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Levels of physical activity of university students in COVID-19: More challenges for women compared to men?

Niveles de actividad física de estudiantes universitarios en COVID-19: ¿Mayores retos para las mujeres que para los hombres?

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Abstract. Studies have indicated lower levels of physical activity and inadequate health conditions among young university students, which may have been exacerbated during the COVID-19 pandemic. Thus, this study aimed to analyze the levels of physical activity based on sociodemographic and health conditions of university students during the pandemic period. This cross-sectional study included 235 students from a public and multi-campus university in the state of Bahia, Brazil, from July to October 2020, when in-person activities were suspended. Levels of physical activity were assessed using the International Physical Activity Questionnaire (short form), and a questionnaire developed by the researchers evaluated sociodemographic and health conditions, both of which were applied via Google Forms®. Most participants (59.1%) showed insufficient levels of physical activity. Only sex differed significantly ($p < 0.001$), with a higher proportion of women (65.7%) reporting lower levels of physical activity than men (38.6%). Barriers challenges may have limited the incorporation of physical activity among women university during the COVID-19 pandemic. Further research is needed to elucidate the findings of this study.
Key words: physical activity, pandemic, covid-19, university students.

Resumen. Los estudios han indicado niveles más bajos de actividad física y condiciones de salud inadecuadas entre los jóvenes estudiantes universitarios, que pueden haberse exacerbado durante la pandemia de COVID-19. Así, este estudio tuvo como objetivo analizar los niveles de actividad física en función de las condiciones sociodemográficas y de salud de los estudiantes universitarios durante el período de pandemia. Este estudio transversal incluyó a 235 estudiantes de una universidad pública y multicampus del estado de Bahía, Brasil, de julio a octubre de 2020, cuando se suspendieron las actividades presenciales. Los niveles de actividad física se evaluaron mediante el Cuestionario Internacional de Actividad Física (formulario abreviado), y un cuestionario desarrollado por los investigadores evaluó las condiciones sociodemográficas y de salud, ambos aplicados a través de Google Forms®. La mayoría de los participantes (59,1%) mostraron niveles insuficientes de actividad física. Sólo el sexo difirió significativamente ($p < 0,001$), con una mayor proporción de mujeres (65,7%) que informaron niveles más bajos de actividad física que los hombres (38,6%). Los desafíos de barreras pueden haber limitado la incorporación de la actividad física entre las mujeres universitarias durante la pandemia de COVID-19. Se necesita más investigación para dilucidar los hallazgos de este estudio.
Palabras clave: actividad física, pandemia, covid-19, estudiantes universitarios.

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Introduction

According to the World Health Organization (WHO) the pandemic caused by the coronavirus (COVID-19) seriously impacted the health of the world population (World Health Organization (WHO), 2020b). Thus, protocols with social distancing, lockdowns were implemented to reduce contact and virus spread (de Moraes et al., 2023). Among various implications, the COVID-19 pandemic reduced the levels of physical activity due to social distancing and restrictions, impairing overall health and increasing risks of health problems related to sedentary lifestyle, such as diabetes, hypertension, obesity, and cardiovascular issues (Ding et al., 2020). Physical activity is defined as body movements performed by the skeletal muscles that spend more energy than the repose (Caspersen et al., 1985). Therefore, WHO recommends that adults should engage in 150 to 300 minutes of moderate to vigorous aerobic physical activity per week, including the cumulative physical activities performed throughout the day (World Health Organization (WHO), 2020a).

Adequate levels of physical activity are important for university students to promote physical and mental health and general well-being (Contreras et al., 2024; González et al., 2023; Hurtado et al., 2024; Mella-Norambuena et al., 2021), contributing to stronger academic performance and a better quality of life (Gibelli et al., 2024; Mella-Norambuena et al., 2021; Strale et al., 2024). However, the suspension of in-person classes and other academic activities reduced the opportunities of university students (Morales et al., 2020) being engaged in regular physical activities (Ammar et al., 2020), particularly for those exposed to social inequalities related to income, age, education, housing or gender (Brattlöf et al., 2023).

Sociodemographic inequities can reduce the chances to be regularly physically active. The relationship between levels of physical activity and sociodemographic conditions is complex and multifaceted, and it is influenced by age, gender, socioeconomic status, and study environment (Alkatan et al., 2021; Bertrand et al., 2021; Úbeda-Colomer et al., 2019). For instance, female university students face more barriers compared to male students when it comes to being physically active (Espada et al., 2023; Estrada-Araoz et al., 2024; Martínez et al., 2024), particularly due to societal influences on body image, beauty standards, and family responsibilities. They also need to feel safe when engaging in physical activities at community facilities, highlighting the greater need for

social support compared to their male peers (Peng et al., 2023a; Wang et al., 2024).

Recent evidence (Peng et al., 2023a; Wang et al., 2024) points to a critical scenario for women being physically active, as they often face several fears when leaving home to go to the gym or outdoor spaces. For this reason, women may be more dependent on a partner to engage in physical activities, and sometimes this partner is not available. Moreover, even in the absence of friends for social support and motivation, it is crucial to create opportunities for friendships and other forms of social support within physical activity programs. This can encourage women not only to be more active but also to view physical activities as safe, inclusive, and open spaces (Frederick et al., 2022; Peng et al., 2023a).

In addition, the recent COVID-19 pandemic altered the routine of university students, interfering in their physical active behavior (Alarcón Meza & Hall-López, 2021a, 2021b; Gibelli et al., 2024; Warnier-Medina et al., 2024), probably including new challenges for women (Bobo-Arce et al., 2024; Estrada-Araoz et al., 2024; Martínez et al., 2024). Despite the body of literature pointing out decreased levels of physical activity in this population in the context of COVID-19 pandemic, there is a lack of research that includes the analysis of sociodemographic and contextual factors of multi-campus universities. Considering the diversity of campuses of some Brazilian public universities and implications of sociodemographic factors during COVID-19 pandemic, research in this specific field is required. This information may expand knowledge and support health promotion and protection strategies in the medium and long term. Hence, this study aimed to analyze levels of physical activity based on sociodemographic and health conditions of university students in the context of the COVID-19 pandemic.

Methods

Study design

This is a cross-sectional and quantitative study that analysed the following variables: physical activity, sociodemographic conditions and health.

Ethical aspects

The study was included in an umbrella project on the physical and mental health of university students of the University during the pandemic and was approved by the research ethics committee (no. 61172722.1.0000.0057 and opinion 5.580.621). The informed consent form was available prior to any assessments.

Participants

University students of both sexes, aged ≥ 18 years, enrolled in face-to-face or distance learning undergraduate courses in different courses available on the university campuses participated in the research.

Instruments

The instruments used in the present study were the Sociodemographic and Health Questionnaire developed by the researchers and the International Physical Activity Questionnaire (IPAQ) in its short version (Lee et al., 2011).

The questionnaire considered sociodemographic and health data, sex, age group, current undergraduate course, residence in the city where the campus is located, presence of any disease or illness, use of controlled medications, cigarette use in the last six months, consumption of alcoholic beverages in the last six months.

The IPAQ measures levels of physical activity in different populations and assesses levels of physical activity according to four domains: (i) physical activity at work; (ii) physical activity as transport; (iii) physical activity at home: work, household, and familiar care; and (iv) recreational, sports, exercise, and leisure (Lee et al., 2011). IPAQ Activities are categorized based on intensity (moderate or vigorous), frequency, and duration (Matsudo et al., 2012). IPAQ considers activities with a minimum duration of 10 consecutive minutes. This study encompassed only physical activities in the "recreational, sports, exercise, and leisure" section.

The weekly score of physical activity was obtained by summing the time spent in each activity; values of vigorous activities were multiplied by two. According to IPAQ, moderate activity requires physical effort that moderately increases heart rate, while vigorous activity requires greater physical effort that greatly increases heart and respiratory rates.

Based on the score from “recreational, sports, exercise, and leisure” activities, participants were classified as active (score ≥ 150 minutes/week) or insufficiently active (score < 150 minutes/week). This criterion aligns with recommendations for physical activity practice (Haskell et al., 2007) and other studies (Azevedo et al., 2007; Hallal et al., 2003).

In this study sociodemographic conditions were those factors related to social and demographic aspects of life, able to identify them towards specific group or society. While health conditions were information capable of increasing or decreasing decision-making in health processes or the attention of care to determine priorities in health systems, mainly in the community where those people live (Fuentealba-Urra et al., 2021). Levels of physical activity are considered the weekly amount of time spent with recreational, sports, exercise and leisure activities, regardless the sitting and sleeping time (Lee et al., 2011).

Procedures

This cross-sectional study was conducted with university students of undergraduate courses from the 15 campuses of the one public University in Bahia, Brazil. Data were collected from July to October 2020, a period

without in-person academic activities due to the social distancing.

Data were collected electronically using remote access for students and researchers via a Google Forms® link. Coordinators and departments were contacted via e-mail or WhatsApp with the link appropriately forwarded. The University has a multi-campus structure and is present in several cities in the state of Bahia, with 29 departments spread over 24 campuses and more than 150 undergraduate and graduate courses.

Data analysis

Initially, simple descriptive statistics were used, characterized by absolute and relative frequencies. Subsequently, the Statistical Package for the Social Sciences (SPSS) version 29.0 software was used and, in all tests, used, statistical significance was established at $p < 0.05$. The Chi-square test was used for association analyses, considering levels of physical activity (insufficiently active or active) and sociodemographic and health conditions as dependent and independent variables, respectively. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to estimate the associations.

Results

The sample included 235 university students whose sociodemographic and health conditions are described in Table 1. Most participants were female (75.7%), aged between 20 and 29 (71.1%), enrolled in physical education course (26.0%), and were residents in the city where the campus is located (68.1%). Most participants reported having no disease (81.7%), did not use controlled medications (87.7%), and did not smoke (95.3%) and consume alcohol (55.3%) in the last six months. Considering the levels of physical activity, most participants were insufficiently active (59.1%).

Table 1.
Characterization of sociodemographic and health conditions, and IPAQ classification

Sociodemographic characteristics	n (N=235)	%
Female	178	75.7%
Male	57	24.3%
Age group		
18-19 years	21	8.9%
20-29 years	167	71.1%
30-39 years	35	14.9%
40-49 years	7	3.0%
50-55 years	5	2.1%
Undergraduate course		
Administration	3	1.3%
Biology	3	1.3%
Accounting science	6	2.6%
Law	17	7.2%
Physical education	61	26%
Nursing	15	6.4%
Sanitary engineering	1	0.4%
Aquacultural engineering	3	1.3%
Pharmacy	3	1.3%
Physical therapy	11	4.7%
Speech therapy	1	0.4%
Physics	2	0.9%
Geography	7	3.0%
History	19	8.1%
Literature	15	6.4%
Mathematics	3	1.3%
Medicine	3	1.3%
Veterinary medicine	3	1.3%
Nutrition	14	6.0%
Pedagogy	15	14.9%
Chemistry	1	0.4%
Public relations	2	0.9%
Tourism and hotel	2	0.9%
Psychology	2	2.1%
Residing in the city where the campus is located		
Yes	160	68.1%
No	75	31.9%
Health conditions		
Illness or disease		
Yes	43	18.3%
No	192	81.7%
Uses controlled medication		
Yes	29	12.3%
No	206	87.7%
Smoked in the last six months		
Yes	11	4.7%
No	224	95.3%
Alcohol consumption in the last six months		
Yes	105	44.7%
No	130	55.3%
IPAQ classification		
Insufficiently active	139	59.1%
Active	96	40.9%

Table 2 presents the physical activity levels according to sociodemographic and health conditions. Only sex was significantly different ($p < 0.001$; OR: 3.05; CI: 1.64-5.65); women were more insufficiently active (65.7%) than men (38.6%).

Table 2.
Levels of physical activity according to sociodemographic and health conditions

Description	IPAQ classification					p-valor	OR (IC:95%)
	Insufficiently active		Active		Total		
	n	%	n	%	N (%)		
Sex							
Female	117	65.7%	61	34.3%	178 (100)	< 0.001	3.05 (1.64-5.65)
Male	22	38.6%	35	61.4%	57 (100)		
Age group							
18-19 years	11	52..4%	10	47..6%	21 (100)	0.70	
20-29 years	102	61.1%	65	38.9%	167 (100)		
30- 39 years	21	60%	14	40 %	35 (100)		
40- 49 years	3	42.9%	4	57.1%	7 (100)		
50-59 years	2	40%	3	60%	5 (100)		
Residing in the city where the campus is located							1,11
Yes	96	60.0%	64	40.0%	160 (100)	0.77	(0.64-1.94)
No	43	57.3%	32	42.7%	75 (100)		
Illness or disease							
Yes	25	58.1%	18	41.9%	43 (100)	1.00	1.05
No	114	59.4%	78	40.6%	192 (100)		(0.53-2.05)
Uses controlled medication							1.02
Yes	17	58.6%	12	41.4%	29 (100)	1.00	(0.46-2.25)
No	122	59.2%	84	40.8%	206 (100)		
Smoked in the last six months							0.82
Yes	7	63.6%	4	36.4%	11 (100)	1.00	(0.23-2.88)
No	132	58.9%	92	41.1%	224 (100)		
Alcohol consumption in the last six months							0.81
Yes	65	61.9%	40	38.1%	105 (100)	0.50	(0.48-1.37)
No	74	56.9%	56	43.1%	130 (100)		

Discussion

Participants were mostly insufficiently active (59.1%). Of these, 117 were women, representing 84.7% of the insufficiently active participants. The OR indicated that women presented a threefold higher risk of being insufficient active than men during the COVID-19 pandemic (OR: 3.05; CI: 1.64-5.65). In this study, the percentage of insufficiently active participants (59.1%;

Table 1) evidence a significant health risk behavior since low levels of physical activity are associated with increased risk of chronic diseases, such as heart disease and diabetes (Pinto et al., 2020). Mental health and overall well-being are also impacted (Doyle et al., 2019; Rogowska et al., 2020), as evidenced by a study prior to the pandemic that found a significant association between low levels of physical activity and higher occurrence of common mental disorders among health sciences students at a public university in Northeast Brazil (Silva & Cavalcante Neto, 2014).

Another study (Oliveira et al., 2022) noted significantly reduced levels of physical activity in university students from the Northeast region (Brazil), primarily attributed to reduced sleep quality and increased musculoskeletal pain resulting from the social isolation imposed during the pandemic. Additionally, the authors (Oliveira et al., 2022) classified 58.8% of university students as insufficiently active, corroborating our results. The results of the present study align with previous findings, given the high prevalence of university students classified as insufficiently active according to IPAQ (short form).

Considering levels of physical activity according to sociodemographic and health conditions, only female participants showed a significant difference (Table 2). Women were more physically inactive than men similar to studies conducted before (Johnson, 2019) and during the pandemic (Peyer et al., 2024). These findings suggest that female participation in physical activity may be influenced by persistent factors, regardless of circumstances (Espada et al., 2023; Johnson, 2019; Peyer et al., 2024). Moreover, the frequency of insufficiently active women during the COVID-19 pandemic was similar between the present study and Oliveira et al. (2022) (65.7% and 70.0%, respectively).

Several factors may influence the levels of physical activity, such as access to resources, goods, and services; family responsibilities; and social and cultural environment (Ammar et al., 2020; Luciano et al., 2021). Thus, adopting sufficient levels of physical activity comes with greater social, economic, and cultural barriers for women, which were not investigated in this study. Compared with men, women are more likely to prefer to practice physical activity with other women, with supervision, and with people of the same age group (Van Uffelen et al., 2017). Although the van Uffelen et al. (2017) study was conducted before the pandemic, its results identified potential determinants of regular adoption of physical activity among women. Restrictions imposed by the pandemic (e.g., social distancing) may have attenuated these preferences, limiting women from being more physically active than men.

These complexities in the divergence of behaviors between women and men are reinforced by social and cultural barriers observed by a systematic review of qualitative studies (Peng et al., 2023b). The challenges were related to time constraints, pressures for the ideal female body and beauty standards, insecurity in attending spaces predominantly occupied by men, and family demands, especially in household and childcare responsibilities. Moreover, women are generally more interested with their health condition and aware to return to face-to-face activities compared to men (Shai et al., 2021). These barriers are crucial in understanding the implications imposed by the pandemic on the health of university students, which should be incorporated into university policies and actions (Bobo-Arce et al., 2024). As a suggestion, we should start listening women's voices to take their needs and perceptions about barriers to engaging in physical activities programs into account. A commission composed of female university students could be established to develop a formal document to guide university managers in creating interventions that promote physical activity, preferably within university facilities. Furthermore, as household and childcare responsibilities are significant for women, creating specific spaces for supervised physical activities for children while their mothers exercise could also be an interesting strategy. We believe that all the suggestions, particularly those arising after the pandemic, are urgent issues that need to be implemented in practice soon in order to mitigate the barriers identified in this study.

This study had some limitations. Although the research was disclosed to the entire student community of the University, the data collection (conveniently and online) may have gained more attention from female participants and those most affected by pandemic restrictions. Another limitation is regarding others sociodemographic variables not controlled in this study to better explain the challenges faced by women in physical activities, such as social support, fear, body standards, safe, or friendships. It can add a thorough comprehension of female barriers to achieve recommended levels of physical activity. In addition, the multi-campus context raised expectations on a larger sample; however, internet access may have been limited (or nonexistent) during the pandemic due to the low socioeconomic status and locations of residence.

Conclusion

University students included in this study showed insufficient levels of physical activity. Considering sociodemographic and health conditions, only female participants showed a significant difference as they presented lower levels of physical activity. These findings suggest that barriers and challenges may have limited the incorporation of physical activity among female university students during the COVID-19 pandemic.

Despite the need for further research, the results of the present study could substantiate strategies to promote and protect the physical and mental health of university students beyond the context of the COVID-19 pandemic. Longitudinal study designs could also add important information in regarding to trends of physical activity behaviors over the time after the pandemic.

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