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Cardiovascular Disease Risk Factors in Senior Staff of Kaduna Polytechnic

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ABSTRACT
Objective: *To assess the cardiovascular disease risk factors among selected senior staff of Kaduna Polytechnic located within Kaduna, the capital city of Kaduna State.*
Methods: *It was a field-based descriptive cross-sectional study. The sampling technique was multistage sampling. The study population included both the academic and non-academic senior staff, who were within the range of 25-65 years that were on full-time employment. The instrument for data collection includes questionnaire, blood pressure measurement, body mass calculation, fasting blood sugar and lipid profile test. The data was analyzed using SPSS version 20.*
Results: *This study has established that hypertension (30.6%), overweight (30.3%) and obesity (21.6%) were the prevalent cardiovascular risk factors among senior staff of Kaduna polytechnic while physical inactivity and high fat diet were the most prevalent behavioral risk factors identified.*
Conclusion: *The outcome of the study showed an overall fair knowledge and awareness to CVD and its risk factors, but it did not translate to good attitude towards the risk factors among the staff.*
KEYWORDS*: Cardiovascular Disease, Risk Factor, Coronary Heart Disease.*

1.0 INTRODUCTION

Cardiovascular diseases (CVDs) encompass a range of conditions affecting the heart and blood vessels, such as coronary artery diseases, cerebrovascular disease, peripheral arterial diseases, congenital heart diseases, deep venous thrombosis, and pulmonary embolism (World Health Organisation, 2015). Cardiovascular diseases (CVDs) are presently accountable for approximately 33% of global mortality. In 2008, it is estimated that CVDs caused the death of approximately 17.3 million individuals, constituting 30% of the total global deaths (World Health Organisation, 2004). Among the recorded fatalities, approximately 7.3 million were attributed to coronary heart disease, whereas stroke accounted for 6.2 million deaths. Low- and middle-income countries exhibit a disproportionate burden of cardiovascular disease (CVD), with over 80% of CVD-related deaths occurring in these regions. Furthermore, the distribution of CVD deaths among men and women in these countries is nearly equal (World Health Organisation, 2003).

Cardiovascular diseases (CVDs) are associated with risk factors that can be categorised into two groups: modifiable and non-modifiable risk factors. Modifiable risk factors associated with cardiovascular diseases (CVDs) encompass various conditions such as abnormal lipids, hypertension, diabetes mellitus, tobacco smoking, abdominal obesity, general obesity, psychological stress, physical inactivity, alcohol consumption, and unhealthy dietary patterns. Nonmodifiable risk factors encompass factors such as increasing age, familial history, gender, and ethnicity (World Health Organisation, 2004). The prevalence rates of cardiovascular disease (CVD) risk factors in developing countries, such as Nigeria, are experiencing a rapid increase as a result of the processes of globalisation and urbanisation (Nwankwo et al., 2008).

Limited research has been conducted on the staff of tertiary institutions and the prevalence of cardiovascular risk factors in northern Nigeria. A study conducted in Jos, a city located in the north central region of Nigeria, revealed that a significant proportion of the respondents (60%) possessed post-secondary education. However, it was observed that more than one third of the participants (36.6%) were affected by hypertension, with the prevalence of this condition increasing as individuals advanced in age. A majority of the participants (54%) did not engage in regular weight monitoring, while a significant proportion (72%) were classified as either obese or overweight, as reported by Funke and Ibrahim (2013).

Similarly, a study in Sokoto, North-West Nigeria found that one-third (33%) of the participants had central obesity (more

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prevalent in the female participants) and the prevalence increased progressively across the age groups. While 37.8% had reduced HDL cholesterol, 32.8% had elevated triglycerides, prevalence of elevated fasting blood glucose was 10.7% and increased progressively with age. The prevalence of hypertension was 31.9% with a slightly higher prevalence among males. The prevalence of which increased progressively and significantly across age groups (Awosan et al., 2013).

2.0 MATERIALS AND METHODS

2.1 Area of Study

Kaduna Polytechnic is situated in Kaduna, the administrative centre of Kaduna State in the Federal Republic of Nigeria. The establishment of the institution took place in 1956, with the primary aim of offering a wide range of educational programmes, including instructions, training, and research in various fields such as technology, sciences, commerce, and the humanities. Additionally, the institution also provided in-service instruction programmes specifically designed for individuals working in the public service sector in Nigeria.

Kaduna Polytechnic comprised four primary campuses situated within the Kaduna metropolis, encompassing six colleges and a central administration. The colleges encompassed a total of 54 departments, namely the College of Environmental Studies, College of Science and Technology, College of Business Management Studies, College of Administration and Social Sciences, College of Technical and Vocational Education, and College of Engineering. The Central Administration comprised several key departments, including the Registry, Bursary, Works department, and the Medical Centre. The Polytechnic exhibited a significant degree of cosmopolitanism, attracting students from various regions within the federation. The polytechnic boasted a robust workforce of more than 4000 individuals, comprising 2895 senior staff members encompassing both academic and non-academic personnel.

2.2 Study Design and Population

This is a field based descriptive cross-sectional study for senior staff of Kaduna Polytechnic including both academic and non-academic staff.

2.2.1 Inclusion Criteria

a) Any senior staff of Kaduna Polytechnic that was within the age of 25-65 years.
b) Any staff that was a full-time employee.

2.2.2 Exclusion Criteria

a) Any senior staff with coexisting CVD.
b) Any senior staff who was on secondment, leave of absence or study leave within the last six months.
c) Any senior staff that was employed for less than six months duration.

Sample Size Determination

The minimum sample size required for the study was calculated using the following formula:

$$n = \frac{Z^2 pq}{d^2}$$

Where n = minimum sample size required, Z = standard normal deviate at 95% confidence interval = 1.96, p = estimated prevalence of cardiovascular risk factors among senior staff in a similar study, q = complementary probability of p = (1-p), d = level of precision=5% (0.05)

Computing these values now with the following values

Z =1.96

P = 0.332 gotten from a prevalence of cardiovascular risk factors in semi urban population in Zaria[27] which was within the same region as Kaduna polytechnic.

q = 1-0.332 =0.668, d = 0.05

Therefore n = $\frac{(1.96)^2 \times 0.332 \times 0.668}{(0.05)^2} = \frac{0.852}{0.0025} = 340.8$

Approximately 341.

But for population less than 10,000, finite reduction is done using the formula $= \frac{n}{1+\frac{n}{N}}$.[47]

Where n = calculated sample size from above

N = population size = 2895

Thus, sample size = $\frac{341}{1+\frac{341}{2895}} = \frac{341}{1.12} = 305$

Adjusting for a maximum anticipated 10% non-response rate

n = 305+30.5 = 336

2.3 Sampling Technique

Multi stage sampling technique was adopted as follows:

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Stage 1: Selection of colleges; from the total list of all colleges in Kaduna Polytechnic, 3 colleges were randomly selected using balloting technique. The selected colleges were College of Business and Management Studies (CBMS), College of Science and Technology (CST) and the Central Administration (CA).
Stage 2: Selection of Departments in Colleges; from the total list of departments in each selected college, departments were randomly selected by use of random numbers after allocation of numbers to all the departments. The selected departments were:

Table 1: Participating Department Based on Colleges

S/NO	COLLEGE	DEPARTMENTS
1	CBMS	Business Administration, Office technology, Management Studies
2	CST	Mathematics and Statistics, Food Technology, Applied Science, nutrition and dietetics.
3	CA	Registry, Bursary, Works and services, Medical Centre.

Stage 3: Selection of Respondents in each department: Respondents were selected from each department using Probability Proportionate to Size (PPS). Thus, the number of respondents from each department is as shown below;
Furthermore, systematic sampling technique was used to select respondents from the list of all senior staff in each Selected department. Where a selected respondent declined / refused to consent or was not available during period of study, the next staff in the sampling frame was selected.

Table 2: Number of Respondent Based on Colleges and Departments

S/N	UNIT	DEPARTMENT	NUMBER OF STAFF	RESPONDENT SELECTED
1	CBMS	Business administration	47	20
2		Office technology	16	7
3		Management studies	28	13
4	CST	Mathematics and statistics	96	41
5		Applied sciences bio, chem & phy)	122	25per department
6				
7		Food technology	59	25
8	CA	Registry	53	23
9		Bursary	134	58
10		Works and services	35	15
11		Medical Centre	72	31
Total			775	336

2.4 Instrument for Data Collection

A structured, self-administered questionnaire which comprised of five sections: These were (a) socio-demographic characteristics contained variables like age, sex, marital status (b) knowledge of CVD risk factors (c) attitude to the CVD risk factors and (d) preventive measures undertaken to prevent CVDs and (e) information about anthropometric and laboratory measurements was done by the investigator. Equipments used were Accu-check glucometer (active), a stadiometer, Accosson's mercury sphygmomanometer and weighing scale.

2.5 Data Collection Technique

Research assistants were recruited from the public health unit of the clinic and trained for two days. They were trained with the objective; methodology of the research and role play of the administration of tools. Field supervision was carried out to ensure completeness, correctness and integrity of data collection.

i. Survey Instrument. The participants were required to complete a data form that encompassed various demographic and health-related variables. These variables included age, marital status, gender, department (unit) of employment, highest level of education attained, previous history of hypertension or diabetes, known family history of hypertension or diabetes, long-term medication usage, history of alcohol or cigarette consumption, levels of physical activity, and dietary habits.
ii. Blood pressure was assessed while the subject was in a seated position, utilising Accoson's mercury sphygmomanometer, which was calibrated in millimetres of mercury (mmHg). The cuff used was of an appropriate size, covering at least two-thirds of the arm. Prior to the measurement, the subject was given a

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minimum of 5 minutes to rest. The systolic blood pressure was measured during the occurrence of the 1st Korotkoff sound, while the diastolic blood pressure was measured during the occurrence of the 5th Korotkoff sound. Two blood pressure readings were obtained and an average was calculated. The patients were categorised as hypertensive based on the criteria established by the World Health Organisation (WHO) and the International Society of Hypertension (ISH), as outlined in the study conducted by Erhun et al. (2006). Specifically, patients were considered hypertensive if their average systolic blood pressure was equal to or greater than 140mmHg, and/or if their average diastolic blood pressure was equal to or greater than 90mmHg.

iii. The height of the participants was measured using a stadiometer, without shoes, with a precision of 0.01m.
iv. The body weight of each participant was assessed in kilogrammes (kg) with a precision of 0.1kg using a digital scale that had a maximum capacity of 150kg and an accuracy of 100g.
v. The fasting blood sugar levels were measured by employing the Accu Chek active glucometer. Prior to the measurement, the index finger was sterilised using an alcohol swab. Subsequently, the index finger was pricked, and a small amount of blood was collected. This procedure was conducted after a minimum fasting period of 10 hours.
vi. The lipid profile was assessed by collecting a blood sample from all participants following a 10-12 hour fasting period through deep vessel venipuncture. The lipid profile was conducted in order to measure the levels of total cholesterol, high density lipoprotein cholesterol, and triglycerides. The calculation of low-density lipoprotein (LDL) was performed utilising the Friedwald equation.

2.6 DATA ANALYSIS

The completeness of the quantitative data was verified and then entered into SPSS version 20 for analysis. The findings were subsequently presented in the form of tables and charts. The statistical significance of the relationship between qualitative variables was evaluated using a chi-square test with a significance level set at P<0.05.

i) Body Mass Index (BMI):

This was calculated by dividing the weight of the subjects in Kilogram (Kg) by the product of height of the subject in meter squared (m^2);

BMI = $\frac{weight}{height^2}$ in kg/m^2.

The following cut –off marks were used for the BMI. Low body weight <18.5 kg/m^2; Normal weight 18.5 – 24.9 kg /m^2 ; overweight 25- 29.9 kg /m^2; and obese >30 kg/m^2.

ii) Lipid Profile

Hypercholesterolemia defined as total cholesterol > 240mg/dl; low HDL cholesterol as HDL cholesterol < 40mg/dl. Elevated LDL cholesterol as >160mg/dl Hypertriglyceridemia defined as triglyceride >150mg/dl.

3.0 RESULTS AND DISCUSSION

3.1 Sociodemographic Characteristics

A total of 340 respondents turned out for the study but two declined. Nine other questionnaires were not well completed, which gave a response rate of 96.8%. Table 1 shows the socio-demographic characteristics of the respondents.

Table 3: Social-Demographic Characteristics of the Respondents

Socio-demographic characteristics	Response	Frequency	Percentage
Sex	Male	198	60.2
	Female	131	39.8
Marital status	Married	283	86.0
	Single	34	10.3
	Divorced	12	3.7
Educational status	National diploma	74	22.5
	Higher national diploma	98	29.8
	Degree	69	21.0
	Postgraduate (master, PhD)	88	26.7
Types of work	Administration	119	36.2
	Lecturing/research	93	28.3
	Medical	20	6.1
	Accounting	31	9.4
	Works and services	27	8.2

	Others	39	11.8
Religion	Islam	224	68.1
	Christianity	92	28.0
	others specify	13	3.9

3.2 Prevalence

The study included a total of 104 hypertensive subjects, constituting 31.6% of the sample population. Among these individuals, 98 were receiving treatment, accounting for 29.8% of the hypertensive subjects. A total of 5 individuals, accounting for 1.6% of the study participants, were identified as having recently developed hypertension. The overall prevalence of hypertension among the participants in the study was found to be 30.7%. Approximately 14.3% (n=47) of the participants in the study were diagnosed with type II diabetes mellitus. Among this subgroup, 93.6% (n=44) were receiving treatment for their condition, while 95.5% (n=42) demonstrated satisfactory glycemic control. No newly diagnosed cases of diabetes were identified, resulting in a prevalence rate of 14.3% for type II diabetes mellitus. The study found that the overall prevalence of hypercholesterolemia was 11.1% (9). Additionally, the prevalence of high HDL cholesterol was 21% (17), while the majority of participants, specifically 67.9% (55), exhibited normal HDL cholesterol values. A smaller proportion, 9.9% (8), had low HDL cholesterol levels. Approximately 11.1% (9) of the entire sample exhibited hypertriglyceridemia.

3.3 Dominant CVD Risk Factors Amongst Staff

The height and fasting blood sugar levels of the male staff were significantly greater than that of the female staff while the weight and body mass index of the female staff was significantly more than that of male staff. This is depicted in the table below which had the p- values <0.05.

Table 4: Statistical Analyses of the Respondents' Parameters

TABLE 1: Group Statistics of Respondents

	Sex	Mean	Std. Deviation	Std. Error Mean
Height	Male	1.7505	.07670	.00545
	Female	1.6539	.06849	.00601
Weight	Male	74.4556	15.67704	1.14642
	Female	80.3556	16.30363	1.45244
BMI	Male	25.1388	10.57781	.75556
	Female	28.6466	7.05143	.62326
fasting blood sugar	Male	11.1589	20.25722	1.43962
	Female	5.9323	8.23790	.72251

About 153 (46.5%) of the subjects had normal body mass index (BMI <25kg/m^2), 97 (29.5%) were overweight (BMI 25-29.9kg/m^2) and seventy (21.3%) were obese (BMI>30kg/m^2). In the study, it was observed that female participants experienced a significantly higher prevalence of obesity and overweight across all grade levels, as compared to their male counterparts (p<0.005).

Knowledge of Cardiovascular Disease Risk Factors

About 203 (61.7%) of the subjects have ever heard of cardiovascular diseases, books 142 (43.2%) and television / radio (40.7%) and were the commonest source of information about the diseases. Health workers 124 (37.8%) were the next common source of information. Only few got their information from Magazines/newspapers (19.5%) family and friends (17.6%) and internet (19.5%).

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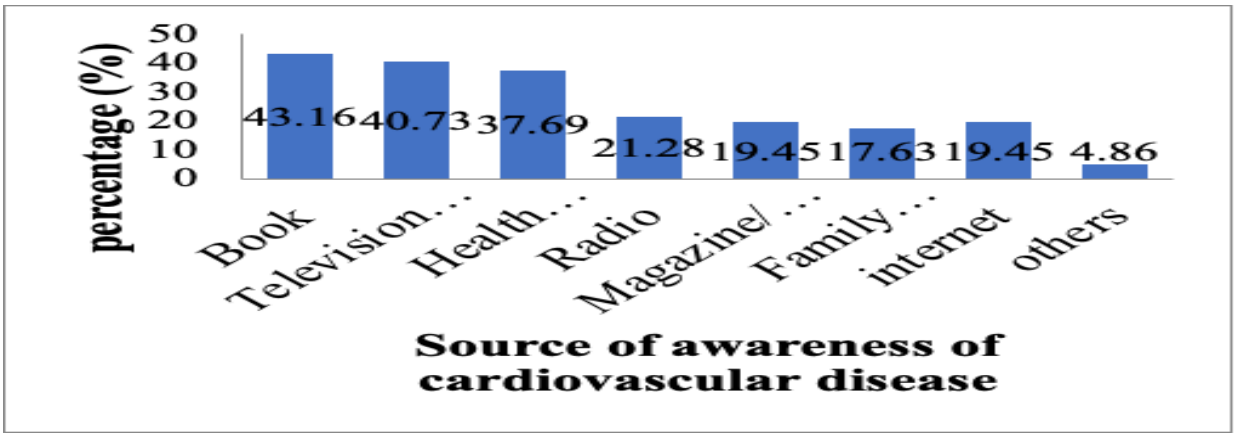

Figure 1

Hypertension was readily identified as a risk factor to CVD in 235 (71.4%) of the respondents, cigarette smoking identified in 120 (36.5%) while 113 (34.3%) identified obesity as a risk factor. Diabetes mellitus and sedentary lifestyle were least identified with 79 (24.4%) and 67 (20.4%) of respondents respectively identifying them. While 108 (32.8%) did not know any cardiovascular disease risk factors.

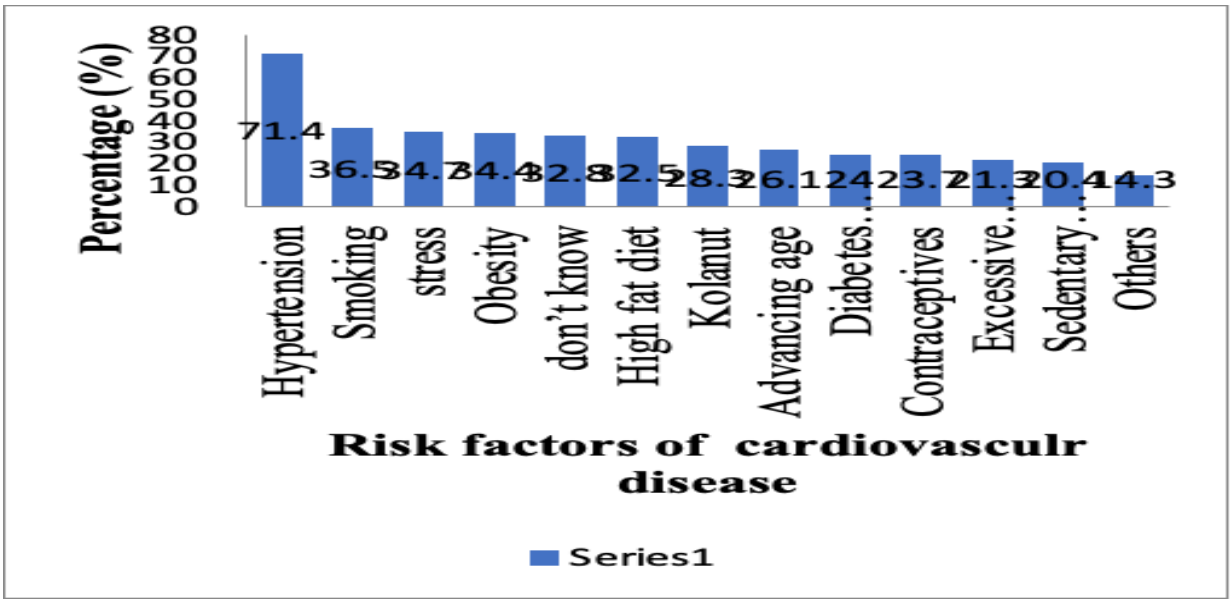

Figure 2

With regards to types of cardiovascular, 67.5% of the respondents identified heart attack as a CVD, 47.7% were able to identify stroke while 32.8% identified fainting. 21.9% of the participants did not know any CVD disease.

3.4 Attitude to Cardiovascular Disease Risk Factors

Table 9 presents an overview of the respondents' general disposition towards various risk factors associated with cardiovascular disease (CVD). Out of the total respondents, 17 individuals (5.2%) acknowledged consuming alcohol, while only 4 individuals (23.5%) among them reported attempting to cease alcohol consumption. Furthermore, out of the total of 27 individuals who currently smoke cigarettes, only 8 individuals, accounting for 29.6%, have made attempts to cease smoking. About 220 (66.9%) are willing to engage in physical exercise within the next 3 months. Although 256 (77.8%) of the respondents say they would visit the hospital in the event of a CVD, 33 (10%) admit they would visit a traditional herbalist. Others 3 (0.9%) mentioned that they will visit a chemist.

Table 5: Prevalence and Risk Factors Associated with CVD

Prevalence of CVD Risk Factors	Response	Frequency	Percentage

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Places clients will go to in event of CVD	Herbalist	33	10.0
	Chemist	3	.9
	Spiritual house	13	4.0
	Hospital	256	77.8
	other specify	10	3.0
Previous attempts to stop drinking alcohol n=17	No	13	76.5
	Yes	4	23.5
Previous attempts to quit smoking cigarette. (n=27)	No	19	70.4
	Yes	8	29.6
Time interval from last general medical check-up	1 month	36	10.9
	0-3 months	58	17.6
	3-6 months	66	20.1
	6-12 months	46	14.0
	over 1 year	82	24.9
Place of last medical check up	Chemist	42	12.8
	Clinic	45	13.7
	Hospital	204	62.0
	Traditional medicine	9	2.7
Regular weight checks	Not regular	143	43.5
	Regular	151	45.9
Time interval of last weight check	0-3 month	99	30.1
	3-6 month	52	15.8
	6-12 month	1	.3
	0ver 1 year	6	1.8
	others specify	10	3.0
Regular blood pressure checks	Not regular	120	36.5
	Regular	185	56.2
Time interval of last BP check	0-3 month	126	38.3
	3-6 month	48	14.6
	6-12 month	3	.9
	0ver 12 month	8	2.4
	others specify	16	4.9
Willingness to engage in physical exercise	No	63	19.1
	Yes	220	66.9

3.5 Adoption of Preventive Measures Against CVD

The distribution of preventive measures being carried out by the respondents against CVD revealed that 231 (70.2%) were engaged in physical exercise, 157 (47.7%) undertook dietary modification of low-fat diet while 140 (42.5%) monitored their blood pressure regularly. Also 47 (14.3%) admitted to ingestion of alternative medicine as a form of prevention and 14 (4.3%) revealed they used traditional concoctions as a preventive measure.

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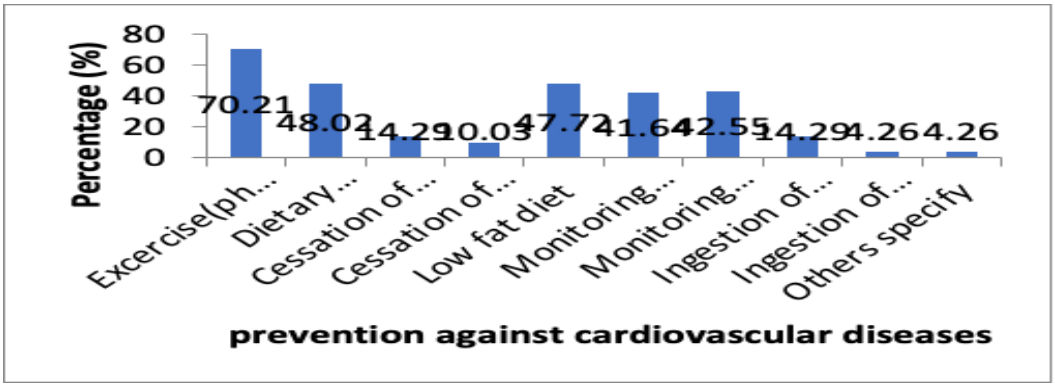

Figure 3

4.0 CONCLUSION

This study has been able to establish that hypertension (30.6%), overweight (30.3%) and obesity (21.6%) were the cardiovascular risk factors that was most prevalent among senior staff of Kaduna polytechnic while physical inactivity and high fat diet were the prevalent behavioral risk factors identified. Despite the study's findings indicating a generally satisfactory level of knowledge and awareness regarding cardiovascular disease (CVD) and its associated risk factors, there was a lack of corresponding positive attitudes towards these risk factors among the staff. The study successfully accomplished all of its objectives and additionally established a foundational evaluation of risk within a specific academic population, thereby facilitating future investigations in this area.

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