● **Original article**

EVALUATION OF THE PRESENCE OF CARDIOVASCULAR RISK FACTORS IN UNIVERSITY STUDENTS FROM PORTUGUESE-SPEAKING COUNTRIES*

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ABSTRACT: Objective: to evaluate the presence of cardiovascular risk factors in university students from Portuguese-speaking countries. **Methodology**: cross-sectional study, carried out from January to July 2017, with 334 students from a federal public university in the state of Ceará, aged 18 years and over, from the following countries: Brazil, Angola, Cape Verde, Guinea-Bissau, Mozambique, Sao Tome and Principe and East Timor. Data was analyzed with the Epi Info version 7.1.2.0 statistical software. **Results:** of the 334 participants, 75.7% were aged 18-24 years old, 56.9% were Brazilian, 51.8% were female, 47.3% were brown and 47.6% were single individuals with an occasional partner. Risk factors for cardiovascular diseases included a family history of cardiovascular disease (81.1%), sedentary lifestyle (44.3%) and alcohol use (36.2%). **Conclusion:** identification of the main modifiable and hereditary risk factors in university students could guide actions aimed at promoting cardiovascular health.
KEYWORDS: Risk; Cardiovascular diseases; Students; Developing countries**.**

AVALIAÇÃO DA PRESENÇA DOS FATORES DE RISCO CARDIOVASCULAR EM ESTUDANTES UNIVERSITÁRIOS DE PAÍSES LUSÓFONOS

RESUMO: Objetivo: avaliar a presença de fatores de risco cardiovascular em estudantes universitários de países lusófonos. **Metodologia:** estudo transversal, realizado de janeiro a julho de 2017, com 334 estudantesde uma universidade pública federal no estado do Ceará, com idade igual ou superior a 18 anos, dos seguintes países: Brasil, Angola, Cabo Verde, Guiné-Bissau, Moçambique, São Tomé e Príncipe e Timor-Leste.Efetuou-se a análise estatística dos dados por meio do programa Epi Info versão 7.1.2.0. **Resultados:** dos 334participantes,75,7% encontravam-se na faixa etária entre 18 e 24 anos, 56,9% eram brasileiros, 51,8% do sexo feminino, 47,3% de cor parda e 47,6% solteiros com parceria eventual. Quanto aos fatores de risco para doenças cardiovasculares, destacaram-se a história familiar de doenças cardiovasculares (81,1%), o sedentarismo (44,3%) e o uso do álcool (36,2%). **Conclusão:** a identificação dos principais fatores de risco modificáveis e hereditários nos estudantes universitários poderão nortear ações voltadas para a promoção da saúde cardiovascular.
DESCRITORES: Risco; Doenças Cardiovasculares; Estudantes; Países em Desenvolvimento.

EVALUACIÓN DE LA PRESENCIA DE LOS FACTORES DE RIESGO CARDIOVASCULAR EN ESTUDIANTES UNIVERSITARIOS DE PAÍSES LUSÓFONOS

RESUMEN: Objetivo: evaluar la presencia de factores de riesgo cardiovascular en estudiantes universitarios de países lusófonos. **Metodología**: estudio transversal, realizado de enero a julio de 2017, con 334 estudiantes de una universidad pública federal en el estado de Ceará, con edad igual o superior a 18 años, de los siguientes países: Brasil, Angola, Cabo Verde, Guinea-Bissau, Mozambique, San Tomé y Príncipe y Timor-Leste. Se hizo análisis estadístico de los datos por medio del programa Epi Info versión 7.1.2.0. **Resultados**: de los 334 participantes, 75,7% estaban en edad entre 18 y 24 años, 56,9% eran brasileños, 51,8% del sexo femenino, 47,3% de color pardo y 47,6% solteros con pareja eventual. Acerca de los factores de riesgo para enfermedades cardiovasculares, se destacaron la historia familiar de enfermedades cardiovasculares (81,1%), el sedentarismo (44,3%) y el uso de alcohol (36,2%). **Conclusión**: la identificación de los principales factores de riesgo modificables y hereditarios en los estudiantes universitarios podrán nortear acciones de promoción de salud cardiovascular.
DESCRIPTORES: Riesgo; Enfermedades cardiovasculares; Estudiantes; Países en desarrollo.

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● INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death worldwide. In 2015 alone, they accounted for approximately 17.7 million deaths, representing 31% of all global deaths, of which 82% were concentrated in low and middle-income countries such as Brazil, African and Asian countries[1-2], which are Portuguese-speaking countries.

In Brazil, cardiovascular diseases are the main causes of death of men and women in the five regions of the country. Mortality by cardiovascular disorders increased in the Northeastern region from 1980 to 2012, unlike the other regions where there was a drop in mortality rates of the total population[3].

These disorders are also the leading cause of morbidity and mortality from non-communicable diseases in Africa. It is estimated that the main cardiovascular risk factors in this region are associated with urbanization, increased tobacco consumption, poor diets that result in high cholesterol levels and diabetes, as well as physical inactivity, leading to overweight or obesity[4].

In summary, in underdeveloped or developing countries, with poor living conditions due to their difficult socioeconomic conditions and, consequently, to a precarious health system, there is a large number of people affected by cardiovascular diseases, which can be exacerbated by late diagnosis and difficulty accessing health care.

It should be stressed that CVDs are originated by multiple factors, and modifiable and non-modifiable risk factors participate in the genesis of these disorders. Some factors favor the onset and development of heart diseases. Therefore, proper monitoring contributes to the identification of precursor signals that, when modified, may reduce or even reverse the evolutionary process of dysfunctions[5].

As for non-modifiable risk factors, the hereditary factor, which is probably a determinant for the development of cardiovascular diseases[6], deserves mention. Thus, accurate knowledge of an individual's family history may identify a predisposition to developing cert in diseases. It is worth mentioning that association of this risk factor with life habits may accelerate the manifestation of CVD.

Therefore, most cardiovascular diseases can be prevented through strategies that cover the entire population and by addressing behavioral risk factors[1]. It is then essential to identify the population exposed to these factors to raise their awareness about the need for behavior changes, since many of these behaviors are related to lifestyle and are hence modifiable. In fact, multiple educational actions in public health related to this issue have been developed[7].

The importance of identifying people who have cardiovascular risk factors in the different age groups and groups is clear. It is estimated that more than half of young adults have at least one risk factor for coronary heart disease, which considerably raises the risk of heart disease throughout life. As several risk factors for cardiovascular diseases arise in adolescence and persist in adulthood, it is recommended that prevention begins primarily in childhood and adolescence[8].

Studies have shown that young university students have several risk factors for CVD[8]. However, despite the high prevalence of these risk factors and early signs of atherosclerosis, the risk is still underestimated in this population[9]. Therefore, it is essential to investigate cardiovascular risk in university students of different nationalities, as is the case in Brazil and in some countries in Africa and Asia, since early identification of risk factors for CVDs may favor an effective intervention to improve the quality of life of these individuals and prevent future cardiovascular disorders.

In view of the aforementioned, the present study aimed to evaluate the presence of cardiovascular risk factors in university students from Portuguese-speaking countries.

● METHODOLOGY

Descriptive, cross-sectional study of a quantitative approach, carried out in January-July 2017. Data was collected in a federal public university with campuses in the cities of Acarape and Redenção, in the state of Ceará that has students from Brazil and from Portuguese-speaking countries (Angola, Mozambique, Cape Verde, Guinea-Bissau, São Tomé and Príncipe, East Timor).

The study population consisted of 2,496 university students of both genders, aged 18 years or over, born in the aforementioned countries, who were enrolled and regularly attending the courses of the Undergraduate Program in the face to face learning modality.

The sample was calculated using the finite sample formula and included 334 students (Brazil: 190, Angola: 30, Cape Verde: 11, Guinea-Bissau: 63, Mozambique: 11, Sao Tome and Principe: 07 and East Timor: 22). For the calculations, N = 2.496; p = 0.25; q = 0.75; and = 0.05 (95% confidence); z = 1.96 were considered.

The method of primary data collection was used, i.e., data was directly obtained from the study participants by the researcher and nursing students who voluntarily helped in data collection. These nursing students were previously submitted to a 4-hour training for standardization of the collection method. The researcher and the volunteers invited the university students to participate in the study after explaining the objectives and the methodology to be followed. After expressing their interest in participating in the study, the students signed the Free Informed Consent Form.

The participants were then interviewed and submitted to physical examination. For the interview, a tool elaborated by the researcher was applied based on cardiovascular risk factors, which included open-ended structured questions regarding patient identification. These questions related demographic and social data, information on health conditions, especially cardiovascular health and presence of risk factors for the development of CVD. The tool was submitted to pre-test with 10 students. No changes were necessary.

Subsequently, anthropometric data (weight, height and waist circumference) was collected and blood pressure was measured. A tested and calibrated scale with a capacity of 150 kilograms (kg) and sensitivity of 100 g with an inelastic measuring tape and an anthropometer was used. In weight measurement, the subjects were standing on the center of the platform of the scale, feet together and the arms extended along the body. Height (stature) was measured with the anthropometer coupled to the scale. The subjects were standing straight, with bare feet, arms hanging loosely on the side, with the palms alongside, feet together and upright chin.

The body mass index was obtained by dividing the weight in kilograms by the square of the person's height in meters (kg/m^2). The values obtained were classified according to the recommendation of the World Health Organization (WHO) for the assessment of adults and elderly: below normal (BMI <18.5), normal (18.5> BMI ≤ 24.0), overweight (BMI ≥ 25) and obesity (BMI ≥ 30) [10].

Waist circumference was measured with the subject erect. The measuring site is estimated at half distance between the costal border and the iliac crest. The following values were considered normal: <102 cm for men and <88 cm for women[10].

The following equipment was used to measure blood pressure: sphygmomanometers with aneroid manometers, duly tested and calibrated, and double stethoscopes.

The interpretation of blood pressure values was based on comparison with clinic blood pressure measurements of individuals older than 18 years taken by doctors for classification of systolic blood pressure (SBP) mmHg and diastolic blood pressure (DBP) mmHg: normal (≤ 120 and ≤ 80); Prehypertension (121 - 139 and 81-89); Stage 1 hypertension (140-159 and 90-99); Stage 2 hypertension (160-179 and 100-109); Stage 3 hypertension (≥180 and ≥110) and isolated systolic hypertension (≥ 140 and <90)[10].

As for physical activity, sedentary lifestyle was defined as the absence of physical activity (less than 25-30 minutes/day for 3 days/week), and moderate physical activity was defined as physical activity for more than 30 minutes on at least 3 days per week[11].

Regarding alcohol consumption, drinking volume and frequency (daily, weekly, monthly or sporadic) were investigated. Heavy drinking was defined as the ingestion of five or more doses of alcoholic drinks for men or four or more doses for women, on one single occasion, at least once in the past 30 days [12]. The use of tobacco and the number of cigarettes per day was also verified based on the recommendations of the World Health Organization[13].

The data collected was arranged in an electronic spreadsheet in Microsoft Office 2010, and statistical analysis was performed with Epi Info version 7.1.2.0 software. Descriptive statistics was used, including frequency distribution for qualitative variables and measures of central tendency and variability suitable to summarize numerical data.

The ethical principles of scientific research recommended by the National Commission for Research Ethics were observed. The project was approved by the Research Ethics Committee of *Universidade da Integração Internacional da Lusofonia Afro-Brasileira* (Unilab), under protocol number 1.873.108.

● **RESULTS**

The results were initially presented in Table 1 according to the socio-demographic profile of the participants, considering: age, nationality, sex, self-reported color and marital status. Table 2 shows the cardiovascular risk factors identified in the students.

Table 1 – Socio-demographic profile of university students from Portuguese-speaking countries (n: 334). Redenção, CE, 2017. (continues)

Variable	No	%
Age range		
18-24	253	75.7
25-31	72	21.6
32-38	4	1.2
39-45	2	0.6
46-52	1	0.3
53-59	2	0.6
Nationality		
Brazil	190	56.9
Angola	30	9
Cape Verde	11	3.3
Guinea–Bissau	63	18.9
Mozambique	11	3.3
São Tomé and Príncipe	7	2
East Timor	22	6.6
Gender		
Female	173	51.8
Male	161	48.2

Self-reported color		
White	30	9
Black	144	43.1
Yellow	2	0.6
Brown	158	47.3
Marital status		
Single with an occasional partner	159	47.6
Single with a fixed partner	154	46.1
Married or in consensual union	17	5.1
Widower (widow)	1	0.3
Divorced	3	0.9

Of the 334 participants in the study, 75.7% (253) were aged 18-24 years;56.9% (190) were Brazilian; 51.8% (173) were female; 47.3% of brown color, and 47.6% (159) were single with occasional partners.

Table 2 – Distribution of university students according to the risk factors for cardiovascular diseases (CVDs) (n: 334). Redenção, CE, 2017. (continues)

Variable	No	%
Smoking		
Yes	18	5.4
No	316	94.6
Alcohol consumption		
Yes	121	36.2
No	213	63.8
Sedentary lifestyle		
Yes	148	44.3
No	186	55.7
Obesity		
Yes	21	6.3
No	313	93.7
Hypertension		
Yes	15	4.5
No	319	95.5
Personal history of CVD		
Yes	35	10.5
No	299	89.5

Family history of CVD		
Yes	271	81.1
No	63	18.9
Knowledge of risk factors		
Yes	226	67.7
No	108	32.3

The main risk factors for CVD were family history of cardiovascular diseases observed in 81.1% (271) of the university students; sedentary lifestyle in 44.3% (148) and alcohol use by 36.2% (121), as shown in Table 2.

● **DISCUSSION**

The profile of the students regarding age range was similar to the profiles observed in other studies conducted in educational institutions in Chile and Mexico that also investigated cardiovascular risk factors in university students. In the study conducted in Chile, the mean age of first-year students was 19.2 ± 1.8 years and of third-year students were 21.7 ± 2.5. In a study conducted in Mexico, the mean age was 20 years, ranging from 16 to 27 years [6,14]. Regarding the predominance of females, the composition of the sample is similar to other studies focused on this population[15-16].

Regarding the risk factors, family history of CVD was highlighted, since it was reported by 271 (81.1%) students, including: systemic arterial hypertension (SAH), diabetes, heart disease, dyslipidemia, acute myocardial infarction and stroke (CVA). A study with students from a university in Mexico also investigated family history of CVD, and high blood pressure was also an important risk factor (45.8%) [14].

Inherited cardiovascular diseases comprise a spectrum of diseases of wide clinical and genetic diversity. Molecular studies with several populations have demonstrated the association of each of these conditions with hundreds of different pathogenic mutations. The clinical variability of these diseases can also be elucidated by epigenetic factors and/or by interaction with the environment[17].

Therefore, knowledge of the family history of diseases is essential for the development of strategies aimed at preventing and/or delaying the onset of these diseases, especially in young adults, because if these individuals of working age become sick they may face difficulty in entering and or staying in the labor market, and treatment costs will be borne by their families.

Moreover, it is known that prevention of cardiovascular risks in young individuals is essential to ensure a better quality of life, with good health, when they grow old.

Another relevant finding was sedentary lifestyle reported in 148 (44.3%) participants. This result was similar to the findings of a study with university students that suggested that spending too much time online using a computer and devoting a great deal of time to academic activities interfere negatively in the practice of physical activity[18].

In the 26 Brazilian capitals and the Federal District the frequency of physically inactive adults was 15.4%, with similar frequency between men (16.2%) and women (14.7%). The percentage of physically inactive people was higher in adults with lower educational level (up to 8 years of schooling) and in those aged 65 and over, for both genders[12].

It should be noted that regular physical activity has many health benefits, being directly related to the reduction of cardiovascular risk factors, as it improves serum levels of high-density lipoprotein (HDL-C) cholesterol, lowers total cholesterol (TC), low-density lipoprotein (LDL-C), triglycerides (TG), blood pressure and helps control blood glucose levels[19]. It also increases blood flow to the brain,

improving memory and thinking skills and stimulates the release of adrenaline, regulating mood[11].

Therefore, physical activity should be encouraged in the university environment, as students spend a long time there. This would allow health professionals to seek partnership with other bodies/associations, as well as develop actions focused on sports and leisure activities that stimulate student participation.

Smoking was not significant, since only 18 (5.4%) of the students were smokers, a positive finding also reported in other studies with this population[18]. In turn, regarding alcohol consumption, it was found that 121 university students drank alcoholic drinks, a significant percentage of 36.2%.

Use and abuse of alcohol and/or other licit and illicit drugs has been progressively increasing worldwide, especially among young people. Therefore, it has become a public health problem that requires serious attention due to its political, economic, cultural, ethical-legal and technological determinants and constraints, which are reflected in the individual, in the family and in society[20].

A study conducted in Brazil in 2013 revealed a prevalence of 16.4% of alcohol abuse in the population aged 18 years or over[11]. In East Timor, the prevalence of ingestion of alcoholic drinks in the last 30 days was 17.4%, with a much higher incidence in men (42.8%). Among those who have drunk alcohol in the past 12 months, 40% drank monthly, about 60% drank weekly and less than 1% drank daily[21].

The situation in the African continent does not differ from the rest of the world. In 2004, alcohol was the main risk factor for disability-adjusted life years (DALY) among male adolescents and young Africans aged 15-24 years[22].

The consumption of alcohol and other drugs increases predisposition to car accidents, unprotected sex and HIV transmission, violence, sleep problems, eating disorders, impairment in perception and greater stress, and impairs academic achievement[23]. It may also cause mood, cardiovascular, neurodegenerative, gastrointestinal, hepatic and mental disorders[24].

Alcohol use by university students is a problem faced by educators and health professionals, because of the health and social problems associated with such behavior[25]. Therefore, greater emphasis should be placed by the universities in the implementation of health promotion actions (workshops and debates) and other strategies aimed to reduce this harmful habit.

Thus, given the strong hereditary factor, the life habits of university students from Portuguese-speaking countries may pose a greater risk for the development of cardiovascular diseases.

It should also be noted there has been a fast rise in the incidence of cardiovascular diseases in the African continent during its economic transition: investments and urbanization have led to the creation of a new high-consuming middle class with sedentary lifestyles in countries with a poor public health infrastructure compared to developed countries. Moreover, the African continent has several other priorities, such as encouraging economic growth and social and political changes, as well as dealing with communicable diseases such as HIV/AIDS[26].

Although CVDs are a major public health problem, there are few studies on their incidence in populations in Portuguese-speaking countries, especially in Africa, since these countries usually lack human and financial resources. Therefore, data regarding general health conditions and the identification of cardiovascular risk factors may be underestimated.

Therefore, actions targeted to the promotion of health in the academic environment are necessary in to raise public awareness on the importance of changes in lifestyle, with emphasis on a policy of encouragement of physical activities aimed to control possible negative effects associated with the consumption of licit and illicit psychoactive substances.

Thus, one important aspect of the present study, which was conducted in a public university in Brazil with a sample of students from several Portuguese-speaking countries, is the possible dissemination by these students of the educational interventions on prevention of the identified cardiovascular risk factors in their countries of origin.

● **CONCLUSION**

Through the assessment of cardiovascular risk of university students from Portuguese-speaking countries, the present study identified the main modifiable and hereditary risk factors, and therefore may contribute to the academic community and health professionals with the identification of habits of young people that are harmful to their hearts. Although the international participants of the study live in Brazil, there was no bias.

In view of the situational diagnosis made in this study, actions focused on health promotion could be developed to emphasize the importance of physical activity and the damages caused by alcohol use, considering the habits and culture of each country.

It is hoped that this study will give health professionals and university students new insights into cardiovascular health. It is also hoped that it will encourage other studies and provide a basis for the construction of strategies that favor the improvement of the quality of care to the referred population.

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