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Self-Reported Cardiovascular Risk Factors among Medical Students

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Methodology: Observational and cross-sectional study on students from the first to the eighth semester of medicine using anonymous questionnaires containing questions about cardiovascular risk factors.

Results: A total of 288 students paticipeted. There was a higher percentage of self-declared emotional stress ($p<0.001$), and high blood pressure ($p=0.007$), family history of coronary heart disease (CAD) or stroke (0.049) in the female group; The group under 20 years old practiced more physical activity ($p=0.023$) and reported a balanced diet ($p=0.047$), the age group between 20 and 29 years old reported a higher percentage of smoking ($p=0.001$) and alcohol consumption ($p=0.048$), those older than 30 years old reported a higher knowledge about family history of CAD or stroke.

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Conclusion: This study demonstrated that smoking and alcohol consumption are higher among those who were older than 30 years and who were attending more advanced semesters of the medical course. Female students and those older than 30 years demonstrated higher knowledge about family history of coronary artery disease or stroke. Female medical students self-reported emotional stress and higher blood pressure levels. It is important to have curricular activities with the participation of students in activities related to health promotion aiming at primary prevention.

Keywords: cardiovascular diseases, primary cardiovascular prevention, cardiovascular risk factors, risk assessment.

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I. Introduction

Coronary heart disease (CAD) has a high prevalence throughout the world, representing a global public health challenge. Its incidence varies between regions and countries, influenced by socioeconomic factors, lifestyles, and genetic characteristics. In industrialized nations, the prevalence is often higher due to unhealthy diets, increased obesity, a sedentary lifestyle, and a higher incidence of cardiovascular risk factors such as hypertension and diabetes. However, there is growing concern in developing countries, where urbanization, and the Westernization of lifestyle habits contribute to the increase in the prevalence of coronary disease. Understanding this worldwide distribution is crucial to direct prevention strategies, early detection and effective treatment, seeking to reduce the impact of CAD on population health globally. (WHO, 2024)

Atherosclerosis is a condition of significant importance, given its relationship with cardiovascular diseases, which are one of the leading causes of morbidity and mortality worldwide. The vascular endothelium is the starting point for the formation of the atherosclerotic plaque, through its aggregation caused by cardiovascular risk factors such as dyslipidemia, high blood pressure or smoking, among others. Consequently, there is an increase in the permeability of the intima to plasma lipoproteins, mainly LDL, which undergo oxidation. Configuring the beginning of atherogenesis, it occurs in a proportional to the concentration of these lipoproteins in plasma. (VISSEREN et al, 2021) (FALUDI et al, 2017) (PRÉCORA et al, 2021) (ARNETT et al, 2019)

Would medical students be able to recognize cardiovascular risk factors? The present study had the objective of evaluate self-knowledge about atherosclerotic risk factors among medical students. As they will be able to contribute early to primary cardiovascular prevention, functioning as knowledge multipliers, in addition to increasing their awareness on the topic.

II. Methods

Observational and cross-sectional study through the application of an anonymous questionnaire on cardiovascular risk factors in medical students,

carried out between October and December 2023 due to the inter-exam period of the academic semester, after signing the free and informed consent form (FICF) by the participants. This study was pproved by the Research Ethics Committee, registered on Plataforma Brasil (PLATAFORMA BRAIL), number 4,482,980.

Those who did not agree to sign were excluded. The participants included in this study were all medical students enrolled at the university, regardless of gender and age, who were studying medicine between the first and eighth semesters.

The total group was divided into three types of groups to carry out statistical analysis: 1- according to the level of the medical course: basic level, between the first and fourth semester of medicine, and the clinical level, between the fifth and eighth semester of medical course; 2- according to the age: below 20 years old, between 20 and 29 years old, over 30 years old; 3- according to biological sex: female and male. The level of the course was chosen taking into account the level of knowledge of medical students. The age ranges were chosen based on the predominance in the course and the possible degree of academic maturity. Biological sex was chosen due to the difference in the prevalence of cardiovascular disease in men and women.

Anonymous questionnaires were used to collect data to preserve the identity of the participants, The questionnaire was filled out by the volunteer student and immediately delivered to one of the research authors. The FICF was signed in advance and handed over to another author, in order to guarantee confidentiality and to be unlinked. Anonymity aimed to guarantee the spontaneity and reliability of responses, avoiding embarrassment for those who ignored them. However, it may have contributed to less care in the responses.

The questionnaire was inspired by previous work on raising awareness of cardiovascular risk factors in pregnant women in the gynecology, S and obstetrics outpatient clinic. (JENNIFER et al, 2020) Questionnaire contains 20 quick answer questions about age, sex, declared ethnicity, weight, height, dyslipidemia, diabetes, high blood pressure, family history of coronary artery disease (CAD), or stroke, physical activity, own perception of emotional stress, personal history of CAD or stroke, smoking, alcoholism, balanced diet, considered DASH diet. The answers were based on the student's perception, and knowledge. (BRICANELLO et al, 2020)

For the sample calculation, the total number of students enrolled at the medical school was considered equal to 1,138, an error of 5%, reliability of 95% and percentage frequencies estimated at 50%, a value that maximizes the sample size. The calculation was carried out using the EPI-INFO program version 7.3.2.1. The research was carried out with 288 students who answered the questions in full, except for references to the memory of the values of the biochemical parameters from the last exam carried out.

The only variables with missing information were recorded in the biochemical test values remembered by the students and statistical calculations were performed with the exact number of biochemical test values reported.

Data were calculated using the number of questionnaires available, regardless of whether they were complete. There was double typing to avoid errors and the available data was used, without replacing missing answers. Data was entered into the Microsoft EXCEL (https://www.microsoft.com/pt-br/microsoft-365/free-office-online-for-the-web) spreadsheet and the computer program used to obtain the statistical calculations was IBM SPSS in version 25 (https://www.ibm.com/docs/en/spss-statistics/25.0.0).

Categorical variables were expressed by absolute frequencies and percentages, and in the numerical variables by statistical measures: mean, standard deviation, minimum value, P25, median, P75 and maximum value. Association between two categorical variables Pearson's Chi-square test or Fisher's Exact test was used when the condition for using the Chi-square test was not verified. In the case of the association study between cardiac risk presented dichotomously (yes or no) with the variables of interest, the OR (Odds Ratio) and respective confidence interval were obtained in each cross. Confidence intervals were also obtained for the mean of each numerical variable. The confidence level used in the decision of the statistical tests was 5.0%, with a significant association being considered if $p < 0.05$ and the intervals were obtained with 95% confidence. The only variables with missing information were those recorded relating to the values of biochemical tests, SBP and DBP not mentioned by the interviewees. Statistical calculations were performed with the exact number of values reported. (DOUGLAS, 1991) (CONOVER, 1999).

III. Results

The age of the patients studied ranged from 18 to 53 years, mean 23.12 years, standard deviation of 5.19 years, confidence interval for mean age varied between 22,52 and 23, 72 years, and median of 22.00 years. Table 1 shows that two-thirds (66.7%) of the sample were between 20 and 29 years old, the majority (65.6%) were in the basic level of the course of medicine, and the remaining 34.4% the clinical level; the majority (63.9%) were female; the majority (75.3%) were those self-declared as white.

Table 1: Self-declared datas about of age, level of medical course, biological sex and color by medical students

Variable	n (%)
Total	288 (100,0)
Age range	
18 to 19	65 (22,6)
20 to 29	192 (66,7)
30 or more	31 (10,8)
Cycle	
Basic	189 (65,6)
Clinical	99 (34,4)
Sex	
Masculine	104 (36,1)
Feminine	184 (63,9)
Self-declared color	
White	217 (75,3)
Brown	54 (18,8)
Black	17 (5,9)

Source: the author

As shown in table 2, the majority (62.5%) of the group reported practicing physical activity at least 150 minutes per week; the majority (59.4%) considered themselves stressed person; execept for three patients with CAD and one with stroke, the remaining 98.6% denied a personal history of CAD or stroke; a little more than half (51.0%) had a family history of CAD or stroke and 8.3% did not know whether or not they had a family history; the percentage that had a smoking habit was 14.9% and that of alcoholism was 13.2%. It was possible to verify that the majority (67.7%) stated that they had a balanced diet; the percentage who stated that they had total cholesterol greater than 190 mg/dL was 6.3% and 42.0% did not know how to provide information; the prevalence of HDL lower than 40 mg/dL was 5.2% and the majority (54.5%) did not know how to inform the HDL value; the percentage frequency with blood pressure greater than 120 x 80 mmHg was 4.5%; it was recorded that only one patient stated that he had diabetes mellitus, of which 8.3% did not know.

Table 2: Self-declared clinical data by medical students

Variable	n (%)
Total	288 (100,0)
Practice physical activity at least 150 minutes/week	
Yes	180 (62,5)
No	108 (37,5)
Self-declared as a stressed person	
Yes	171 (59,4)
No	117 (40,6)
Personal history of cardiovascular disease	
CAD	3 (1,0)
STROKE	1 (0,3)
Deny	284 (98,6)
Family history of cardiovascular disease	
Yes	147 (51,0)
No	117 (40,6)
Smoking	24 (8,3)
Yes	43 (14,9)
No	245 (85,1)
Alcoholism	
Yes	38 (13,2)
No	250 (86,8)
Medical evaluation	
Yes	36 (12,5)
No	252 (87,5)
Balanced diet	
Yes	195 (67,7)
No	93 (32,3)
Reports total cholesterol more than 190 mg/dL	
Yes	18 (6,3)
No	149 (51,7)

Do not know	121 (42,0)
Report HDL less than 40 mg/dL	
Yes	15 (5,2)
No	116 (40,3)
Do not know	157 (54,5)
Reports LDL greater than 130 mg/dL	
Yes	5 (1,7)
No	122 (42,4)
Do not know	161 (55,9)
Reports blood pressure greater than 120/80	
Yes	13 (4,5)
No	261 (90,6)
Do not know	14 (4,9)
Diabetes Mellitus	
Yes	1 (0,3)
No	263 (91,3)
Do not know	24 (8,3)

Source: the author

Data of weight, height and body mass index (BMI), total cholesterol, HDL cholesterol and LDL cholesterol, systolic and diastolic blood pressure (SBP) (DBP) and glucose were mentioned in table 3. The variability of the standard deviation was reduced in analyzed variables of table 3, since the value was less than one-third of the corresponding means, except for HDL cholesterol.

Table 3: Self-reported data on anthropometric and laboratory measurements by medical students.

Variable	Average	SD	CI 95% to mean	Minimum	P25	Median	P75	Maximum
Weight (n = 288) (kilogram)	69,74	15,29	67.97 to 71.51	43,00	59,25	67,00	78,00	140,00
Height (n = 288)	**1.69**	0,09	1,68 to 1.70	1,48	1,62	1,69	1,75	1,97
BMI (n = 288)	24,37	4,24	23.88 to 24.86	16,42	21,36	23,62	26,30	43,21
Total cholesterol (n = 43) mg/dL	177,72	42,76	164.56 to 190.88	90	150,00	180,00	205,00	290
HDL (n = 37) mg/dL	57,78	19,40	51.32 to 64.25	29	46,00	51,00	64,50	120
LDL col (n=26) mg/dL	109,28	33,78	95.63 to 122.92	20	89,00	114,00	125,50	170
SBP (n = 125) mmHG	113,81	10,55	111,94 to 115.68	90	110,00	110,00	120,00	150
DBP (n = 125) mmHg	75,95	8,58	74.43 to 77.47	50	70,00	80,00	80,00	100
Glucose (n = 75) mg/dL	84,52	17,62	80.47 to 88.57	2	80,00	86,00	90,00	150

Source: the author.

The results of crossing each of the questions: practice of physical activity, consider yourself stressed, family history, smoking, alcoholism, balanced diet, high total cholesterol, low HDL cholesterol, high LDL cholesterol and high blood pressure with gender, age, and level of the course of medicine groups are described in tables 4 to 7.

Table 4 demonstrated significant associations ($p < 0.05$) were verified for the level of significance considered (5%) between sex and self-reported stress and family history. percentage of self-report stress was higher among female than male respondents (67.4% x 45.2%); the percentage who responded positively to family history was higher in the group of male students than female students (56.0% x 42.3%) and the opposite happened with those who responded negatively to the question, which was higher among males (50 .0% x 35.3%).

Information on the level of high blood pressure demonstrated an association with sex, with a higher prevalence in males than females (9.6% x 1.6%) and, on the contrary, it occurred with those who did not have the problem, with a higher value in females (93.5% x 85.6%).

Table 4: Assessment of variables: physical activity, stress, family history, smoking, alcoholism, cholesterol data, according to biological sex

variable	biological sex			P value
	male n (%)	female n (%)	Total group n (%)	
Total	104 (100,0)	184 (100,0)	288 (100,0)	
Practice physical activity				p (1) = 1,000
Yes	65 (62,5)	115 (62,5)	180 (62,5)	
No	39 (37,5)	69 (37,5)	108 (37,5)	
Self-declared stress				p (1) < 0,001*
Yes	47 (45,2)	124 (67,4)	171 (59,4)	
No	57 (54,8)	60 (32,6)	117 (40,6)	
Family history CV disease				p (1) = 0,049*
Yes	44 (42,3)	103 (56,0)	147 (51,0)	
No	52 (50,0)	65 (35,3)	117 (40,6)	
Do not know	8 (7,7)	16 (8,7)	24 (8,3)	
Smoking				p (1) = 0,060
Yes	21 (20,2)	22 (12,0)	43 (14,9)	
No	83 (79,8)	162 (88,0)	245 (85,1)	
Alcoholism				p (1) = 0,121
Yes	18 (17,3)	20 (10,9)	38 (13,2)	
No	86 (82,7)	164 (89,1)	250 (86,8)	
Balanced diet				p (1) = 0,678
Yes	72 (69,2)	123 (66,8)	195 (67,7)	
No	32 (30,8)	61 (33,2)	93 (32,3)	
High cholesterol				p (1) = 0,100
Yes	3 (2,9)	15 (8,2)	18 (6,3)	
No	51 (49,0)	98 (53,3)	149 (51,7)	
Do not know	50 (48,1)	71 (38,6)	121 (42,0)	
low HDL				p (1) = 0,054
Yes	3 (2,9)	12 (6,5)	15 (5,2)	
No	35 (33,7)	81 (44,0)	116 (40,3)	
Do not know	66 (63,5)	91 (49,5)	157 (54,5)	
Elevated LDL				p (2) = 0,077
Yes	1 (1,0)	4 (2,2)	5 (1,7)	
No	36 (34,6)	86 (46,7)	122 (42,4)	
Do not know	67 (64,4)	94 (51,1)	161 (55,9)	
High blood pressure				p (1) = 0,007*
Yes	10 (9,6)	3 (1,6)	13 (4,5)	
No	89 (85,6)	172 (93,5)	261 (90,6)	
Do not know	5 (4,8)	9 (4,9)	14 (4,9)	

(*) Significant association at 5%. (1) Pearson's Chi-square test. (2) Fisher's Exact Test.

Source: the author

Table 5 shows a significant association between age group with practice of physical activity, family history, smoking, alcoholism, showing significant differences: the percentage who said they practiced physical activity was lower (41.9%) among students aged 30 or over, it was higher among those aged 18 to 19 (70.8%); the prevalence of reported family history was lower (43.1%) among students aged 18 to 19 and ranged from 53.1% to 54.8% in the other two age groups; the percentage of smoking was highest (21.4%) in the 20 to 20 age group and ranged from 1.5% to 3.2% in the other two age groups; the percentage of those with a drinking habit was higher (16.7%) in the 20 to 29 age group. Balanced eating was lowest among students aged 30 or over (48.4%) and ranged from 69.3% to 72.3% in the other two age groups.

Table 5: Assessment of variables: physical health, personal and family history, smoking, alcoholism, according to age group

	age group				
variable	18 to 19	20 to 29	30 ou more	Total group	P value
	n (%)	n (%)	n (%)	n (%)	
Total	65 (100,0)	192 (100,0)	31 (100,0)	288 (100,0)	
Practice physical activity					p (1) =0,023*
Yes	46 (70,8)	121 (63,0)	13 (41,9)	180 (62,5)	
No	19 (29,2)	71 (37,0)	18 (58,1)	108 (37,5)	
Self-declared stress					p (1) =0,587
Yes	35 (53,8)	117 (60,9)	19 (61,3)	171 (59,4)	
No	30 (46,2)	75 (39,1)	12 (38,7)	117 (40,6)	
Family history					p (1) =0,020*
Yes	28 (43,1)	102 (53,1)	17 (54,8)	147 (51,0)	
No	25 (38,5)	79 (41,1)	13 (41,9)	117 (40,6)	
Do not know	12 (18,5)	11 (5,7)	1 (3,2)	24 (8,3)	
Smoking					p (1) <0,001*
Yes	1 (1,5)	41 (21,4)	1 (3,2)	43 (14,9)	
No	64 (98,5)	151 (78,6)	30 (96,8)	245 (85,1)	
Alcoholism					p (1) =0,048*
Yes	4 (6,2)	32 (16,7)	2 (6,5)	38 (13,2)	
No	61 (93,8)	160 (83,3)	29 (93,5)	250 (86,8)	
Balanced diet					p (1) =0,047*
Yes	47 (72,3)	133 (69,3)	15 (48,4)	195 (67,7)	
No	18 (27,7)	59 (30,7)	16 (51,6)	93 (32,3)	
High cholesterol					p (2) =0,317
Yes	3 (4,6)	13 (6,8)	2 (6,5)	18 (6,3)	
No	31 (47,7)	97 (50,5)	21 (67,7)	149 (51,7)	
Do not know	31 (47,7)	82 (42,7)	8 (25,8)	121 (42,0)	
low HDL					p (2) =0,116
Yes	5 (7,7)	9 (4,7)	1 (3,2)	15 (5,2)	
No	25 (38,5)	72 (37,5)	19 (61,3)	116 (40,3)	
Do not know	35 (53,8)	111 (57,8)	11 (35,5)	157 (54,5)	
Elevated LDL					p (2) =0,433
Yes	0 (0,0)	4 (2,1)	1 (3,2)	5 (1,7)	
No	29 (44,6)	77 (40,1)	16 (51,6)	122 (42,4)	
Do not know	36 (55,4)	111 (57,8)	14 (45,2)	161 (55,9)	
High blood pressure					p (2) =0,759
Yes	3 (4,6)	8 (4,2)	2 (6,5)	13 (4,5)	
No	59 (90,8)	173 (90,1)	29 (93,5)	261 (90,6)	
Do not know	3 (4,6)	11 (5,7)	0 (0,0)	14 (4,9)	

(*) Significant association at 5%. (1) Pearson's Chi-square test. (2) Fisher's Exact Test.

Source: the author

Table 6 showed a significant association between the level of medical school with smoking and alcohol consumption, percentages were higher among students in the clinical level, when compared with basic level (24.2% x 10.1% for smoking and 19.2% x 10.1% for alcohol consumption). No significant associations ($p > 0.05$) were recorded between the cycle and self-reported clinical variables.

Table 6: Assessment of data variables according to the stage of the medical course.

Variable	basic level n (%)	clinical level n (%)	Total group n (%)	P value
Total	189 (100,0)	99 (100,0)	288 (100,0)	
Practice physical activity				p (1) = 0,321
Yes	122 (64,6)	58 (58,6)	180 (62,5)	
No	67 (35,4)	41 (41,4)	108 (37,5)	
Self-declaration of stress				p (1) = 0,116
Yes	106 (56,1)	65 (65,7)	171 (59,4)	
No	83 (43,9)	34 (34,3)	117 (40,6)	
Family history				p (1) = 0,122
Yes	97 (51,3)	50 (50,5)	147 (51,0)	
No	72 (38,1)	45 (45,5)	117 (40,6)	
Do not know	20 (10,6)	4 (4,0)	24 (8,3)	
Smoking				p (1) = 0,001*
Yes	19 (10,1)	24 (24,2)	43 (14,9)	
No	170 (89,9)	75 (75,8)	245 (85,1)	
Alcoholism				p (1) = 0,030*
Yes	19 (10,1)	19 (19,2)	38 (13,2)	
No	170 (89,9)	80 (80,8)	250 (86,8)	
Balanced diet				p (1) = 0,601
Yes	126 (66,7)	69 (69,7)	195 (67,7)	
No	63 (33,3)	30 (30,3)	93 (32,3)	
High cholesterol				p (1) = 0,826
Yes	11 (5,8)	7 (7,1)	18 (6,3)	
No	100 (52,9)	49 (49,5)	149 (51,7)	
Do not know	78 (41,3)	43 (43,4)	121 (42,0)	
low HDL				p (1) = 0,808
Yes	11 (5,8)	4 (4,0)	15 (5,2)	
No	76 (40,2)	40 (40,4)	116 (40,3)	
Do not know	102 (54,0)	55 (55,6)	157 (54,5)	
Elevated LDL				p (2) = 1,000
Yes	3 (1,6)	2 (2,0)	5 (1,7)	
No	80 (42,3)	42 (42,4)	122 (42,4)	
Do not know	106 (56,1)	55 (55,6)	161 (55,9)	
High blood pressure				p (2) = 0,340
Yes	11 (5,8)	2 (2,0)	13 (4,5)	
No	168 (88,9)	93 (93,9)	261 (90,6)	
Do not know	10 (5,3)	4 (4,0)	14 (4,9)	

(*) Significant association at 5%. (1) Pearson's Chi-square test.
Source: the author.

Table 7 contains the results of cross-checks between the cardiovascular risk factors of cholesterol levels and blood pressure, reported by the students, expressed with at least one of the four factors (High

cholesterol, low HDL, high LDL, and high blood pressure, being considered "no" if all four factors are negative and the category "does not know" if in any of the four the answer was "does not know") with each of the characterization variables: sex, age group and cycle in addition to the practical variables of physical activity, is considered stressed and has a balanced diet. In Table 7, no significant associations ($p > 0.05$) were recorded between cardiac risk and the variables analyzed.

Table 7: Assess Analysis of the characteristics studied according to the level of the medical course

	level of medical course			
Variable	basic level	clinical level	Total group	P value
	n (%)	n (%)	n (%)	
Total	189 (100,0)	99 (100,0)	288 (100,0)	
Practice physical activity				p (1) = 0,321
Yes	122 (64,6)	58 (58,6)	180 (62,5)	
No	67 (35,4)	41 (41,4)	108 (37,5)	
Self-declaration of stress				p (1) = 0,116
Yes	106 (56,1)	65 (65,7)	171 (59,4)	
No	83 (43,9)	34 (34,3)	117 (40,6)	
Family history				p (1) = 0,122
Yes	97 (51,3)	50 (50,5)	147 (51,0)	
No	72 (38,1)	45 (45,5)	117 (40,6)	
Do not know	20 (10,6)	4 (4,0)	24 (8,3)	
Smoking				p (1) = 0,001*
Yes	19 (10,1)	24 (24,2)	43 (14,9)	
No	170 (89,9)	75 (75,8)	245 (85,1)	
Alcoholism				p (1) = 0,030*
Yes	19 (10,1)	19 (19,2)	38 (13,2)	
No	170 (89,9)	80 (80,8)	250 (86,8)	
Balanced diet				p (1) = 0,601
Yes	126 (66,7)	69 (69,7)	195 (67,7)	
No	63 (33,3)	30 (30,3)	93 (32,3)	
High cholesterol				p (1) = 0,826
Yes	11 (5,8)	7 (7,1)	18 (6,3)	
No	100 (52,9)	49 (49,5)	149 (51,7)	
Do not know	78 (41,3)	43 (43,4)	121 (42,0)	
Low HDL				p (1) = 0,808
Yes	11 (5,8)	4 (4,0)	15 (5,2)	
No	76 (40,2)	40 (40,4)	116 (40,3)	
Do not know	102 (54,0)	55 (55,6)	157 (54,5)	
Elevated LDL				p (2) = 1,000
Yes	3 (1,6)	2 (2,0)	5 (1,7)	
No	80 (42,3)	42 (42,4)	122 (42,4)	
Do not know	106 (56,1)	55 (55,6)	161 (55,9)	
High blood pressure				p (2) = 0,340
Yes	11 (5,8)	2 (2,0)	13 (4,5)	
No	168 (88,9)	93 (93,9)	261 (90,6)	
Do not know	10 (5,3)	4 (4,0)	14 (4,9)	

(*) Yes if it was registered by one of the yes factors, no if all four factors had a negative answer and don't know if at least one of the factors didn't know and the other factors had a no answer. (1) Pearson's Chi-square test. (2) Fisher's Exact Test
Source: the author

Table 8: Assessment four risk factors according to the sample characteristics

Four cardiovascular risk factors (high cholesterol, low HDL, high LDL, high blood pressure)					
variable	yes *	no *	Total	OR (%, a 0,95)	P value
	n (%)	n (%)	n (%)		
Total group	41 (31,8)	88 (68,2)	129 (100,0)		
Age range					p (1) = 0,855
18 to 19	9 (32,1)	19 (67,9)	28 (100,0)	1,33 (0,36 a 4,83)	
20 to 29	27 32,9)	55 (67,1)	82 (100,0)	1,37 (0,45 a 4,21)	
30 or more	5 (26,3)	14 (73,7)	19 (100,0)	1,00	
Cycle					p (1) = 0,343
Basic	30 34,5)	57 (65,5)	87 (100,0)	1,48 (0,66 a 3,36)	
Clinical	11 26,2)	31 (73,8)	42 (100,0)	1,00	
Sex					p (1) = 0,284
Masculine	15 (38,5)	24 (61,5)	39 (100,0)	1,54 (0,69 a 3,39)	
Feminine	26 (28,9)	64 (71,1)	90 (100,0)	1,00	
Practice physical activity					p (1) = 0,463
Yes	27 (34,2)	52 (65,8)	79 (100,0)	1,34 (0,62 a 2,89)	
No	14 (28,0)	36 (72,0)	50 (100,0)	1,00	
Self-declaration of stress					p (1) = 0,950
Yes	24 (32,0)	51 (68,0)	75 (100,0)	1,02 (0,48 a 2,17)	
No	17 (31,5)	37 (68,5)	54 (100,0)	1,00	
Family history					p (2) = 0,328
Yes	25 (37,9)	41 (62,1)	66 (100,0)	1,52 (0,27 a 8,46)	
No	14 (25,0)	42 (75,0)	56 (100,0)	0,83 (0,14 a 4,78)	
Do not know	2 (28,6)	5 (71,4)	7 (100,0)	1,00	
Balanced diet					p (1) = 0,107
Yes	24 (27,3)	64 (72,7)	88 (100,0)	1,00	
No	17 (41,5)	24 (58,5)	41 (100,0)	1,89 (0,87 a 4,11)	

(*) "Yes" if at least one of the factors was recorded and "no" if all four factors had a negative response. (1) Pearson's Chi-square test. (2) Fisher's Exact Test

Source: the author

In Table 8 we analyzed 129 responses to the questionnaire due to the exclusion of the "didn't know" answers. No significant associations ($p > 0.05$) were recorded between the data reported on knowledge of cholesterol and blood pressure levels, blood lipids, and the variables analyzed.

IV. Discussion

Understanding the main risk factors for the development of atherosclerotic disease plays a vital role in disease prevention, and control. It is essential training of health professionals, especially medical students, contributing to early knowledge of atherosclerotic risk factors since the first years of medical school. This is particularly relevant given that cardiovascular diseases often begin in childhood and adolescence, making it crucial that future doctors are well-informed from the beginning of their academic journey. Furthermore, this study seeks to contribute with awareness about the importance of primary prevention of cardiovascular diseases for of medical students, in the context of the risk factors involved. By assessing the level of knowledge and monitoring its evolution, we will be able to identify areas that require greater emphasis in the educational curriculum and develop strategies to strengthen the training of future health professionals. The knowledge obtained from this research will benefit medical students themselves, and will contribute with promoting population's health, as well-informed doctors are essential for the prevention and adequate treatment of cardiovascular diseases. The sample included aged patients between 18 and 53 years, with an average of 23.12 years, majority of patients were between 20 and 29 years old, representing 66.7% of the sample. 65.6% of respondents were in the basic level of medical

school. Females predominated, representing 63.9% of the sample. These sociodemographic characteristics of the sample are important to contextualize the research results and understand how different groups may present variations in their knowledge of atherosclerotic risk factors. The analysis of these variables can provide valuable insights for discussing the results and their clinical and educational implications. These results provide a comprehensive view of the sample's characteristics regarding physical health, risk behaviors, and personal and family histories. These variables are essential for understanding atherosclerotic risk factors and their implications for the prevention and early diagnosis of cardiovascular diseases, aspects that will be discussed in detail.

Regarding the practice of physical activity, there was a difference between age groups, which was more significant in younger groups. Around 62.5% of all participants reported practicing at least 150 minutes of physical activity per week, while 37.5% reported not performing this minimum amount of exercise. This data is relevant as regular physical activity is associated with a reduced risk of cardiovascular diseases. (PRÉCOMA et al. 2021) (MOSCA et al. 2011) (BRYAN et al, 2018) (BARROSO et al, 2021)

The perception of stress was also investigated, with significant difference between the sexes. A greater number of women, 67.4%, reported considering themselves stressed, compared to 45.2% of men. Difference between female and male sexes was statistically significant ($p < 0.001$). In the total group, 59.4% of patients self-declared emotional stress, while 40.6% did not. Stress is a factor that can influence the development of cardiovascular diseases, and self-perception is important aspect to be considered. Regarding the perception of stress, there was also no significant difference between the groups according to the level in the medical faculty. Both groups had similar proportions of students who considered themselves stressed regarding knowledge of a family history of cardiovascular diseases. However, in smoking, a significant difference was observed between the groups with a higher prevalence in the basic level group (24.2% vs. 10.1%, $p = 0.001$), as alcoholism (19.2% vs. 10.1%, $p = 0.030$). (STEPTOE et al. 2012) (DAR et al. 2019)

Smoking and alcohol consumption were more prevalent among aged group between 20 and 30 years and those who were studying the clinical level of medical school. Regarding smoking, 14.9% of patients reported being smokers, while the vast majority, 85.1%, stated they did not smoke. Smoking is a main risk factors for atherosclerosis and cardiovascular diseases. Regarding alcoholism, 13.2% of participants reported consuming alcohol in a way that could be considered alcoholism, while 86.8% denied this behavior. Excessive alcohol consumption is also associated with cardiovascular health risks. (ROY et al. 2017) (PRÉCOMA et al. 2021) (GALLUCCI et al. 2020) (HOEK et al. 2022)

The average of weight was 69.74 kg, with a wide range from 43.00 kg to 140.00 kg. Body Mass Index (BMI) demonstrated average of 24.37 (16.42 to 43.21). Most patients had a BMI between 21.36 and 26.30. (SIMÃO et al, 2013) (VISSEREN et al, 2023) (PRÉCOMA et al, 2021) (BARROSO et al, 2021) (BRYAN et al, 2018)

The majority of the group reported adequate cholesterol levels, as well as blood pressure levels, with an average systolic pressure (SBP) of 113.81 mmHg and an average diastolic pressure (DBP) of 75.95 mmHg; glycemia, average was 84.52 mg/dL. Regarding family history, there were more reports among female and older groups. The percentage of 51% of students interviewed reported a family history of cardiovascular diseases. A family history of cardiovascular disease may increase an individual's risk of these conditions. The high prevalence of female knowledge regarding family history of cardiovascular diseases may possibly be related to the social values of caring. Added to this, it can be attributed to the role of the gynecologist in women's health care, during prevention consultations. (PREISLER et al, 2018) (FALUDI et al, 2017) (LEON et al, 2025) (NICOLAUS et al, 2023) (UNGER et al, 2020) (PRÉCOMA et al, 2021) (BARROSO et al, 2021) (BRYAN et al, 2018)

In relation to balanced nutrition, a significant difference was observed between age groups. The youngest group (18 to 19 year old) showed a higher prevalence of students reporting a balanced diet (72.3%), followed by the group between 20 to 29 (69.3%), and the older group had the lowest proportion (48.4 %). The difference between age groups was statistically significant ($p = 0.047$). These results indicate that the age group has a significant influence only on the variable related to a balanced diet. This information is relevant to understanding how eating habits can vary according to age and will be discussed in the Discussion section to evaluate its clinical and educational implications. (NICOLAUS et al, 2023) (BARROSO et al, 2021) (BRYAN et al, 2018)

It was observed that, overall, 14.2% of participants presented at least one of the four cardiac risk factors, while 30.6% did not present any of the factors, and 55.2% did not know or did not respond. However, there was no difference in relation to the age group. The distribution of risk factors was similar across all age groups (18 to 19 years, 20 to 29 years and 30 or more years).

When analyzed according to the level of the medical school, basic, and clinical level, no statistically significant differences were observed of risk factors. Both groups had similar proportions of participants with at least one of these factors. Regarding sex, there was no statistically significant difference in the presence of

risk factors between men and women. Both groups had similar proportions of participants with at least one of the factors.

The presence of at least one of the four cardiac risk factors (high cholesterol, low HDL, high LDL, and high blood pressure) based on several characteristics of the sample, including age group, medical course level, gender, practice of physical activity, perception of stress, family history and balanced diet. The table also includes the Odds Ratio (OR) and p-value for each association. It was observed that, overall, 31.8% of participants presented at least one of the four cardiac risk factors, while 68.2% did not present any of the factors.

When analyzing risk factors according to age group, no significant differences were found between the groups. Odds Ratio of the youngest group (18 and 19 years old), the intermediate group (20 to 29 years old), and the oldest group were not statistically significant, suggesting no association with aged group and risk factors.

When analyzed according to the phase of the medical course, basic and clinical level, the Odds Ratio was also not statistically significant, indicating that the level in medical school was not associated with risk factors. Regarding gender, the Odds Ratio for male group compared to female group was 1.54, but this difference was not statistically significant.

The practice of physical activity also did not show a significant association with the presence of cardiac risk factors. The Odds Ratio between participants who practiced physical activity and those who did not was 1.34, but this difference was not statistically significant. Likewise, the perception of stress was not associated with the presence of cardiac risk factors, with an Odds Ratio of 1.02 between participants who considered themselves stressed and those who did not.

When evaluating family history, the Odds Ratio for those with a family history of cardiovascular disease compared to those without a family history was 1.52, but this difference was not statistically significant. Finally, in relation to a balanced diet, the Odds Ratio for those who did not follow a balanced diet compared to those who did was 1.89, but this difference was also not statistically significant. This analysis did not identify significant associations between the presence of at least one of the four cardiac risk factors and the characteristics of the sample examined, including age group, medical course cycle, gender, practice of physical activity, perception of stress, family history and balanced diet. This suggests that these risk factors may affect medical students independently of these characteristics.

Future research can investigate the gap between the findings found in this research and correlate with parallel situations, such as different populations, but with the same profile. University extension activities in a community or hospital environment that explore the importance of primary cardiovascular prevention, emphasizing self-knowledge about risk factors, as well as active methodologies and workshops on laboratory dosages and blood pressure measurements could contribute to greater assimilation about the theme. The study demonstrated that students in the clinical cycle and those aged between 20 and 29 years reported a higher prevalence of smoking and alcohol consumption, and there may be preventive measures to promote co-incentives in this group.

As limitations of this study, we could mention the possible lack of reliability of the values provided by the students, referring to blood tests and blood pressure measurements, since they were reported and not collected for laboratory analysis. However, the objective was to evaluate students' knowledge of their own risk factors and their values, therefore, the relevance lies in this aspect.

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V. Conclusion

This study demonstrated that smoking and alcohol consumption were more prevalent among students with the highest age group studied, over 30 years old, and were also more frequent in the clinical cycle phase of medical school. There was a higher prevalence of knowledge regarding the family history of CAD and CVA among female students and those over 30 years of age. Reports of self-declared emotional stress and higher blood pressure levels were more frequent among female medical students.

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