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Original article

The impact of the COVID-19 pandemic on sedentary behavior and physical inactivity in university students

O impacto da pandemia da COVID-19 no comportamento sedentário e inatividade física em estudantes universitários

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ABSTRACT

Objective: To describe the changes in the prevalence of sedentary behavior and physical inactivity in university students of the Physical Education course during the COVID-19 pandemic. **Methods:** A cross-sectional observational study was carried out, involving a sample of 137 students from Physical Education courses at a public university in Teresina/PI. Students answered, through a link, a questionnaire with questions regarding their sociodemographic aspects and physical activity practices (weekly frequency and daily duration; cut-off point of 150 min/week), TV time and computer time/ tablet and/or smartphone (daily duration; cut-off point of 4 hours/day). **Results:** The prevalence of TV time, computer/tablet and/or smartphone time and physical inactivity increased by 533%, 161% and 21% respectively during the pandemic. When analyzing the sociodemographic variables of the students, there was no significant difference ($p \leq 0.05$) in the increase in inactive during the pandemic. Regarding TV time (≥ 4 hours/day), a significant increase was observed during the pandemic only in females, mixed race, single and living in the capital ($p \leq 0.05$). Regarding computer/tablet and/or smartphone use (≥4 hours/day), there was an increase during the pandemic in all sociodemographic variables analyzed, with the exception of those who work in the hybrid form, and those with higher family income ($p \leq 0.05$). **Conclusion:** The prevalence of sedentary behavior and physical inactivity in college students has increased during the COVID-19 pandemic.

Keywords: sedentary behavior; physical inactivity; COVID-19.

RESUMO

Objetivo: Descrever as mudanças na prevalência de comportamento sedentário e inatividade física em universitários do curso de Educação Física durante a pandemia da COVID-19. **Métodos:** Foi realizado um estudo observacional de corte transversal, que envolveu uma amostra de 137 estudantes dos cursos de Educação Física de uma universidade pública em Teresina/PI. Os estudantes responderam, por meio de um link, um questionário com perguntas referentes aos seus aspectos sociodemográficos e sobre práticas de atividades físicas (frequência semanal e duração diária; ponto de corte de 150 min/sem.), tempo em TV e tempo no computador/*tablet* e/ou *smartphone* (duração diária; ponto de corte de 4 horas/dia). **Resultados:** A prevalência de tempo de TV, tempo de computador/*tablet* e/ou *smartphone* e de inatividade física aumentaram 533%, 161% e 21% respectivamente durante a pandemia. Ao se analisar as variáveis sociodemográficas dos estudantes, não se observou diferença significativa ($p \leq 0,05$) no aumento de inativos durante a pandemia. Com relação ao tempo de TV (≥ 4 horas/dia), observou-se aumento significativo durante a pandemia apenas no sexo feminino, cor parda, ser solteiro e morar na capital ($p \leq 0,05$). Já com relação ao uso do computador/*tablet* e/ou *smartphone* (≥ 4 horas/dia), houve aumento durante a pandemia em todas as variáveis sociodemográficas analisadas, com exceção de quem trabalha na forma híbrida, e naqueles com renda familiar mais elevada ($p \leq 0,05$). **Conclusão:** A prevalência de comportamento sedentário e inatividade física nos universitários aumentou durante a pandemia de COVID-19.

Palavras-chave: comportamento sedentário; inatividade física; COVID-19.

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Introduction

The increase in sedentary behavior (SB) and physical inactivity is a major public health concern worldwide. Scientific evidence reveals the relationship between these behaviors and the incidence of non-communicable chronic diseases and also that not only the practice of physical activities but also the reduction of SB has a positive impact on the improvement of the population's health [1-2].

The COVID-19 pandemic has contributed to the increase in the prevalence of SB and physical inactivity in the population, as the strategies to deal with the new Coronavirus (SARS-COV-2) involved periods of quarantine and social distancing. Furthermore, the adoption of classes remotely by states and municipalities worsened this situation of hypokinesia in the population [3-5].

When analyzing the prevalence of SB and physical inactivity before and during the COVID-19 pandemic, it was observed that the harm of such behaviors favors physical and mental health risks [1,6,7]. An even more worrying fact is that research with university students, even in the health area, has already shown a marked reduction in the level of physical activity, an increase in SB, high use of tobacco and alcohol, thus showing greater susceptibility of these students to negative behaviors for the health [8-10].

It is expected that university students in the health area know the consequences of SB and physical inactivity. However, there is a high prevalence of these behaviors in these populations [11,12]. Given the negative impact of SB and physical inactivity on the health of the population, the present study aims to describe the changes in the prevalence of sedentary behavior and physical inactivity in university students of the Physical Education course during the COVID-19 pandemic.

Methods

A cross-sectional observational study was carried out with a population of 142 university students from Physical Education courses at a public university in Teresina, Piauí. The sample was selected for convenience and finalized in 137 university students due to 5 refusals to participate.

Inclusion criteria were: students enrolled in the Licentiate and Bachelor's Degree Courses in Physical Education who were attending classes. The research was carried out in July 2021, still during the COVID-19 pandemic period, and the institution involved was complying with the decree established by the State, which determined exclusively remote classes. Data collection took place through a Google Forms link, passed on to all classes. Also, for greater engagement and encouragement of students to participate in the study, the researchers entered the virtual classrooms to explain the importance of the study. Students who agreed to participate in the study accessed the link containing the Free and Informed Consent Form and started filling out the form, divided into 3 sessions, with a total of 20 questions, referring to their sociodemographic, SB, and physical activity level.

For assessing SB and the level of physical activity, the questions from the National ConVid - Behavior Survey were used, which dealt with movement behaviors before and during the pandemic [5]. In the data analysis, the cutoff point of the forenamed survey was also adopted, with the classification of SB > 4 hours/day of TV or computer/tablet and/or smartphone, and physical inactivity < 150 minutes per week of physical activities.

Sedentary behavior before and during the pandemic was determined by TV and computer/tablet and/or smartphone time, and participants were asked: "Usually, before the pandemic, how many hours a day did you spend watching television?" and "During the pandemic, how many hours a day did you spend watching television?" "Typically, before the pandemic, how many hours a day did you spend on your computer/tablet and/or smartphone?" and "During the pandemic, how many hours a day did you use a computer/tablet and/or smartphone?".

For the level of physical activity before the COVID-19 pandemic, participants were asked: "Before the COVID-19 pandemic, how many days a week did you practice some type of physical exercise or sport? (do not consider physical therapy)". Possible answers were: (a) less than 1; (b) 1-2; (c) 3-4; or (d) 5 or more. For those who reported physical activity, we also asked: "How long did this activity last?". Possible answers were: (a) less than 30 minutes; (b) 30-45 minutes; (c) 46-60 minutes; or (d) more than 60 minutes. In addition, for physical activity during the COVID-19 pandemic, it was asked: "During the COVID-19 pandemic, how many days a week did you practice some type of physical exercise or sport? (do not consider physical therapy)". Possible answers were: (a) less than 1; (b) 1-2; (c) 3-4; or (d) 5 or more. For those who report physical activity, we also asked: "How long did this activity last?". Possible answers were: (a) less than 30 minutes; (b) 30-45 minutes; (c) 46-60 minutes; or (d) more than 60 minutes.

Statistical analysis was performed using the SPSS - IBM statistical package, version 20.0, in which descriptive and inferential statistics were performed. Statistical analysis was performed using the SPSS – IBM statistical package, version 20.0, in which descriptive and inferential statistics were performed. Physical inactivity was calculated using the midpoint of frequency of each category of the variable "How many days a week did you practice some type of physical activity/exercise or sport" multiplied by the midpoint of each category of the variable "How long, on average, did this activity last?", resulting in a single scale of minutes per day. Those with less than 150 minutes of physical activity were considered inactive. The McNemar test was used to verify the difference between the variables before and during the COVID-19 pandemic. The significance level adopted was 5% ($p < 0.05$). Tables and graphs were used to present the results.

This study was approved by the Ethics Committee of State University of Piauí under opinion number 2,070,131, in compliance with Resolution 466/12 of the National Health Council for research with human beings of the Ministry of Health.

Results

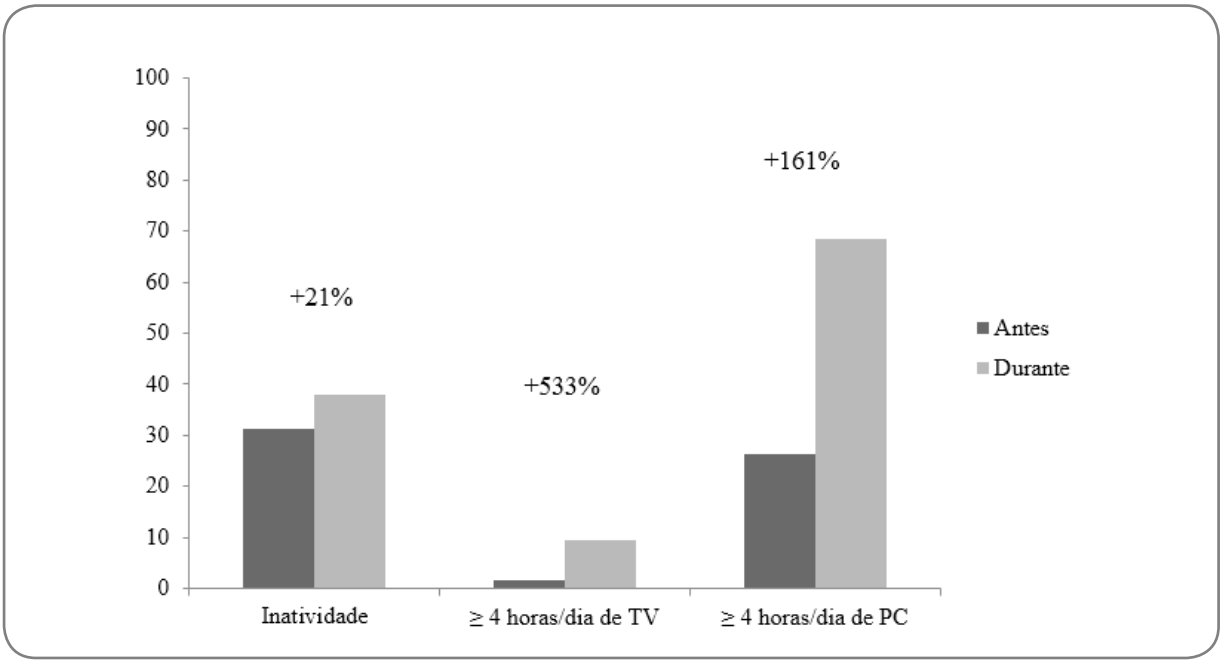
The sociodemographic characteristics of the 137 students evaluated are shown in table I.

Table I - Sociodemographic profile of the Physical Education students evaluated

Variables	N	%
Age		
up to 21 years	69	50.4
more than 21 years	68	49.6
Mean ± SD	22.1 ± 2.7	
Gender		
Female	73	53.3
Male	64	46.7
Marital status		
No partner	121	88.3
With partner	16	11.7
Resides		
Teresina	113	82.5
Other municipality	24	17.5
Work during the pandemic		
No	66	48.2
Yes, in person	46	33.6
Yes, in home office	16	11.7
Yes, in hybrid form	9	6.6
Family income		
Up to 1 MW	37	27.0
From 1 to 2 MW	44	32.1
From 2 to 3 MW	34	24.8
From 3 to 4 MW	15	10.9
More than 4 MW	7	5.1

MW = Minimum Wage

The prevalence of physical inactivity (< 150 min/wk), TV hours ≥ 4 hours/day, and computer/tablet and/or smartphone use ≥ 4 hours/day, before and during the pandemic, are shown in Figure 1. There was an increase of 21% in inactive students, 533% in TV hours, and 161% in computer/tablet and/or smartphone hours during the pandemic.



PC = computer/tablet and/or smartphone
Figure 1 - Changes in the prevalence of inactivity and SB in Physical Education students, before and during the COVID-19 pandemic

Table II presents the sociodemographic characteristics of the students, before and during the COVID-19 pandemic, according to the level of physical activity and SB. It is observed that there was a predominance of students with SB, especially in PC time (computer/tablet and/or smartphone) ≥ 4 hours/day, during the pandemic ($p < 0.05$).

Discussion

This study aimed to describe the changes in the prevalence of SB and physical inactivity in university students of the Physical Education course during the COVID-19 pandemic. The results reveal an increase during the pandemic in the prevalence of TV time (533%), computer/tablet and/or smartphone time (161%), and physical inactivity (21%) among the evaluated university students. Significant increases were observed in the prevalence of students with SB, especially in the time spent on a computer/tablet and/or smartphone ≥ 4 hours/day, during the pandemic.

The alarming increases in SB and physical inactivity in all age groups in recent decades were already a major public health concern worldwide, and the COVID-19 pandemic has worsened this situation, given that with the need for quarantine and social distancing, the use of computers, tablets, and smartphone are the options to maintain activities related to work and study, as well as social coexistence and entertainment [4,5,13].

Table II - Physical inactivity and SB before and during the COVID-19 pandemic according to the sociodemographic profile of Physical Education students

	(< 150 min/wk)			≥ 4 hours/day of TV			≥ 4 hours/day of PC		
Variables	Before (n=43) n (%)	During (n=52) n (%)	p-value	Before (n=2) n (%)	During (n=13) n (%)	p-value	Before (n=36) n (%)	During (n=94) n (%)	p-value
Age									
Up to 21 years	19 (27.5)	19 (27.5)	1.000	2 (2.9)	5 (7.2)	0.453	18 (26.1)	51 (73.9)	**<0.001**
More than 21 years	24 (35.3)	33 (48.5)	0.108	-	8 (11.8)	-	18 (26.5)	43 (63.2)	**<0.001**
Gender									
Female	28 (38.4)	31 (42.5)	0.743	2 (2.7)	11 (15.1)	**0.022**	14 (19.2)	56 (76.7)	**<0.001**
Male	15 (23.4)	21 (32.8)	0.210	-	2 (3.1)	-	22 (34.4)	38 (59.4)	**<0.001**
Marital status									
Single	33 (27.3)	43 (35.5)	0.193	2 (1.7)	10 (8.3)	**0.039**	34 (28.1)	80 (66.1)	**<0.001**
Married/With partner	10 (62.5)	9 (56.3)	1.000	- -	3 (18.8)	-	2 (12.5)	14 (87.5)	**<0.001**
Currently reside in									
Teresina (Capital)	33 (29.2)	46 (40.7)	0.053	2 (1.8)	11 (9.7)	**0.022**	33 (29.2)	81 (71.7)	**<0.001**
Other municipality	10 (41.7)	6 (25.0)	0.424	- -	2 (8.3)	-	3 (12.5)	13 (54.2)	**0.002**
Work during the pandemic									
No	22 (33.3)	22 (33.3)	1.000	- -	5 (7.6)	-	19 (28.8)	46 (69.7)	**<0.001**
Yes, in person	13 (28.3)	17 (37.0)	0.424	2 (4.3)	5 (10.9)	0.453	13 (28.3)	33 (71.7)	**<0.001**
Yes, in home office	7 (43.8)	8 (50.0)	1.000	- -	2 (12.5)	-	3 (18.8)	11 (68.8)	**0.008**
Yes, in hybrid form	1 (11.1)	5 (55.6)	0.125	- -	1 (11.1)	-	1 (11.1)	4 (44.4)	0.250
Income									
Up to 1 MW	12 (32.4)	19 (51.4)	0.167	- -	5 (13.5)	-	13 (35.1)	29 (78.4)	**<0.001**
From 1 to 2 MW	14 (31.8)	15 (34.1)	1.000	2 (4.5)	4 (9.1)	0.687	8 (18.2)	30 (68.2)	**<0.001**
From 2 to 3 MW	10 (29.4)	12 (35.3)	0.774	- -	2 (5.9)	-	12 (35.3)	22 (64.7)	**0.013**
From 3 to 4 MW	7 (46.7)	3 (20.0)	0.125	- -	1 (6.7)	-	2 (13.3)	8 (53.3)	0.070
More than 4 MW	- -	3 (42.9)	-	- -	1 (14.3)	-	1 (14.3)	5 (71.4)	0.125

MW = Minimum Wage; PC = computer/tablet and/or smartphone; p-value = McNemar test

The evaluated university students were, during the data collection period, attending exclusively virtual classes since the Institution complied with Ordinance No. 343, of March 17, 2020, of the Ministry of Education [14], which provides for the replacement of face-to-face classes in digital media while the COVID-19 pandemic situation lasts, and this fact may have influenced the results of high prevalence in the time of computer/tablet and/or smartphone use during the pandemic.

A significant nationally-based online retrospective survey study with 39,693 Brazilian adults, carried out during the COVID-19 pandemic by Silva et al. [5], revealed significant changes in physical inactivity and SB, in which the prevalence of physical inactivity, TV time, and computer/tablet time increased by 26%, 266%, and 38%, respectively, during the pandemic. These findings are in agreement with our study. However, regarding the time of computer and tablet use, the increases were not as pronounced as ours, perhaps because the sample was composed of students who were attending exclusively virtual classes.

In other countries, studies also carried out during the COVID-19 pandemic showed similar results. In Italy, Pietrobelli et al. [15] identified that children and adolescents reduced the time of sports practices and the screen time increased significantly. In Canada, Moore et al. [16] showed that children and adolescents, during the restrictions of the pandemic, had lower levels of physical activity and higher SB, including leisure screen time.

In this study, it was observed that there were no significant changes in physical inactivity during the pandemic. Generally, significant changes in the increase in physical inactivity are demonstrated among more active groups before the pandemic [5]. Meyer et al. [4] evaluated 3,052 North American adults during the COVID-19 pandemic and found that physical activity in active individuals before the pandemic was reduced by 32.3% with the pandemic.

University students have been the subject of investigations for decades, since entering a university or college is an event marked by changes in social relationships, habits, and behaviors, comprising an important step for the consolidation of healthy habits, including the practice of physical activities [11,17].

A systematic literature review carried out in 2011 concluded that the levels of physical inactivity in Brazilian university students had a high prevalence, which reached 78.9% of physical inactivity or low levels of physical activity, either in global terms or only in leisure time [18]. In 2016, Lourenço et al. [19] showed that most university students had greater exposure to computer use, studies, and leisure, followed by time watching TV and using video games. Screen time was significant so that eight out of ten university students were exposed to these types of SB.

It is believed that students of Physical Education courses, future health professionals, have healthier habits in their daily lives and are more active. In this sense, studies involving the university population have shown that Physical Education students are generally more active than others and have a higher prevalence of healthier habits in their daily lives, a fact that may be largely due to the knowledge disseminated in the course [20-22].

A study carried out with 280 university students from a public university in the health and biological areas, which involved the courses of Physical Education, Pharmacy and Biochemistry, Dentistry and Biological Sciences, showed that only Physical Education students remained physically active during graduation [24]. However, other studies show a high prevalence of insufficient levels of physical activity and/or SB in university students of the Physical Education course [11,24,25].

When analyzing TV time, this study showed an increase in the prevalence of the variables: female, single, and living in the capital during the pandemic. When analyzing computer/tablet and/or smartphone time, in most sociodemographic variables, significant increases were observed during the pandemic. The longer TV time observed in women corroborates numerous studies that show lower levels of movement behavior when compared to men [18,21,25-27], and according to Nowak, Bozek, and Blukacz [18], this tendency increases with age.

The results found in this study reinforce the importance of analyzing the population of Physical Education students, as they are future health professionals and disseminators of more active and healthy behaviors and lifestyles, considering that evidence has revealed that they often do not take these health-promoting practices with themselves.

The results also indicate the need for a careful look at public policies to encourage physical activities in the context of leisure both in pandemic and post-pandemic times, and specifically that schools and universities promote actions that stimulate and provide conditions for students can stay physically active.

Some limitations in the current study should be considered, such as the retrospective self-report design, which can produce recall bias. Also, the fact that the sample was from a single city, with only one public institution analyzed, limits the generalization of the results and demands caution in their interpretation.

Conclusion

It is concluded that there were increases in SB and physical inactivity during the COVID-19 pandemic in the evaluated university students. The prevalence of TV time, computer/tablet and/or smartphone time, and physical inactivity increased by 533%, 161%, and 21%, respectively, during the pandemic. The recommendations of health organizations to contain the new coronavirus, such as quarantine, social distancing, and especially the adoption of virtual classes, may have influenced the significant increase in these behaviors in students.

Conflict of interest
No conflict of interest has been reported for this study.

Financing source
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Author's contributions
Conception and design of the research: Ribeiro BFL, Silva JFA, Cabral PUL; **Data collection:** Ribeiro BFL, Silva JFA, Silva SFN, Linhares JNS, Lima MBS; **Data analysis and interpretation:** Cabral PUL, Madeira FB; **Writing of the manuscript:** Ribeiro BFL, Silva JFA, Cabral PUL; **Critical review of the manuscript:** Rebêlo VCN, Madeira FB.

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