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CHAPTER 27

Analysis of the lipid profile and lifestyle of university students in the correlation with dyslipidemia and cardiovascular diseases

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ABSTRACT

Lipids are essential molecules, responsible for regulatory and homeostasis functions. However, lifestyle can cause an imbalance in your metabolism, contributing to dyslipidemia and cardiovascular disease (CVD). Thus, the objective of this study was to analyze the lipid profile and lifestyle of university students as possible risk factors for dyslipidemia and CVD. A comparative analysis, of the prospective, qualitative and quantitative cross-sectional type, was carried out in 264 university students from different courses and academic semesters – Belém-Pará, having been followed from 03/2020 to 11/2022. Among the 264 participants, 37% were between the ages of 18 and 22 and 71.9% were women. 90.1% reported a busier routine after starting university, 79.5% changed eating habits, 53.7% started eating more at fast-foods and cafeterias, 38.6% reduced or stopped physical activities, in addition to 50% who were already sedentary before university, and 66.6% reported frequent alcoholism. Finally, 228 (86.3%) acknowledged the worsening of their quality of life after university. There were significant unfavorable differences ($p < 0.05$) in triglycerides, total cholesterol and fractions in the fourth and eighth semester students, mainly compared to freshmen, and veterans in the ninth and tenth semesters, suggesting a correlation between the university routine and a higher risk of dyslipidemia and CVD.

Keywords: University students, Lifestyle, Dyslipidemias, Cardiovascular diseases.

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INTRODUCTION

Lipids constitute a fundamental class of molecules, providing energy and responsible for regulatory functions and body homeostasis. Among the most important are cholesterol and triacylglycerols, called triglycerides, which make up the main structure in the formation of cell membranes and as precursors of steroid hormones, bile acids and vitamin D. However, imbalance in lipid metabolism can cause some of the main clinical problems, such as atherosclerosis and obesity1,2.

Based on density, plasma lipoproteins are separated into: chylomicrons, very low density lipoproteins (VLDL), low density lipoproteins *(LDL), and* high *density lipoproteins* (HDL)). The ratio of triglycerides, total cholesterol and its fractions is an important indicator for the detection of several cardiovascular diseases (CVD)[2].

An unbalanced diet, rich in trans, saturated and industrialized fats, as well as a sedentary lifestyle, overweight, alcohol intake, smoking and genetic predisposition, are the main factors for the imbalance of serum levels of lipoproteins, which are directly related to dyslipidemias3.

CVD is among the leading causes of death worldwide. In Brazil, it represents about 30% of deaths, kills twice as many as all types of cancer, 2.5 times more than all accidents and deaths due to violence, and six times more than infections. In 2013, there were approximately 1,138,670 deaths in Brazil, of which 339,672 (29.8%) were due to CVD4,5. It is noteworthy that, previously, these diseases were observed only in adults and the elderly, but currently there is a high incidence in the juvenile phase. A study conducted with 1937 children and adolescents of both sexes, aged between 2 and 19 years, at the Hospital de Clínicas of the State University of Campinas (HC-UNICAMP), showed altered LDL cholesterol and triglyceride parameters in 44% and 56% of the children and in 44% and 50% of the adolescents, respectively6.

The high levels of triglycerides and cholesterol among young people reflect their lifestyle, especially among university students, who represent a public whose lifestyle and situations typical of the academic environment can result in the skipping of meals, high consumption of fast and nutritionally inadequate snacks, among other risk factors7,8.

Thus, we aimed to analyze the lipid profile and lifestyle of university students in the city of Belém-Pará, from different courses and academic semesters, as possible risk factors for dyslipidemia and CVD, since when entering the university, many students are subject to changes in lifestyle, especially regarding the development of bad eating habits. This can lead to an increase in serum cholesterol levels, leading to the development of dyslipidemia and several other diseases concomitantly related to eating habits and lifestyle.

METHODOLOGY

This is a prospective and comparative cross-sectional analysis, of qualitative and quantitative character, carried out from March 2020 to November 2022, in 264 university students from different courses and academic semesters, random volunteers, adults and of both sexes, in the city of Belém-Pará, being carried out periodically each semester, through biochemical analysis of triglyceride lipid parameters, total cholesterol and HDL, LDL and VLDL fractions, and application of the socio-epidemiological questionnaire of the volunteer research participants at the time of entry into the research, to identify the possible risk factors associated with the lifestyle of the research participants, acquired and presented during their academic life.

The data were compiled in Microsoft Excel spreadsheets, 2010 (Microsoft Office®), for correlation and statistical parameter analysis using the BioEstat 5.0 software (Manoel Ayres, 2007).

The study was benefited by the Scientific Initiation Program (PIC) of the University of the Amazon-UNAMA (N. 3105-1, 2022), and approved by the Research Ethics Committee (CEP) with human beings of the University of the Amazon - UNAMA, on 10/08/2018 (CAAE 94988318.4.0000.5173).

RESULTS

SOCIO-EPIDEMIOLOGICAL ANALYSES

An initial analysis of the profile of the university students participating in the research, presented in Table 1, showed that the majority were female, representing 190 (71.9%) of the participants, compared to the male sex, with 74 (28.03%) of the volunteers, with a higher prevalence in the age group between 18 and 22 years of age (37%), and a greater weight range between 60 and 69 kilograms. in 68 (25%) participants. 172 (65.15%) participants had no occupation other than academic activities at the university, followed by those with receptionist occupations, 34 (12.88%) volunteers, and 10 (3.79%) cashiers.

Regarding family income, 74 (28.03%) university students reported having a family income between 1 and 2 minimum wages, while only 20 (7.58%) participants reported an income equal to or greater than 5 minimum wages.

Table 1: Profile of university students.

PROFILE		N = 264	100%
Sex	Male	74	28,03%
	Female	190	71,97%
Age group	18 – 22	98	37,12%
	23 – 27	58	21,97%
	28 – 32	40	15,15%
	33 – 37	26	9,85%
	38 – 42	34	12,88%
	43 – 47	6	2,27%
	48 – 52	2	0,76%
Weight	40 – 49	24	9,09%
	50 – 59	54	20,45%
	60 – 69	68	25,76%
	70 – 79	58	21,97%
	80 – 89	36	13,64%
	90 – 99	10	3,79%
	100 – 109	8	3,03%
	110 – 119	4	1,52%
	120 – 125	2	0,76%
Occupation	Self-employed	8	3,04%
	Civil servant	6	2,28%
	Balcony Operator	2	0,76%
	Sales Consultant	2	0,76%
	Entrepreneur	4	1,52%
	Beautician	4	1,52%
	Manager	4	1,52%
	Cashier	10	3,79%
	Teacher	4	1,52%
	Receptionist	34	12,88%
	Medicines Representative	2	0,76%
	Loja Supervisor	2	0,76%
	Tec. in Occupational Safety	2	0,76%
	Nursing Technician	4	1,52%
	Pharmacy technician	2	0,76%
	University	172	65,15%
	Vigilant	4	1,52%
Household income	Less than 1 minimum wage	34	12,88%
	1 minimum wage	48	18,18%
	Between 1 and 2 minimum wages	74	28,03%
	Between 2 and 3 minimum wage	58	21,97%
	Between 3 and 4 minimum wages	30	11,36%
	Equal to or greater than 5 minimum wages	20	7,58%

Source: own authorship.

Risk aspects presented by possible signs and symptoms, family history, and clinical collaboration in health care (Table 2) revealed as the most prevalent results that 120 (45%) of the

participants had had a medical appointment less than 6 months ago, 86 (32.58%) had a family history of diabetes and hypertension, while 66 (25.0%) had only hypertension. When asked if they had any of the symptoms, such as easy tiredness, shortness of breath (standing still or with slight exertion), headaches, dizziness/blurred vision, tingling/cramps, chest pain or tightness, weakness/malaise, and palpitations/tachycardia, 176 (20.51%) reported having at least four of these symptoms, while 144 (16.78%) answered feeling all of the above symptoms. periodically.

Table 2: Representation of risk aspects and clinical care of university students.

PROFILE	**N = 264**	**100%**
When was your last doctor's appointment?		
Less than 6 months ago	120	45,45%
Between 6 months ago 1 year ago	58	21,97%
Between 1 to 2 years ago	40	15,15%
It's been more than 2 years	46	17,42%
Do you have a family history (parents, uncles, grandparents, siblings, etc.) of any of the diseases below?		
Diabetes	28	10,61%
Diabetes, Hypertension	86	32,58%
Diabetes, Hypertension, Obesity	30	11,36%
Hypertension	66	25,00%
Hypertension, Obesity	6	2,27%
Obesity	4	1,52%
I do not have any family history of these diseases	44	16,67%
Amounts of symptoms reported		
1	66	7,69%
2	112	13,05%
3	102	11,89%
4	176	20,51%
5	130	15,15%
6	72	8,39%
7	56	6,53%
8	144	16,78%

Source: own authorship.

Evaluation of the habits and lifestyle of the research participants revealed that most of them drink alcohol, even if rarely (30.30%), even occasionally (32.58%) or constantly (3.79%), against 88 (33.33%) of the 264 participants who reported not practicing alcohol habits. Regarding smoking, the majority, 246 (93.18%) of the participants, reported not being smokers. 132 (50%) university students declared themselves sedentary when asked about the practice of physical activities and 140 (53.03%) slept an average of 4 to 6 hours per night. These data can be seen in full in Table 3.

Table 3: Representation of habits and lifestyle among university students.

PROFILE	N = 264	100%
Do you drink alcohol?		
No (never or more than 10 years ago)	88	33,33%
Rarely (1 to 2 times a month)	80	30,30%
Eventually (1 time a week)	86	32,58%
Constantly (more than once a week)	10	3,79%
Is it steaming?		
No	246	93,18%
Rarely (less than one wallet per week)	14	5,30%
Moderately (between one to two wallets per week)	2	0,76%
Daily (average of one wallet per day)	2	0,76%
Do you exercise?		
No	132	50,00%
Yes, 1 time a week	38	14,39%
Yes, 2 times a week	20	7,58%
Yes, 3 times a week	34	12,88%
Yes, 4 times a week	10	3,79%
Yes, more than 4 times a week	30	11,36%
How many hours at night do you usually sleep on average?		
Up to 4 hours on average	16	6,06%
Between 4 to 6 hours on average	140	53,03%
Between 6 to 8 hours on average	106	40,15%
More than 8 hours on average	2	0,76%

Source: own authorship.

The profile of the university students was investigated regarding the impact on the lifestyle habits that the academic routine caused among the participants. Of the 264 participants, 238 (90.15%) stated that their routine became busier/more stressful after entering university, 210 (79.55%) had changes in their eating habits, 142 (53.79%) reported that they started to eat more in restaurants, fast-foods and cafeterias, and 102 (38.64%) decreased or interrupted their physical activity practices after entering university.

When asked if the university routine influenced changes to less healthy eating habits, weight gain, poor sleep quality, greater stress, that is, if it worsened their quality of life, 228 (86.36%) answered yes.

Table 4: Representation of the lifestyle profile after entering university.

PROFILE	N = 264	100%
Has your routine become more "busy" and stressful after university?		
No	26	9,85%
Yes	238	90,15%
Have there been any changes in your eating habits after university?		
No, they remained the same and at the same times	54	20,45%
Yes, they have changed in type and/or times	210	79,55%
Have you started eating more in restaurants, snack bars, fast-food outlets, etc.?		
No	122	46,21%
Yes	142	53,79%
Did your physical activity practices change after university?		
No, I kept practicing in the same routine	74	28,03%
No, I still didn't practice physical activity	66	25,00%
Yes, I have increased or started the practice of physical activity	22	8,33%
Yes, they have decreased or stopped practicing physical activity	102	38,64%
Did the university lifestyle influence you to have less healthy eating habits, weight gain, poor sleep quality, greater stress, that is, that worsened your quality of life?		
No	36	13,64%
Yes	228	86,36%

Source: own authorship.

Most of the interviewees acknowledged that if they maintain their current lifestyle for another 10 to 20 years, they will be in poor health (46.21%) or very bad (13.64%), while only 18 (6.82%) participants believe that even after entering academic life, they will continue to maintain a healthy routine with a good quality of life. However, most of the research participants, 166 (62.88%), reported that because they are university students, they have the knowledge to identify and prevent CVD and dyslipidemias. These data can be seen in Table 5.

Table 5: Representation of knowledge and lifestyle expectations of university students.

PROFILE	N = 200	100%
Considering your lifestyle today, how do you think your health will be in 10 to 20 years, if you maintain the same habits as today?		
Bad	36	13,64%
Bad	122	46,21%
Normal	88	33,33%
Great	18	6,82%
As a university student, do you consider that you have the necessary knowledge to prevent and identify possible cardiovascular and dyslipidemic diseases in you?		
No	98	37,12%
Yes	166	62,88%

Source: own authorship.

BIOCHEMICAL ANALYSIS

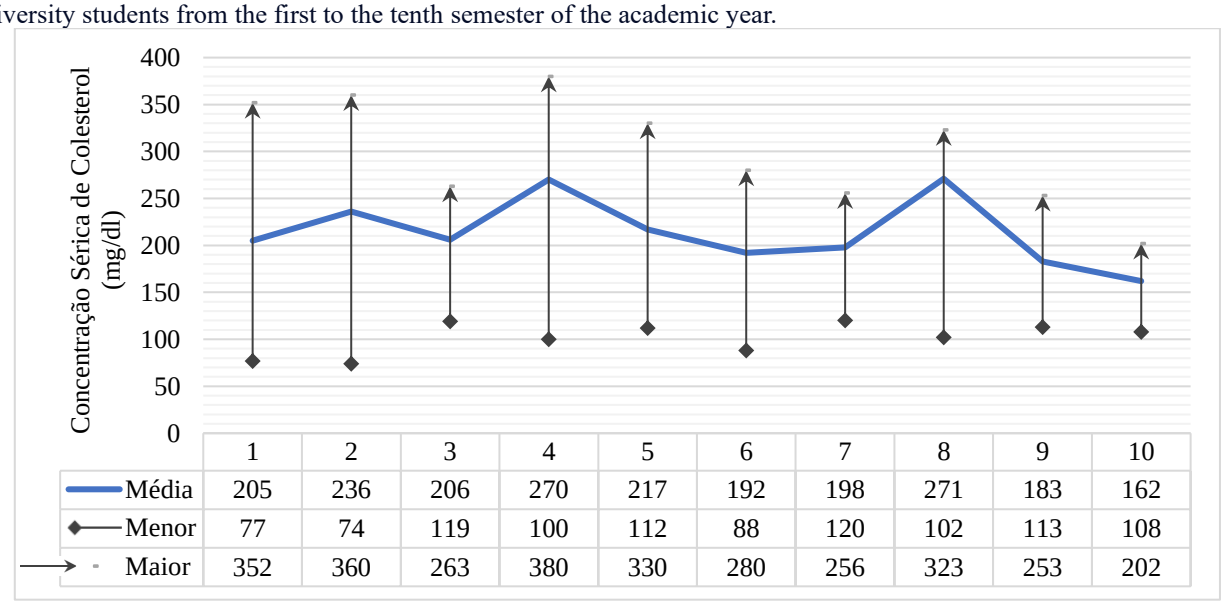
Biochemical analyses comparing the serum total cholesterol levels of university students between the academic semesters showed a significant increase among the students of the first semester compared to those of the fourth semester ($p = 0.0237$), as well as of the second semester compared to the students of the eighth semester ($p = 0.0019$). However, there was a significant decrease in serum total cholesterol levels presented by university students in the last academic semesters (ninth and tenth semesters) compared to university students in previous academic periods ($p < 0.05$), as well as in intermediate academic periods (fifth, sixth and seventh semesters) ($p < 0.05$), as shown in Table 6.

Table 6: Comparative analysis of serum cholesterol levels between academic semesters

Comparison between semesters	*p* value	Comparison between semesters	*p* value	Comparison between semesters	*p* value
1°S and 2°S 1°S and 3°S **1°S and 4°S** 2°S and 3°S 2°S and 4°S 3°S and 4°S	**0,0237**	1°S and 5°S 1°S and 6°S 1°S and 7°S 5°S and 6°S 5°S and 7°S 6°S and 7°S	0,7907	**1°S and 8°S** 1°S and 9°S 1°S and 10°S 8°S and 9°S 8°S and 10°S 9°S and 10°S	**0,0305**
2°S and 5°S 2°S and 6°S 2°S and 7°S	0,9941	**2°S and 8°S** 2°S and 9°S 2°S and 10°S	**0,0019**	3°S and 5°S 3°S and 6°S 3°S and 7°S	0,0626
3°S and 8°S 3°S and 9°S 3°S and 10°S	0,9997	**4°E and 5°S** **4°S and 6°S** **4°S and 7°S**	**0,0003**	4°S and 8°S **4°S and 9°S** **4°S 10°S**	**< 0.0001**
5°S and 8°S 5°S and 9°S **5°S and 10°S**	**0,0179**	6°S and 8°S 6°S and 9°S 6°S and 10°S	0,3297	**7°S and 8°S** 7°S and 9°S 7°S and 10°S	**< 0.0001**

Source: own authorship.
Legenda: n (negrito) = $p < 0,05$.

Graph 1: Representation of the mean ($\bar{x}$) of the highest and lowest values of serum total cholesterol levels among university students from the first to the tenth semester of the academic year.



Legend: statement of the highest and lowest values of serum total cholesterol levels of university students from the first to the tenth semester, showing an increase in the mean serum levels of total cholesterol in the fourth and eighth semesters compared to the other academic periods, as well as a decrease among university students attending the final periods of the ninth and tenth semesters.

When comparing the serum triglyceride levels of university students from the first to the tenth semester, it was possible to observe a significant increase in the first and third semesters, compared

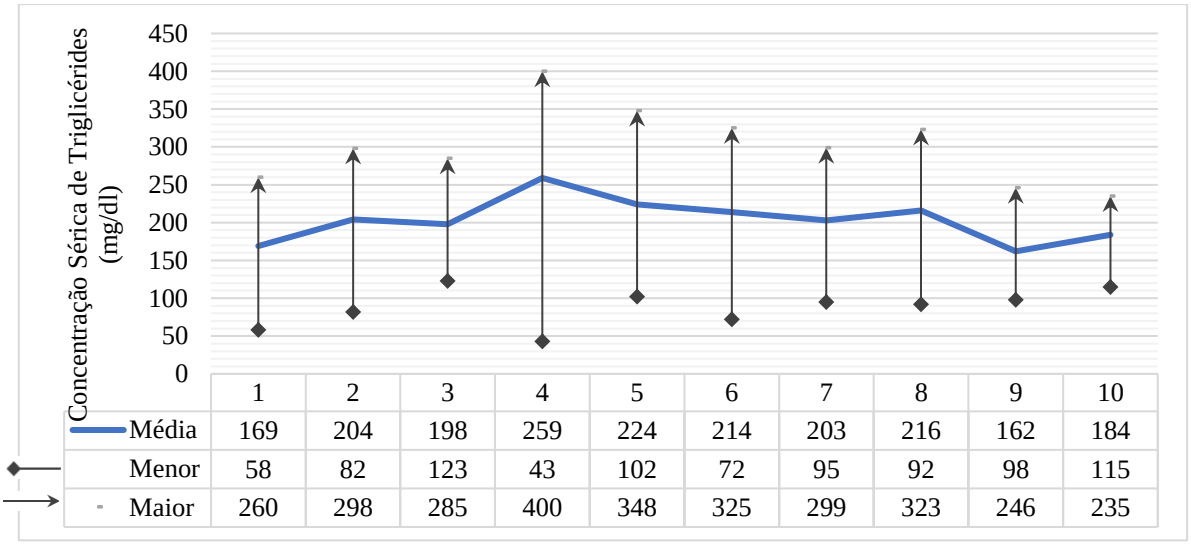
to the fourth semester ($p < 0.0001$). However, there was a significant decrease observed in the final periods of the seventh and ninth semesters, compared to the intermediate periods of the fourth and fifth semesters ($p < 0.05$), as shown in Table 7.

Table 7: Comparative analysis of serum triglyceride levels between academic semesters

Comparison between semesters	***p* value**	**Comparison between semesters**	***p* value**	**Comparison between semesters**	***p* value**
1°S and 2°S 1°S and 3°S **1°S and 4°S** 2°S and 3°S 2°S and 4°S **3°S and 4°S**	**< 0.0001**	1°S and 5°S 1°S and 6°S 1°S and 7°S 5°S and 6°S 5°S and 7°S 6°S and 7°S	0,0534	1°S and 8°S 1°S and 9°S 1°S and 10°S 8°S and 9°S 8°S and 10°S 9°S and 10°S	0,7083
2°S and 5°S 2°S and 6°S 2°S and 7°S	0,5918	2°S and 8°S 2°S and 9°S 2°S and 10°S	0,1870	3°S and 5°S 3°S and 6°S 3°S and 7°S	0,5002
3°S and 8°S 3°S and 9°S 3°S and 10°S	0,2574	4°E and 5°S 4°S and 6°S **4°S and 7°S**	**0,0336**	4°S and 8°S **4°S and 9°S** 4°S 10°S	**0,0031**
5°S and 8°S **5°S and 9°S** 5°S and 10°S	**0,0211**	6°S and 8°S 6°S and 9°S 6°S and 10°S	0,3485	7°S and 8°S 7°S and 9°S 7°S and 10°S	0,0644

Source: own authorship.
Legenda: n (negrito) = $p < 0,05$.

Graph 2: Representation of the mean ($\bar{x}$), the highest and lowest values of serum triglyceride levels among university students from the first to the tenth semester.



	1	2	3	4	5	6	7	8	9	10
Média	169	204	198	259	224	214	203	216	162	184
Menor	58	82	123	43	102	72	95	92	98	115
Maior	260	298	285	400	348	325	299	323	246	235

Legend: statement of the highest and lowest values of serum triglyceride levels of university students from the first to the tenth semester, showing an increase in the mean serum triglyceride levels in the fourth semester, as well as a decrease among university students attending the final periods of the seventh and ninth semesters.

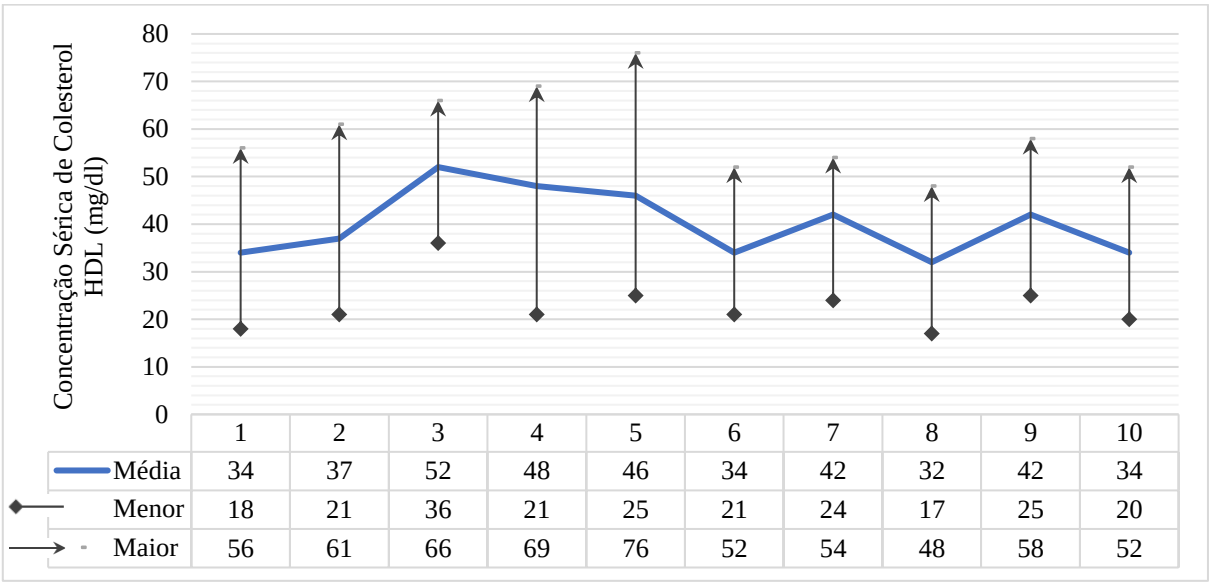
Biochemical analysis of serum HDL cholesterol levels in university students from the first to the tenth semester showed a significant decrease in the third semester compared to the eighth and tenth semesters ($p = 0.0006$), as can be seen in Table 8. However, there was no significant difference in serum HDL cholesterol levels between the other school periods.

Table 8: Comparative analysis of serum HDL cholesterol levels between academic semesters

Comparison between semesters	***p* value**	**Comparison between semesters**	***p* value**	**Comparison between semesters**	***p* value**
1°S and 2°S 1°S and 3°S 1°S and 4°S 2°S and 3°S 2°S and 4°S 3°S and 4°S	0,9831	1°S and 5°S 1°S and 6°S 1°S and 7°S 5°S and 6°S 5°S and 7°S 6°S and 7°S	0,9775	1°S and 8°S 1°S and 9°S 1°S and 10°S 8°S and 9°S 8°S and 10°S 9°S and 10°S	0,0987
2°S and 5°S 2°S and 6°S 2°S and 7°S	0,9973	2°S and 8°S 2°S and 9°S 2°S and 10°S	0,2715	3°S and 5°S 3°S and 6°S 3°S and 7°S	0,9981
3°S and 8°S 3°S and 9°S **3°S and 10°S**	**0,0006**	4°E and 5°S 4°S and 6°S 4°S and 7°S	0,5800	4°S and 8°S 4°S and 9°S 4°S 10°S	0,1936
5°S and 8°S 5°S and 9°S 5°S and 10°S	0,2074	6°S and 8°S 6°S and 9°S 6°S and 10°S	0,1015	7°S and 8°S 7°S and 9°S 7°S and 10°S	0,1522

Source: own authorship.
Legenda: n (negrito) = $p < 0,05$.

Graph 3: Representation of the mean ($\bar{x}$) of the highest and lowest serum HDL cholesterol levels among university students from the first to the tenth semester.



Legend: Statement of the highest and lowest values of serum levels of HDL cholesterol of university students from the first to the tenth semester, showing a decrease in the mean serum levels of HDL cholesterol in the third semester compared to the final periods of the eighth and tenth semester.

Biochemical analysis of serum LDL cholesterol levels among university students from the first to the tenth semester showed a significant increase in the third semester compared to the fourth semester ($p < 0.0001$) and in the third semester compared to the eighth semester ($p = 0.0029$). However, there was a significant decrease ($p < 0.005$) in serum LDL cholesterol levels among university students in the intermediate (fifth, sixth and seventh semesters) and final (ninth and tenth semesters) academic periods, as shown in Table 9.

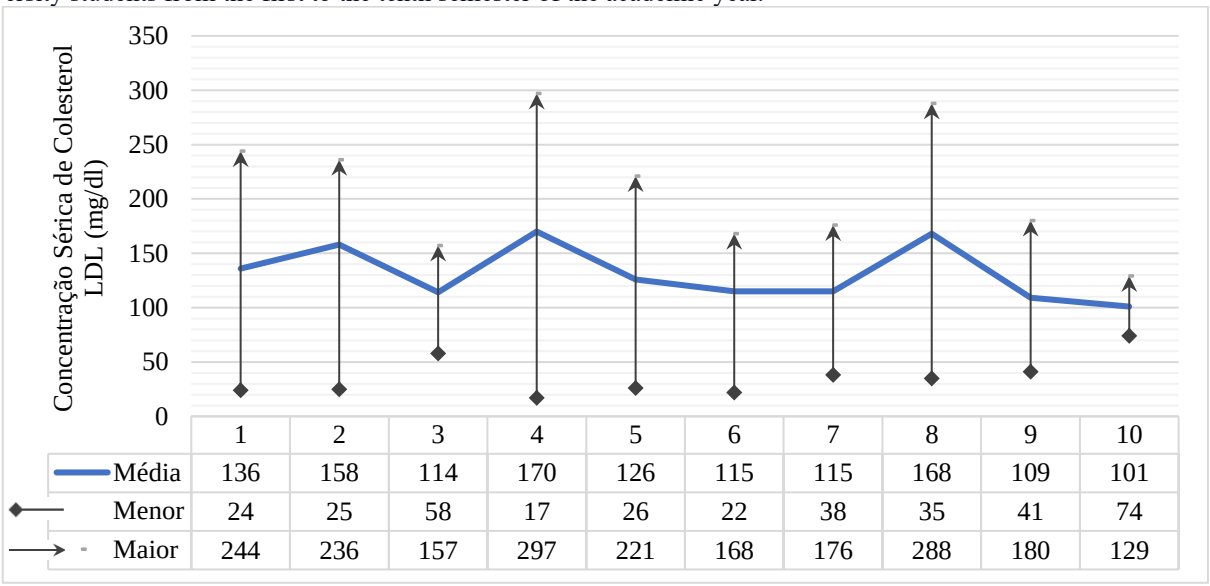
Table 9: Comparative analysis of serum LDL cholesterol levels between academic semesters

Comparison between semesters	***p* value**	**Comparison between semesters**	***p* value**	**Comparison between semesters**	***p* value**
1°S and 2°S 1°S and 3°S 1°S and 4°S 2°S and 3°S 2°S and 4°S **3°S and 4°S**	**< 0.0001**	1°S and 5°S 1°S and 6°S 1°S and 7°S 5°S and 6°S 5°S and 7°S 6°S and 7°S	0,6784	1°S and 8°S 1°S and 9°S 1°S and 10°S 8°S and 9°S 8°S and 10°S 9°S and 10°S	0,2894
2°S and 5°S 2°S and 6°S 2°S and 7°S	0,9579	2°S and 8°S **2°S and 9°S** 2°S and 10°S	**0,0182**	3°S and 5°S 3°S and 6°S 3°S and 7°S	0,7449
3°S and 8°S 3°S and 9°S 3°S and 10°S	**0,0029**	**4°E and 5°S** **4°S and 6°S** **4°S and 7°S**	**0,0012**	4°S and 8°S **4°S and 9°S** **4°S 10°S**	**< 0.0001**

5°S and 8°S 5°S and 9°S 5°S and 10°S	0,5861	6°S and 8°S 6°S and 9°S 6°S and 10°S	0,6531	7°S and 8°S 7°S and 9°S 7°S and 10°S	0,6846

Source: own authorship.
Legenda: n (negrito) = $p < 0,05$.

Graph 4: Representation of the mean ($\bar{x}$) of the highest and lowest values of serum LDL cholesterol levels among university students from the first to the tenth semester of the academic year.



	1	2	3	4	5	6	7	8	9	10
Média	136	158	114	170	126	115	115	168	109	101
Menor	24	25	58	17	26	22	38	35	41	74
Maior	244	236	157	297	221	168	176	288	180	129

Legend: statement of the highest and lowest values of serum LDL cholesterol levels of university students from the first to the tenth semester, showing an increase in the mean serum levels of LDL cholesterol in the fourth and eighth semesters, as well as a decrease among university students attending the intermediate periods of the fifth, sixth and seventh semesters, as well as the final academic periods of the ninth and tenth semesters.

DISCUSSION

Dyslipidemia is a serious public health problem, as it is among the main factors for the development of CVD, which are the main causes of death in Brazil. About 300,000 people suffer heart attacks every year, in which heart attack is fatal in 30% of cases. In 2014, the National Health Survey (PNS) identified that 18.4 million Brazilians over 18 years of age had high cholesterol, which represents 12.5% of the adult population, 15.1% women and 9.7% men9,10.

In the northern region, more specifically in the municipality of Belém, CVD were responsible for 26% of deaths in 2004, with 4% of these individuals under 20 years of age. Comparing the five Brazilian regions, the population of the northern region has the lowest HDL values, responsible for the reverse transport of cholesterol, and the highest values of triglycerides, which are exogenous fats, i.e., acquired from the diet, resulting in the highest CVD index in relation to the other regions of the country9,11.

According to Morales et al. (2017), university students exhibit critical characteristics in their lifestyle due to the transition between high school and university, and such changes may predispose

to CVD12. Data that contribute to the findings of this study, related to changes in the university lifestyle to a less healthy routine after entering university.

Comparative studies carried out among university students to assess the prevalence of cardiovascular risk factors (CVRF) reveal higher risks of CVD and high lipid levels, including a study carried out with university students in the health area of the University Center of the Municipality of Araucária, Paraná, which revealed significantly high values of body mass index (BMI) in 27.08%, Being mostly men, 58% did not practice physical activity, 37% had high total cholesterol, 16.66% had low HDL, 18.75% had increased LDL and 25% had high triglycerides13. In a similar study, when comparing the prevalence of CVRF in first- and third-year medical students, as well as demographic and anthropometric data, such as blood pressure, lipid profile, blood glucose, insulin resistance (IR), sedentary lifestyle, tobacco and alcohol consumption, it was observed that 32.4% of the students had prehypertension, 30.6% abdominal obesity and 26.3% IR12. In addition, the passing of the years seems to influence the occurrence of a lifestyle with deleterious habits, since third- and fourth-year university students have higher lipid profile values when compared to first-year students, as well as higher alcohol consumption. In addition, medical students are up to 3.9 times more likely to be obese, have high LDL cholesterol and smoke. The highest values of sedentary lifestyle were also reported in women (57.9%) compared to men (44.1%)[12,14,15]. These data represent a concern, since the lipid alterations associated with choices for quick and industrialized meals, without nutritional balance, associated with a sedentary lifestyle and the consumption of alcohol and tobacco, may contribute to a faster progression of dyslipidemia in these students15. Data that converge with the findings of the study in question, which evidenced changes in eating habits for a fast diet in fast foods, snack bars, in addition to a sedentary lifestyle with less practice or absence of physical activities.

In a study conducted by Freitas et al. (2018), regarding the practice of physical activity, 72% of university students did not perform at least 30 minutes of daily physical activity. The high rate of sedentary lifestyle was also observed the more university students advance in the academic semesters of the undergraduate course. As the student progressively progresses through the course, the rate of sedentary lifestyle is more prevalent17. The practice of physical activity at rates lower than those recommended by the World Health Organization (WHO), presented in studies mentioned above, with more than 50% of university students considered inactive, with this parameter being higher among women (61%), and the higher BMI in male university students, suggest tendencies to the consumption of higher amounts of monounsaturated fats, cholesterol, proteins, dietary fibres and total energy value. In addition to the correlation found in some studies between moderate alcohol consumption and increased HDL levels, and the negative correlation between HDL and BMI[13].

For Abdala et al. (2018), students need attention regarding some changes in habits and lifestyle, in both sexes. For men, the most evident risk factors are prehypertension, hypertension, hyperglycemia and alcohol use, while for women, they are higher levels of BMI, cholesterol and sedentary lifestyle18.

A study carried out by Brito and collaborators in 2019 revealed that the consumption of industrialized products in general is still growing, especially in adults and university students. The lack of reading or misunderstanding of the labels is also an important factor, considering that the Brazilian industry seeks to mask its foods so that the consumer does not understand them correctly, requiring criticality during the purchase of the product, as well as at the time of choosing food19.

It was observed that, mainly, university students attending the fourth and eighth semesters of school had significantly unfavorable levels of the lipid parameters investigated, suggesting greater risks of dyslipidemia in these academic periods, data that corroborate the findings of Nepal et al. in 2018, which also presented results indicating a moderate degree of dyslipidemia in young university students, of which 11.1% had hypercholesterolemia, 12.1% had elevated LDL, 33.9% had low HDL and 13.9% had hypertriglyceridemia. Studies like this are important, because the early diagnosis of dyslipidemia acts to control CVD risk factors from a young age16.

Young people between 18 and 20 years of age have high cholesterol levels and are subject to diseases such as atherosclerosis, a chronic inflammatory disease that begins with a long asymptomatic period, in which, in most cases, prophylactic measures are disregarded. It is essential to evaluate the lifestyle of young people, especially university students, because entering college corresponds to several responsibilities, such as housing, food, management of their finances and academic responsibilities, contributing to the exposure of these students to inadequate eating habits and lifestyle3,20. It is also important to highlight the emotional factor, which is often unnoticed, but which should be considered as a notable reason for inadequate eating habits, as anxiety can transform food into a "refuge" in situations of mental and physical stress, leading to the consumption of carbohydrate-rich foods, resulting in increased cholesterol and favoring obesity, as people with anxiety or emotional tension tend to eat more21, 22.

CONCLUSION

The data presented infer that university students are exposed to a variety of environmental and lifestyle factors that predispose to the development of dyslipidemia and CVD, requiring greater attention, care and guidance to this group by health, education and authorities, as well as a more effective approach to collaboration and participation of the scientific community on the subject.

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