

Employees' modifiable risk factors for cardiovascular disease: The case of an African University

J.S. PHILLIPS AND J. BANYANGIRIKI

*Department of Physiotherapy, University of the Western Cape, Bellville, South Africa.
E-mail: jphillips@uwc.ac.za*

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Abstract

The importance of determining the prevalence of modifiable health risk behaviours among specific populations for effective preventive and therapeutic measures has been emphasized in literature. Worksites have been identified as strategic locations for the delivery of interventions to decrease the prevalence of chronic diseases of lifestyle among adult populations. The aim of this study was to determine the prevalence of modifiable risks factors for cardiovascular diseases of employees at an urban university in Kigali, Rwanda. Physical activity levels were assessed by the International Physical Activity Questionnaire (IPAQ). Body mass index was computed from weight and height measurements. Blood pressure readings were taken and hypertension for the study was defined as $\geq 140/90$ for systolic and diastolic respectively. A total of 36 participants were classified as being hypertensive. Both systolic blood pressure ($r=0.627$; $p<0.05$) and diastolic blood pressure ($r=0.598$; $p<0.05$) significantly correlates with age. A total of 41% of the participants were classified as either overweight or obese and 28% as physically inactive. Factors found to be significantly associated with hypertension was current smoking, current alcohol use, self-reported diabetes mellitus, physical inactivity and overweight and obesity. This study confirms the high prevalence of modifiable risk factors for cardiovascular diseases among adults employed at an urban university in Kigali, Rwanda. These findings further highlight the need for health promoting initiatives at the work place and specifically the benefits of such initiatives at institutions of higher education.

Keywords: Modifiable risk factors; cardiovascular disease, health promotion, work place.

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Introduction

The importance of determining the prevalence of modifiable health risk behaviours among specific populations for effective preventive and therapeutic measures has been emphasized in literature (Mion et al., 2004) and worksites have been identified as strategic locations for the delivery of interventions to decrease the prevalence of chronic diseases of lifestyle among adult populations (Emmons, Linnan, Shodel, Marcus & Abrams, 1999). Health promotion programmes at the worksite have increased over the last two decades (Schult, McGovern, Dowd & Pronk, 2006). Researchers have attributed this increase to

the increased awareness of the benefits and advantages of having quality health promotion programmes available for employees (Schult et al., 2006). In addition soaring health care costs have also encouraged employers to take a more proactive approach in keeping their employees healthy (Carter, Kelly, Alexander & Holmes, 2011). These authors further stated that universities specifically, are taking a more active approach in understanding and monitoring employees' modifiable health risk factors.

Health promotion and health screening at the workplace can have a beneficial influence on employees' health behaviour and can also raise awareness of sedentary lifestyle risks (Alkhatib, 2013). In addition changing from a sedentary lifestyle to a more active one can lead to a significant reduction in the cardiovascular risk of employees. The university campus has been recognized as an ideal setting for health promotion by various researchers for several reasons (Alkhatib, 2013; Burke & McCarthy, 2011; Carter et al., 2011). Some of these reasons include the presence of students attending health-related university courses, staff whose role is directly linked to health promotion and the availability of resources for health, recreation and fitness.

The need for understanding and monitoring employee modifiable health risk factors cannot be overemphasized and this is no different for developing countries and the African continent too. The prevention and control of many chronic diseases of lifestyle related modifiable risk factors have not received the due attention in many developing countries including those in sub Saharan Africa. Researchers have shown that chronic diseases of lifestyle, such as diabetes mellitus and hypertension, once rare in traditional African societies, are rapidly becoming a major public health problem (Mafunda et al., 2006). In Africa, the shift of many people from rural to urban areas has rendered these diseases an epidemic and with it comes "the burden of civilization" (Opier & Seedat, 2005). Furthermore, the anticipated increase in this burden is likely to be of momentous consequences because only a few people will have access to treatment and control is likely to be very poor (Addo, Smeeth & Leon, 2007).

The purpose of this study was to determine the prevalence of modifiable risks factors for cardiovascular diseases among employees at an urban university in Kigali, Rwanda.

Methodology

Participants and design

In this cross-sectional study all the participants were employees at a university in Kigali, Rwanda. After permission and ethical clearance for the study was

obtained from the Ethics Review Committee of the University of the Western Cape, the Ministry of Health in Rwanda and the rector of the university, a list of employees was obtained from the Human Resources Department at the university. A systematic random sampling technique was used to select the participants from an estimated 325 employees. Of 180 employees approached, 100 finally agreed and gave written informed consent to participate in the study.

Measurements

Physical activity levels were assessed by the International Physical Activity Questionnaire (IPAQ). This consists of 15 questions which assess the physical activities related to work, transport and leisure-time. The IPAQ was first used in Geneva in 1998 and has undergone extensive reliability and validity testing across 12 countries. Craig et al. (2003) concluded that the IPAQ has acceptable measurement properties for use in many settings and in different languages. Physical activity levels were dichotomized into active and sedentary. Participants who accumulated less than 600 MET-minutes per week were considered sedentary and those who accumulated 600 and more MET-minutes per week considered as active.

A digital scale was used to measure weight in light clothes to the nearest 0.1 kg. Two weight measurements were obtained, and a third was taken if the first two differed by more than 0.2 kg. A tape measure was used to measure height, without shoes, to the nearest 0.1 cm. The participants were requested to stand on paper without shoes in a straight position against the wall and the line at the level of the head was selected for measurements. Two height measurements were taken and a third was recorded if the first two were more than 0.5 cm apart.

Body mass index was computed from weight and height measurements. Participants were classified according to the WHO (2000) standards as follows: BMI <18.5 as underweight; between 18.5 – 24.9 as normal; between 25 – 29.9 as overweight and >30 as obese.

Blood pressure readings were taken after participants had been seated for at least 15 minutes. A registered nurse practitioner used a sphygmomanometer and stethoscope to measure blood pressure of the participants. Two measurements of blood pressure were taken with the mean of these two measurements recorded. Hypertension was defined as $\geq 140/90$ for systolic and diastolic respectively as stipulated by the World Health Organization's International Society of Hypertension Writing Group (2003).

Participants answered questions related to smoking, alcohol use and diabetes mellitus. Participants were requested to report on current smoking and alcohol

use (within the 30 days preceding the study). In addition, participants were requested to report on history of diagnosis of diabetes mellitus and hypertension.

Data analysis

Univariate analyses were conducted to describe demographic and risk factor characteristics. These are presented as means and standard deviations for continuous data and as percentages for categorical data. Chi-square tests were used to assess differences between categorical variables and t-tests for continuous variables. The level of statistical significance was set at $p < 0.05$.

Results

A total of 100 employees with a mean age of 38.8 (SD=9.50) participated in the study. The anthropometric and blood pressure measurements of the study sample are summarized in Table 1.

Table 1: Mean (SD) for anthropometric measurements

Variable	Males (n=69)	Females (n=31)	Total (n=100)	p-value
Body mass	78.7 (14.26)	70.5 (11.30)	76.11 (13.89)	0.006
Height	1.75 (0.06)	1.69 (0.06)	1.73 (0.06)	0.000
BMI	23.7 (5.30)	22.0 (4.51)	23.2 (5.10)	0.143
SBP	130.7 (16.89)	127.6 (20.29)	129.7 (17.96)	0.087
DBP	81.4 (12.78)	78.6 (12.60)	80.5 (12.72)	0.752

BMI = Body mass index; SBP = Systolic blood pressure; DBP = diastolic blood pressure

Using the WHO International Society of Hypertension Writing Group's guidelines (2003) and those with prior diagnosis as hypertensive, a total of 36 participants were classified as being hypertensive, giving a crude prevalence of 36%. A total of 41% of the participants were classified as either overweight or obese and 28% as physically inactive.

For hypertensive participants the mean systolic blood pressure was 147.8 (SD=12.50) and diastolic blood pressure was 93.8 (SD=7.01); for participants with normal blood pressure the mean systolic blood pressure was 119.5 (SD=11.33) and diastolic blood pressure was 73.1 (SD=8.39). Both systolic blood pressure ($r=0.627$; $p < 0.05$) and diastolic blood pressure ($r=0.598$; $p < 0.05$) significantly correlates with age.

Factors found to be significantly associated with hypertension was current smoking, current alcohol use, self-reported diabetes mellitus, physical inactivity and overweight and obesity as summarized in Table 2. Participants classified as current smokers (reporting smoking in last 30 days prior to study) and current alcohol users (reporting alcohol use in 30 days prior to study) were more likely to be hypertensive compared to participants that did not smoke or use alcohol

($p < 0.05$). Participants who reported to have been diagnosed with diabetes mellitus, who were classified as physically inactive and either as overweight or obese were also more likely to be hypertensive than those without diabetes mellitus, who were physically active and of normal weight or underweight ($p < 0.05$).

Table 2: Factors associated with hypertension (n=100)

Variable	Hypertensive (n=36)	normal-tensive (n=64)	p-value	Cramer V
Gender:			0.934	0.007
Males	69.4 (n=25)	68.8 (n=44)		
Females	30.6 (n=11)	31.3 (n=20)		
Smoking			0.007	0.268
Yes	41.7 (n=15)	17.2 (n=11)		
No	58.3 (n=21)	82.8 (n=53)		
Alcohol use			0.028	0.220
Yes	66.6 (n=24)	43.8 (n=28)		
No	33.3 (n=12)	56.3 (n=36)		
Diabetes			0.000	0.444
Yes	27.8 (n=10)	0 (n=0)		
No	72.2 (n=26)	100 (n=64)		
Physical Activity			0.000	0.414
Sedentary	52.8 (n=19)	14.1 (n=9)		
Active	47.2 (n=17)	85.9 (n=55)		
BMI			0.000	0.391
Underweight/Normal	33.3 (n=12)	73.4 (n=47)		
Overweight/Obese	66.7 (n=24)	26.6 (n=17)		

Diabetes = self-reported diabetes mellitus.

Discussion

The study aimed to demonstrate the prevalence of modifiable risk factors for cardiovascular disease within the workplace, a university specifically. Following the comparison of the measured factors with internationally recommended values, the presence of several modifiable risk factors for cardiovascular disease was confirmed. An overall prevalence of 36% for hypertension, 41% for overweight and obesity and 28% for physical inactivity was found. Hypertension has been described as quantitatively the most important risk factor for premature cardiovascular disease (Kannel, 1996). Furthermore, overweight and obesity has been reported to be a leading cause for chronic diseases of lifestyle including cardiovascular diseases (Yusuf et al., 2005). These findings clearly indicate that this institution cannot be considered a “healthy” university workplace.

Literature has provided us with evidence that universities or tertiary education institutions are in a unique position to encourage employees and students to adopt healthier lifestyle options and reduce risks for non-communicable diseases (Carter et al., 2011). Leslie, Sparling and Owen (2001) are also of the opinion

that the tertiary education institutions are settings where opportunities exist to influence healthier habits, but these are partially neglected. Carter et al. (2011) are of the opinion that tertiary education institutions should use a collaborative model in partnership with health science students on campuses to implement approaches to improve employee's health. Therefore, in addition to improving the health of employees, students also learn positive health habits and demonstrate model approaches to promote health and wellness (Kupchella, 2009).

The findings of this study provide a good baseline for a tailored effective intervention programme to reduce the health risks of employees at this institution. Researchers have drawn attention to the fact that employers have a legitimate role to play in health promotion programmes at the workplace as working adults are spending significant amounts of time in workplace settings (Schult et al., 2006; Chapman, 2004). It is recognized that a big number of individuals can be reached at the workplace with health promoting interventions making it an ideal venue (Hughes et al., 2011). Taking into account the relatively low mean age of these employees (38.8 years), tailored intervention programmes is a worthwhile investment in employee health as they can be reached repeatedly and at a very low cost. It is also argued that if we reach employees early it is possible to slow down the morbidity onset, therefore cutting down on the cost associated with it.

Conclusion

This study confirms the prevalence of several modifiable risk factors for cardiovascular disease among adults employed at an institution for higher education. These findings further highlight the need for health promoting initiatives at the work place and specifically the benefits of such initiatives at institutions of higher education. It is thus important for us to know the characteristics and risk factors of a population that spends time in a particular setting and knowledge of baseline demographic data is of utmost importance to address the health needs at a particular setting effectively and efficiently.

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