



Knowledge and Perception of Cardiovascular disease Risk Factors among Allied Health Sciences Students of Bayero University, Kano

Alkassim Sani Usman¹, ⁶Jibril Mohammed Nuhu², Aisha Ahmad Ahmad², Ibrahim Muhammad Chiroma³, Jibril Mohammed²

¹ Department of Physiotherapy, Specialist Hospital, Damaturu, Yobe State, Nigeria

² Department of Physiotherapy, Faculty of Allied Health Sciences, Bayero University, Kano, Nigeria

³ Department of Physiotherapy, Usmanu Danfodiyo University Teaching Hospital, Sokoto State, Nigeria

Abstract

Background: Knowledge and perception of cardiovascular disease (CVD) risk factors are important for the prevention and control of CVD given its high prevalence in Africa. Little or no information is available on the knowledge and perception of CVDs among university-level students in Nigeria. This study assessed knowledge and perception of CVD factors among allied health sciences students at Bayero University, Kano (BUK), Nigeria. **Methods:** Respondents were recruited proportionally from all levels of study (100 to 500/600) of the five departments (Medical Laboratory Science [MLS], Nursing Science, Physiotherapy, Radiography and Optometry) that make up the Faculty of Allied Health Sciences in BUK using a systematic sampling technique. The ABCD Risk Assessment Questionnaire, which assesses knowledge and perception of cardiovascular disease risk factors was administered to the respondents. Data obtained was analyzed using descriptive and inferential statistics on SPSS version 24. **Results:** A total of 311 respondents participated in this study. In terms of department and level of study, the highest number of participants were from the department of MLS and 200 level, whilst the least proportion were from the department of optometry and 500 level, respectively. Also, male respondents were slightly more in number than females (54% vs. 46%). The major results of the study indicated that nearly all the respondents were evenly split between having a moderate (49.8%) and good (49.5%) level of knowledge of CVDs. The results further showed most respondents demonstrated a positive perception towards CVD risk factors in the domains assessed such as perceived susceptibility, severity, barriers, and benefits of lifestyle changes. Nevertheless, respondents largely did not attempt questions about alcohol consumption or cigarette smoking. Lastly, the results also revealed that being female, of a higher level of study and studying physiotherapy followed by radiography then nursing science then medical laboratory science and optometry was significantly associated with better knowledge of the risk of CVDs ($p < 0.05$), whilst age

⁶ **Correspondence Author:** Dr. Jibril Mohammed, Department of Physiotherapy, Faculty of Allied Health Sciences, Bayero University, Kano **Email:** jmohammed.pth@buk.edu.ng

was not significantly associated with knowledge of the risk of CVDs ($p > 0.05$) **Conclusion:** *It was concluded that allied health sciences students of Bayero University Kano have between moderate to a good level of knowledge and perception of CVD and CVD risk factors, which is greatly influenced by gender, level/programme of study.*

Keywords:

Introduction

Cardiovascular diseases (CVDs) are a leading cause of mortality and morbidity globally and are emerging as a prominent public health problem in developing countries (WHO, 2002; Lui, 1990). CVDs have reached near epidemic proportions in Africa (Johnson et al., 2013) because Africans have been reported to have a higher prevalence of hypertension, diabetes, stroke, and renal disease, which are all predisposing factors to CVDs (James et al., 2002). Already, these diseases 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 (WHO, 2002) in addition to the emerging trend of CVD-related death among young individuals (WHO, 2002). Furthermore, WHO in 2002 revealed that 80% of deaths from CVDs and 87% of related disability occur in low- and middle-income countries (WHO, 2002)

Cardiovascular diseases refer to any disorder, abnormality or failure of the heart and blood vessels to function well (Boon et al., 2002). They typically include coronary artery disease, atherosclerosis, myocardial infarction (heart attack) and chronic heart failure (Shanthi et al., 2011). Other CVDs include stroke, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, heart arrhythmias, congenital heart disease, valvular heart disease, peri-myocarditis, aortic aneurysms, peripheral artery disease, thromboembolic disease, and venous thrombosis (Shanthi et al., 2011; Global Burden of Disease [GBD], 2013).

The risk factors for CVDs are classified into modifiable and non-modifiable. Non-modifiable risk factors include increasing age, hereditary, gender (male) and ethnicity (black), while modifiable risk factors include obesity, hypertension, elevated serum cholesterol, diabetes mellitus, dyslipidemia, diabetes mellitus, physical inactivity, nutrition, low socio-economic status, alcohol consumption and smoking (Pasternak et al., 2003; Gupta, 2003) It is estimated that up to 90% of CVDs may be preventable (McGill et al., 2008; O'Donnell & Chin, 2016), and this involves preventing CVD risk factors through healthy eating, regular physical activity and exercise, avoidance of tobacco and limiting alcohol intake (Shanthi et al., 2011; Krist et al., 2020).

Despite past and ongoing efforts to create awareness regarding the need for CVD prevention through improving risk factors (especially modifiable), several population groups have been reported to still have poor knowledge and/or perception regarding these risk factors (Boateng et al., 2017). One example of note is low awareness of the

risk factors for CVD reported among entry-year undergraduate health science students (Udaykiran *et al.*, 2017; Shaikh *et al.*, 2011). Having good knowledge and perception of CVD risk factors is known to substantially contribute to both prevention as well as the reduction in rates of CVD-associated morbidity and mortality. This study assessed knowledge and perception of cardiovascular disease risk factors among the allied health sciences students of Bayero University, Kano.

Methodology

Study Design

The study was a cross-sectional design study which assessed knowledge and perception of cardiovascular disease risk factors among students of the Faculty of Allied Health Sciences, College of Health Sciences, Bayero University, Kano. The design was more appropriate for the study because the data was taken from a cross-section of the population (students of faculty of allied health sciences) and was taken only once at a time, and no follow-up.

Population

Respondents selected for this study were from the population of students of the Faculty of Allied Health Sciences, College of Health Sciences, Bayero University, Kano. The respondents were all full-time undergraduate students of the Faculty of Allied Health Sciences that were willing to participate in the study were included in this study.

Sample size and sampling technique

The sample size was calculated using Yamene's formula as follows:

(Yamene, 1967)

Where = sample size

N = total population

e = margin of error

N = 1,925 (Total number of students of the Faculty of Allied Health Sciences)

e = 5%

Therefore = 331

A Systematic sampling technique was used to select respondents in this study. The sample size of the study was three hundred and thirty-one (331) as shown in the formula above. The number of potential respondents (sample) from each department and level of study was drawn proportionally to the number of students present therein. For this, the list of students (sampling frame) was obtained. Thereafter, the first respondent was randomly selected from a predetermined number range (derived from dividing the number of respondents in a level of study). The same number is used to arrive at an interval for choosing subsequent students in the list of sampling frames for

a particular level of study (in a department) until the required number of respondents per level of study is reached. In short, each level of study and/or department with a high number of participants had a proportionally higher sample size.

Instrumentation

The ABCD Risk Questionnaire was used to collect the data for this study. The 85-item questionnaire is a short-validated questionnaire with satisfactory content and face validity and reliability examining CVD risk awareness (Woringer et al., 2017). It consists of eight (8) subscales, namely: (i) knowledge of CVD risk and prevention, (ii) perceived risk and vulnerability of CVD, (iii) perceived susceptibility, (iv) perceived severity, (v) perceived benefits, (vi) perceived barriers, (vii) self-efficacy; and (viii) intention to change behaviour or cues to action.

In the knowledge category, each correct answer is scored 1 point, while an incorrect answer or not available is allotted a zero point. The total score obtainable in the knowledge category is 18 points. A respondent with a score between 0-6 points was categorized as having poor knowledge of CVD risk factors, while those with a score of 7 and 12 points were categorized as having moderate knowledge of CVD risk factors. Participants with a score of 13 and above (to 18 points) were classified as having good knowledge of CVD risk factors. For the perception scales, each item was rated mainly using a four-point Likert as follows; strongly agree, agree, disagree and strongly disagree. Meanwhile, a five-point Likert scale comprising (i) not all confident, (ii) somewhat confident, (iii) moderately confident, (iv) very confident, and (v) completely confident was used to rate the perception of the respondents regarding self-efficacy.

Procedure

Ethical approval was sought and obtained from the Ethical Committee of the College of Health Sciences, Bayero University, Kano. Thereafter, potential respondents for the study were randomly selected using a systematic sampling technique. The consent form was used to obtain permission from the respondents before questionnaire administration. The questionnaires were distributed to sampled participants along with the study information form as described above. The questionnaires were distributed during lecture hours in their classrooms in the various departments.

Analysis

Responses from the questionnaires were analyzed descriptively using frequencies and percentages. Chi-squared test was used to assess the association between demographic variables and knowledge of risk factors of CVDs. Alpha probability was significant at 0.05 and analysis was done using Statistical Package for Social Sciences (SPSS) version 24 on the Windows software.

Results

The distribution of the respondents based on their demographic variables shows that participants from the Department of Medical Laboratory Science had the highest number of respondents (22.2%), while those from the Department of Optometry accounted for the lowest proportion of respondents (14.8%). Based on the level of study, participants in 200 levels constituted the highest proportion of participants with 82 respondents (21.4%), while those in the 500 level had the lowest representation (54 or 17.4%). Male respondents (56.9%) were slightly more in number than females as indicated in Table 1. Furthermore, results from Table 1 further show that out of 311 respondents to the study, in terms of knowledge of CVDs, the majority (almost all) of them were evenly split between moderate (49.8%) or good (49.5%) levels of knowledge. Meanwhile, about 0.7% (2 respondents) demonstrated poor knowledge.

Table 2 shows the results of the perceived vulnerability or predisposition to CVD risk of the respondents. Here, most of the respondents demonstrated a more positive perception towards CVD risk and their perceived vulnerability to them.

Most of the respondents of the study showed good perception for questions regarding susceptibility to CVDs (by strongly disagreeing that they were susceptible to CVD), severity of CVD (many think that CVDs can be fatal), benefits of activities or lifestyles that help to reduce the risk of CVD (which shows variable perception levels) and the barriers to CVD risk prevention (Table 3).

Furthermore, the perception of the respondents based on questions relating to their self-efficacy indicated that the majority of the respondents were mostly confident in their ability to control the risks of having CVDs such as maintaining a healthy weight, taking a healthy diet and other modifiable risk factors as indicated in Table 4. The perception of the respondents based on their intention to change CVD risk-associated behaviours or cues to action is presented in Table 5. Here, the findings of the study revealed that most questions about alcohol consumption or cigarette smoking were not attempted by the respondents.

Lastly, the results from the Chi-square analyses showed that gender (female), level of study (higher levels) and programme of study (Physiotherapy followed by Radiography followed by Nursing Science, followed by Medical Laboratory Science and Optometry department) were significantly associated with better knowledge of the risk of CVDs ($p < 0.05$), whilst age of respondent was not significantly associated knowledge of the risk of CVDs ($p > 0.05$) as indicated in Table 6.

Table 1: Distribution of Respondents Based on Demographic Variables and Knowledge of CVD Risk Factors (n=311)

Variables	n (%)
Department	
Medical Laboratory Science	69 (22.2)
Nursing Sciences	81 (26.0)
Optometry	46 (14.8)
Physiotherapy	63 (20.3)
Radiography	52 (16.7)
Level of study	
100	51 (16.4)
200	82 (26.4)
300	58 (18.6)
400	66 (21.2)
500	54 (17.4)
Gender	
Male	177 (56.9)
Female	134 (43.1)
Knowledge	
Poor	2 (0.6)
Moderate	155 (49.8)
Good	154 (49.5)

Key: CVD= cardiovascular disease, n= number, %=percentage

Table 2: Perception of Respondents Based on CVD Risk and Vulnerability (n=311)

Statement	Responses, n(%)			
	SD	D	A	SA
There is a possibility that I will have a heart attack or stroke.	149 (47.9)	93 (29.9)	52 (16.7)	16 (5.1)
There is a good chance I will experience a heart attack or stroke in the next 10 years	165 (53.1)	94 (30.2)	36 (11.6)	16 (5.1)
A person who gets a heart attack or stroke has no chance of recovering.	109 (35.0)	133 (42.8)	52 (16.7)	16 (5.1)
I have a high chance of getting a heart attack or stroke because of my past behaviours	173 (55.6)	77 (24.8)	39 (12.5)	20 (6.4)
I feel sure that I will have a heart attack or stroke	186 (59.8)	76 (24.4)	31 (10.0)	17 (5.5)
Healthy lifestyle habits are unattainable.	150 (48.2)	98 (31.5)	41 (13.2)	20 (6.4)
It is likely that I will get a heart attack or stroke.	146 (46.9)	102 (32.8)	50 (16.1)	13 (4.2)
I am at risk of having a heart attack or stroke.	157 (50.5)	94 (30.2)	35 (11.3)	22 (7.1)
It is possible that I will have a heart attack or stroke	135 (43.4)	77 (24.8)	72 (23.2)	26 (8.4)
I am not doing anything that is unhealthy to my heart	66 (21.2)	76 (24.4)	82 (26.4)	85 (27.3)
I am too young to have a heart attack or stroke.	74 (23.8)	90 (28.9)	74 (23.8)	72 (23.2)
People like me do not get a heart attack or stroke	85 (27.3)	90 (28.9)	79 (25.4)	56 (18.0)
I am very healthy so I will not have a heart attack or stroke	76 (24.4)	105 (33.8)	85 (27.3)	44 (14.1)
I am not worried that I might have a heart attack or stroke.	90 (28.9)	110 (35.4)	69 (22.2)	37 (11.9)
People my age are too young to have a heart attack or stroke.	82 (26.4)	104 (33.4)	83 (26.7)	38 (12.2)
People my age do not have a heart attack or stroke	74 (24.1)	142 (45.7)	61 (19.6)	32 (10.3)
My lifestyle habits do not put me at risk of having a heart attack or stroke.	65 (20.9)	69 (22.2)	100 (32.2)	75 (24.1)
No matter what I do, if I am going to have a heart attack or stroke, I will have one	113 (36.3)	100 (32.2)	65 (20.9)	32 (10.3)
People who do not have a heart attack or stroke are just plain normal.	99 (31.8)	80 (25.7)	87 (28.0)	44 (14.1)
The causes of a heart attack or stroke are unknown.	131 (42.1)	105 (33.8)	50 (16.1)	24 (7.7)

Key: SD= strongly disagree, D= disagree, A= agree, SA= strongly agree

Table 3: Perception of Respondents Based on Susceptibility to, Severity of, Benefits to, and Barriers to Prevention of CVD (n=311)

Statement	Responses, n(%)			
	SD	D	A	SA
Perceived susceptibility to CVD				
It is likely that I will suffer from a heart or stroke in the future.	142 (45.7)	103 (33.1)	52 (16.7)	14 (4.5)
My chances of suffering from a heart attack or stroke in the next few years are great	147 (47.3)	110 (35.4)	38 (12.2)	16 (5.1)
Having a heart attack or stroke is currently a possibility for me.	147 (47.3)	106 (34.1)	33 (10.6)	24 (7.7)
I feel I will suffer from a heart attack or stroke sometime during my life	146 (46.9)	95 (30.5)	52 (16.7)	18 (5.8)
I am concerned about the likelihood of having a heart attack or stroke in the future	134 (43.1)	77 (24.8)	75 (24.1)	24 (7.7)
Perceived severity of CVD				
Heart attacks and strokes are always fatal	66 (21.2)	65 (20.9)	88 (28.3)	86 (27.7)
Having a heart attack or stroke will threaten my relationship with my significant other	57 (18.3)	97 (31.2)	99 (31.8)	57 (18.3)
My whole life would change if I had a heart attack or stroke	54 (17.4)	74 (23.8)	121 (38.9)	62 (19.9)
Having a heart attack or stroke would have a very bad effect on my sex life.	58 (18.6)	71 (22.8)	118 (37.9)	61 (19.6)
If I have a heart attack or stroke, I will die within 10 years.	100 (32.2)	116 (37.3)	57 (18.3)	38 (12.2)
Perceived benefits for CV health				
Increasing my exercise will decrease my chances of having a heart attack or stroke.	76 (24.4)	47 (15.1)	94 (30.2)	94 (30.2)
Eating a healthy diet will decrease my chance of having a heart attack or stroke.	53 (17.0)	61 (19.6)	90 (28.9)	107 (34.4)
Stopping smoking will reduce my chance of having a heart attack or stroke	55 (17.7)	47 (15.1)	98 (31.5)	111 (35.7)
When I exercise I am doing something good for myself	44 (14.1)	44 (14.1)	81 (26.0)	141 (45.3)
When I eat healthily, I am doing something good for myself	42 (13.5)	43 (13.8)	83 (26.7)	137 (44.1)
Cutting down on alcohol will decrease my chances of having a heart attack or stroke	37 (11.9)	52 (16.7)	93 (29.9)	129 (41.1)
Perceived barriers to the prevention of CVD				
I do not know the appropriate exercises to perform to reduce my risk of developing CVD	94 (30.2)	108 (34.7)	87 (28.0)	22 (7.1)
I do not know the recommended drinking limits for men or women.	66 (21.2)	100 (32.2)	110 (35.4)	34 (10.9)
I do not have time to exercise for 30 minutes a day on most days of the week	80 (25.1)	107 (34.4)	93 (29.9)	31 (10.0)
I do not know what is considered a healthy diet that would prevent me from developing CVD	92 (29.6)	118 (37.9)	68 (21.9)	33 (10.6)
I will not have energy if I stop smoking	146 (46.9)	86 (27.7)	50 (16.1)	28 (9.0)
I cannot afford to buy healthy foods	112 (36.0)	109 (35.0)	64 (20.6)	25 (8.0)
I have other problems more important than worrying about diet and exercise	97 (31.2)	117 (37.6)	64 (20.6)	31 (10.0)

Key: SD= strongly disagree, D= disagree, A= agree, SA= strongly agree

Table 4: Perception of Respondents Based on Self-Efficacy (n=311)

Question	Responses	n (%)
How confident are you that you know or can control the risks of having a heart attack or stroke?	Not all confident	37 (11.9)
	Somewhat confident	57 (18.3)
	Moderately confident	93 (29.9)
	Very confident	81 (26.0)
	Completely confident	43 (13.0)
How confident are you that you know or can maintain a healthy weight by exercising regularly?	Not all confident	19 (6.1)
	Somewhat confident	44 (14.1)
	Moderately confident	100 (32.2)
	Very confident	91 (29.3)
	Completely confident	57 (18.3)
How confident are you that you know or can stop smoking if you want to?	Not all confident	35 (11.3)
	Somewhat confident	48 (15.4)
	Moderately confident	52 (16.7)
	Very confident	75 (24.1)
	Completely confident	101 (32.5)
How confident are you that you know or can consume less alcohol?	Not all confident	32 (10.3)
	Somewhat confident	40 (12.9)
	Moderately confident	59 (19.0)
	Very confident	80 (25.7)
	Completely confident	100 (32.2)
How confident are you that you know or can control your blood pressure and/or cholesterol levels by taking prescribed medication?	Not All Confident	20 (6.4)
	Somewhat confident	40 (12.9)
	Moderately confident	60 (19.3)
	Very confident	88 (28.3)
	Completely confident	102 (32.8)
How confident are you that you know or can eat a healthy and balanced diet?	Not all confident	29 (9.3)
	Somewhat confident	29 (9.3)
	Moderately confident	60 (19.3)
	Very confident	100 (32.2)
	Completely confident	92 (29.6)

Table 5: Perception of Respondents Based on Intention to Change Behaviour or Cues to Action (n=311)

Statement	Responses, n(%)			
	SD	D	A	SA
I want to stop smoking (if you do smoke).	N/A	N/A	N/A	N/A
I intend to maintain a healthy weight	21 (6.8)	28 (9.0)	94 (30.2)	168 (54.0)
I intend to be physically active within two months	25 (8.0)	27 (8.7)	124 (39.9)	132 (42.4)
I expect to maintain a healthy weight	19 (6.1)	23 (7.4)	109 (35.0)	156 (50.2)
I want to be physically active.	21 (6.8)	24 (7.7)	87 (28.0)	177 (56.9)
I intend to eat a healthy and balanced diet within two months	21 (6.8)	35 (11.3)	119 (38.3)	133 (42.8)
I expect to stop smoking (if you do smoke).	N/A	N/A	N/A	N/A
I want to cut down on alcohol	N/A	N/A	N/A	N/A
I want to maintain a healthy and balanced diet	21 (6.8)	21 (6.8)	85 (27.3)	175 (56.3)
I intend to stop smoking within two months (if you do smoke).	N/A	N/A	N/A	N/A
I expect to eat a healthy and balanced diet.	17 (5.5)	19 (6.1)	108 (34.7)	160 (51.4)
I intend to cut down on alcohol in the next two months	N/A	N/A	N/A	N/A
I expect to be physically active	23 (7.4)	25 (8.0)	93 (29.9)	164 (52.7)
I expect to cut down on alcohol.	N/A	N/A	N/A	N/A
I expect to take my medication to control my blood pressure and/or cholesterol	N/A	N/A	N/A	N/A
I want to take my medication to control my blood pressure and/or cholesterol	N/A	N/A	N/A	N/A
I intend to take my medication to control my blood pressure and/or cholesterol within two months	N/A	N/A	N/A	N/A

Key: SD= strongly disagree, D= disagree, A= agree, SA= strongly agree, N/A= not applicable

Table 6: Association between Socio-Demographic Factors and Knowledge of Risk Factors for CVDs

Variables value	X ² value	df	p-
Age	22.844	36	0.9
Gender[female*]	10.534	2	0.005*
Level of study	18.136	8	0.020*
Department	17.158	8	0.029*

Key: CVDs= Cardiovascular Diseases, * p values significant at 0.05

Discussion

This study assessed the knowledge and perception of CVD risk factors among students of the Faculty of Allied Health Sciences of Bayero University, Kano. The results of the study indicated that the majority of the respondent's knowledge of CVDs (and its risk factors) was evenly split between moderate and good, as only two respondents were found to have poor knowledge of CVDs. We considered this result to be largely positive considering the high rates of morbidity and mortality that are caused by CVDs (Yuyun et al 2020; Mensah et al., 2015). Moreover, students in the faculty of allied health sciences across all the departments and levels of study have in their programme curriculum topics in cardiovascular science, which may have greatly influenced the moderately good knowledge of CVD risk factors of the respondents.

From the findings of this study, we also observed that the level of study greatly influenced knowledge of CVD risk factors. On average, students in the 500 level were found to have higher knowledge of CVD risk factors than those in the lower levels (especially those in the 100 levels). However, this is not unexpected as most students of allied health sciences faculty in the higher levels of study would have taken courses that cover specific topics in cardiovascular physiology/pathology, and the corresponding management strategies/interventions (Micheal et al., 2022; Anderson et al., 2017). Nevertheless, some students in lower levels who were yet to offer basic medical sciences courses like physiology were knowledge of the CVDs are usually taught exhibiting generally moderate to good knowledge.

Furthermore, the study results indicated that studying a bachelor of physiotherapy followed by radiography then nursing science then medical laboratory science and doctor of optometry programmes, respectively were significantly associated with better knowledge of the risk of CVDs. One explanation for this may be the scope and focus of curricula of the various programmes in the faculty. The findings also indicated that being female better knowledge of the risk of CVDs. However, we could not explain the reason for these results. Hence, future studies may be needed to further confirm these findings.

The result of this study also shows that the majority of the respondents strongly disagreed with questions that relate to them being at risk or vulnerable to having CVDs. We consider this to be a positive situation because most of the respondents are apparently healthy young individuals. Moreover, CVDs have been long known to be common among the elderly populations (Droller & Pemberton, 1953). These results are also supported by the findings presented in earlier studies among university students who demonstrated good knowledge and a both positive/negative perception towards CVD risk factors (Tran et al, 2017; Tran et al., 2021; Odunaiya et al, 2021).

Further results from this study indicated that the respondents demonstrated a positive perception regarding the severity of CVD risk factors. This means that the respondents mostly agreed that CVDs can have a significant impact on health, and function and can even be fatal. This result may not be unconnected with the increasingly high rate of sudden death and morbidity and is often associated with CVDs within the study area even among informal cycles (Mukadas and Musbau, 2009). The respondents also indicated that participating in regular exercise, eating a healthy diet and quitting or cutting down on smoking/alcohol intake have benefits for cardiovascular health. These modifiable risk factors have been well established in literature to help prevent CVDs (Arafa et al., 2021; El Fakiri, Bruijnzeels & Hoes, 2006). Furthermore, the majority of the respondents downplayed having perceived barriers to adopting preventive strategies for CVD. Other population groups have exhibited higher rates of barriers. Nevertheless, this may be because the respondents are college students with limited socioeconomic problems.

The findings of the study revealed that the majority of the respondents were very confident (self-efficacious) in their capability and intention to adopt better lifestyle changes that offer reduced risk factors for CVDs. The majority of the participants did not respond to the questions concerning smoking and alcohol use, which is probably because most of the respondents were non-smokers. Smoking and alcohol use are not very common within the geography (northern Nigeria) of the study site (Dumbili, 2013; Obot, 2000), and among individuals of the age group of respondents of this study (Dhingra & Vasan, 2012). Therefore, these results may not be surprising.

Overall, this study has demonstrated that despite the positive findings presented in our results, there is still a need for more awareness strategies to be incorporated into the training of allied health sciences students in order to improve knowledge and awareness of CVDs and their risk factors.

Conclusion

It was concluded that allied health sciences students of Bayero University Kano have between moderately to good levels of knowledge of CVDs and their risk factors. It was also concluded that female gender, higher level of study and programme of study substantially influenced the knowledge of CVDs and its risk factors of the respondents.

References

- Arafa, A., Lee, H.H., Eshak, E.S., Shirai, K., Liu, K., Li, J., Anni, N.S., Shim, S.Y., Kim, H.C. and Iso, H., 2021. Modifiable risk factors for cardiovascular disease in Korea and Japan. *Korean Circulation Journal*, 51(8), pp.643-655.
- Anderson, L.C. and Krichbaum, K.E., 2017. Best practices for learning physiology: combining classroom and online methods. *Advances in physiology education*, 41(3), pp.383-389.
- Boateng, D., Wekesah, F., Browne, J.L., Agyemang, C., Agyei-Baffour, P., Aikins, A.D.G., Smit, H.A., Grobbee, D.E. and Klipstein-Grobusch, K., 2017. Knowledge and awareness of and perception towards cardiovascular disease risk in sub-Saharan Africa: A systematic review. *PloS one*, 12(12), p.e0189264.
- Boon, NA, Fox, KA, Bloomfield, P & Bradibury, A 2002, 'Davidson's principles and practice of medicine', (19th ed) *Edinburgh*.
- Chandrashekar, Y & Anand, IS 1991, 'Exercise as a coronary protective factor. Am Heart J', pp. 1723–1739.
- Droller, H. and Pemberton, J., 1953. Cardiovascular disease in a random sample of elderly people. *British Heart Journal*, 15(2), p.199.
- Dhingra, R. and Vasan, R.S., 2012. Age as a risk factor. *Medical Clinics*, 96(1), pp.87-91.
- Dumbili, E., 2013. Changing patterns of alcohol consumption in Nigeria: an exploration of responsible factors and consequences.
- El Fakiri, F., Bruijnzeels, M.A. and Hoes, A.W., 2006. Prevention of cardiovascular diseases: focus on modifiable cardiovascular risk. *Heart*, 92(6), pp.741-745.
- Global Burden of Diseases 2013, 'Mortality and Causes of Death Collaborators, 2013 Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 2013; a systematic analysis for the Global Burden of Disease Study 2013', *Lancet*, pp. 117–71.
- Global Burden of Diseases 2013, 'Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013' .17 *December Lancet*, pp. 117–171.
- Gupta, S, Gudapati, R, Gaurav, K & Bhise, M, 2013, 'Emerging risk factors for cardiovascular diseases', *Indian J Endocrinol Metab*, pp. 806–14.
- Johnson, OE, Adedoyin, RA, Awotidebe, TO, Mbada, CE, Otolorin OA & Owoseni, 2013, *International Journal of Public Health and Epidemiology*, pp. 085-089.
- Katcher, HI, Hill, AM, Lanford, JL, Yoo, JS & Kris-Etherton PM 2009, 'Lifestyle approaches and dietary strategies to lower LDL-cholesterol and triglycerides and raise HDL-cholesterol', *Endocrinology Metab Clin North Am*, pp. 45–78.
- Kelley, GA & Kelley, KS, 2008, 'Effects of aerobic exercise on non-high-density lipoprotein cholesterol in children and adolescents: a meta-analysis of randomized controlled trials' *ProgCardiovascNurs*, pp. 128–132.

- Krist, A.H., Davidson, K.W., Mangione, C.M., Barry, M.J., Cabana, M., Caughey, A.B., Donahue, K., Doubeni, C.A., Epling, J.W., Kubik, M. and Landefeld, S., 2020. Behavioural counselling interventions to promote a healthy diet and physical activity for cardiovascular disease prevention in adults with cardiovascular risk factors: US Preventive Services Task Force recommendation statement. *Jama*, 324(20), pp.2069-2075.
- Liu, L 1990, 'Epidemiology of hypertension and cardiovascular disease- chain experience' *Lin. Exp. Hypertension*, pp. 831-44.
- Manna, P & Jain, S.K, 2015, 'Obesity, oxidative stress, adipose tissue dysfunction, and the associated health risks: causes and therapeutic strategies', *MetabSyndrRelatDisord*, pp. 44–423
- McGill, HC, McMahan, CA & Gidding, SS 2008, 'Preventing heart disease in the 21st century: implications of the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) study'.
- Mensah, G.A., Sampson, U.K., Roth, G.A., Forouzanfar, M.H., Naghavi, M., Murray, C.J., Moran, A.E. and Feigin, V.L., 2015. Mortality from cardiovascular diseases in sub-Saharan Africa, 1990–2013: a systematic analysis of data from the Global Burden of Disease Study 2013. *Cardiovascular Journal of Africa*, 26(2 H3Africa Suppl), p.S6.
- Michael, J.A., Wenderoth, M.P., Modell, H.I., Cliff, W., Horwitz, B., McHale, P., Richardson, D., Silverthorn, D., Williams, S. and Whitescarver, S., 2002. Undergraduates' understanding of cardiovascular phenomena. *Advances in physiology education*, 26(2), pp.72-84.
- Morris, CK & Froelicher, VF 1991, 'Cardiovascular benefits of physical activity' *Herz*, pp 222–236.
- Mukadas, A.O. and Misbau, U., 2009. Incidence and patterns of cardiovascular disease in northwestern Nigeria. *Nigerian Medical Journal*, 50(3), p.55.
- Obot, I.S., 2000. The measurement of drinking patterns and alcohol problems in Nigeria. *Journal of substance abuse*, 12(1-2), pp.169-181.
- O'Donnell, MJ and Chin, SL, 2016, 'Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): a case-control study' *Lancet*. 388 (10046): 761–75.
- Odunaiya, N.A., Adesanya, T.B., Okoye, E.C. and Oguntibeju, O.O., 2021. Towards cardiovascular disease prevention in Nigeria: A mixed method study of how adolescents and young adults in a university setting perceive cardiovascular disease and risk factors. *African Journal of Primary Health Care & Family Medicine*, 13(1), pp.1-9.
- Pasternak, RC, Abrams, J, Greenland, P, Smaha, LA, Wilson, PW & Houston-Miller, N, 2003, 'Identification of coronary heart disease risk: is there a detection gap?', *J Am CollCardiol*, pp. 1863–1874.

- Shaikh, R.B., Mathew, E., Sreedharan, J., Muttappallymyalil, J., Al Sharbatti, S. and Basha, S.A., 2011. Knowledge regarding risk factors of hypertension among entry-year students of a medical university. *Journal of Family and Community Medicine*, 18(3), p.124.
- Shanthi, M, Pekka, P & Bo, N 2011, 'World Health Organization, Global Atlas on Cardiovascular Disease Prevention and Control, World Health Organization in collaboration with the World Heart Federation and the World Stroke Organization', pp. 3–18.
- Tran, D.M.T., Zimmerman, L.M., Kupzyk, K.A., Shurmur, S.W., Pullen, C.H. and Yates, B.C., 2017. Cardiovascular risk factors among college students: Knowledge, perception, and risk assessment. *Journal of American College Health*, 65(3), pp.158-167.
- Tran, D.M.T., Dingley, C. and Arenas, R., 2021. Perception and beliefs regarding cardiovascular risk factors and lifestyle modifications among high-risk College students. *Canadian Journal of Nursing Research*, 53(2), pp.94-106.
- Udaykiran, B., Gaikwad, B., Kulkarni, P., Takalkar, A.A. and Bhise, M.D., 2019. Assessment of awareness about cardiovascular disease risk factors amongst first-year medical students.
- Wilund, KR, Feeney, LA, Tomayko, EJ, Weiss, EP & Hagberg, JM 2009, 'Effects of endurance exercise training on markers of cholesterol absorption and synthesis', *Physiol Res*, pp. 545–552.
- World Health Organisation (WHO) 2002, 'The world health report- reducing risks, promoting healthy lifestyles', *Geneva*.
- Yamane, T. (1967). (2nd Ed.). *Statistics: An Introductory Analysis*. New York: Harper and Row
- Yuyun, M.F., Sliwa, K., Kengne, A.P., Mocumbi, A.O. and Bukhman, G., 2020. Cardiovascular diseases in sub-Saharan Africa compared to high-income countries: an epidemiological perspective. *Global Heart*, 15(1).