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Epidemiology of health risk behavior among university students

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ABSTRACT

Objective: Quantify and qualify students' physical activity at the Federal University of Mato Grosso (UFMT) and compare them between entering and graduating.
Methods: The National College Health Behavior Survey (NCHRBS) questionnaire was adapted and validated for Brazilian undergraduate students and only addressed aspects related to physical activity. Of the 18,986 students enrolled in the five UFMT campuses, 9,720 students accessed the questionnaire. Of these, 7,379 had their responses validated, corresponding to 75.92% of accesses or 38.87% of the universe studied. Data were tested for normality by the Kolmogorov-Smirnov method, and their differences were determined by the Kruskal-Wallis or Mann-Whitney tests, followed by Dunn's post hoc test.
Results: Differences were observed in the level of physical activity among university students. Students from the Rondonópolis campus had lower physical activity results ($p = 0.0008$), while Linguistics and Letter students also had lower physical activity levels than students from other areas. Additionally, female students ($n = 57.49\%$; $p < 0.05$) had lower physical activity levels than males, as well as entering compared to graduating ($p = 0.0005$).
Conclusion: It is evident that young students' health risk behavior is characterized by physical inactivity, which challenges senior management for the necessary investment in policies that encourage women and newcomers to participate in regular physical exercise on the five campuses.

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INTRODUCTION

Physical activity includes exercises and other activities that involve body movements and is performed as part of games, work, active transport, domestic chores, and recreational activities[1].

Moderate and vigorous physical activity is essential to maintain an adequate and healthy body composition[2]. According to the World Health Organization (WHO)[3], physical activity for practitioners over 18 "reduces the risk of ischemic heart disease, diabetes, breast, and colon cancer. Additionally, it reduces the risk of stroke, hypertension, and depression and is a determining factor for energy balance and weight control".

The inversion of this logic allows the rise of chronic non-communicable diseases (NCDs) such as heart disease, stroke, diabetes, overweight and obesity, worsening mental health, quality of life, and well-being. The high number of deaths caused by this group of diseases is seen in Brazil[4] and worldwide, especially in developing countries[5]. Physical inactivity is, therefore, a risky health behavior.

According to the WHO, the minimum time required for physical activity benefits to be achieved by adults is 150 min per week of moderate physical activity or at least 75 min of intense activity or a combination of both. However, for more significant benefits, adults should perform 300 min of moderate or equivalent activity per week, in addition to muscle-strengthening activities on two or more days of the week, exercising large muscle groups[6].

Based on this knowledge, the WHO highlights the need to increase physical activity in the world population through an action plan related to non-communicable diseases from 2013 to 2020[5] and the 2030 Agenda for Sustainable Development[7].

However, these efforts have not been effective because of the high level of inactivity worldwide[8]. Another study found that in 55 (33%) of 168 countries, more than a third of the population does not practice enough physical activity. In four countries, more than half of adults are insufficiently active: Kuwait (67%), American Samoa (53%), Saudi Arabia (53%), and Iraq (52%). The countries with the lowest physical activity levels are Uganda and Mozambique (6% each)[9].

From 2013 to 2017, there was a reduction of 1.02%/year in the frequency of insufficient physical activity among women in Brazil. Additionally, obesity indicators have evolved. From 2006 to 2017, the frequency of overweight adults increased by an average of 1.14%/year and obese adults by 0.67%/year; following this trend, the frequency of individuals diagnosed with diabetes increased by an average 0.24%/year[10]. The problems resulting from global physical inactivity are related to metabolic syndrome[11], overweight[12,13], and dementia[14,] among others[15].

Population-based studies on undergraduate students' physical activity or inactivity are not standardized, and, therefore, the results cannot be applied to other realities; however, the results follow the representative trends of society in general.

Studies comparing the practice of physical activity showed a higher prevalence among male students in different countries around the world[16,17], but with a low level of practice. The main barriers were attributed to long hours of study, lack of energy/fatigue, and lack of company in the different programs analyzed[18,19], as well as difficulties in using bicycles for school transport and, therefore, in maintaining physical activity[20].

Considering the Federal University of Mato Grosso (UFMT) is located far from the main Brazilian population centers, even with five campuses spread over three different ecosystems, all with different characteristics, a scarcity of research was developed to know the reality of its public academic. Assessing, under these specific conditions, whether students adopt physical activity during their academic life is a necessary task for the precise development of public policies in the region where they are inserted.

Thus, the objective of this epidemiological study is twofold: to quantify and qualify the physical activity/inactivity of students at the UFMT and compare their level of physical activity.

METHODS

This is a descriptive observational study of the health risk behavior of university students from five UFMT campuses, conducted in the 1st academic term of 2018. All undergraduate courses participated. For data collection, an electronic link was provided individually through the institutional webpage to the students, who redirected them to the National College Health Risk Behavior Survey (NCHRBS). Upon accessing the link, the student read the informed consent form and chose to participate or not in the study. After agreeing to participate, the contestants responded to the survey. Although everyone could participate in principle, the exclusion criteria were applied later due to incorrect filling in the form. The questionnaire was adapted and validated for use with Brazilian university students by Franca and Colares in 2010[21] and applied in Google Docs™.

The instrument used is composed of 51 questions, but this study only addressed the aspects related to physical activity. For this question, eight variables were presented concerning the number of times students performed physical activity during the week, ranging from none to seven times. Therefore, the student could select one of the alternatives foreseen in the questionnaire presented on a Likert scale, never up to seven times a week. Regarding the number of activities performed per week, physical exercise was defined as participation in sports activities for at least 20 min, causing the student to sweat and breathe hard, such as basketball, jogging, swimming, tennis, weight training, cycling, or similar aerobic activities.

Assuming a total of 18,986 students in the UFTM, an estimated proportion of 50%, and an error of 2%, a minimum sample of 3,402 individuals was calculated to achieve a 99% confidence level.

The data were evaluated for normal distribution using the Kolmogorov–Smirnov test and presented a nonparametric distribution. Differences between groups were determined by Kruskal-Wallis followed by Dunn's

post hoc test when comparing three or more groups or the Mann-Whitney classification sum test when comparing two groups. Statistical significance was set at 0.05. All results are presented as mean and standard deviation. Sigma Plot™ version 10 (Systat Software Inc., 2006) was used.

The research was approved by the UNIRIO Research Ethics Committee under the CAAE number: 79742117.0.0000.5285, with decision number 2.520.447, and complied with all ethical principles that rule research in human beings (Brazilian National Health Council Resolution Nr. 466 from December 2012) and the Declaration of Helsinki.

RESULTS

Of the 18,986 students enrolled in the five UFMT campuses in the 1st term of 2018, 9,720 students accessed the questionnaire. Of these, 7,379 had their responses validated, corresponding to 75.92% accesses or 38.87% of the study population.

The sample was characterized by a predominance of first-year students (69.6%), female (57.9%), with an average age of 24.3 ± 7.1 years, the majority in courses of baccalaureate (80.3%), and full-time (59.9%). No racial or ethnic financial issues have been researched.

Table 1 shows the sample composition divided among campuses, indicating that Sinop had the highest percentage of participation per campus, followed by Rondonópolis and Cuiabá. However, the largest absolute number of participants was observed in the state capital, Cuiabá.

According to the methodology adopted by the Coordination for the Improvement of Higher Education Personnel (CAPES) of the Brazilian Ministry of Education (MEC), the participants were distributed by areas of knowledge on all campuses; also, eight areas were considered, based on existing courses at UFMT. The data demonstrated an unequal distribution of courses across the campuses, depending on the vocation of the region where each one is located. There was a predominance of student participation from Applied Social Sciences, followed by Human Sciences and Engineering, while there was a low adherence from Linguistics and Arts.

Table 2 shows the profile of weekly physical activity on all campuses and the different values for entering and graduating students for each site. Again, the frequency distribution by strata reveals little physical activity on the campuses.

Figure 1 reveals students on the Rondonópolis campus had higher risk behaviors than students on the Araguaia campus. The average number of physical activities performed was one to two times on almost all campuses. Statistically significant differences for physical inactivity were found between the Rondonópolis campus versus Araguaia, Cuiabá, and Sinop; all other comparisons showed no differences.

Figure 2 confirms the results of the comparisons between the study areas of all universities. However, no comparison was made in the Várzea Grande campus because it offered only the engineering course.

Analyzing each location separately, it was noticed that the students participated little in physical activities during the weekly sessions, confirming that the risk behavior was more prevalent in the Cuiabá and Rondonópolis campuses than in the other campuses.

Table 1 — Composition of the sample by campus and study areas, expressed as n(%).

Variables	Population	Demographic composition by campus				
		Sample				
		Total	Fem	Male	Entering *	Graduating †
Araguaia	2,494	805 (30.59)	476 (59.13)	329 (40.87)	209 (25.96)	138 (17.14)
Cuiabá	10,157	4,152 (39.89)	2,411 (58.07)	1,741 (41.93)	1,264 (30.44)	772 (18.59)
Rondonópolis	3,739	1186 (30.94)	670 (56.49)	516 (43.51)	351 (29.60)	224 (18.89)
Sinop	1,835	914 (45.78)	563 (61.60)	351 (38.40)	255 (27.90)	212 (23.19)
Várzea Grande	761	322 (39.82)	122 (37.89)	200 (62.11)	121 (37.58)	20 (6.21)
Total	**18,986**	**7,379 (38.87)**	**4,242 (57.49)**	**3,137 (42.51)**	**2,200 (29.81)**	**1,366 (18.51)**

Variables	Sample composition by area					
	Campus					
	Araguaia	Cuiabá	Rondonópolis	Sinop	Várzea Grande	Total
Applied Social Sciences	125 (15.53)	1,025 (24.69)	365 (30.78)	-	-	1,586 (20.39)
Agricultural Sciences	82 (10.19)	398 (9.59)	70 (5.90)	230 (25.16)	-	831 (10.68)
Linguistics, Language & Literature and Arts	34 (4.22)	275 (6.62)	29 (2.45)	-	-	351 (4.52)
Life Sciences	44 (5.47)	263 (6.33)	81 (6.83)	170 (18.60)	-	595 (7.65)
Health Sciences	223 (27.70)	826 (19.89)	145 (12.23)	253 (27.68)	-	1,535 (19.73)
Engineering	176 (21.86)	409 (9.85)	285 (24.03)	195 (21.33)	322 (100)	1,464 (18.82)
Humanities	34 (4.22)	569 (13.70)	168 (14.17)	-	-	803 (10.32)
Exact and Earth Sciences	87 (10.81)	387 (9.32)	43 (3.63)	66 (7.22)	-	614 (7.89)
Total	**805 (100)**	**4,152 (100)**	**1,186 (100)**	**914 (100)**	**322 (100)**	**7,779 (100)**

*1st and 2nd semesters / † 8th to 10th semesters

Table 2 — Number of times that physical activity was performed per week, by campus and areas for incoming and graduating students, expressed as n(%).

Profile of weekly physical activity among campus						
Nr of times	**Araguaia**	**Cuiabá**	**Rondonópolis**	**Sinop**	**Várzea Grande**	**Total**
7	47 (5.43)	168 (4.13)	59 (4.97)	90 (10.43)	12 (3.73)	376 (5.15)
6	26 (3.01)	89 (2.19)	30 (2.53)	88 (10.2)	7 (2.17)	249 (3.41)
5	78 (9.02)	272 (6.69)	64 (5.4)	79 (9.15)	23 (7.14)	516 (7.06)
4	57 (6.59)	243 (5.97)	54 (4.55)	45 (5.21)	18 (5.59)	417 (5.71)
3	107 (12.37)	406 (9.98)	108 (9.11)	70 (8.11)	35 (10.87)	726 (9.94)
2	87 (10.06)	451 (11.09)	111 (9.36)	106 (12.28)	43 (13.35)	798 (10.93)
1	99 (11.45)	449 (11.04)	112 (9.44)	68 (7.88)	42 (13.04)	770 (10.54)
0	364 (42.08)	1,990 (48.92)	648 (54.64)	317 (36.73)	142 (44.1)	3,461 (47.38)
Total	**865 (100)**	**4,068 (100)**	**1,186 (100)**	**863 (100)**	**322 (100)**	**7,304 (100)**

Number of weekly physical activity sessions - Entering and Graduating									
Variables	**Number of times**								
	7	6	5	4	3	2	1	0	Total
Araguaia Entering	8 (3.24)	6 (2.43)	45 (18.22)	11 (4.45)	22 (8.91)	16 (6.48)	30 (12.15)	109 (44.13)	247
Araguaia Graduating	4 (0.89)	6 (1.33)	51 (11.31)	56 (12.42)	70 (15.52)	90 (19.96)	119 (26.39)	55 (12.20)	451
Cuiabá Entering	63 (4.95)	16 (1.26)	81 (6.37)	58 (4.56)	107 (8.41)	154 (12.11)	140 (11.01)	653 (51.34)	1272
Cuiabá Graduating	31 (3.97)	23 (2.95)	59 (7.56)	56 (7.18)	91 (11.67)	84 (10.77)	75 (9.62)	361 (46.28)	780
Rondonópolis Entering	20 (5.57)	12 (3.34)	25 (6.96)	11 (3.06)	26 (7.24)	32 (8.91)	31 (8.64)	202 (56.27)	359
Rondonópolis Graduating	12 (5.17)	5 (2.16)	9 (3.88)	16 (6.90)	33 (14.22)	22 (9.48)	26 (11.21)	109 (46.98)	232
Sinop Entering	18 (6.87)	7 (2.67)	33 (12.60)	21 (8.02)	20 (7.63)	32 (12.21)	21 (8.02)	110 (41.98)	262
Sinop Graduating	9 (4.46)	7 (3.47)	13 (6.44)	11 (5.45)	29 (14.36)	27 (13.37)	15 (7.43)	91 (45.05)	202
Várzea Grande Entering	7 (5.43)	3 (2.33)	7 (5.43)	10 (7.75)	16 (12.40)	11 (8.53)	15 (11.63)	60 (46.51)	129
Várzea Grande Graduating	1 (3.85)	-	2 (7.69)	2 (7.69)	2 (7.69)	6 (23.08)	3 (11.54)	10 (38.46)	26
Total	**173 (4.37)**	**85 (2.15)**	**325 (8.21)**	**252 (6.36)**	**416 (10.51)**	**474 (11.97)**	**475 (11.99)**	**1,760 (44.44)**	**3960**

Based on the findings presented in Figure 2, an analysis was conducted to show the possibility of differences between the programs in the areas with the lowest level of physical activity on the Cuiabá and Rondonópolis campuses. According to Figure 3, however, no significant differences were found between them.

Table 2 displays the number of physical activity sessions between entering and graduating students, whereas Figure 4 compares the risk behavior among both groups. The comparative analysis between first-year students and seniors did not indicate a clear pattern regarding the number of physical activity sessions, the same occurring in comparing the different locations. For each variable, students behave differently depending on their university. However, incoming students showed a predominance of absolute inactivity, except for students on the Sinop campus. Consequently, graduating students predominated in physical activity two to three times a week. Figure 4A revealed a difference between incoming and graduating students from all campuses and the Araguaia campus (p = 0.0001, both) and Cuiabá campus (p = 0.0051), with no other difference observed. Finally, Figure 4B does not show differences in a comparison between fields that differ when entering Sinop.

Figure 5 exhibits a comparison of risk behavior by gender for each campus and in general. Again, there was a higher risk behavior among women, with significant differences in all comparisons (p<0.05). Comparatively, men showed increased physical activity, especially at the Cuiabá and Sinop campuses.

DISCUSSION

The study presents as the main findings the physical inactivity of UFMT students as established by the WHO, especially among the female population. Even considering a higher level of physical activity practiced by students in the Health area and graduating, the rates are still precarious.

The regular practice of physical activity has several benefits, which have been described in the literature[22-24]. This indicates the relevance of conducting a population survey on the practice of physical activity

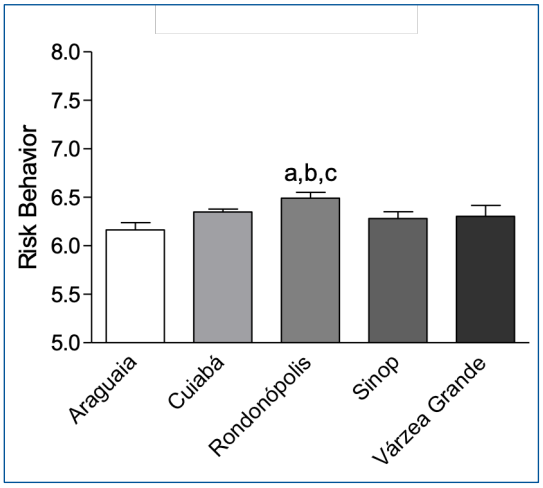

Figure 1 **—** **D**istribution of average physical inactivity on each of the campuses. a, b, c = Differences were observed between Rondonópolis vs Araguaia (p = 0.0008), Cuiabá (p = 0.037) and Sinop (p = 0.0167), respectively. All other comparisons do not differ. For comparisons, Kruskal-Wallis with Dunn's post hoc test with a 5% significance level was used.

among UFMT students and identifying whether lifestyles adopted during the university period influence physical activity.

Undergraduate students at UFMT practice less physical activity than what is recommended by the WHO[3]. In an assessment between campuses, there was a significant difference below the overall average of UFMT. However, insufficient levels of physical activity have been reported in several other studies. In 2016, 379 university students in Cali, Colombia, were analyzed[25], showing groups of male and female students with unhealthy physical activity practices, regardless of whether they were working. Calestine et al. (2017)[26] observed sedentary behavior and obesity in 512 students in the United States and related it to the excessive use of social media. The same phenomenon was observed in Brazil, where a study in the Northeast region found a 52% prevalence of sedentary lifestyle in 605 students[27]; 30.8% of students in a sample from the Southern region also exhibited an insufficient level of physical activity[28].

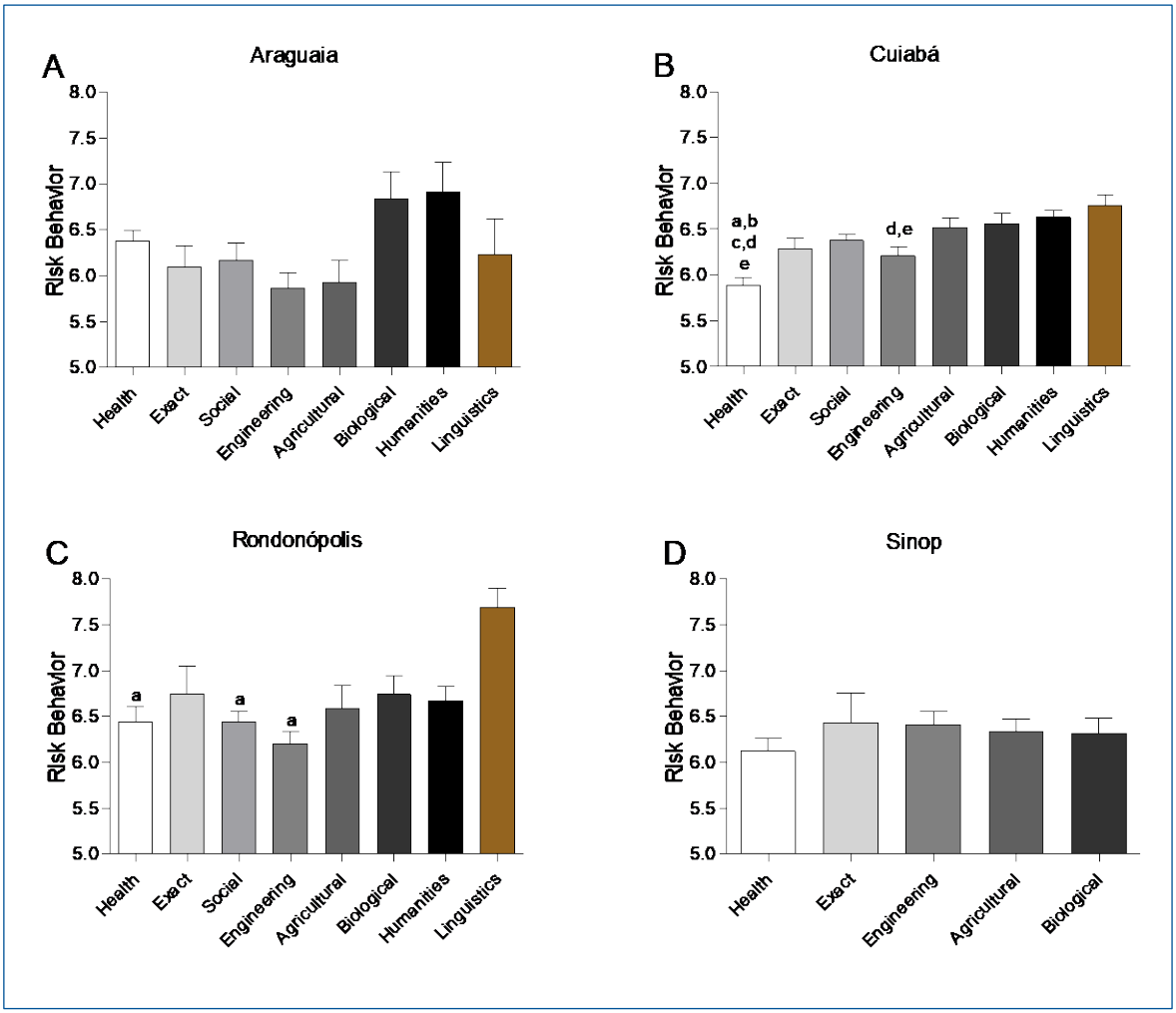

Figure 2 **—** Comparison of risk behavior of physical inactivity in intraprogram research.
(2B) a, b, c, d, e = the health area has less risky behavior than the Social area (p = 0.0092), Agricultural, Biological (p = 0.0001), Human (p = 0.0001) and Linguistics (p = 0.0001).
(2C) a = presents a higher risk behavior for the Linguistics area when compared to the Health area (p = 0.0003), Social area (p = 0.0007) and Engineering area (p = 0.0001).
To compare physical inactivity, the Kolmogorov—Smirnov normality test was performed followed by Kruskal—Wallis with Dunn's post hoc test with a 5% significance level.

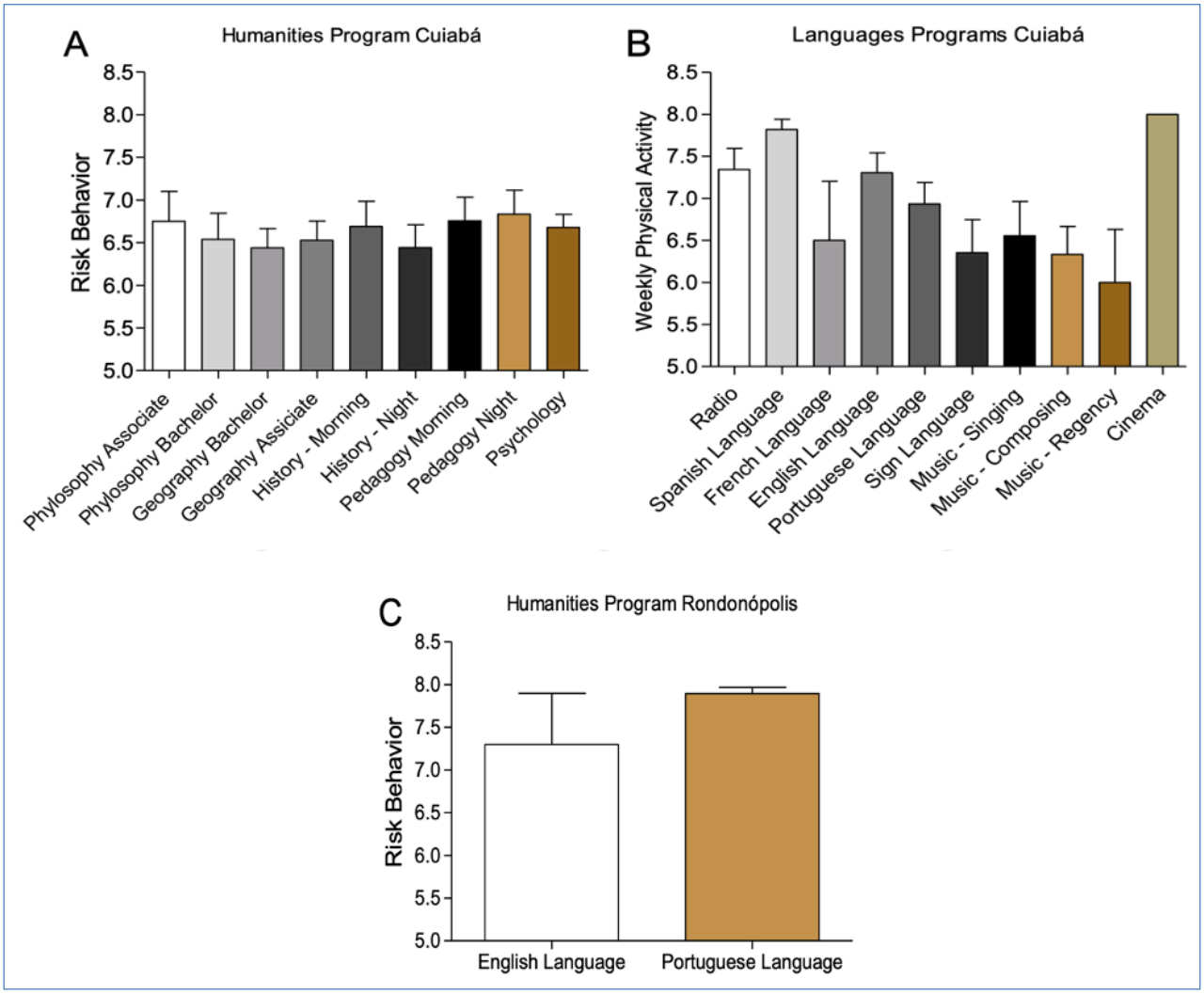

Figure 3 — Intraprogram comparison of the risk behavior. No differences were observed in the intraprogram comparison of weekly physical inactivity (p > 0.05). (A) = Humanities Programs - Cuiabá; (B) Language Programs - Cuiabá; (C) Linguistics Programs - Rondonópolis. To compare the level of physical inactivity, the Kolmogorov-Smirnov normality test was first performed, followed by the Kruskal—Wallis test with Dunn's post hoc test for Figures 1A and 1B, and Mann—Whitney test for Figure 1C.

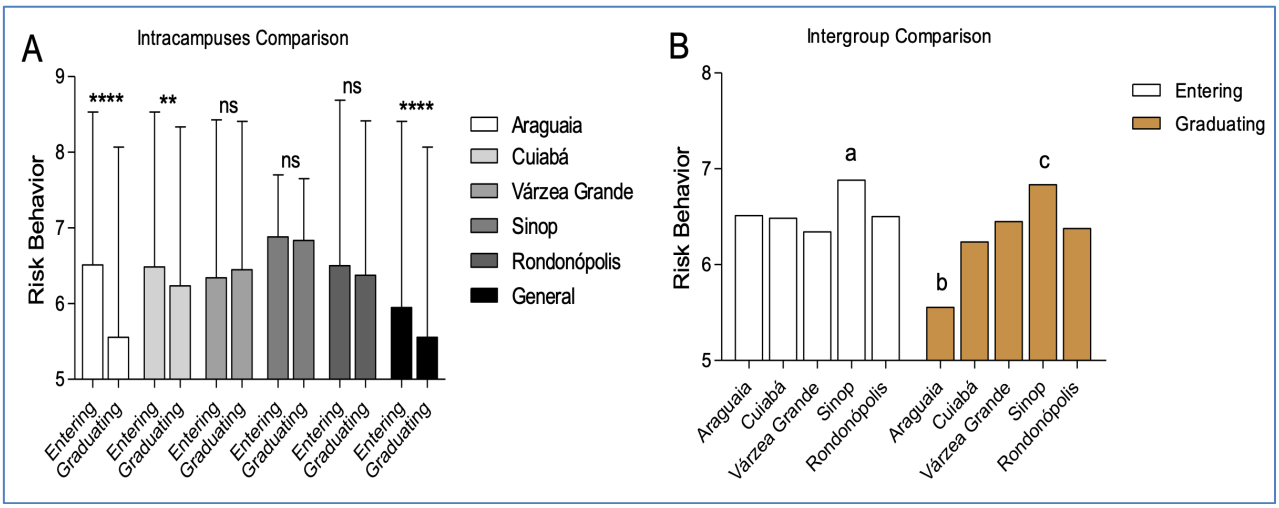

Figure 4 — Comparison of risk behavior among entering and graduating students from all campuses.
(4A) Difference between entering and graduating students (**** p = 0.0001; ** p = 0,0051; ns = no difference).
(4B) a, and b= higher risk behavior; c= lower risk behavior between intracapus entering and graduating students.
To compare the level of physical inactivity, the Shapiro-Wilks normality test was initially performed, followed by Kruskal-Wallis with Dunn's post hoc test with a 5% significance level.

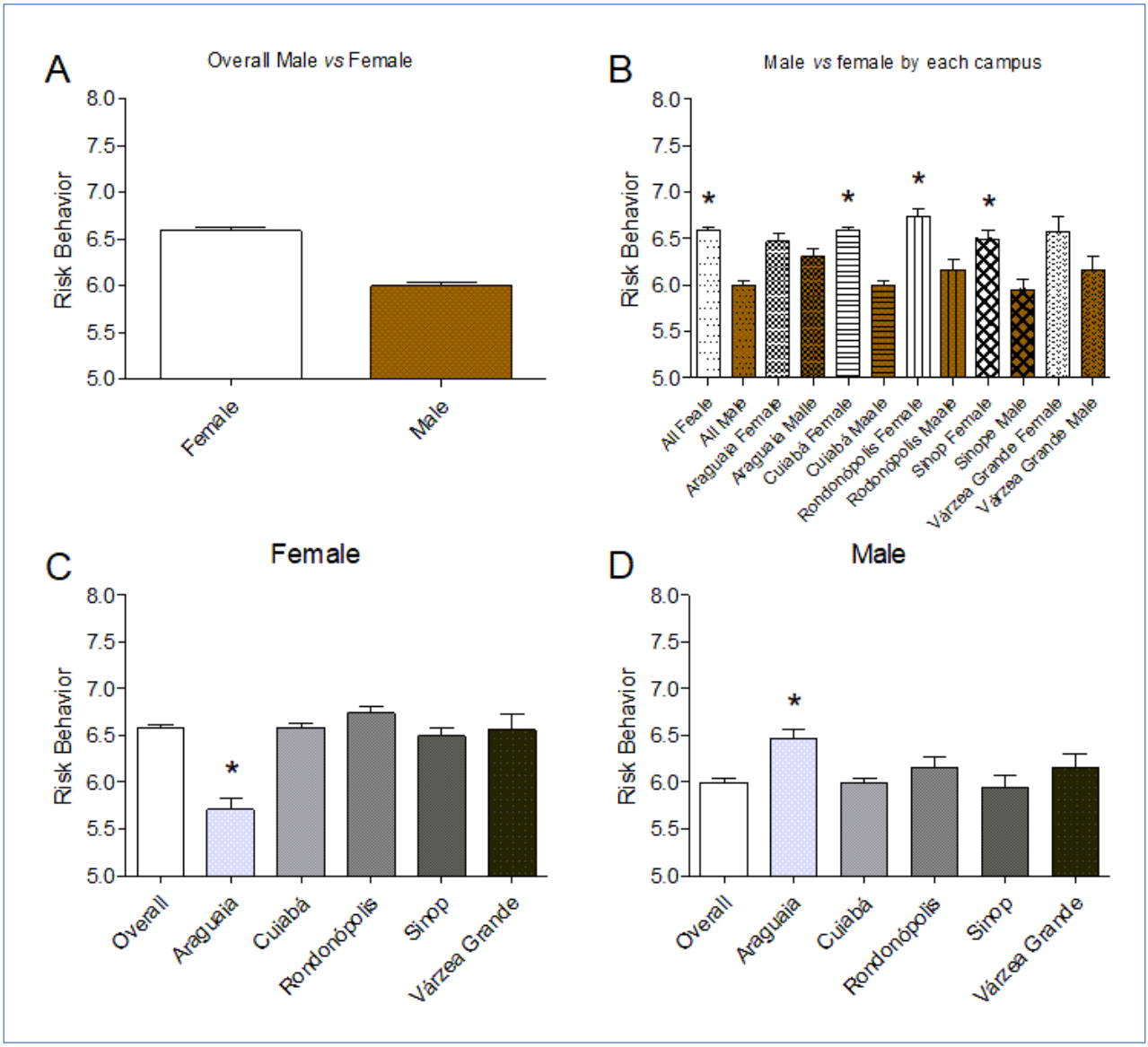

Figure 5 — Weekly physical inactivity: gender comparison of all campuses.
(A) *= $p<0.05$ Significant differences between women and men in general.
(B) *= $p<0.001$ Significant differences between male and female by campus.
(C) *= $p<0.001$ Significant differences between the Araguaia risk behavior for all (female).
(D) *= $p<0.05$ Significant differences between the Araguais to Overall, Cuiabá and Sinop (Male).
To compare the level of physical inactivity, the Kolmogorov—Smirnov normality test was first performed followed by the Mann—Whitney test (A), or Kruskal—Wallis with the Dunn post hoc test (B, C, D).

Like our study, other authors also found higher physical inactivity among females[29-31] with a consequent increase in the rates of obesity[12-14], diabetes mellitus, hypercholesterolemia, metabolic syndrome, and hypertension[32].

Comparing the UFMT undergraduate programs in Health of Sciences, the number of weekly physical activity sessions among students was statistically higher on the Cuiabá and Rondonópolis campuses, representing 31.72% of the total students evaluated. These results are consistent with a study conducted in Brazil, which reported a good level of physical activity in Physical Education, Physical Therapy, Nursing, and Nutrition students[18].

The differences in the amount of physical activity performed by students entering and graduating may reveal characteristics acquired during their life as university students.

To understand the university lifestyle effect on engaging in sedentary risk behavior, entering and graduating students were compared. It was observed that the university experience had a positive impact on physical activity behaviors once the graduating students participated in physical activity more than those entering. This result is inconsistent within the published literature, agreeing with the findings of a study conducted in Piauí in which entering students were more sedentary than those graduating[33]. Also, a study conducted in the Amazonas found that graduating students were more adept at physical activity than those entering[34]. However, it diverges from the findings of another work conducted in Brazil with a sample size of

1,599 students from Paraná, which found that graduating students were those most likely to have insufficient physical activity[35]. Abroad, the results from a North American study showed a low level of physical activity among female college freshmen[36]. A recent study conducted in the United States also revealed barriers to exercise such as lack of time, energy, and willpower in male and female students classified as traditional or nontraditional[37]. Also, a different study in the US did not show differences between entering and graduating students regarding participation in intramural physical activity[38].

The main limitation of this study is the cross-sectional analysis that does not allow longitudinal student monitoring. Additionally, the self-reported collection modality may not portray a reality that would be found in a follow-up study with practical intervention. Finally, the diversity of the sample related to five campuses with different characteristics and courses with different interest profiles that, on the one hand, is significant, eliminates the homogeneity seen in other studies.

Note that more significant investment in policies to promote physical activity among university students in all areas is necessary so that its intensity be equal to or higher than the levels recommended for those over 18 years of age, mainly among young women, and for the creation of mechanisms for adhering to physical activity upon entering all university campuses. This study sheds light on the importance of the awareness that future professionals should have concerning harmful behaviors to their lives and, consequently, to society in general.

CONCLUSION

The research showed a significant number of students who, from a young age, maintain the risky behavior of physical inactivity, most in women and in the incoming. Among those who most practice physical activities are those in the health area, showing a change in posture imposed by the academic trajectory of the Federal University of Mato Grosso and coherence with a training area in which one intends to work.

The highest perceived amount of physical activity, between once and twice a week, reveals a disagreement between what is recommended and what is found among the research participants, which denote a coexistence of assuming a risk of long-term chronic disease.

REFERENCES

1. World Health Organization (WHO). Global recommendations on physical activity for health [Internet]. Geneva: WHO; 2010 [cited 2021 Jun 15];60 p. Available from: https://www.who.int/publications/i/item/9789241599979
2. Arigo D, Rohde P, Shaw H, Stice E. Psychosocial predictors of physical activity change among college students in an obesity prevention trial. J Phys Act Heal. 2017;14(7):513-9. https://doi.org/10.1123/jpah.2016-0515
3. World Health Organization (WHO). Physical activity [Internet]. Geneva: WHO; 2020 [cited 2021 Jun 15]. Avaiable from: https://bit.ly/3gn1gLT
4. Brasil, Ministério da Saúde, Secretaria de Vigilância em Saúde. Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis (DCNT) no Brasil 2011-2022 [Internet]. Brasília: MS; 2011 [cited 2021 Jun 15]. 160 p. Avaiable from: https://bit.ly/3cHQTAe
5. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020 [Internet]. Geneva: WHO; 2013 [cited 2021 Jun 15]. Available from: https://bit.ly/3pSwa21
6. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020;54(24):1451-62. https://doi.org/10.1136/bjsports-2020-102955
7. World Health Organization. The 2030 Agenda and the Sustainable Development Goals: An opportunity for Latin America and the Caribbean. Goals, Targets and Global Indicators [Internet]. Geneva: WHO; 2019 [cited 2021 Jun 15]. 92 p. Avaiable from: https://bit.ly/2Sxl8Tu
8. Word Health Organization, Global Health Observatory (GHO). Prevalence of insufficient physical activity among adults aged 18+ years (age-standardized estimate) (%) [Internet]. [cited 2021 Jun 15]. Avaiable from: https://bit.ly/3ztbOAP
9. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. Lancet Glob Heal. 2018;6:e1077-86. https://doi.org/10.1016/S2214-109X(18)30357-7
10. Brasil, Ministério da Saúde, Sistema de Vigilância em Saúde. Vigitel Brasil 2019: Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico [Internet]. Brasília, DF: Ministério da Saúde; 2020 [cited 2021 Feb 21]. 137 p. Available from: https://bit.ly/3vsWmkQ
11. Barbosa JB, Santos AM, Barbosa MM, Barbosa MM, Carvalho CA, Fonseca PCA, et al. Metabolic syndrome, insulin resistance and other cardiovascular risk factors in university students. Cien Saude Colet. 2016;21(4):1123-36. https://doi.org/10.1590/1413-81232015214.10472015
12. Lee J, Jin M, Son H, Cui W. Body-related perspectives and weight control methods of Korean-Chinese nursing school students in Yanbian, China: A pilot study. Osong Public Heal Res Perspect. 2017;8(4):275-81. https://doi.org/10.24171/j.phrp.2017.8.4.08
13. Marques A, Barbosa M, Guedes D. Exercise and fruit/vegetable intake in a sample of Brazilian university students: association with nutritional status. Rev Bras Ativ Fís Saúde. 2017;22(2):165-75. https://doi.org/10.12820/rbafs.v.22n2p165-175
14. Sallis JF, Bull F, Guthold R, Heath GW, Inoue S, Kelly P, et al. progress and challenges progress in physical activity over the olympic quadrennium. Lancet. 2016;388(24):1325-36. https://doi.org/10.1016/S0140-6736(16)30581-5
15. Carvalho CA, Fonseca PCA, Barbosa JB, Machado SP, Santos AM, Silva AAM, et al. Associação entre fatores de risco cardiovascular e indicadores antropométricos de obesidade em universitários de São Luís, Maranhão, Brasil. Cien Saude Colet. 2015;20(2):479-90. https://doi.org/10.1590/1413-81232015202.02342014
16. Fagaras S-P, Radu L-E, Vanvu G. The level of physical activity of university students. Procedia - Soc Behav Sci. 2015;197:1454-7. https://doi.org/10.1016/j.sbspro.2015.07.094
17. Santos T, Leão O, Leite J, Silva M. Atividade física em acadêmicos de Educação Física: um estudo longitudinal. Rev Bras Ativ Fís Saúde. 2017;22(1):76-84. https://doi.org/10.12820/rbafs.v.22n1p76-84
18. Nascimento T, Alves F, Souza E. Barreiras percebidas para a prática de atividade física em universitários da área da saúde de uma instituição de ensino superior da cidade de Fortaleza, Brasil. Rev Bras Ativ Fís Saúde. 2017;22(2):137-46. https://doi.org/10.12820/rbafs.v.22n2p137-146
19. Pinto AAA, Claumann GS, Cordeiro PC, Felden ÉP, Pelegrini AA, Felden E, et al. Barreiras percebidas para a prática de

atividade física entre universitários de Educação Física. Rev Bras Ativ Fís Saúde. 2017;22(1):66-75. https://doi.org/10.12820/rbafs.v.22n1p66-75
20. Yuan C, Sun Y, Lv J, Lusk AC. Cycle tracks and parking environments in China: Learning from college students at peking university. Int J Environ Res Public Health. 2017;14(8):930. https://doi.org/10.3390/ijerph14080930
21. Franca C da, Colares V, da Franca C, Colares V. Validação do National College Health Risk Behavior Survey para utilização com universitários brasileiros. Cien Saude Colet. 2010;15(sup 1):1209-15. https://doi.org/10.1590/S1413-81232010000700030
22. Doyle CB, Khan A, Burton NW. Knowledge of physical activity guidelines and mental health benefits among Emirati university students. Perspect Public Health. 2019;139(6):316-9. https://doi.org/10.1177/1757913919834060
23. Malm C, Jakobsson J, Isaksson A. Physical activity and sports-real health benefits: a review with insight into the public health of Sweden. Sports (Basel). 2019;7(5):127. https://doi.org/10.3390/sports7050127
24. Manferdelli G, La Torre A, Codella R. Outdoor physical activity bears multiple benefits to health and society. J Sports Med Phys Fitness. 2019;59(5):868-79. https://doi.org/10.23736/S0022-4707.18.08771-6
25. Varela-Arévalo MT, Ochoa-Muñoz AF, Tovar-Cuevas JR. Tipologías de estilos de vida en jóvenes universitarios. Univ Salud. 2016;18(2):246-56. https://doi.org/10.22267/rus.161802.35
26. Calestine J, Bopp M, Bopp CM, Papalia Z. College Student Work Habits are Related to Physical Activity and Fitness. Int J Exerc Sci. 2017;10(7):1009-17. PMID: 29170702 PMCID: PMC5685070
27. Martins MCC, Ricarte IF, Rocha CHL, Maia RB, Silva VB, Veras AB, et al. Pressão arterial, excesso de peso e nível de atividade física em estudantes de universidade pública. Arq Bras Cardiol. 2010;95(2):192-9. https://doi.org/10.1590/S0066-782X2010005000069
28. Augusto D, Silva S. Fatores associados ao nível de participação em atividades físicas em estudantes de uma universidade pública no sul do Brasil. Ciênc Saúde Coletiva. 2011;4087-94. https://doi.org/10.1590/S1413-81232011001100014
29. Alzamil HA, Alhakbany MA, Alfadda NA, Almusallam SM, Al-Hazzaa HM. A Profile of Physical Activity, Sedentary Behaviors, Sleep, and Dietary Habits of Saudi College Female Students. J Fam Community Med [Internet]. 2019 [cited 2019 Oct 14];14. Available from: www.jfcmonline.com
30. Olfert MD, Barr ML, Charlier CC, Greene G, Zhou W, Colby SE. Sex differences in lifestyle behaviors among U.S. college freshmen. Int J Environ Res Public Health. 2019;16(3):482. https://doi.org/10.3390/ijerph16030482
31. Towne SD Jr, Ory MG, Smith ML, Peres SC, Pickens AW, Mehta RK, Benden M. Accessing physical activity among young adults attending a university: the role of sex, race/ethnicity, technology use, and sleep. BMC Public Health. 2017;17(1):721. https://doi.org/10.1186/s12889-017-4757-y
32. Zhang M, Schumann M, Huang T, Törmäkangas T, Cheng S. Normal weight obesity and physical fitness in Chinese university students: an overlooked association. BMC Public Health. 2018;18(1):1334. https://doi.org/10.1186/s12889-018-6238-3 PMID: 30509225 PMCID: PMC6278052
33. Turi BC, Codogno JS, Fernandes RA, Monteiro HL. Low levels of physical activity and metabolic syndrome: cross-sectional study in the Brazilian public health system. Ciênc Saúde Coletiva. 2016;21(4):1043-50. https://doi.org/10.1590/1413-81232015214.23042015
34. Santos LR, Brito ECC, Neto JCGL, Alves LEP, Alves LRA, de Freitas RWJF. Analysis of sedentary lifestyle among college students. Rev Enferm UERJ [Internet]. 2014 [cited 2021 jun 15];22(3):416-21. Available from: https://bit.ly/3iKxLFp
35. Prata Nogueira A, Rossato M, Araújo Soares A, Bezerra ES, Seabra Moraes M. O estilo de vida dos universitários da Faculdade de Educação Física e Fisioterapia da UFAM. Rev Port Ciênc Desp. 2014;2014(S1A):689-701. https://doi.org/10.5628/rpcd.14.S1A.689
36. Gasparotto S. Association between moment of the undergraduate course and cardiovascular risk factors in university students. Rev Lat-Am Enferm. 2013;21(3):687-94. https://doi.org/10.1590/S0104-11692013000300006
37. Butler SM, Black DR, Blue CL, Gretebeck RJ. Change in diet, physical activity, and body weight in female college freshman. Am J Heal Behav. 2004;28(1):24-32. https://doi.org/10.5993/AJHB.28.1.3
38. Ball JW, Bice MR, Maljak KA. Exploring the Relationship between College Students' Barriers to Exercise and Motivation. Am J Health Stud; 2018;33(2):61-9. Avaiable from: https://neiudc.neiu.edu/hpera-pub/7

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