Factors associated with the practice of physical activity among university students in social isolation during the covid-19 pandemic

Fatores associados à prática de atividade física entre universitários durante o isolamento social-pandemia covid-19

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Abstract - This study sought to analyze the practice of physical activity (PA) among university students, during the COVID-19 pandemic, and associated factors. This is a cross-sectional study with an analytical approach, carried out with 857 university students enrolled in higher education institutions in Montes Claros, in the state of Minas Gerais. Data collection was carried out using the Google forms, which was shared via social networks, containing questions regarding sociodemographic profile, physical activity, clinical factors, and behavioral and health habits. A descriptive exploratory analysis of the data was carried out, with frequency distribution of the study variables. Subsequently, bivariate analyses were performed and the associated variables with up to a level of 20% (p ≤ 0.20) were selected for multiple analysis using Poisson Regression. The prevalence non-practice of PA during the pandemic was of 56.8% among college students. Variables, such as being with a partner (PR=1.28), presence of respiratory diseases (PR=1.17), negative self-perception of health (PR=1.37), increased consumption of ultra-processed foods (PR=1.29), and presence of depression (PR=1.21), showed statistically significant associations with the practice of physical activity. We concluded that the non-practice of PA in university students during the social isolation caused by the COVID-19 pandemic is associated with marital status, presence of respiratory diseases, negative self-perception of health, increased consumption of ultra-processed foods, and presence of depression.

Key words: Physical activity; Lifestyle; Student health; Pandemic.

Resumo - *Este estudo buscou analisar a prática de atividade física entre universitários durante a pandemia de COVID19, e os fatores associados. Trata-se de estudo transversal de abordagem analítica, realizado com 857 universitários matriculados em instituições de ensino superior de Montes Claros–Minas Gerais. A coleta de dados foi realizada através do formulário Google forms, divulgado por redes sociais, contendo perguntas referentes ao perfil sociodemográfico, prática de atividade física, fatores clínicos, hábitos comportamentais e de saúde. Realizou-se análise descritiva exploratória dos dados, com distribuição de frequências das variáveis do estudo. Em seguida foram realizadas análises bivariadas e as variáveis associadas até o nível de 20% (p ≤ 0,20) foram selecionadas para a análise múltipla através da Regressão de Poisson. A prevalência de ausência da prática de AF durante a pandemia foi de 56,8% entre os universitários. Variáveis como estar com companheiro (RP=1,28), presença de doenças respiratórias (RP=1,17), autopercepção negativa da saúde (RP=1,37), aumento do consumo de alimentos ultraprocessados (RP=1,29) e presença de depressão (RP=1,21) demonstraram associações estatisticamente significativas com a prática de atividade física. Neste estudo, observou-se elevada prevalência de universitários que não praticam AF durante o isolamento social, sendo associado a diversos fatores, como o estado conjugal, à presença de doenças, hábitos alimentares e a autopercepção do estado de saúde. Dessa forma, tais características podem subsidiar intervenções com o intuito de incentivar hábitos saudáveis e sobretudo, promover a prática de AF como promoção a saúde física e mental.*

Palavras-chave: *Atividade física; Estilo de vida; Saúde do estudante; Pandemia*

INTRODUCTION

The first case of the new coronavirus in Brazil was confirmed in February 2020, the year in which the World Health Organization (WHO) decreed a worldwide pandemic state[1]. Due to the considerable morbidity and mortality rate, as well as the rate of transmission of this virus, social distancing was the most widespread and effective prophylactic measure[2]. Municipal and State Health Departments published documents proposing the provisional closure of several spaces, including those destined for the practice of physical activity (PA)[3]. These measures, however necessary, may contribute to physical inactivity[4] and associated factors, such as obesity, poor diet[2], non-communicable chronical diseases[5], and mental disorders[6].

The practice of physical activity is defined as any body movement produced by skeletal muscles that results in energy expenditure higher than at resting levels; when performed in a planned, structured, and repetitive way, it is called physical exercise, which, in turn, confers improvement or maintenance of physical fitness[7]. The promotion of PA is directly related to the large amount of benefits it brings; among which are the improvement in quality of life and the reduction of disabilities caused by diseases that are aggravated by sedentary lifestyle, besides being closely related to the improvement of muscle, cardiac, respiratory, metabolic, and psychological conditions[8]. Consequently, there is also an effect on the health system with a reduction of hospitalizations, medications, and control of health expenditures in general[5].

With the closing of spaces for the practice of PA, work, and educational activities, university students tend to adopt a sedentary routine, which favors weight gains and the emergence of associated comorbidities[3]. Although there are studies in the literature examining the practice of PA and the potential impact of the COVID-19 pandemic, more research on this topic is still needed[9], especially focusing on university students[10]. It is important to investigate the factors associated with the non-practice of PA to establish a fundamental basis for developing appropriate recommendations for lifestyle modifications during this period and to improve responses to similar events in the future. This study aims to analyze the practice of PA among university students during the COVID-19 pandemic and its associated factors.

METHODS

Characterization of the study

This is a cross-sectional study, of analytical approach. The study was conducted as part of a project called "Impactos no estilo de vida e saúde mental dos acadêmicos das instituições públicas e privadas de Montes Claros-Minas Gerais, em decorrência da pandemia do novo coronavírus (COVID-19)", approved by the Research Ethics Committee of the State University of Montes Claros, under Opinion no. 4.040.766.

Participants

The target population was composed of academics enrolled in higher education institutions in Montes Claros, in the state of Minas Gerais. As inclusion criteria, students had to be regularly enrolled in a higher education institution in Montes Claros and be 18 years of age or older.

Procedures and Instruments

Data collection was performed via Google Forms®, which was shared via social network WhatsApp. A questionnaire was used with questions obtained from other validated instruments.

The dependent variable was represented by the practice of PA, which was evaluated by the following question: during the period of social isolation, have you practiced regular physical exercises? (yes; no).

The independent variables were related to sociodemographic profile, clinical factors, and behavioral and health habits. The sociodemographic variables studied were gender (woman; man), age (≤ 30 years; > 30 years), race (white; non-white), marital status (without a partner, with a partner), type of educational institution they attend (private; public), loss of family income during social isolation (no; yes).

Clinical factors were evaluated by the presence of respiratory diseases, body mass index (BMI), and depression (no; yes). To assess the presence of respiratory diseases, the following question was used: "Has any doctor ever said that you have, or have had respiratory diseases? (yes; no)." To obtain BMI, weight and height were self-reported, the BMI was estimated using the Quetelet's formula[11], and later categorized (normal; altered).

The presence of depression symptoms was assessed using the Depression, Anxiety, and Stress Scale (DASS-21). DASS-21 is an instrument developed by Lovibond and Lovibond[12] and validated in Brazil by Vignola and Tucci.[13] The instrument is a self-report Likert-scale, with three subscales (depression, anxiety, and stress), consisting of 7 items. Each item consists of a phrase (a statement) that refers to negative emotional symptoms. Subjects are asked to respond to the extent to which each statement can be applied to them during the last month. There are four possibilities of answers for each sentence, presented on a 4-point Likert scale (from 0 to 3: 0. "did not apply to me at all," 1. "applied to me to some degree, or some of the time," 2. "applied to me to a considerable degree, or a good part of the time," 3. "Applied to me very much, or most of the time"). The score of each subscale or factor corresponds to the sum of the scores of their respective items[14].

Regarding behavioral and health habits, self-perception of health status, consumption of ultra-processed foods, and sleep disorders were evaluated. The self-perception of health status, which was extracted from the Vigitel questionnaire and adapted to the context of social isolation, was investigated by the question: in the period of social isolation, how do you consider your health status? The four response categories were dichotomized into positive ("very good" and "good") and negative ("regular" and "bad").

To evaluate the consumption of ultra-processed foods, the concept was defined in the questionnaire as industrial formulations ready for consumption, including saltine crackers and chips; cakes, pies, sweet biscuits, chocolates, candies; breakfast cereals; hamburgers and sausages; fast-food snacks; ready-to-eat or semi-ready dishes (pizzas, frozen pasta or meat dishes, instant noodles, and powdered soups); and soft drinks and other sugary drinks[15]. Subsequently, the following question was asked: during the period of social isolation, did the consumption of this type of food increase or decrease? (decreased; increased)

To evaluate sleep quality, the Pittsburgh Sleep Quality Index, translated and validated by Bertolazi et al.[16], was used to assess the sleeping habits during the

last month. It consists of 19 items that assess seven domains: subjective quality of sleep, sleep latency (time it takes to sleep and frequency with which they could not sleep in 30 minutes), sleep duration, habitual sleep efficiency (at what time they usually go to bed and get up, and how many hour of sleep they have per night), sleep disorders (frequency with which they: wake up in the middle of the night or early morning; get up to go to the bathroom; have difficulty breathing comfortably; coughed or snored heavily; felt very cold; felt very hot; have bad dreams; feel pain; have difficulty sleeping due to another reason), use of sleeping medications, and daytime dysfunction (frequency with which they have difficulty staying awake while driving, eating, or participating in social activity; and, how problematic it is to maintain the enthusiasm to do things). For each domain, values from 0 to 3 are assigned, with a global score ranging from 0 to 21. The higher the score, the worse the quality of sleep. Overall score greater than 5 indicates poor sleep quality.

Statistical analysis

The Statistical Package for the Social Sciences software (SPSS) version 21 was used for data analysis. Initially, a descriptive analysis was performed, with frequency distribution of the studied variables. Subsequently, bivariate analyses were performed, seeking associations between the outcome studied (PA practice) and the independent variables, using the chi-square test, with the associated variables of up to 20% ($p \leq 0.20$) being selected for multivariate analysis.

In the adjusted analytical phase, the independent variables were inserted in the Poisson regression model in an increasing manner, according to their statistical significance ($p < 0.20$), remaining in the model if they remained significant ($p < 0.05$) and/or adjusted to the model. Prevalence ratios (PR) and their respective 95% confidence intervals (95%CI) were obtained.

RESULTS

In total, 857 university students participated in this study, 73.7% were women and the mean age was 22.3 years (±4.68). The prevalence of non-practice of PA during the pandemic was 56.8% among university students. Table 1 shows the results of bivariate analyses between PA practice and independent variables. We found that the following variables were associated with the 20% level: gender, age, marital status, institution they attend, respiratory diseases, self-perceived health, consumption of ultra-processed foods, sleep disorder, and depression.

Table 1. Practice of physical activity among university students according to sociodemographic factors, clinical factors, and behavioral and health habits during the COVID-19 pandemic. (n=857).

Characteristics	Physical activity during social isolation				p-value*
	Yes		No		
	n	%	n	%	
Socio-demographic factors					
Gender					0.122
Men	107	47.6	118	52.4	
Women	263	41.6	369	58.4	
Age					0.016
<= 30 years	358	44.1	453	55.9	
> 30 years	12	26.1	34	73.9	

Note. * (x^2) = Pearson's chi-square test; p-value = Significance level p< 0.20.

Table 1. Continued...

Characteristics	Physical activity during social isolation				p-value*
	Yes		No		
	n	%	n	%	
Race					0.710
White	136	44	173	56	
Non-white	234	42.7	314	57.3	
Marital Status					0.067
Without a partner	352	44	448	56	
With a partner	18	31.6	39	68.4	
Institution they attend					0.163
Private	248	41.6	348	58.4	
Public	122	46.7	139	53.3	
Lost family income during social isolation					0.768
No	112	42.4	152	57.6	
Yes	258	43.5	335	56.5	
Clinical Factors					
Respiratory Diseases					0.051
Yes	119	48.4	127	51.6	
No	251	41.1	360	58.9	
Body Mass Index					0.562
Normal	274	43.8	352	56.2	
Altered	96	41.6	135	58.4	
Depression					<0.001
No	236	51.0	227	49.0	
Yes	134	34.0	260	66.0	
Behavioral and Health Habits					
Self-Perceived Health					<0.001
Positive	222	54.4	186	45.6	
Negative	148	33.0	301	67.0	
Ultra-processed food items					0.001
Decreased	78	56.5	60	43.5	
Increased	292	40.6	427	59.4	
Sleep disorders					0.001
No	318	46.0	374	54.0	
Yes	52	31.5	113	68.5	

Note. * (x^2) = Pearson's chi-square test; p-value = Significance level $p < 0.20$.

In the adjusted multiple analysis, the following variables remained associated with non-practice of PA during the COVID-19 pandemic: being with a partner (PR=1.28), presence of respiratory diseases (PR=1.17), negative self-perception of health (PR=1.37), increased consumption of ultra-processed foods (PR-1.29), and presence of depression (PR=1.21) (Table 2).

Table 2. Crude and adjusted prevalence ratio for physical activity according to sociodemographic factors, clinical factors, and behavioral and health habits during the COVID-19 pandemic. (n=857).

Characteristics	Prcrude (95%CI)	Pradjusted (95% CI)
Gender		
Men	1	-
Women	1.11 (1.20-1.56)	-
Age		
<= 30 anos	1	-
> 30 years	1.32 (1.10-1.59)	-
Marital Status		
Without a partner	1	1
With a partner	1.22 (1.01-1.47)	1.28 (1.02-1.61)

Note. Deviance: 516.91 / p-value: 0.610. CI: Confidence Interval.

Table 2. Continued...

Characteristics	Prcrude (95%CI)	Pradjusted (95% CI)
Institution they attend		
Private	1	-
Public	0.92 (0.80-1.04)	-
Respiratory Diseases		
No	1	1
Yes	1.14 (1.00-1.31)	1.17 (1.02-1.33)
Self-perceived health		
Positive	1	1
Negative	1.47(1.29-1.67)	1.38 (1.21-1.58)
Ultra-processed food items		
Decreased	1	1
Increased	1.37 (1.12-1.67)	1.30 (1.07-1.57)
Sleep disorders		
No	1	-
Yes	1.27 (1.12-1.44)	-
Depression		
No	1	1
Yes	1.34 (1.20-1.51)	1.21 (1.03-1.43)

Note. Deviance: 516.91 / p-value: 0.610. CI: Confidence Interval.

DISCUSSION

Our study revealed a high prevalence non-practice of PA among university students, during the pandemic. These findings reveal that during social isolation, university students modified their lifestyles, with an increase in sitting time by spending more time at home, studying and/or working remotely, and consequently reducing the amount of time spent in PA[17]. The study by Tavares et al.[18], with 1,679 university students, in which the prevalence of physical inactivity during the pandemic was 44.4%, corroborates this study.

The results from a study conducted with university students from the province of Saskatchewan, Canada, agree with those found in this study. Prior to the pandemic, 16% of participants were complying with the Canadian Adult Movement Guidelines of 150 minutes of moderate to vigorous PA. And during the pandemic only 10% met the guidelines for PA[19]. A cross-sectional study with data from a health survey with 45,161 individuals, aged 18 years or older, living in Brazil, showed a reduction in the number of individuals who regularly performed PA, the percentage fell from 30.1% to 12.0%[2]. Another survey, with 2,004 adults living in municipalities from the five regions of Brazil, showed an increase in the percentage of participants classified as insufficiently active, from 65.5% to 80.1%. Moreover, of the participants considered sufficiently active before the new pandemic, 59% decreased their activity levels[20].

As for the university population, the shift from the controlled environment of the school to a more independent environment can impact the pattern of PA[21]. The closure of gyms and other recreational facilities, in public and private establishments, resulted in a reduction in the PA level[3]. Another possible explanation for the high percentage of students who were physically inactive during the pandemic may be that many of the students who were no longer physically going to the university, since it had been transitioned to remote learning. However, the data presented in this study differ from those found by Romero-Blanco et al. [22] with university students of Health Sciences, in which there was an increase in sitting time, but there was also an increase in both the

time spent practicing PA and in the number of days in which the participants remained active. These outcomes indicate that the demands of the school environment do not facilitate PA, but in the absence of social relations and actions of the environment it increased the number of days and minutes that students spend with physical activity.

The results of our study indicated that university students with a partner tend toward not practicing PA during the pandemic. Similarly, another study suggests that living with a partner and/or children reduces the chance of PA during the pandemic by 48.0%[23]. This association is also seen in non-pandemic periods, as shown in the study by Silva et al.[24], in which they observed that being single, divorced, or widowed increase the chance of being sufficiently active compared to married couples. These findings suggest that the practice of PA during social isolation attenuates parental stress and decreased quality of life in the home environment, due to the high demands of work and domestic activities[25]. The need to formulate new health promotion strategies aimed at married individuals is noticeable, since having a spouse proved to be a negative stimulus for practicing physical activity.

The presence of respiratory diseases was also associated with non-practice of PA. Individuals with respiratory diseases often decrease PA due to fear of worsening symptoms and this may result in reconditioning. During the pandemic, asthma patients were more inactive than healthy individuals, regardless of the presence of chronic disease[26]. Strict measures of social isolation also substantially affected the PA levels of individuals with cystic fibrosis[27]. This is worrisome, since physical exercise is a vital pillar for the treatment of respiratory diseases, especially for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The implementation of PA programs is a useful complementary tool for prevention, increasing recovery, improving quality of life, and providing long-term immune protection[28].

Several studies[24,29] have shown the association between PA practice and negative self-perception of health. Behavioral issues, such as the practice of PA, may have different effects on self-perceived health, being considered a protective factor[24]. This association reinforces the benefits of regular PA practice in the prevention of diseases and changes in the general state of health, including its psychological and social aspects.

Our study showed that, during social isolation, the consumption of ultra-processed foods was related to the non-practice of PA among the university students evaluated. A study conducted with 955 university students, from four universities in northeastern Brazil, also observed a significant association between the consumption of ultra-processed foods and the non-practice of PA[29]. Social restriction can influence the consumption of foods rich in sugars, fats, calories, food preservatives and salt, and decrease energy expenditure, affecting energy balance, which can result in health damages such as increased obesity, hypertension and cardiovascular diseases.

The increased time spent at home, watching or hearing news on the pandemic, the increase in anxiety and food cravings due to mood, and the decrease in physical activity can cause unwanted repercussions on an individual's physical and mental health. Prolonged PA restriction and isolation negatively affect depression, as well as feelings of anxiety and fear. In this study, the presence of depression was associated with non-practice of PA. Studies confirm that regular PA during the COVID-19 pandemic is associated with lower levels of anxiety and depression among the interviewees[30].

This study presents some limitations, such as the evaluation of PA made through self-reported information, which could overestimate a practice considered desirable. This is a cross-sectional study, which makes it impossible to establish a cause-effect relationship, and the questionnaires evaluated through social media may be subject to selection bias.

CONCLUSIONS

In this study, we observed a high prevalence of university students who did not practice PA during social isolation, which was associated with several factors, such as marital status (married), the presence of diseases (respiratory and depression), eating habits (consumption of ultra-processed foods), and their state of health (negative self-perception). Thus, such characteristics can support interventions to encourage healthy habits and, above all, promote the practice of PA as a promotion of physical and mental health.

COMPLIANCE WITH ETHICAL STANDARDS

Funding

Ethical approval

Ethical approval was obtained from the local Human Research Ethics Committee – State University of Montes Claros and the protocol (no. 4.040.766) was written in accordance with the standards set by the Declaration of Helsinki.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

Conceived and designed the experiments; Performed the experiments; Analyzed the data; Contributed reagents/materials/analysis tools; Wrote the paper: BMSR, MFOS, VCNM, JVBF, EOA, ALLPEC, JSBR, LP.

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