

Cardiovascular disease risk among professionals: A survey of modifiable risk factors among teachers in an urban community

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Abstract

Background: Teachers are often faced with repetitive work related stress, which has been associated with chronic diseases among professionals. Those living in the urban community may be at more risk due to unhealthy lifestyle exposure, but there is little information about their cardiovascular disease profile. Such data may be useful in developing CVD prevention strategies for this population. The study assessed modifiable cardiovascular risk factors among teachers in an urban community in southwestern Nigeria.

Methods: Apparently healthy 356 teachers, aged between 25 and 74 years, from randomly selected public schools in urban community in southwestern Nigeria participated in this study. Information on socio-demographic, alcohol use, tobacco use was obtained while obesity indices, physical activity and blood pressure were assessed using standard instruments. Data were summarized and inferential statistics of Mann-Whitney U and Kruskal-Wallis were used to test for statistical significance difference between and across proportions respectively.

Results: Participants consisted of 137 (38.5%) males and 219

(61.5%) females with mean age of 44.6±8.9 years and mean BMI of 25.8±5.1. A quarter of the participants had abdominal obesity, 43.5% had prehypertension and another 15% were hypertensive. More than 80% of teachers with prehypertension were previously not aware. High prevalence (41%) of low physical activity was noted among participants of this study. Tobacco use among the study participants was low (2.1%) but alcohol intake was high (17%). More females (45.2%) reported low physical activity than the males (34.3%) also significantly more female teachers had abdominal obesity compared with male teachers.

Conclusion: The prevalence of modifiable cardiovascular risk factor among the study population was high, primary prevention strategy may be helpful in reducing CVD risks.

Keywords: Cardiovascular risk, teachers' health, urban professionals

Highland Med Res J 2016;16(1):1-6

Introduction

Cardiovascular disease (CVD) remains a major cause of morbidity and mortality worldwide¹. It accounts for about 17.5 million deaths worldwide with 80% of these deaths occurring in low- and middle-income countries². It is projected that by 2020, mortality resulting from CVD will increase by 120% for women and 137% for men globally³. In Nigeria, CVD accounted for 12% mortality in 2008⁴. With healthcare system already stretched to the limit due to prevalent infectious diseases, developing countries are faced with additional socio-economic and health burden resulting from rising CVD incidence^{5,6}.

Chronic work-related stress has been identified as a major risk factor for CVD⁷. School teachers are often faced with chronic repetitive stressful conditions⁸, which makes them vulnerable to developing CVD. Awosan et al⁹, noted a low level of CVD risk awareness among teacher and high prevalence of CVD risk compared with bankers in northeastern part of Nigeria. However, there is very little information on lifestyle cardiovascular risk factors among teachers in south-western Nigeria. Hence this study investigated the prevalence of the selected modifiable risk factors for cardiovascular disease among primary and secondary school teachers in Ibadan North Local Government Area, southwestern Nigeria.

Materials and Methods

Participants in this study were full time primary and secondary school teachers in Ibadan North Local Government Area, Ibadan, south-western Nigeria. Pregnant women were excluded from this study.

Measurements and Instruments: Participants' age, gender, marital status and professional cadre were obtained and documented; while weight, height, waist-hip-ratio and blood pressure were measured using standard protocols. Blood pressure was classified in

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accordance with NIH¹⁰ recommended guideline for individuals aged 15 years and above: 1) Normal; <120/80 (mm/Hg), 2) Pre hypertension; 120-139/80-89 (mm/Hg), 3) grade 1 hypertension; 140-159/90-99 (mm/Hg) and 4) grade 2 hypertension; $\geq 160-179/\geq 100$. Waist-hip-ratio ≥ 1 for men and ≥ 0.8 for women were considered as central obesity.

Socioeconomic class questionnaire adopted from a previous study¹¹ was used to assess social and economic classes of the participants. The questionnaire comprises of items on level of education, with doctoral degree scored as 7 and primary school leaving certificate scored as 1; possession of household utensils and appliances were scored $\frac{1}{2}$ point each; crowding indices (which is the ratio of number of rooms to number of persons in house) of ≥ 0.5 was assigned $\frac{1}{2}$ point and > 0.5 assigned 1 point. Sum of these scores was used to obtain representative values for socioeconomic status of each participant. Possible obtainable values ranging from 1 to 27 points. Participants with < 9 points were classified as having low socioeconomic status, those with scores between 9 and 17 points were classified as middle socioeconomic status, while those of scores > 17 were classified as having high socioeconomic status. The short form of International Physical Activity Questionnaire (IPAQ)¹², was used to assess physical activity level of participants. It consist of 7 items and 4 domains including domestic and yard gardening activity, transport-related activity, leisure time activity and work-related activity. The items in the short form of the IPAQ questionnaire were structured to provide scores on walking, moderate-intensity activity and vigorous-intensity activity. Scoring is based on summation of the duration (in minutes) and frequency (in days) of walking, moderate-intensity and vigorous activities. The scores were further expressed in Metabolic Equivalent (MET)-minutes/week¹².

The Alcohol Use Disorder Identification Test (AUDIT-C), which is a modified version of the 10 question AUDIT instrument, is an alcohol screening tool that reliably identifies patients who are hazardous drinkers or have active alcohol use disorders¹³. Each question has 5 answer choices and is scored on a scale of 0-12. A score of 4 or more for men is considered as hazardous drinking or active alcohol use disorders, while for women, a score of 3 or more is also considered positive for hazardous drinking or active alcohol use disorders. The higher the score, the more likely it is that the participant's drinking was affecting his or her safety. Also a modified version of the 7-item question adapted from Tobacco Use Questionnaire (QUITWORKS-RI)¹⁴ was used to identify persons who were smokers or have active tobacco use disorders.

Data analysis

Socio- demographics characteristics of the participants

were summarized as frequencies, while continuous variables of blood pressure, waist-hip-ratio, weight, height body mass index and physical inactivity were summarized as mean and standard deviation. Mann-Whitney U was used to test for statistical significance difference in proportions of cardiovascular risk factors between primary and secondary school teachers and between male and female teachers, while Kruskal-Wallis was used to test for difference in proportions across age groups. Level of significance was set at $p = 0.05$

Results

A total of 356 teachers, comprising of 137 (38.5%) males and 219 (61.5%) females from Ibadan North Local Government Area of Oyo State, Nigeria participated in this study. Demographics characteristics of participants are shown in Table 1. Participants consisted of 132(37%) primary school teachers and 224(63%) secondary school teachers, mostly of middle aged (range:25 – 62years; mean= 44.6 ± 8.9 years), with BMI ranging from 21 – 33 kg/m^2 (mean = $25.8 \pm 5.1 \text{ kg/m}^2$) and WHR range from 0.74 to 1.15 (mean = 0.84 ± 0.7).

Table 1: Summary of demographic characteristics of participants

Variable	Frequency	Percentages
Age		
25- 34	53	14.9
35- 44	136	38.2
45- 54	115	32.3
55- 64	46	12.9
65- 74	6	1.7
Total	356	100
Gender		
Male	137	38.5
Female	219	61.5
Total	356	100
Marital status		
Single	34	9.6
Married	301	84.5
Divorced	21	5.9
Total	356	100
Level of Education		
Bachelors	234	65.1
Masters	108	30.3
Doctoral	14	3.9
Total	356	100
Socioeconomic level		
Low SES	21	5.9
Middle SES	250	70.2
High	85	23.9
Total	356	100

Key:

SES: Socioeconomic Status

All participants in this study had university education, with 34.2% having postgraduate degree. Most (94.1%) of the participants were of middle socioeconomic status and above.

Table 2: Pattern of selected modifiable cardiovascular disease risk factors among participants

Risk factors	Combine N= 356 (%)	Pry schools N= 132 (%)	Secondary Schools N= 224 (%)	p value
Waist-Hip ratio				
Normal	267(75)	96(72.7)	171(76.3)	0.91
Central obesity	89(25)	36(27.3)	53(23.7)	0.12
Alcohol intake				
No Alcohol	295(82.8)	114(86.4)	178(79.5)	0.16
Positive Alcohol	61(17.2)	18(13.6)	46(20.5)	0.03*
Tobacco use				
No Smoking	348(97.7)	130(98.5)	218(97.3)	0.51
Active Smoking	8(2.3)	2(1.5)	6(2.7)	0.34
BMI				
Normal	187(52.5)	74(56)	113(50.5)	0.02*
Overweight	93(26.1)	36(27.3)	57(25.4)	0.06
Obesity	76(21.4)	22(16.7)	54(24.1)	0.01*
Blood pressure				
Normal	146(41)	57(43.2)	89(39.7)	0.11
Pre-hypertension	155(43.5)	53(40.2)	102(45.6)	0.09
Hypertension	55(15.5)	22(16.6)	33(14.7)	0.10
Physical activity				
LPAL	146(41)	61(46.2)	85(37.9)	0.06
MPAL	191(53.7)	65(49.2)	126(56.3)	0.1
HPAL	19(5.3)	6(4.6)	13(5.8)	1.1

Key:

%; Percentage; N: Total population of participant; LPAL: Low Physical Activity Level
MPAL: Moderate Physical Activity Level; HPAL: High Physical Activity Level
BMI: Body Mass Index; *: Significant, PRY = Primary

Modifiable cardiovascular disease risk factors among participants

A quarter of all participants had abdominal obesity, while about a fifth had general obesity as assessed. Comparison of CVD modifiable risk factors by school type showed that significantly more secondary school teachers (24.1%) were obese compared with their primary school counterpart (16.7%). About 40% of the participants had low physical activity level and pre-hypertension, of which they were previously not aware. About a fifth of the participants were active/hazardous drinkers; significantly more secondary school teachers (20.5%) were active/hazardous drinkers compared with the primary school teachers (13.6%) with $p = 0.03$ (Table 2).

Comparison of selected cardiovascular disease risk factors between genders and across age groups

More than half of the participants (males 60%; females 58%) had raised blood pressure. Comparison of proportions with raised blood pressure between genders showed no significant difference ($p = 0.8$). Significantly more females had central obesity (40% vs. 0.7%; $p = 0.001$) and were also overweight (30.2% vs. 19.7%; $p = 0.01$) and obese (25% vs. 15%; $p = 0.02$). Though the males were more involved in hazardous alcohol use, it was not significant. There was no significant difference in active tobacco use between genders (Table 3).

Table 3: Prevalence of cardiovascular disease risk factors among male and female participants

CVD risk factors	Male (N=137) n (%)	Female (N=219) n (%)	p value
Blood Pressure			
Normal	55(40.1)	91(41.6)	0.1
Pre-hypertension	66(48.2)	89(40.6)	0.08
Hypertension	16(11.7)	39(17.8)	0.12
BMI			
Normal	89(65)	98(44.7)	0.07
Overweight	27(19.7)	66(30.2)	0.01*
Obesity	21(15.3)	55(25.1)	0.02*
Waist-Hip ratio			
Normal	136(99.3)	131(59.8)	0.01*
Obesity	1(0.7)	88(40.2)	0.001*
Alcohol consumption			
No Alcohol	107(78.1)	188(85.8)	0.41
Hazardous Alcohol	30(21.9)	31(14.2)	0.21
Smoking status			
Non smoker	133(97.1)	215(98.2)	0.9
Smoker	4(2.9)	4(1.8)	0.07
Physical activity Level			
Low PAL	47(34.3)	99(45.2)	0.03*
Moderate PAL	80(58.4)	111(50.7)	0.11
High PAL	10(7.3)	9(4.1)	0.09

Key:

N: Total number of teachers; %: Percentage; PAL: Physical Activity Level; *: Significant

Significantly more females (45.2%) reported low physical activity than the males (34.3%) with $p = 0.03$. There was no significant difference in the selected risk factors among participants across age groups (Tables 4).

Table 4: Prevalence of cardiovascular disease risk factors across age groups

Risk factors	Age(years)					p value
	25-34	35-44	45-54	55-64	65-74	
	N=53 n (%)	N=146 n (%)	N=115 n (%)	N=36 n (%)	N=6 n (%)	
Blood pressure						
Normal	35(9.8)	65(18.3)	43(12.1)	7(2)	1(0.3)	0.14
Pre-hypertension	15(4.2)	67(18.8)	52(14.6)	25(7)	1(0.3)	1.1
Hypertension	3(0.8)	14(3.9)	20(5.6)	14(3.9)	4(1.1)	0.17
BMI						
Normal	37(10.4)	73(20.5)	53(14.9)	23(6.5)	1(0.3)	0.08
Overweight	8(2.2)	39(11)	33(9.3)	34(9.6)	4(1.2)	0.11
Obesity	8(2.2)	34(9.6)	29(8.1)	12(3.4)	1(0.3)	0.61
Waist-hip ratio						
Normal	45(12.6)	106(29.8)	85(23.9)	29(8.1)	6(1.7)	0.07
Obesity	8(2.2)	40(11.2)	30(8.4)	17(4.8)	0(0)	0.12
Alcohol consumption						
No Alcohol	42(11.8)	117(32.9)	93(26.1)	40(11.2)	5(1.4)	0.09
Hazardous drinker	11(3.1)	29(8.1)	22(6.2)	6(1.7)	1(0.3)	1.3
Smoking status						
Non smoker	51(14.3)	142(40.2)	113(31.7)	44(12.4)	6(1.7)	0.07
Smoker	2(0.6)	4(1.1)	2(0.6)	2(0.6)	0(0.00)	0.23
PAL						
Low PAL	28(7.9)	56(15.7)	43(12.1)	21(6.5)	2(0.6)	0.66
Moderate PAL	21(5.9)	40(11.2)	66(18.5)	25(7)	3(0.8)	0.1
High PAL	4(1.1)	10(2.8)	6(1.7)	0(0.00)	1(0.3)	0.12

Key:

N: Total number of teachers; %: Percentage; PAL: Physical Activity Level

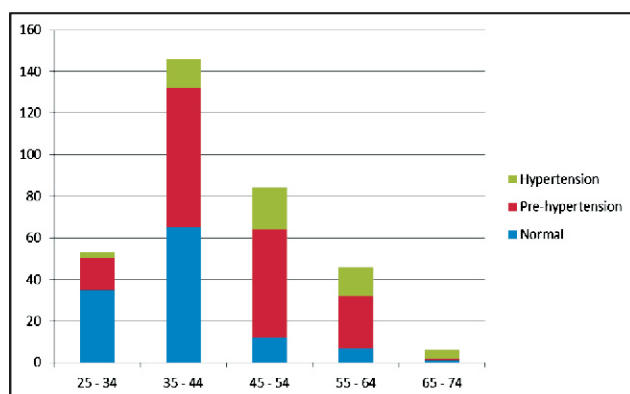


Figure 1. Classification of blood pressure across age groups

Discussions

The increasing prevalence of CVD is thought to be fueled by rising incidence of risk factors, which have been associated with changing population demographics, urbanization and changes in lifestyle¹⁵. Early identification and risk control strategies such as risk factor screening and education, targeted at vulnerable individuals, have the potential to mitigate this trend. Risk factors for CVD are categorized broadly as modifiable and non-modifiable risk factors¹⁶. Non-modifiable risk factors include age, family history, race and gender while

high blood pressure, abnormal blood lipids, tobacco use, physical inactivity, obesity, unhealthy diets, diabetes mellitus, depression, psycho-social stress, alcohol use and use of certain medications and lipoprotein are noted as modifiable risks.

In this study we investigated the prevalence of modifiable risk factors such as hypertension, abdominal obesity, general obesity, hazardous tobacco use, alcohol use and physical inactivity among teachers. Majority of the participants (53%) were young adults (25 - 44years), 60% were female and 70% were of middle socioeconomic status. We observed a high prevalence of prehypertension, active alcohol use disorder and physical inactivity among study participants. Among the female participants, overweight, general obesity and central obesity were more prevalent.

Teachers comprise a large and growing segment of the workforce in many countries. They may be exposed to various forms of stressor, which may include administrative, and curriculum concerns, career advancement, student motivation, work overload due to large class size, intensive verbal communication, and prolonged standing¹⁵. Mariammal et al¹⁷, reported that occupational stress is higher among teachers than general office workers. They also noted that this high stress level is associated with increased cardiovascular indices such as mean arterial pressure, resting heart rate and systolic and diastolic blood pressure. Faced with severe time constraints, teachers are often overwhelmed by the multiplicity of tasks, role conflict and job security. Stress may also arise from dealing with children's misbehaviors in addition to physical or environmental hazards such as noise. The fact that majority of teachers were women raises the question of how the dual role of full time employment together with being a home maker may affect women's health.

Hypertension is a major clinical risk factor for cardiovascular disease and has been described as a silent killer because often times it is asymptomatic¹⁸. The prevalence of hypertension (15.5%) observed in this study population is high, and is comparable to findings from previous studies in Nigeria: Obokun¹⁹, Nnsuka²⁰ and Niger-Delta²¹. Hypertension, which was once rare in developing economies, is now becoming a major public health issue in sub-Saharan Africa²². Increasing urbanization, changing lifestyle and work-related stressors have been identified as social contributors to this trend. We also noted that 43% of the study population had pre-hypertension, majority of whom are young adults (between 35 and 44 years). Similar proportion of the male (60%) and female (59.4%) teachers had elevated blood pressure. Surprisingly, about 75% of individuals with raised blood pressure are not aware. This finding highlights the need for routine screening and prevention strategies among this

population, especially among the young adults with prehypertension.

Excess body fat, especially centrally located excess adiposity is a major lifestyle modifiable risk factor for CVD. In this study we observed that a high prevalence of general and abdominal obesity among participants, with a quarter having abdominal obesity, while about half had excess body weight. Prevalence of overweight, general obesity and abdominal obesity were significantly higher in female teachers. Age, level of education and socioeconomic status was not significant with BMI and abdominal obesity but there was a high prevalence among graduate and teachers of middle socioeconomic status. This could be due to their work related stress complicated by lack of physical activity at their level.

Prevalence of alcohol use disorders was high among both male (21.9%) and females (14.2%). Age, socioeconomic status and level of education does not seem to influence alcohol consumption. Highest prevalence of positive alcohol use disorder was observed in participants between ages 35 and 44 years. The proportion of positive alcohol intake was significantly higher among secondary school teachers. Alcohol consumption could be a coping strategy to manage stress as alcohol intake temporarily relieves from stress among this population²³. Also we observed that education had a significant influence on level of physical activity as teachers with higher degree were more physically active.

Conclusion

Prevalence of modifiable cardiovascular risk factors was high among participants. General and abdominal obesity was more prevalent among female teachers while low physical activity was more among male teachers. Obesity and alcohol abuse were more prevalent among secondary school teachers. With more than half of the study participants being young adults, a high prevalence of modifiable cardiovascular risk factors observed in this study highlights the need for primary prevention strategies, which may help reduce future cardiovascular disease burden among this population.

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