PENSAR ENFERMAGEM
Revista Científica | Journal of Nursing

Physical activity among university students before and during the COVID-19 pandemic

Tássia Teles Santana de Macêdo[1]
orcid.org/0000-0003-2423-9844

Marla Vitória Santos Nascimento[2]
orcid.org/0009-0009-1136-2465

Cátia Suely Palmeira[3]
orcid.org/0000-0001-6328-8118

Gleide Glícia Gama Lordello[4]
orcid.org/0000-0002-9915-8961

Glícia Gleide Gonçalves Gama[5]
orcid.org/0000-0002-0221-0453

[1] PhD. Enfermeira do Centre Hospitalier Universitaire de Québec - Université de Laval e Professora Adjunta da Escola Bahiana de Medicina e Saúde Pública (EBMSP), Salvador, Brasil.

[2]Undergraduate Student in Nursing, Escola Bahiana de Medicina e Saúde Pública (EBMSP), Salvador, Brasil.

[3]PhD. Professora Adjunta da Escola Bahiana de Medicina e Saúde Pública (EBMSP), Salvador, Brasil.

[4]Master. Professora Adjunta da União Metropolitana de Educação e Cultura (UNIME) e da Escola Bahiana de Medicina e Saúde Pública (EBMSP), Salvador, Brasil.

[5]PhD. Chefe da Unidade de Clínica Médica COM-HUPES da Universidade Federal da Bahia e Professora Adjunta da Escola Bahiana de Medicina e Saúde Pública (EBMSP), Salvador, Brasil.

Abstract

Introduction
The COVID-19 pandemic affected daily life worldwide, with university students being particularly impacted. Changes in teaching modalities significantly influenced students' lifestyles, leading to alterations in regular physical activity participation.

Objective
To compare the physical activity patterns of university students before and during the COVID-19 pandemic.

Methods
We conducted a cross-sectional study with 185 students from a private university in Salvador, Bahia, Brazil. Data collection took place in 2022 using an electronic survey hosted on the RedCap® platform. We sent a unique survey link via email to enrolled students. The data encompassed sociodemographic and academic characteristics, as well as lifestyle habits, including physical activity. Descriptive statistical analyses were performed using SPSS software.

Results
The majority of participants were women (78.9%), identified as White (44.9%), with a mean age of 23.4 years (SD ± 6.31). Most students were in their first to fourth semester (53.6%), and the most common degree program was medicine (27.0%). The students maintained an average of four days per week of physical activity both before and during the pandemic. However, the mean duration of physical activity decreased from 76 minutes pre-pandemic to 65 minutes during the pandemic. Strength training and gym workouts were the most common activities before the pandemic, whereas strength training, running, and home exercises predominated during the pandemic. Physiotherapy students were the least active group during the pandemic.

Conclusion
Despite efforts to diversify exercise modalities to sustain regular physical activity, university students experienced a reduction in the average duration of physical activity during the COVID-19 pandemic.

Keywords
Physical activity; COVID-19; University students; Lifestyle.

Corresponding author:
Tassia Macedo
E-mail: tassiamacedo@bahiana.edu.br

Received: 16 Dec 2024
Accepted: 07 Mar 2025

Editor: Paulo Seabra

How to cite this article: Macêdo T, Nascimento M, Palmeira C, Lordello G, Gama G. Physical activity among university students before and during the COVID-19 pandemic. Pensar Enf [Internet]. 2025 Mar; 29(1): e00407. Available from: https://doi.org/10.71861/pensarenf.v29i1.407

Introduction

Entering university requires students to adapt to various routines and activities related to the demands of higher education, which may necessitate a reorganization of daily life.[1] This new dynamic can lead to a series of changes, including financial adjustments, modifications in interpersonal relationships, and challenges in time management.[2] Balancing the distribution of daily academic tasks with leisure activities, such as engaging in physical activity, can help prevent the mental and physical strain experienced by many young individuals during this stage of life.[3]

According to the World Health Organization (WHO), physical activity is any bodily movement produced by skeletal muscles that results in energy expenditure, varying in intensity and duration.[4,5] The recommended amount of regular moderate- to vigorous-intensity physical activity per week is at least 150 to 300 minutes.[4,5] The primary difference between intensity levels lies in the duration and effort required for execution, which determines the level of energy expenditure.[6]

However, global statistics indicate that one in four adults does not engage in the level of physical activity recommended by international guidelines,[7,8] and among the countries with the lowest global rates of physical activity, Brazil ranks first.[9]

However, alarming data show that nearly half of the Brazilian adult population—48.2%—does not engage in regular physical activity at the recommended level.[10] This percentage was even higher during the pandemic period. Due to the need for social isolation to prevent the transmission of COVID-19, physical activity levels declined further when compared to the pre-pandemic period.[11,12]

To contain the spread of the novel subtype of severe acute respiratory syndrome coronavirus (SARS-CoV) in humans, several public health measures were implemented, such as the use of face masks and the closure of public parks, sports centers, and gyms to prevent possible gatherings.[13,14] These measures altered the population's physical activity routines, as various programs were interrupted and/or reduced,[13] leading to a more sedentary lifestyle.[15]

During the pandemic, social isolation also influenced changes in family routines, requiring the completion of other activities at home, including remote work, distance learning, and leisure and religious practices.[16] With the suspension of in-person educational activities, most institutions began implementing distance learning, which significantly impacted university students as they adapted to this new academic routine.[17] This transition contributed to increased sedentary behavior, extended screen time, and greater use of electronic devices.[18]

Since insufficient physical activity is recognized as a health risk behavior among university students,[19] preventive measures against sedentary behavior should be implemented during their professional training. Considering the reality of higher education institutions during the pandemic—which resulted in increased screen time and reduced physical activity levels due to the necessity of social isolation, thereby exacerbating the harmful effects of sedentarism on health—this study aims to compare the physical activity patterns of university students before and during the COVID-19 pandemic.

Method

This is a cross-sectional, analytical study conducted with university students from a private higher education institution (HEI) in Salvador, in the state of Bahia, Brazil. The data analyzed in this study are part of the parent project entitled *"Impact of the COVID-19 pandemic on the lifestyle and cardiovascular risk of university students,"* carried out in 2022.

We invited all university students over 18 years of age, who were actively enrolled during the data collection period in one of the seven undergraduate programs offered by the institution, to voluntarily participate in the study. Thus, we used convenience sampling to select participants.

Data collection lasted six months, and we conducted it using an electronic instrument developed on the RedCap® (Research Electronic Data Capture) platform. Using the RedCap® electronic platform provided significant advantages regarding the speed of data visualization, systematic organization of research findings, and cost savings related to research resources.[20]

We generated a unique online link to ensure participant anonymity. After receiving approval from the ethics committee, we sent the survey link to students via their institutional email. The email provided information about the study's objectives, expected outcomes, risks, and benefits, as well as the Informed Consent Form (ICF), which students signed electronically to confirm their participation.

The online questionnaire collected sociodemographic, academic, and clinical data, along with lifestyle habits, including physical activity before and during the COVID-19 pandemic. The variables analyzed in this study regarding physical activity included the weekly frequency of physical activity and the time spent engaging in such activity.

We exported the responses from RedCap® to SPSS and R software for processing and generating results through simple and descriptive statistical analyses. Categorical variables were expressed as absolute and relative frequencies—n (%), while continuous variables with normal distribution were presented as means and standard deviations (±SD).

Considering a significance level of 5%, we applied the nonparametric Kruskal-Wallis test to analyze differences in the number of days and time spent on physical activity before and during the pandemic across sociodemographic and academic subgroups.

We used the Kruskal-Wallis test to compare the means of days and duration (continuous variables) across different student groups.[21]

This study was conducted in accordance with Resolution No. 466/2012 of the National Health Council (CNS). It also adhered to Circular Letter 2/2021, which guides virtual research. The project received approval from the Ethics Committee on October 1, 2022, under the opinion number 5.677.887.

Results

This study included 185 undergraduate health sciences students, the majority of whom were female (78.9%, n = 146), identified as White (44.9%, n = 83), and were between 18 and 23 years old (73.5%, n = 136), with a mean age of 23.4 years (SD ± 6.3). Regarding academic variables, the highest concentration of students was in the first and third semesters (14.1%, n = 26). The most represented degree programs were medicine (27%, n = 50), followed by nursing (23.2%, n = 43) and biomedical sciences (14.5%, n = 27), as shown in Table 1.

As also presented in Table 1, regarding clinical variables, most students reported no history of hypertension (95.7%, n = 117) or diabetes mellitus (99.5%, n = 184). As for body mass index (BMI) classification, although most students had a normal weight (55.7%, n = 103), more than one-third were classified as overweight (21.1%, n = 39) or as having varying degrees of obesity: obesity class I (8.7%, n = 18), obesity class II (1.6%, n = 3), and obesity class III (1.1%, n = 2).

Table 1 – Sociodemographic, academic, and clinical data of students from a private higher education institution (HEI), Salvador, Brazil. 2022 (n = 185)

Variables	N	%
Sex		
Female	146	78.9
Male	39	21.1
Age		
18–23 years	136	73.5
≥ 24 years	49	26.5
Race/Color		
White	83	44.9
Black	31	16.8
Brown	69	37.3
Yellow	2	1.1
Current semester		
1st semester	26	14.1
2nd semester	23	12.4
3rd semester	26	14.1
4th semester	24	13.0
5th semester	25	13.5
6th semester	21	11.4
7th semester	11	5.9
8th semester	13	7.0
9th semester	8	4.3
10th semester	3	1.6
11th semester	1	0.5
12th semester	4	2.2
University program		
Medicine	50	27.0
Nursing	43	23.2
Physiotherapy	21	11.4
Biomedical sciences	27	14.6
Psychology	16	8.6
Sports science	14	7.6
Dentistry	14	7.6
BMI classification		
Underweight	20	10.8
Normal weight	103	55.7
Overweight	39	21.1
Obesity type 1	18	9.7
Obesity type 2	3	1.6
Obesity type 3	2	1.1
Hypertension diagnosis		
Yes	8	4.3
No	177	95.7
Diabetes mellitus diagnosis		
Yes	1	0.5
No	184	99.5

Source: Author's data

Regarding physical activity, among the 185 participants in this study, 114 (61.6%) reported engaging in physical activity before the pandemic, while 97 (52.4%) continued practicing during the pandemic emergency period. The mean number of days per week and the time dedicated to physical activity decreased during the pandemic compared to the pre-pandemic period (Table 2).

In other words, during the pandemic, students engaged in physical activity an average of 4.0 days per week, with a mean duration of 65 minutes per day. In contrast, before the pandemic, the average was 4.7 days per week and 76 minutes per day (Table 2).

Table 2 – Mean number of days and time spent on physical activity before and during the pandemic at a private higher education institution (HEI), Salvador, Brazil. 2022 (n = 185)

	Physical activity practice	
Variable	**Before the pandemic Mean (SD)**	**During the pandemic Mean (SD)**
Days of practice	4.07 (1.443)	4.03 (1.365)
Time spent on physical activity	76.18 (28.954)	65.05 (42.644)

Source: Author's data
Legend: * Number of students before the pandemic (114), number of students during the pandemic (97).

As for physical activity stratified by degree program, students in sports science, followed by those in dentistry and nursing, had the highest mean number of days and time per week dedicated to physical activity before the pandemic, compared to students in other programs. However, when analyzing this practice during the pandemic, we observed a reduction in exercise duration and a slight increase in the mean number of days per week. Notably, dentistry and nursing students maintained the highest averages (Table 3).

We found a statistically significant difference only in the pre-pandemic period in the university programs' mean number of days dedicated to physical activity (Table 3).

Table 3 – Mean number of days and time spent on physical activity before and during the pandemic at a private higher education institution, by university program, Salvador, Brazil. 2022 (N = 185)

Variable	**Before the pandemic (N = 114)**				**During the pandemic (N = 97)**			
University program	Mean number of days (SD)	p-value	Mean time (minutes) (SD)	p-value	Mean number of days (DP)	p-value	Mean time (minutes) (SD)	p-value
Sports science	4.9(1.1)		96.9(32.7)[a.b.c.d]		4.1(1.3)		79.2(56.3)	
Dentistry	4.3(1.9)		88.8(30.9)		4.6(1.3)		85.0(87.9)	
Nursing	4.3(1.3)		67.9(25.4) [a]		4.3(1.3)		65.7(39.6)	
Physiotherapy	4.0(1.0)	0.25	70.0(24.9) [c]	0.04**	4.1(1.0)	0.65	47.3(20.9)	0.23
Medicine	4.0(1.3)		71.5(25.6) [b]		3.8(1.5)		56.2(24.2)	
Biomedical sciences	3.8(1.8)		83.9(38.0)		4.2(1.1)		73.5(33.5)	
Psychology	3.5(1.6)		70.8(19.3) [d]		3.4(1.7)		72.1(48.2)	

Source: Author's data
Legend: Kruskal-Wallis test with statistical significance <0.05. Identical letters indicate a statistically significant difference ($p < 0.05$).

Discussion

This study aimed to compare the physical activity patterns of university students before and during the COVID-19 pandemic. Regarding demographic data, there was a predominance of young students, most of whom were female, a profile observed in previous studies conducted with university populations.[22] The concept of race is complex, as it also involves color and ethnicity, yet it remains a relevant factor in the context of this study. In the present research, most students self-identified as White, with a higher proportion in the medicine program, despite the 2022 Census conducted by the Brazilian Institute of Geography and Statistics (IBGE) indicating that Salvador has the highest concentration of Afro-descendants in Brazil.[23] Another study with medical students aligns with the present study's findings.[24] The predominance of White students in this study may, in part, be attributed to the historical advantage of White individuals in accessing private higher education institutions. This phenomenon reflects socioeconomic and structural inequalities that affect access to higher education in Bahia and Brazil. In contrast, in 2012, the federal government implemented an

affirmative action policy for Black students to promote greater democratization of access to public universities.[25]

Regarding university routines, students are required to complete both curricular and extracurricular activities at various times throughout their education. The heavy course load, combined with study schedules, may influence the time available for engaging in physical activity.[26] Physical inactivity, characterized by the absence of bodily movement, is a major predisposing factor for excess weight.[5] Although most students in this study had a normal weight, research on university students indicates a high prevalence of overweight individuals among undergraduate students.[15,26]

During the pandemic, students engaged in physical activity for an average of 65 minutes per day, whereas before the pandemic, the mean duration was 76 minutes per day, aligning with WHO recommendations.[4,5,27] However, this trend differed in other populations. For instance, data from the Canadian Community Health Survey revealed a significant impact of the pandemic on physical activity levels among Canadians, with a 14-percentage-point decrease in the proportion of young individuals meeting physical activity recommendations—from 51% in 2018 (pre-pandemic) to 37% in 2020 (during the pandemic).[28] Another population-based study found that the average step count during the pandemic was significantly lower across all 200 participating countries and territories than in the same pre-pandemic period ($p < 0.001$).[29]

The impacts of the COVID-19 pandemic also affected the routines of university students worldwide.[1,30] Students faced challenges related to physical health, including weight gain and reduced physical fitness, as well as mental health issues, such as increased stress and anxiety while adapting to distance learning.[3,15] Leitão et al.[31] found in their study involving 115 Brazilian university students that the amount of time dedicated to daily exercise decreased during the pandemic, with a preference for shorter workout sessions.[31] Another study with 320 medical students reported that 46.6% developed or worsened symptoms of anxiety disorders, including excessive worry, difficulty concentrating, and high levels of stress during the pandemic. Additionally, 24% increased their consumption of psychoactive substances, such as alcohol, drugs, and tobacco, while 20% reduced the frequency of physical activity.[32]

Regarding the recommended weekly amount of physical activity, the university students in this study reported engaging in and maintaining the minimum recommended levels, averaging 4.0 days per week and 65 minutes per day, both before and during the pandemic. One possible explanation for this finding is the students' field of study. As demonstrated by Saraiva et al.,[33] students in health-related fields were more likely to meet the minimum weekly physical activity recommendations than those in other academic disciplines. Thus, acquiring knowledge and information during health-related training may contribute to a greater awareness of the benefits of adopting healthy habits.[33]

Studies have confirmed a significant change in physical activity levels among university students before and during the pandemic.[34-36] A study conducted with medical students in Italy revealed that 90% of students from the first to sixth years spent an average of more than six hours per day sitting during lockdown. Additionally, final-year students, or those in their sixth year, spent an average of eight hours per day sitting before the lockdown and ten hours per day during the confinement period. The majority of university students also reported a reduction in physical activity due to decreased opportunities for walking and daily movement (65%), as well as the lack of access to sports facilities or gym equipment (51%).[34] Similar findings were observed in a study involving 857 university students enrolled in higher education institutions in Montes Claros, Minas Gerais, which reported a 56.8% reduction in physical activity during the pandemic.[36]

Lifestyle habits, including physical activity, tend to change in both quality and quantity as university students advance through their academic programs.[19,37] A study conducted with undergraduate physiotherapy students found that those in the final years of their program had lower physical activity levels than first-year students.[38]

Given that this study was conducted with university students—future healthcare professionals—health promotion strategies should be implemented to help them maintain the minimum recommended level of daily physical activity, even in periods of epidemic lockdowns and public health emergencies.

Conclusion

Health sciences university students reduced the amount of time dedicated to physical activity during the COVID-19 pandemic despite diversifying their exercise modalities in an effort to maintain regular physical activity. During this public health emergency, remote work and study became widespread, increasing screen time—an adaptation that young students had to incorporate into their daily routines. In this context, the findings of this study can encourage universities to implement both collective and individual strategies that promote students' physical and mental well-being, supporting healthy lifestyle changes even during pandemic-related emergencies. Therefore, further research in public and mental health focusing on university students should be conducted to assess the impact of the pandemic on their willingness to engage in physical activity.

When interpreting the results of the present study, some limitations should be considered. First, this study relied on self-reported data with recall-based questions, which may have been strongly influenced by recall bias. Another limitation is the use of convenience sampling, as the selected participants were not representative of the university student population as a whole. Future studies should include larger samples and incorporate students from a broader range of academic disciplines beyond health sciences.

Despite these limitations, our findings have important clinical and social implications.

Authors' contributions

Macêdo T: Conception and design of the study; Data collection; Data analysis and interpretation; Obtaining funding; Writing the manuscript; Critical revision of the manuscript; Approval of the final version of the manuscript and taking responsibility for it;
Nascimento M: Conception and design of the study; Data collection; Data analysis and interpretation; Writing the manuscript; Critical revision of the manuscript; Approval of the final version of the manuscript and taking responsibility for it;
Palmeira C: Conception and design of the study; Data collection; Data analysis and interpretation; Writing the manuscript; Critical revision of the manuscript; Approval of the final version of the manuscript and taking responsibility for it;
Lordello G: Conception and design of the study; Data collection; Data analysis and interpretation; Writing the manuscript; Critical revision of the manuscript; Approval of the final version of the manuscript and taking responsibility for it;
Gama G: Conception and design of the study; Data collection; Data analysis and interpretation; Writing the manuscript; Critical revision of the manuscript; Approval of the final version of the manuscript and taking responsibility for it.

Conflicts of interest and Funding

No conflicts of interest were declared by the authors

Acknowledgments

To the Escola Bahiana de Medicina e Saúde Pública for providing a scholarship through the Institutional Scientific Initiation Scholarship Program (PIBIC) to support the development of this project as well as the availability of the Red-Cap® tool, essential for the collection and management of research data.

Sources of support / Financing

This study was supported by a scientific initiation scholarship from the Institutional Scholarship Program Scientific Initiation (PIBIC) at the Bahiana School of Medicine and Public Health.

Referências

1. Vieira KM, Postiglioni GF, Donaduzzi G, Porto CS, Klein LL. Vida de estudante durante a pandemia: Isolamento social, ensino remoto e satisfação com a vida. EaD em Foco [Internet]. 22 setembro 2020 [cited 2024 Jan 23];10(3). Available from: https://doi.org/10.18264/eadf.v10i3.1147

2. Fiorentin L, Beltrame V. Distanciamiento social por COVID-19: Efectos en la rutina de estudiantes universitários. Rev Cuid [Internet]. 15 março 2022 [cited 2024 Jan 23];13(1). Available from: https://doi.org/10.15649/cuidarte.2093

3. Du X, Liu Z. Influence of physical education on the mental health of college students. Rev Bras Med Esporte [Internet]. 2022 Aug [cited 2024 Jan 23];28(4):311–4. Available from: https://doi.org/10.1590/1517-8692202228042021_0062

4. Exercise is Medicine [Internet]. EIM physical activity vital sign: A clinical tool for assessing physical activity in patients. Indianapolis: ACSM; 2021 [cited 2024 Mar 12]. Available from: https://www.exerciseismedicine.org/wp-content/uploads/2021/04/EIM-Physical-Activity-Vital-Sign.pdf

5. Pitanga FJG, Pitanga CPS, Beck CC. Physical activity for the prevention of cardiometabolic diseases: How much is required? Curr Res Diabetes Obes J [Internet]. 2019 [cited 2024 Jan 26]; 9(4): 555766. Available from: https://juniperpublishers.com/crdoj/CRDOJ.MS.ID.555766.php 10.19080/CRDOJ.2019.09.555766

6. World Health Organization (WHO). Considerações para a implementação de uma abordagem de precaução universal para prevenção e controle de infecções durante a pandemia de COVID-19 em estabelecimentos de saúde [Internet]. Genebra: Organização Mundial da Saúde [cited 2025 Jan 25]; 2020. Available from: https://www.paho.org/pt/noticias/6-5-2022-oms-lanca-primeiro-relatorio-mundial-sobre-prevencao-e-controle-infeccoes

7. Organização Pan-Americana da Saúde. Diretrizes sobre atividade física e comportamento sedentário 2020-2030 [Internet]. Brasília (DF): OPAS 2020; [cited 2024 Mar 23]. Available from: https://www.paho.org/pt/noticias/26-11-2020-oms-lanca-novas-diretrizes-sobre-atividade-fisica-e-comportamento-sedentario

8. Pitanga FJG, Beck CC, Pitanga CPS. Atividade física e redução do comportamento sedentário durante a pandemia do coronavírus. Arq Bras Cardiol [Internet]. 2020 Jun [cited 2024 Mar 25];114(6):1058–60. Available from: https://doi.org/10.36660/abc.20200238

9. Clemence M. Global views on sports: 58% globally would like to practice more [Internet]. Ipsos; 2021 [cited 2024 Oct 04]. Available from: https://www.ipsos.com/en/global-views-to-sports-2021

10. Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. Vigitel Brasil 2021: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2021 [Internet]. Brasília: Ministério da Saúde; 2021[cited 2024 Oct 04]. Available from:

https://bvsms.saude.gov.br/bvs/publicacoes/vigitel_brasil_2021.pdf

11. Cabral BL, Oliveira TPF, Christmann M, Gerlach A, Brum LS, Skupien JA. A prática de atividade física no período de isolamento social. Braz J Hea Rev [Internet]. 7 outubro 2021 [cited 2024 Nov 23];4(5):21218-31. Available from: https://doi.org/10.34119/bjhrv4n5-216

12. Monteiro LS, Torres RG, Silva MFL. Impacto da pandemia da Covid-19 na prática ou adesão ao exercício físico. RSD [Internet]. 2022 Jul 5 [cited 2024 Nov 04];11(9):e12111931739. Available from: https://doi.org/10.33448/rsd-v11i9.31739

13. Aquino EML, Silveira IH, Pescarini JM, Aquino R, Souza-Filho JA, Rocha AS, et al. Medidas de distanciamento social no controle da pandemia de COVID-19: potenciais impactos e desafios no Brasil. Ciência & Saúde Coletiva. 2020 Jun 5 [cited 2024 Oct 10];25(1):2423–46. Available from: https://doi.org/10.1590/1413-81232020256.1.10502020

14. Secretaria de Vigilância em Saúde e Ambiente. COVID-19: informações e dados [Internet]. Brasilia: Ministério da Saúde; 2023 [cited 2024 Sep. 12]. Available from: https://covid.saude.gov.br/

15. Botero JP, Farah BQ, Correia MA, Lofrano-Prado MC, Cucato GG, Shumate G, et al. Impacto da permanência em casa e do isolamento social, em função da COVID-19, sobre o nível de atividade física e o comportamento sedentário em adultos brasileiros. Einstein (SP) [Internet]. 2021 [cited 2024 Jun 10]; 19:eAE6156. Available from: https://doi.org/10.31744/einstein_journal/2021AE6156

16. Elesbão, K. F., Dimov, T., Barros, W. S., Erazo-Chavez, L. J., & Ricci, E. C. Pandemia de COVID-19 no Brasil: análise do cotidiano e desdobramentos de uma intervenção grupal. Cad Bras Ter Ocup [Internet]. 2023 [cited 2024 Oct 15]; 31:e3262. Available from: https://doi.org/10.1590/2526-8910.ctoAO249332621

17. Santos AJS, Medeiros EC. Impactos da pandemia frente aos discentes da modalidade educação a distância do ensino superior. TICs & EaD [Internet]. 2022 dez 7 [cited 2024 Jan 18];8(3):23-39. Available from: https://ticsead.uemanet.uema.br/index.php/ticseadfoco/article/view/588

18. Pedroso DG, Pinheiro GP, Silva TCR, Fernandes AGO. Tempo de tela e prática de atividade física entre universitários durante a pandemia. Mundo Saúde [Internet]. 2023 [cited 2024 Oct 19];47:e14252022–2. Available from: https://revistamundodasaude.emnuvens.com.br/mundodasaude/article/view/1425/1327

19. Macedo TTS, Mussi FC, Sheets D, Campos ACP, Patrão AL, Freitas CLM, et al. Lifestyle behaviors among undergraduate nursing students: A latent class analysis. Res Nurs Health [Internet]. 2020 Sep 1 [cited 2024 Out 25];43(5):520–8. Available from: https://doi.org/10.1002/nur.22064

20. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform [Internet]. 2009 Apr [cited 2024 Jan 05];42(2):377–81. Available from: https://doi.org/10.1016/j.jbi.2008.08.010

21. França A. Teste de Kruskal-Wallis: o que é e quando usar? [Internet]. Blog Psicometria Online. 2021 [cited 2025 Jan 25]. Available from: https://www.blog.psicometriaonline.com.br/teste-de-kruskal-wallis/

22. Lopes AR, Nihei OK. Preditores de impactos negativos da pandemia de covid-19 em universitários brasileiros. Arq Ciênc Saúde UNIPAR [Internet]. 2023 Apr 20 [cited 2024 Out 09];27(4):1552–68. Available from: https://revistas.unipar.br/index.php/saude/article/view/9552

23. Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2022: Identificação étnico-racial da população, por sexo e idade: Resultados do universo [Internet]. Rio de Janeiro: IBGE; 2023 [cited 2024 Jan 04]. Available from: https://biblioteca.ibge.gov.br/visualizacao/periodicos/3105/cd_2022_etnico_racial.pdf

24. Costa EAP, Sobrinho ACR, Canto GM, Portugal MR, Avena KM. Conduta sedentária entre estudantes de medicina: repercussões da pandemia do coronavírus. Rev Bras Med Esporte [Internet]. 2024 Jan 1 [cited 2024 Jan 18];30. Available from: https://doi.org/10.1590/1517-8692202430012022_0407p

25. Brasil. Lei nº 12.711, de 29 de agosto de 2012. Dispõe sobre o ingresso nas universidades federais e nas instituições federais de ensino técnico de nível médio e dá outras providências [Internet]. Diário Oficial da União; 30 ago 2012 [cited em 2025 Jan 25]. Available from: https://www2.camara.leg.br/legin/fed/lei/2012/lei-12711-29-agosto-2012-774113-normaatualizada-pl.pdf

26. Macedo TTS, Mussi FC, Pires CGS, Teixeira JRB, Portela PP. Perfil alimentar, clínico e padrão de atividade física em ingressantes universitários de enfermagem. Rev Cubana Enferm [Internet]. 2019 [cited 2024 Dez 15];35(1):e1785–5. Available from: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-03192019000100010

27. World Health Organization. Physical activity [Internet]. Geneva: World Health Organization; 2024 [cited 2024 Oct

04]. Available from: https://www.who.int/news-room/fact-sheets/detail/physical-activity

28. Colley RC, Watt J. The unequal impact of the COVID-19 pandemic on the physical activity habits of Canadians. Health Rep [Internet]. 2022 May 18 [cited 2024 Ago 11];33(5):22–33. Available from: https://doi.org/10.25318/82-003-x202200500003-eng

29. Tison GH, Barrios J, Avram R, Kuhar P, Bostjancic B, Marcus GM, et al. Worldwide physical activity trends since COVID-19 onset. Lancet Glob Health [Internet]. 2022 Aug [cited 2024 Sep 15];10(8):e1381-e1382. Available from: https://doi.org/10.1016/S2214-109X(22)00361-8

30. Yang D, Tu CC, Dai X. The effect of the 2019 novel coronavirus pandemic on college students in Wuhan. Psychol Trauma [Internet]. 2020 Aug [cited 2024 Nov 19];12(S1):S6–14. Available from: https://doi.org/10.1037/tra0000930

31. Leitão LMJ, Peçanha PLO, Machado LS, Linhares GB, Nery V, Silva JS. Como a pandemia afetou a prática de exercícios físicos dos estudantes universitários. Anais Noite Acadêmica. Centro Universitário UNIFACIG [Internet]. 2021 Jun 18 [cited 2024 May. 21];1. Available from: https://pensaracademico.unifacig.edu.br/index.php/noiteacademica/article/view/2723

32. Felippe TO, Spaniol CM, Silva LA, Calabria AC, Ferreira G, Carvalho NL, et al. O estresse do estudante de medicina durante a pandemia de COVID-19. RSD [Internet]. 2021 Aug 3 [cited 2024 Jul 15];10(9):e58310918372. Available from: https://doi.org/10.33448/rsd-v10i9.18372

33. Saraiva LC, Nascimento Junior JRA, Petrolini AL, Sousa Filho AN, Bezerra TA, Moraes JFVN, et al. Frequência e duração da prática de atividade física de discentes e servidores universitários. JPhysEduc [Internet]. 2018 Jun.21 [cited 2024 Sep. 01];29(1):e-2958. Available from: https://periodicos.uem.br/ojs/index.php/RevEducFis/article/view/37299

34. Luciano F, Cenacchi V, Vegro V, Pavei G. COVID-19 lockdown: Physical activity, sedentary behaviour and sleep in Italian medicine students. Eur J Sport Sci [Internet]. 2021 Oct [cited 2024 Fev 15];21(10):1459-1468. Available from: https://doi.org/10.1080/17461391.2020.1842910

35. Heller S, Kalo K, Werner AM, Eisenbarth L, Reichel JL, Mülder LM, et al. Sedentary time of university students before and during the COVID-19 pandemic: Risk groups and pre-pandemic predictors using cross-sectional and longitudinal data. Front Public Health [Internet]. 2023 Apr 5 [cited 2024 Oct 18];11:1138442. Available from: https://doi.org/10.3389/fpubh.2023.1138442

36. Rocha BMS, Souto MFO, Mendes VCN, Ferreira JVB, Azevedo EO, Cunha ALLPE, et al. Factors associated with the practice of physical activity among university students in social isolation during the covid-19 pandemic. Rev Bras Cineantropom Desempenho Hum [Internet]. 2023 Nov 13 [cited 2024 Oct 18];25:e90191. Available from: https://doi.org/10.1590/1980-0037.2023v25e90191

37. Muniz GBA, Garrido EN. Mudanças de hábitos e saúde dos estudantes após ingresso na universidade. Rev Psi Divers Saúde [Internet]. 2021 Jul 26 [cited 2024 Oct 15];10(2):235-4. Available from: https://journals.bahiana.edu.br/index.php/psicologia/article/view/3443

38. Costa PHV, Silva FS, Machado CJ. Nível de atividade física e qualidade de vida dos estudantes de fisioterapia de uma instituição privada de ensino superior. Rev interdiscip Ciênc Méd [Internet]. 2018 Mar 7 [cited 2024 Oct 19];2(1):46–53. Available from: https://revista.fcmmg.br/index.php/RICM/article/view/38/26