staff	312	0.25	78
2.	Non-academic staff	535	0.25	134
Total		**847**		**212**

Respondents were selected using multi-stage sampling technique. The first stage involved random selection of three schools out of the five schools in the Polytechnic by balloting. The second stage involved the random selection of three departments each from each of the schools while in the third stage, respondents were selected randomly based on population of respondents in each school.

Inclusive and exclusion criteria (criterion)

Only willing academic and non-academic staff participated in the study while pregnant staff in both categories as well as those with medical ill-health were excluded from the study. However, 200 staff (academic and non-academic) gave their informed consent to participate in the study after the objective of the study have been explained to them.

Ethical Approval

The study was approved by the Ethical Review Committee of the College of Natural and Applied Sciences, Bells University of Technology, Ota, Ogun State, Nigeria. (BELLSTECH/COLNAS/ERC/018/019)

Materials for data collection

The following were used in data collection of the respondents

1. Semi-structured questionnaire
2. Bathroom scale (BR 9707)
3. Measuring tape
4. Automatic Blood Pressure Monitor (KD 002)
5. Calibrated meter rule

Method of Data Collection

A validated self-administered questionnaire was used to elicit relevant information on socio-economic/demographic characteristics of the respondents such as age, gender, marital status, highest level of education attained, employment status and income level.

Anthropometric measurements (weight, height, waist circumference and hip circumference) were taken using standard procedures. The weight was taken with a bathroom weighing scale (BR 9707) and the height with a calibrated meter rule while the waist and hip circumference were taking with a measuring tape. These measurements were used to calculate the Body Mass Index (BMI), the Waist-Hip Ratio (WHR) and compared to standards (16). The BMI calculated was classified as underweight (< 18.5kg/m^2), normal weight (18.5-24.9kg/m^2), overweight (25.0-29.9kg/m^2) and obese (≥ 30kg/m^2) using WHO classification (15). The WHR was also classified using WHO classification (16). For men, low risk (≤ 0.95), medium risk (0.96-1.00) and values >1.00 were at high risk. Women on the other hand were classified low risk as (≤ 0.80), medium risk (0.81-0.85) and high risk at > 0.85. The blood pressure measurement involved the use of an automatic blood pressure monitor (KD 002). The reading was taken in duplicate (at the beginning and at the end of the interview), the mean recorded and compared with NCEP ATP III classification (17) Blood pressure (systolic/diastolic pressure: normal (<120/<80mmHg), pre-hypertension (120-139/80-89mmHg) and hypertension (>140/90mmHg

Statistical analysis: Statistical analysis was done using SPSS version 20.0. Descriptive statistics such as frequencies, percentages, means and standard deviation were used to analyze the socio-demographic and anthropometric data. Inferential statistics; chi square and regression analysis were used to establish the relationship between anthropometric parameters and the risk factors of CVDs at $p < 0.05$

RESULTS

Socio-demographic Characteristics of the respondents

Table 2 shows that 57.5% males and 42.5 females took part in the study. Most (82.5%) of them were married with less than half (32%) above the age of 50years while 12.5% were between the ages of 18-30years. The study comprised of 65% non-academic staff and 35% academic staff of the institution. The highest level of education attained indicated that about 31% had HND/B.Sc., 28% had postgraduate qualifications while 12% had lower qualifications comprising primary school leaving certificate, trade test certificate, proficiency certificate and City and Guild of London Certificate. Only 5% earned above N200,000 monthly while 47% earned between N50,000 – N99,999.

Distribution of Risk factors of CVD among the respondents

The distribution of risk factors of cardiovascular diseases (CVDs) are depicted in Table 3. Obesity, which is one of the risk factors defined by body mass index (BMI) greater than 30kg/m^2 was observed in 25.5% of the respondents, 32% were overweight while only 3% were underweight. The systolic and diastolic blood pressure indicated that most of the respondents were of normal blood pressure. However, 15% and 12.5% were hypertensive for systolic and diastolic blood pressure respectively. Majority of the respondents do not engage in smoking and alcohol consumption. The results of the waist to hip ratio among the male respondents showed that a little more than half (51.3%) were at low risk while 10.4% were at high risk of abdominal obesity. More (64.7%) of the women of study were at high risk of abdominal obesity as against 10.6% who were at low risk based on the waist to hip ratio.

Table 2: Socio-economic and demographic characteristics of the respondents

Variables	Frequency	Percentage (%)
Age in years		
18-30	25	12.5
31-40	49	24.5
41-50	62	31.0
>50	64	32.0
Sex		
Female	85	42.5
Male	115	57.5
Highest level of Education		
WASCE/GCE	21	10.5
OND/ NCE	38	19.0
HND/B.Sc	61	30.5
MBA/M.Sc.	49	24.5
Ph.D.	7	3.5
Others	24	12.0
Employment Status		
Academic staff	70	35.0
Non-academic	130	65.0
Monthly Income		
<N20,000	46	23.0
N20,000 - N49,999	29	14.5
N50,000 - N99,999	94	47.0
N100,000 - N200,000	21	10.5
> N200,000	10	5.0
Total	**200**	**100**

Table 3: Distribution of Risk factors of CVD among the respondents

Variables Risk factors	Frequency	Percentage (%)
BMI (kg/m^2)		
< 18.5 (Underweight)	6	3.0
18.5-24.9 (Normal weight)	79	39.5
25.0-29.9 (Overweight)	64	32.0
≥ 30 (Obese)	51	25.5
Systolic Blood Pressure (mmHg)		
Normal (<120)	101	50.5
Pre-hypertension (120-139)	69	34.5
Hypertension (>140)	30	15.0
Diastolic Blood Pressure (mmHg)		
Normal (<80)	120	60.0
Pre-hypertension (80-89)	55	27.5
Hypertension (>90)	25	12.5
Lifestyle factors		
Engaging in Regular Exercise		
Yes	28	14.0
No	172	86.0
Smoking		
Yes	3	1.5
No	197	98.5
Alcohol consumption		
Yes	48	24.0
No	152	76.0
Daily fruit consumption		
Yes	49	24.5
No	151	75.5
Daily vegetables consumption		
Yes	38	19.0
No	162	81.0
Waist Hip Ratio Distribution		
Male		
Risk of obesity		
Low Risk ≤ 0.95	59	51.3
Medium Risk 0.96-1.00	44	38.3
High Risk > 1.00	12	10.4
Female		
Risk of Obesity		
Low Risk ≤ 0.80	9	10.6
Medium Risk 0.81-0.85	21	24.7
High Risk > 0.85	55	64.7
Total	**200**	**100**

Relationship between body mass index (BMI), waist to hip ratio (WHR), lifestyle factors and dietary practices

Tables 4 and 5 shows the relationship between body mass index (BMI), waist hip ratio (WHR), lifestyle factors and dietary practices of the respondents using chi square and regression analysis. The result indicated that cigarette smoking (r = .111; p = .014), alcoholic intake (r = .036; p = .001), salt consumption (r = .101; p = .013), systolic blood pressure (r = .094; p = .010), diastolic blood pressure (r = .219; p = .000) and fruits and vegetables consumption (r = .761; p = .005) all had a positive relationship with the body mass index (BMI) of the respondents while oil intake (r = -.045; p = .571) has a negative relationship with the BMI.

The ordinal regression for waist to hip ratio, lifestyle and dietary practices revealed a positive association between cigarette smoking (r = .006; p = .016), alcoholic intake (r = .061; p = .048), systolic blood pressure (r = .304; p = .000), diastolic blood pressure (r = .190; p = .000) and the waist to hip ratio while the salt consumption (r = -.047; p = .210), fruits and vegetables consumption (r = -.611; p = .005) and oil intake (r = -.045; p = .109) had negative relationship with the WHR. (Table 5).

Table 4: Relationship between blood pressure, lifestyle and dietary practices of the respondents

Variable	Coefficient	Sig (P-value)	Exp (β)	Probability (%)
Cigarette Smoking	.111	.014	1.117	11.7
Alcohol Intake	.036	.001	.965	3.5
Salt Consumption	.101	.013	.904	9.6
Oil Intake	-.045	.571	1.041	4.1
Systolic Blood Pressure	.094	.010	.843	5.6
Diastolic Blood Pressure	.219	.000	.898	4.5
Fruit & Vegetable Intake	.761	.005	1.182	6.1
Constant	.021	.962		
Hosmer and Lemeshow Test (Chi-Square)	4.443	.815		

*** Significant at p < 0.05**

Table 5: Ordinal Regression for Waist-Hip Ratio and Lifestyle and Dietary Practices

Variable/Statistics	Coefficient	Sig (P-value)	Exp (β)	Probability (%)
Cigarette Smoking	.006	.016	1.006	0.6
Alcoholic intake	.061	.048	1.056	5.6
Salt consumption	-.047	.210	.953	4.7
Oil Intake	-.045	.109	1.041	4.1
Systolic Blood Pressure	.304	.000	.723	2.6
Diastolic Blood Pressure	.190	.000	1.008	3.5
Fruit & Vegetable Cons.	-.611	.005	1.121	1.1
Goodness-of-fit (Chi-Square) Pearson				
Deviance	15319.768	.619		
	1561.171	.800		
Test of Parallel Lines (Chi-Square)	798.31	.752		

DISCUSSION

The subjects of this study comprised of more male (57.5%) than female (42.5%). The higher male to female ratio in the study is similar to the study among tertiary hospital employees and families on cardiovascular risk factors by Divya *et al*, (18). The educational status of the respondents showed that most are well educated with qualifications of B.Sc/HND, M.Sc/MBA and Ph.D. as cardiovascular disease (CVD) can affect people of any age, sex and class (19). The high level of education seen could also be because the study was carried out in a tertiary institution where such is expected among the staff. However, reverse was the case among public-sector workers in Angola where there was low education level in 34.6% of the respondents of study despite working in an institution of higher education (4). It should be noted that education increases people's communication skills, reduces inequalities in the knowledge of disease transmission. The improvement in education is crucial for the prevention, early diagnosis and adequate management of chronic disease risk factors (4).

Majority of the respondents of study were married with 12.5% single, this high proportion of married people could have a significant impact on non-communicable diseases occurrence especially high blood pressure since marital issues related to social, financial and nutritional obligation has been found to have an associated effect on blood pressure among married couples (20).

The result of the BMI was higher than what was obtained from other studies around the country with reported prevalence of 8.1%; 22.8% for obesity and overweight in Maiduguri, 12.5% and 20.3% in Ile-Ife but similar to findings in Lagos with (22.2% obesity and 32.7% overweight (21). These higher values in the subject of study could be attributed to the perceived sedentary nature of their work as many of the respondents (86%) do not engage in regular exercise. Certain occupations characterized by sitting for long periods predispose individuals to sedentary lifestyles and these individuals spend most part of their adult working lives less engaged in physical activity if they don't consciously involve themselves in physical or sporting activities outside of working hours (22**)**. The same trend of non-involvement in regular physical exercises was observed among the respondents of study thereby increasing their susceptibility to overweight and obesity which could predispose them to chronic diseases associated with physical inactivity. In addition, the study revealed a substantially high prevalence of cardiovascular risk factor especially overweight and obesity. This was higher than what was obtained from other studies around the country with reported prevalence of 24.3%, 19% and 18% in Ota, Lagos and Zaria respectively (23). Early data in

Nigeria during the middle and later part of the last century suggested low prevalence of obesity (24, 25), reverse is however the case in the present time where more people are becoming overweight and obese arising from urbanization thereby encouraging sedentary lifestyle and unhealthy eating.

In addition, more females were obese than male measured by assessing the central obesity which is similar to Adegoke *et al*, (26) and Ogunmola *et al*, (27) in their studies in rural communities. This was attributed to the fact that majority of the women studied in the rural communities were low income earners and might not be able to afford variety of foods hence settling for the regular monotonous foods mostly carbohydrates and fats which predisposed them to obesity. Central obesity was predominantly higher among the female respondents of study and unhealthy diet has been shown to play a major role in the development of diet related non-communicable diseases (28).

The systolic and diastolic blood pressure measurement in the study indicated a prevalence of 27.5% of hypertension which is lower than that reported in Angola (4) but within the range reported in other African countries such as South Africa (29), Uganda (30), Ethiopia (31) and Ghana (32) where the prevalence varied from 13.7% to 30.5%. This difference might be due to the differences in the methodology employed as well as the area of study. Hypertension highlights the central role of endothelial dysfunction which is contributory to the initiation and progression of atherosclerosis. It points to the importance of early diagnosis and intervention against hypertension and associated CVD risks and complications (9). Most of the respondents of study exhibited good systolic and diastolic blood pressure values. This could be attributed to the fact that a higher percentage had their blood pressure monitored regularly as result of the available clinic and enrolment in the National Health Insurance Scheme (NHIS) within the institution.

The prevalence of cigarette smoking of 1.5% was lower than that reported by Ogah *et al* (23). The WHO in 2008 estimated about 4.6% smoke cigarette daily (12). Alcohol consumption was also observed to be lower which does not conform with the study on cardiovascular risk factors and non-communicable diseases in Abia State where alcohol consumption was noted to be high (23). Therefore, the lifestyle of the respondents of study indicated majority do not indulge in smoking and alcohol consumption. This compares favorably with Lawoyin *et al*, (25) and Aliyu *et al*, (33**)**. This may be because the respondents are aware of the hazards of smoking and excessive alcohol intake and the disease conditions associated with it in relation to their higher level of education. The relationship between BMI, WHR, lifestyle factors and dietary practices revealed BMI and WHR as risk factors of CVD among the respondents of study.

CONCLUSION

The study showed the risk factors of cardiovascular diseases (CVD) among the staff of Federal Polytechnic in Ilaro, Ogun State. The most risk factors associated with increased risk of CVDs among the staff were overweight, obesity and limited physical exercises. There is the need to sensitize the staff of the institution and create awareness through nutrition education on the need for early detection of risk factors of cardiovascular diseases with emphasis on lifestyle and dietary intake. Interventions relating to sports, keep fit/gym membership can be implemented to promote physical and regular exercise among the workers.

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