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RISK FACTORS FOR CARDIOVASCULAR DISEASES IN UNIVERSITY STUDENTS: DIFFERENCES BETWEEN THE SEXES

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ABSTRACT

Objective: to compare the prevalence of risk factors for cardiovascular diseases in university students by gender. **Methodology**: a cross-sectional study conducted with fourth year undergraduates from eight courses at a public university in northwestern Paraná. Socioeconomic and lifestyle characteristics, blood pressure, nutritional status and waist circumference were evaluated. In the statistical analysis, the logistic regression was used. **Results:** the 242 university students evaluated had a mean age of 22.46 years (± 1.72), the majority being female (73.97%) and white (72.7%). According to the BMI, 21.48% were overweight, more frequently among males. In multivariate logistic regression by sex, it was found that men presented greater chances for overweight (ORaj = 4.30, p = <0.001); smoking (OR a = 5.15, p = 0.016); (ORaj = 4.01, p = 0.012) and for the practice of physical activity (ORaj = 2.49, p = 0.006). **Conclusion:** university students of the male and female sexes present differences in behavior regarding risk factors for cardiovascular diseases.

Keywords: Cardiovascular Diseases. Students. Risk Factors. Sex.

INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death in Brazil. It is estimated that 23.3 million people will die in 2030 as a result of heart disease and stroke [1]. Studies have shown that these diseases have affected younger and younger age groups, especially in developing countries. This is due in part to the fact that young people do not see CVD in their lives, perceiving it as possible only in older individuals [2].

It is added, considering the harmful potential that these diseases have in the young public, that some researchers have been dedicated to investigate which factors are related to the emergence of them in this group of individuals[3,4]. Risk factors are classified as modifiable, such as inadequate living habits, represented by physical inactivity, smoking, alcohol abuse, obesity and inadequate food, and not modifiable, such as genetic and biological [4].It is worth noting that modifiable risk factors can account for about 80% of cases of coronary and cerebrovascular disease1, as well as contribute to the development of chronic diseases such as cancer, hypertension and diabetes[4,5].

Habits considered harmful often start as a result of admission to university. This is because, for many, this is the first moment in which students take responsibility for their housing, food and also for the management of their finances. The difficulty to perform such tasks, along with psychosocial factors, lifestyle, as well as the situations of the academic environment can greatly favor pernicious behaviors [6], which, consequently, can trigger the emergence of CVD [4].

Considering that the knowledge of the factors related to CVD in university students will enable the creation and implementation of health promotion and prevention measures, especially in the university environment, it was defined as the objective of this study to compare the prevalence of risk factors for diseases in

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university students according to sex.

METHODOLOGY

Cross-sectional study conducted at a public university in northwestern Paraná. Data was collected in October and November of 2015, in the classroom, in the three shifts (morning, afternoon and evening), with the use of self-applied instrument.

The subjects of the study were the last year's scholars enrolled in eight undergraduate courses randomly selected from among the 46 courses offered by the institution. They are: Agronomy; Animal husbandry; Biological Sciences; Psychology; Dentistry, Pharmacy, Nursing and Architecture and Urbanism.. Included in the study, were students of both sexes present in the classroom on the days defined by the respective coordinators for the data collection. Pregnant women, nursing mothers and individuals with physical disabilities (due to changes in body composition) were excluded.

For the definition of sample size, the total number of students enrolled in the institution, in the fourth year of the eight courses (504 students), with a prevalence of 0.5%, a confidence level of 95% (z = 1 , 96), and a sample error of 5% (e = 0.05), resulting in a minimum sample of 219 individuals who, plus 10%, for possible losses, totaled 242 individuals to be approached.

The variables under study were:

a) Sociodemographic characteristics - gender (male / female); age; color (white / non-white) and stroke;

b) Life habits - smoker (yes / no); alcohol consumption in the last 30 days (yes / no); practice of physical activity for at least 30 minutes, three times a week (yes / no);

c) Clinical conditions - blood pressure (normal / altered), considering altered blood pressure values when systolic SBP> 130 and / or diastolic DBP> 85 [7]. The blood pressure was verified with a Premium Aneroid Pressure device, with the individual sitting and the right arm resting at the height of the left atrium;

d) Anthropometric variables - weight, height and waist circumference. The weight was determined in G-TECH, Glass 7 scale, with a maximum capacity of 130 kg. The height was measured by means of a tape measure, with a precision of 0.1 cm, fixed on a smooth wall, without a baseboard, with the students standing with their backs to the wall, barefoot, with their feet together and their arms extended along the body.

The nutritional status was classified according to the Body Mass Index (BMI), according to the parameters of the World Health Organization, [8] underweight (BMI <18.5kg / m²); eutrophy (BMI between 18.5-24.9kg / m²); overweight (BMI between 25.0-29.9kg / m²) and obesity (BMI ≥ 30.0kg / m²). They were then categorized as "risk" (overweight and obese) and "non-risk" (eutrophic).

For the waist circumference, the subjects remained standing, with the abdomen relaxed, arms extended along the body and a tape measure positioned at the midpoint between the lower edge of the last rib and the iliac crest. An increased cardiovascular risk was considered when CC was equal to or greater than 102 cm for men and 88 cm for women [9].

In the analysis, descriptive statistics were used to characterize the population with the use of mean and standard deviation. To identify factors associated with cardiovascular diseases and gender, univariate logistic regression was used. All variables with p value lower than <0.20 were included in the multiple logistic regression analysis, and in the final model, those with p-value <0.05 remained. A confidence level of 95% ($\alpha = 0.05$) was considered. Data was entered and organized using the Microsoft Excel program and then analyzed using the Statistical Analysis Software (SAS - 9.4).

The development of the study was approved by the Standing Committee on Ethics in Research with Humans of the signatory university (Opinion: 1,150,063). The scholars were clarified about the objectives of the research and signed the Free and Informed Consent Term (FICT) in two ways.

RESULTS

The 242 university students under study were aged between 20 and 33 years - mean: 22.46 years (± 1.72), the majority being female (73.97%); white (72.70%); graduating from the courses of Psychology (17.35%), Agronomy

(13.22%), Architecture (11.98%), Biology (10.74%), Pharmacy (12.39%), Dentistry (8.67%) and Nursing (8.26%).

Regarding the nutritional evaluation, it was found that 21.48% were overweight, 9.50%, low weight and the others were eutrophic. The proportion of overweight was higher among males (males: 42.85% and females: 13.96%); however, most of both groups were eutrophic (males: 52.38% and women: 74.86%). The majority of undergraduates had abdominal circumference classified as normal (91.73%), according to table 1.

Table 1. Characterization of the studied population according to sex. Maringá-PR, Brazil. 2015.

Variables	**Male**	**Female**	**Total**	
	Mean (SD)	Mean (SD)	Mean (SD)	Minimum - Maximum
Age(years)	22.63 (1.62)	22.40 (1.76)	22.46 (1.72)	20 - 33
BMI(kg/m²)	25.24 (4.52)	21.86 (3.18)	22.72 (3.84)	16.30 – 44.10
CC (cm)	86.44 (11.78)	73.13 (8.76)	76.59 (11.25)	52.5 - 134
SBP(mmHg)	120.33 (10.60)	106.42 (10.78)	110.04 (12.34)	70 – 150
DBP(mmHg)	74.92 (8.95)	70.27 (8.70)	71.48 (8.98)	50 – 100

Concerning life habits, most (79.3%) reported consumption of alcoholic beverages in the last 30 days, 52.1% did not perform regular physical activity and 4.9% were smokers. It was observed in the univariate logistic regression that men were more likely to be overweight, changes in systolic and diastolic pressure at the time of the interview, were smokers, consume alcoholic beverages and were more active, compared to women (Table 2).

Table 2. Factors associated with cardiovascular diseases in college students according to sex. Maringá-PR, Brazil. 2015.

Variables	**Female n(%)**	**Male n(%)**	**Total n(%)**	**Odds (CI)**	**p-value**
Colour					
White	129 (72.1)	47 (74.6)	176 (72.7)	-	
NotWhite	50 (27.9)	16 (25.4)	66 (27.3)	0.87 (0.45 – 1.69)	0.69
CC					
No risk	164 (91.6)	58 (92.1)	222 (91.7)	-	
Risk	15 (8.4)	5 (7.9)	20 (8.3)	0.94 (0.32 – 2.70)	0.91
BMI					
No risk	154 (86.0)	35 (55.6)	189 (78.1)	-	
Risk	25 (14.0)	28 (44.4)	53 (21.9)	4.92 (2.56 – 9.46)	<0.001
SBP					
No risk	178 (99.4)	58 (92.1)	236 (97.5)	-	
Risk	1 (0.6)	5 (7.9)	6 (2.5)	15.34 (1.75 – 134.04)	0.014
DBP					
No risk	172 (96.1)	55 (87.3)	227 (93.8)	-	
Risk	7 (3.9)	8 (12.7)	15 (6.2)	3.57 (1.24 – 10.30)	0.018
Physical activity					
No risk	77 (43.0)	39 (61.9)	116 (47.9)	2.15 (1.19 – 3.87)	0.011
Risk	102 (57.0)	24 (38.1)	126 (52.1)	-	
Smoking					
No risk	175 (97.8)	55 (87.3)	230 (95.0)	-	
Risk	4 (2.2)	8 (12.7)	12 (5.0)	6.36 (1.84 – 21.94)	0.003
Drinking					
No risk	45 (25.1)	5 (7.9)	50 (20.7)	-	
Risk	134 (74.9)	58 (92.1)	192 (79.3)	3.89 (1.47 – 10.31)	0.006

In the logistic regression analysis, the independent factors associated with males were: overweight (ORaj = 4.30, p = <0.001); smoking (OR a = 5.15, p = 0.016); (ORaj = 4.01, p = 0.012) and to practice physical activity (ORaj = 2.49, p = 0.006), adjusted for diastolic blood pressure (DBP) (Table 3).

Table 3. Logistic regression of the factors associated with the risk of cardiovascular diseases according to the male sex. Maringá-PR, Brazil. 2015.

Variables	OddsRatio (ORaj)	CI (95%)	p-value
BMI			
No risk	–	–	
Risk	4.30	2.13 – 8.64	<0.001
Smoking#			
No risk	–	–	
Risk	5.17	1.35 – 19.74	0.016
Drinking			
No risk	–	–	
Risk	4.01	1.35 – 11.87	0.012
Physical activity			
No risk	2.49	1.29 – 4.82	0.006
Risk	–	–	
DBP*			
No risk	–	–	
Risk	2.84	0.78 – 10.34	<0.001

*#Adjustment Variable

DISCUSSION

Most of the university students under study were female, which shows that women are currently present in all fields of human performance. In Thailand, a study with university students between 18 and 25 years old showed a higher participation of women (72.7%) [6]. The study carried out in Spain, with university students between 18 and 33 years old, observed slightly higher participation among men (51.3%)[3]. It is emphasized that the sex of the individual interferes in the way in which he perceives the risk factors of a disease, its diagnosis, treatment and prevention [10], which justifies the accomplishment of studies of comparison between the sexes.

In this study, considering the risk factors for CVD, it was observed that male college students presented a higher proportion of living habits and poor health conditions, with four times more chances of being overweight and consuming alcoholic beverages and five times more likely to be smokers. On the other hand, they were twice as likely to be physically active compared to women. It is important to consider that the greater the number of risk factors present in the same individual, the greater the likelihood of a cardiovascular event [3,4].

It was evidenced that 30.98% of university students presented some impairment in nutritional status (21.5% overweight and 9.5% underweight). It is emphasized that it is in university life that many habits of life change due to the greater vulnerability in acquiring habits detrimental to health. In this group, it is common to skip meals, associated with low consumption of fruits and vegetables and high snacks fast. These changes in eating habits may contribute to a diet characterized by unbalanced meals and low nutritional value and, consequently, may lead to the development of excess weight - an important risk factor for CVD[4].

The fact that 21.48% of the participants were overweight corroborates the results of a study carried out with university students from a public institution in Piauí, which found a prevalence of 20.4% of overweight (11), as well as studies with university students in other countries [12-13].In addition, it was shown that male subjects were four times more likely to be overweight, corroborating findings from international studies that also identified a higher prevalence of overweight among men [6,13,14].It is emphasized that overweight has become a major public health problem and has affected younger and younger strata. The results found may be related to the insertion in the academic environment, which led to changes in life habits, especially in food.

The percentage of low weight found in this study may be related to women's desire to

present a slender body, following the current pattern of beauty often imposed by society and the media, especially in this age group. This causes women to worry more about (or less) eating habits, leading them to implement changes that are not always healthy, such as skipping meals (especially breakfast), replacing meals with quick snacks and / or unhealthy, in addition to long periods of fasting.

In this sense, a study carried out with 1,147 students from the University of Kuwait found the presence of disordered eating behaviors and eating disorders, a fact attributed in large part to a combination of social influences, diet characterized by food restriction and lifestyle. These attitudes contributed, according to the authors, to a perception of impaired body weight, as well as a high prevalence of overweight and obesity in this population[15].

Also in relation to the nutritional status, it was observed that, in general, men and women presented an adequate waist circumference, that is, without risks for cardiovascular events. However, it should be noted that 8.4% of university students and 7.9% of university students presented this risk factor. Excess abdominal fat increases the risk of developing cardiovascular diseases, as it is usually associated with metabolic changes such as insulin resistance and systemic arterial hypertension[16].

It is noteworthy that more than half of the students reported not practicing physical activity regularly, being this an important risk factor that predisposes them to cardiovascular diseases, but that is susceptible of prevention with changes in the lifestyle. The high prevalence of sedentary can be justified by students' own daily life, marked by lack of time and place to perform physical activity, [17] as well as due to an indisposition for the rush of academic life or, moreover, to assign priority to other activities.

It is worth noting that, although high, the proportion of sedentarism found was lower than that of a study carried out in Piauí (71.7%), which also identified that a significant proportion of university students evaluated, had components for the metabolic syndrome, leading the authors to conclude that, the profile of the study population reinforces the importance of early diagnosis, in order to reduce the risk of developing chronic comorbidities [11]. Study with university students in Thailand found that more than half of them (54%) were physically inactive and 40% had a sedentary lifestyle (sitting six hours or more in a day)[13].

However, male university students were twice as likely to be active than females. Other studies also identified a higher prevalence of regular physical activity among college students[3,10]. This situation, the one with the highest frequency of physical activity among males, has been identified, even among high school students [18]. This may be justified by the fact that, despite the fact that the Brazilian socio-cultural profile has undergone several modifications, it can be seen that female children and adolescents are still more oriented towards caring for their family and domestic tasks, while those of the male sex are oriented to the labor activities and those of vigorous intensity [19].

The low percentage of university students who are addicted to smoking (5.0%) differs greatly from the percentage found in studies with university students in Spain (36%) [3] and in Portugal (26.2%)[20], however, it resembles those found in a study carried out in India (7%)[6]. However, it is important to note that, in this study, being male was five times more likely to be a smoker.

In Brazil, the low rate of smoking is sometimes due to national anti-tobacco campaigns, prohibition of advertising related to these products, as well as the existing set of laws to control their use. The effects of tobacco use are increasingly emphasized, and this is one of the risk factors for several diseases, including chronic noncommunicable diseases, which are associated with deaths due to CVD [20].

Due to the age group and the period of the university student's life, the student is more likely to initiate unhealthy habits, especially in relation to tobacco and alcohol consumption. A study carried out in Portugal, with 472 students, shows that, according to university students, the frequent onset of this habit occurs between 14 and 17 years of age [20].In this study, a high proportion of individuals with high alcohol consumption in the last 30 days was observed, as has been identified in national and international studies [6,11].Alcohol represents a serious public health problem and generates social concern in

view of the consequences of its abusive and incorrect use [3].

Despite the frequent alcoholic beverages consumption among college students of both sexes, it was observed that being male quadrupled the odds of alcohol consumption. Studies carried out with university students in Spain [10] and Colombia [21] also identified higher chances among men. However, a study carried out in another region of Spain found a high alcohol consumption among college students (more than 85%), with no differences between the sexes [3]. The high consumption of alcoholic drinks by university students can be triggered by several factors, such as the fact that the university represents the entrance into adult life and, therefore, the freedom of behavior, mainly because they do not believe in the damages caused by alcohol consumption and , also, because this habit constitutes a strategy of social interaction. These factors also contribute to the combined use of tobacco and alcoholic beverages, increasing the risks for future health problems.

Regarding the clinical condition established from the blood pressure values, it was verified that the alterations were not very significant. However, males were more likely to have both systolic and diastolic changes. It should be emphasized that changes in blood pressure may be a reflection of the association of several risk factors that are detrimental to health as they may also be due to genetic or hormonal problems. A study conducted in Saudi Arabia found a 60.0% overall prevalence of dyslipidemia, with overweight / obese students being more likely to have at least an undesirable lipid concentration [22]. This result led the authors to recommend the creation of a health awareness plan to educate university students about healthy lifestyle choices and quality food [22].

Some limitations can be pointed out in this study. One of them refers to the cross-sectional design, which does not allow establishing a cause and effect relationship. Likewise, the lack of population representativeness of the universe of university students requires prudence in the interpretation of the results obtained. Another aspect to be highlighted is the fact that blood pressure values were established from a single measurement.

CONCLUSION

The results of the study show that the university students analyzed (with a mean age of 22.6 years) already present a high prevalence of some risk factors for cardiovascular diseases, such as overweight, sedentary lifestyle and alcohol consumption. Although they practice more physical activity than female college students, males are more likely to have certain risk factors, such as being overweight, smoking, and drinking.

The most pressing risk factors for the development of various public health problems today include smoking, alcohol consumption, sedentary lifestyle, unbalanced eating and overweight. Identifying that some of these factors are already present in university students is an alert, considering that most of the habits started at this stage of life tend to be consolidated in adult life, contributing to the emergence / development of chronic diseases, such as cardiovascular diseases, at an earlier age. Given this context, it is necessary to implement educational and health promotion actions among university students, especially among males.

FATORES DE RISCO PARA DOENÇAS CARDIOVASCULARES EM UNIVERSITÁRIOS: DIFERENÇAS ENTRE OS SEXOS

RESUMO

Objetivo: comparar a prevalência de fatores de risco para as doenças cardiovasculares em universitários segundo o sexo. **Metodologia**: estudo transversal realizado com acadêmicos do quarto ano de oito cursos de uma universidade pública no noroeste do Paraná. Foram avaliadas características socioeconômicas e do estilo de vida, pressão arterial, estado nutricional e circunferência abdominal. Na análise estatística, foi utilizada a regressão logística. **Resultados:** os 242 universitários avaliados tinham idade média de 22,46anos (±1,72), sendo a maioria do sexo feminino (73,97%) e de cor branca (72,7%). De acordo com o IMC, 21,48% tinhamexcesso de peso, com maior frequência entre os do sexo masculino. Na regressão logística multivariada por sexo, constatou-se que homens apresentaram maiores chances para excesso de peso (ORaj=4,30; p=<0,001); tabagismo (ORaj=5,15; p=0,016); consumo de bebida alcoólica (ORaj=4,01; p=0,012) e para a prática de atividade física (ORaj=2,49; p=0,006). **Conclusão:** universitários dos sexos

masculino e feminino apresentam diferenças de comportamento em relação aos fatores de risco para as doenças cardiovasculares.

Palavras-chave: Doenças Cardiovasculares. Estudantes. Fatores de Risco. Sexo.

FACTORES DE RIESGO PARA ENFERMEDADES CARDIOVASCULARES EN UNIVERSITARIOS: DIFERENCIAS ENTRE LOS SEXOS

RESUMEN

Objetivo: Comparar la prevalencia de factores de riesgo para enfermedades cardiovasculares en universitarios, según el sexo. **Metodología:** Estudio transversal realizado con académicos del cuarto año de ocho cursos de una universidad pública en el noroeste de Paraná. Fueron evaluadas características socioeconómicas y del estilo de vida, presión arterial, estado nutricional y circunferencia abdominal. En el análisis estadístico fue utilizada regresión logística. **Resultados**: Los 242 universitarios evaluados tenían un promedio de 22,46 años (±1,72), siendo la mayoría del sexo femenino (73,97%) y de color blanco (72,7%). De acuerdo con el IMC, 21,48% tenía exceso de peso, con mayor frecuencia entre los del sexo masculino. En la regresión logística multivariante por sexo se constató que hombres tuvieron mayor probabilidad para el exceso de peso (ORaj=4,30; p=<0,001), tabaquismo (ORaj=5,15; p=0,016); consumo de bebida alcohólica (ORaj=4,01; p=0,012) y para la práctica de actividad física (ORaj=2,49; p=0,006). **Conclusión:** Universitarios de los sexos masculinos y femeninos presentan diferencias de comportamiento respecto a los factores de riesgo para enfermedades cardiovasculares.

Palabras clave: Enfermedades Cardiovasculares. Estudiantes. Factores de riesgo. El sexo.

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