

EFEITO DO ISOLAMENTO SOCIAL DURANTE O PERÍODO PANDÊMICO DE COVID-19 SOBRE A PRÁTICA DE ATIVIDADE FÍSICA EM INDIVÍDUOS QUE SE CONSIDERAM ATIVOS

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Resumo:

Este estudo teve como objetivo investigar e caracterizar as alterações ocorridas a partir do surto de uma nova doença pelo Coronavírus, respeitando todos os aspectos éticos. Os dados foram obtidos a partir do desenvolvimento de um questionário online, por meio da plataforma Google Forms, que foi disponibilizado durante o auge das medidas de isolamento social para a pandemia Sars-Cov2. Participaram 199 voluntários, dos quais 62,32% se declararam do sexo feminino e 37,68% do masculino. Os resultados demonstraram que entre os participantes antes das medidas de isolamento, 66,33% foram considerados ativos, enquanto após as medidas de isolamento, apenas 21,6% foram considerados ativos, representando um aumento no nível de sedentarismo. Como a atividade física é amplamente reconhecida por apresentar um alto custo-benefício, é necessário avaliar medidas que atuam sobre esses resultados, enfatizando que os dados fornecem características específicas da população considerada ativa no momento pré-pandêmico na região estudada.

Palavras-chave:

Coronavírus, sedentarismo, inatividade física, exercício.

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EFFECT OF SOCIAL ISOLATION DURING THE COVID-19 PANDEMIC PERIOD ON THE PRACTICE OF PHYSICAL ACTIVITY IN INDIVIDUALS WHO CONSIDER THEMSELVES ACTIVE

Abstract:

This study focused on investigating and characterizing changes that occurred from the outbreak of a new disease caused by the Coronavirus, respecting all ethical aspects. The data were obtained from the development of an online questionnaire, through the Google Forms platform, which was made available during the height of the social isolation measures for the Sars-Cov2 pandemic. A total of 199 volunteers participated, of which 62.32% declared themselves to be female and 37.68% male. The outcomes demonstrated that among the participants before the isolation measures, 66.33% were considered active, while after the isolation measures, only 21.6% were considered active, representing an increase in the level of sedentarism. As physical activity is widely recognized for presenting a high cost-benefit, it is necessary to evaluate measures that act on these results, emphasizing that the data provide specific characteristics of the population considered active in the pre-pandemic moment in the studied region.

Keywords:

Coronavirus, sedentarism, physical inactivity, exercise.

EFFECTO DEL AISLAMIENTO SOCIAL DURANTE EL PERÍODO DE PANDEMIA DEL COVID-19 SOBRE LA PRÁCTICA DE ACTIVIDAD FÍSICA EN PERSONAS QUE SE CONSIDERAN ACTIVAS

Resumen:

Este estudio se centró en investigar y caracterizar los cambios ocurridos a partir del brote de una nueva enfermedad provocada por el Coronavirus, respetando todos los aspectos éticos. Los datos se obtuvieron del desarrollo de un cuestionario en línea, a través de la plataforma Google Forms, que se puso a disposición durante el apogeo de las medidas de aislamiento social por la pandemia Sars-Cov2. Participaron 199 voluntarios, de los cuales el 62,32% se declararon mujeres y el 37,68% hombres. Los resultados demostraron que entre los participantes antes de las medidas de aislamiento, el 66,33% se consideraron activos, mientras que después de las medidas de aislamiento, solo el 21,6% se consideraron activos, lo que representa un aumento en el nivel de sedentarismo. Dado que la actividad física es ampliamente reconocida por presentar un alto costo-beneficio, es necesario evaluar medidas que actúen sobre estos resultados, enfatizando que los datos brindan características específicas de la población considerada activa en el momento pre-pandémico en la región estudiada.

Palabras-clave:

Coronavirus, sedentarismo, inactividad física, ejercicio.

Introdução

In 2019, there was an outbreak of a new disease, caused by the Coronavirus, which has become the most recent threat to global health (COVID-19). This disease started in the city of Wuhan (China), and is already present in more than 185 countries, having been declared a pandemic by the World Health Organization (WHO) on March 11, 2020. The disease is caused by coronavirus 2, which is related to severe acute respiratory syndrome (SARS-CoV-2) and is highly contagious, with more than 50 million confirmed cases reported by the WHO from December 2019 to November 2020, resulting in more than 1.2 million deaths. This current scenario in the area of health has required great attention and many adaptations to the new reality (ORGANIZATION, 2020).

Several countries have promoted measures aimed at reducing the transmission of the disease. These efforts include quarantine, hygiene procedures, travel restrictions, postponing or canceling events, and closing facilities and borders. However, some of these actions have generated global socioeconomic impacts that, together with the direct impacts of COVID-19, have put even the greatest global powers in crisis. During this period, the aim has been to reduce the risk of contagion among people, which also involves the confinement of individuals who may not be infected (BROOKS; WEBSTER; SMITH; WOODLAND *et al.*, 2020). Isolation and quarantine often include not only physical confinement, but also cognitive, affective, and spiritual isolation due to limitations in interactions between people. (GIUBILINI; DOUGLAS; MASLEN; SAVULESCU, 2018).

Among the various habits that have changed in this new reality, due to the COVID-19 pandemic, are restrictions on the practice of physical activity. There is evidence that a regular exercise routine is an effective primary and secondary preventive measure for reducing the risk of viral infection, and symptoms related to anxiety, depression, weight maintenance, ongoing prevention, and treatment for more than 25 chronic medical conditions (including cardiovascular disease) and premature mortality (FALLON, 2020). International guidelines for physical activity, in general, recommend practice of 150 minutes per week of moderate to vigorous intensity. A critical review of the literature indicates that half of this volume of physical activity can generate marked health benefits (WARBURTON; BREDIN, 2016). These include improvement in anti-inflammatory activity, since the interaction between

muscle contraction and other tissues with circulating cells is mediated by signals transmitted by “myokines” produced with muscle contractions. In addition, beneficial associations have been found between physical activity and mortality in populations with various age distributions and in various geographical areas.

Physical activity can also benefit cognition because it maintains brain plasticity, increases brain volume, stimulates neurogenesis and synaptogenesis, and increases neurotrophic factors in different areas of the brain, possibly providing a reserve against cognitive decline and dementia that may emerge over the years. Exercise has a role to play in managing the vast majority of these conditions. These therapeutic and preventive effects should be maintained throughout the current period of social isolation (PRATALI; MASTORCI; VITIELLO, 2014).

However, the role of physical activity remains undervalued, being the most neglected therapeutic intervention worldwide, despite evidence of its protective effects, and the cost burden due to current levels of global physical inactivity. According to the WHO, physical inactivity is the fourth major risk factor for global mortality. The prevalence (for an attributable risk population) is similar and often higher than all other risk factors. From a physiological point of view, lack of physical activity can be considered an aggression, leading to alterations that increase the chances of chronic diseases, for the cardiovascular and metabolic systems (KOHL; CRAIG; LAMBERT; INOUE *et al.*, 2012).

In this scenario, knowing that physical inactivity (mainly sitting time) entails significant health risks, and that a side effect of the period of social isolation imposed by the new Covid-19 pandemic is the difficulty in practicing activities in gyms, outdoors, and team sports, it is important to investigate the possible consequences and changes caused by the imposition of social isolation, which can have a direct impact on general health, quality of life, fitness, and physical performance levels, especially in populations that had an active life and in general practiced physical exercises regularly before the start of the quarantine.

In view of the above, the objective of this study was to know, understand, and characterize the current changes, analyzing the possible need for implementation of prophylactic measures, which mainly include the awareness of the population, and suggestions of behaviors and interventions, both recoverable and preventive, to reduce exposure to sedentarism, and its future consequences, at the end of the period of social isolation.

1 Methodology

The work was designed according to the guidelines established by Resolution 196/96 of the National Health Council, on research involving human beings.

To perform the study, an online questionnaire was developed through the Google Forms platform. The questionnaire was disseminated to the target population of the study through social networks, such as WhatsApp, Facebook, and Instagram. According to FALEIROS; KÄPPLER; PONTES; DA COSTA SILVA *et al.* (2016) this mode of data collection (virtual questionnaire and dissemination), when properly implemented, is fast and economical, with good use of responses.

As inclusion criteria for the study, the volunteer was required to be over 18 years old, have read and accepted the informed consent form (ICF), and have answered “yes” to the question: “Did you practice any form of physical exercise or consider yourself active in the period before social isolation measures due to the Sars-Cov2 or Covid-19 pandemic?”.

The questionnaire was available for completion from August 4 to September 2, 2020, during the height of the social isolation measures caused by the Sars-Cov2 pandemic. In total, 199 volunteers answered the study questionnaire.

The questionnaire applied in the study was divided into 3 parts: in the first part the volunteer answered questions related to the inclusion criteria in the study, if they agreed with the ICF, date of birth, whether they performed any type of physical exercise in the period prior to measures of social isolation, education, and sex. In the second part the volunteer answered the short and adapted version of the International Physical Activity Questionnaire (IPAQ) (MATSUDO; ARAÚJO; MATSUDO; ANDRADE *et al.* ; 2001) referring to the period prior to social isolation measures in their city. In the third part of the study, the volunteer answered the IPAQ short version referring to the previous week, a period that included social isolation measures.

The IPAQ short version consists of estimating the weekly time spent in physical activities of moderate and vigorous intensity, in different contexts of daily life, and also the

time spent in passive activities, performed in a sitting position (BENEDETTI; ANTUNES; RODRIGUEZ-AÑEZ; MAZO *et al.*, 2007).

The questions on the IPAQ short version are related to the activities carried out in the week prior to the application of the questionnaire. The adapted version used in this study was related to a week prior to the period of social isolation measures. The volunteer data were tabulated, evaluated, and subsequently classified according to the guidance of the IPAQ itself, which divides and conceptualizes the categories into:

Sedentary – Does not perform any physical activity for at least 10 continuous minutes during the week;

Insufficiently Active – Consists of classifying individuals who practice physical activities for at least 10 continuous minutes per week, but in an insufficient way to be classified as active. To classify individuals in this category, the duration and frequency of the different types of activities are added (walking + moderate + vigorous). This category is divided into two groups:

Insufficiently Active A – Performs 10 continuous minutes of physical activity, following at least one of the criteria mentioned: frequency - 5 days/week or duration - 150 minutes/week;

Insufficiently Active B – Does not meet either of the criteria of the recommendation cited in insufficiently active A individuals;

Active – Complies with the following recommendations: a) vigorous physical activity - ≥ 3 days/week and ≥ 20 minutes/session; b) moderate or walking - ≥ 5 days/week and ≥ 30 minutes/session; c) any combined activity: ≥ 5 days/week and ≥ 150 min/week;

Very Active – Complies with the following recommendations: a) vigorous - ≥ 5 days/week and ≥ 30 min/session; b) vigorous - ≥ 3 days/week and ≥ 20 min/session + moderate and or walking ≥ 5 days/week and ≥ 30 min/session (SILVA; BERGAMASCHINE; ROSA; MELO *et al.*, 2007).

The IPAQ, applied digitally, presented significant correlations and moderate agreement in relation to the questions on the printed IPAQ, demonstrating favorable conditions for the use of the online questionnaire as a data collection instrument in the digital environment (ALVES, 2013).

Data analysis was performed using the GraphPad Prism 6.0 program. Descriptive data were analyzed using means, standard deviations, and percentages. When two independent variables were compared, we used bidirectional ANOVA with the Tukey or Sidak post-test.

When the data did not present normal distribution, the Mann Whitney and Kruskal-Wallis test were used. Values are presented as mean \pm SD. The results were considered significant when $p < 0.05$.

2 Results

In total, 199 volunteers answered the questionnaire (Table 1), with a mean age of 27.83 ± 8.93 years. Of the total volunteers, 62.32% declared themselves to be female and 37.68% male. No age difference was found between males and females.

Table 1- Characterization of study participants

	Male	Female	Total
Participants:	75 (37.68%)	124 (62.32%)	199 (100%)
Age (years):	27.93 ± 8.04	27.71 ± 9.50	27.83 ± 8.93

The volunteers also answered questions about schooling (Table 2). When analyzing these data we observed that more than 90% of the volunteers had completed high school, with 43.71% of the volunteers had completed higher education. No differences were found between schooling in male and female volunteers.

Table 2 – Schooling of the study participants

Schooling	Female	Male	Total
Elementary School Complete	9 (7.25%)	5 (6.66%)	14 (7.03%)
High School Complete	49 (39.51%)	32 (42.66%)	81 (40.70%)
Higher Education Incomplete	14 (11.29%)	3 (4%)	17 (8.54%)
Higher Education Complete	24 (19.35%)	16 (21.33%)	40 (20.10%)
Post Graduation	28 (22.58%)	19 (25.33%)	47 (23.61%)

Table 3 compares the IPA Q classi

fication before and during social isolation measures between the sexes and the total participants.

Table 3- IPAQ classification before and after social isolation measures

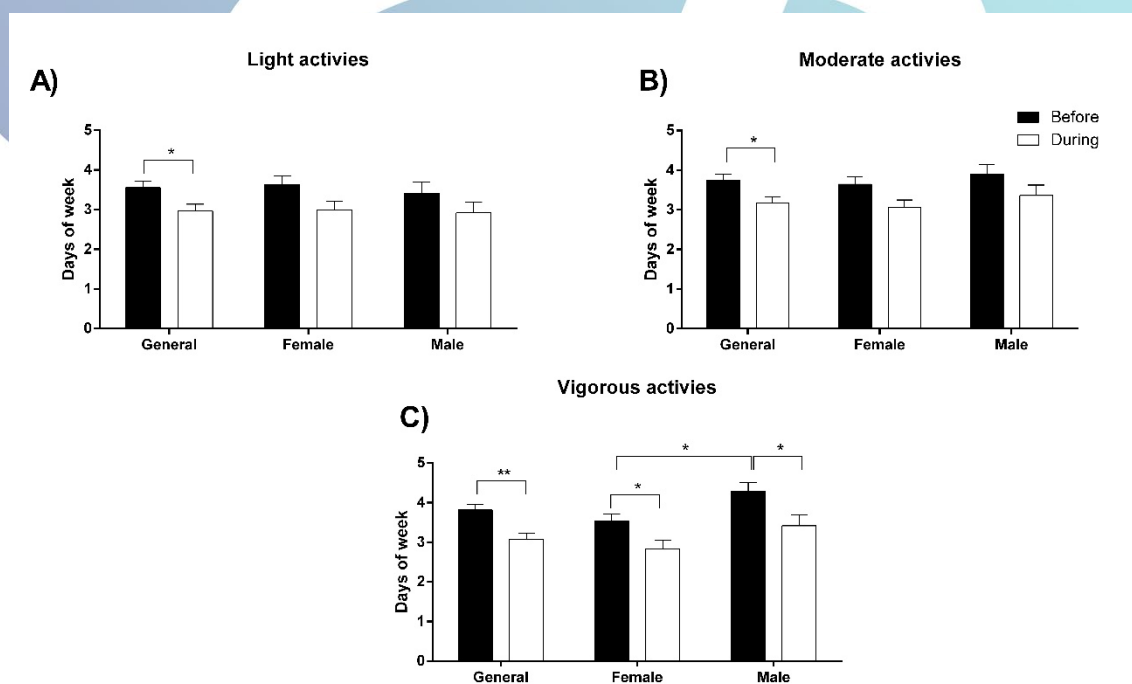
Sex:	Female		Male		General	
	Before	During	Before	During	Before	During
Sedentary	1 (0.80%)	8 (6.45%)	1 (1.33%)	7 (9.33%)	2 (1%)	15 (7.53%)
Insufficiently active-A	7 (5.64%)	38 (30.64%)	4 (5.33%)	17 (22.66%)	11 (5.5%)	55 (27.63%)
Insufficiently active - B	17 (13.70%)	7 (5.64%)	9 (12%)	5 (6.66%)	26 (13.06%)	12 (6.03%)
Active	88 (70.96%)	26 (20.96%)	44 (58.66%)	17 (22.66%)	132 (66.33%)	43 (21.60%)
Very active	11 (8.87%)	45 (36.29%)	17 (22.66%)	29 (38.66%)	28 (14.07%)	74 (37.18%)

Table 3 shows that only 2 volunteers were classified as sedentary in the period before the start of social isolation measures. This number increased to 15 during social isolation measures, representing 7.53% of all volunteers in the study. However, when evaluating volunteers who were classified as insufficient-B, a reduction in volunteers was found when comparing the periods before and during the pandemic; in women the percentage moved from 13.70% to 5.64%, in men from 12% to 6.6%, and evaluating the total volunteers, the values moved from 13.06% for before social isolation measures to 6.03% in the period that included social isolation measures. In the volunteers classified as insufficient-A, an increase was found in the percentage of volunteers when comparing the periods before and during the measures of social isolation in both women and men; in women the percentage moved from 5.64% to 30.64%, in men from 5.33% to 22.66%, and in the total sample from 5.5% to 27.63%. In the group considered active, we found a very significant reduction when comparing the periods before and during the measures of social isolation; in women the percentage moved from 70.96% to 20.96%, in men from 58.66% to 22.66%, and in the total sample from 66.33% to 21.60%. Surprisingly, we found an increase in the percentage of volunteers classified as very

active according to the IPAQ classification; in women the percentage moved from 8.87% to 36.29%, in men from 22.66% to 38.66%, and in the total sample from 14.07% to 37.18%. In the very active group, we also noticed a higher percentage of individuals considered active in the male sex when compared to the female sex in the period prior to social isolation measures (22.66 vs 8.87%).

Figure 1 represents the days of the week when the participants performed activities considered light (figure 2-A), moderate (figure 2-B), and vigorous (figure 2-C), before and during the period of social isolation. In order to facilitate the analysis of the data, we have divided the data between female, male, and general.

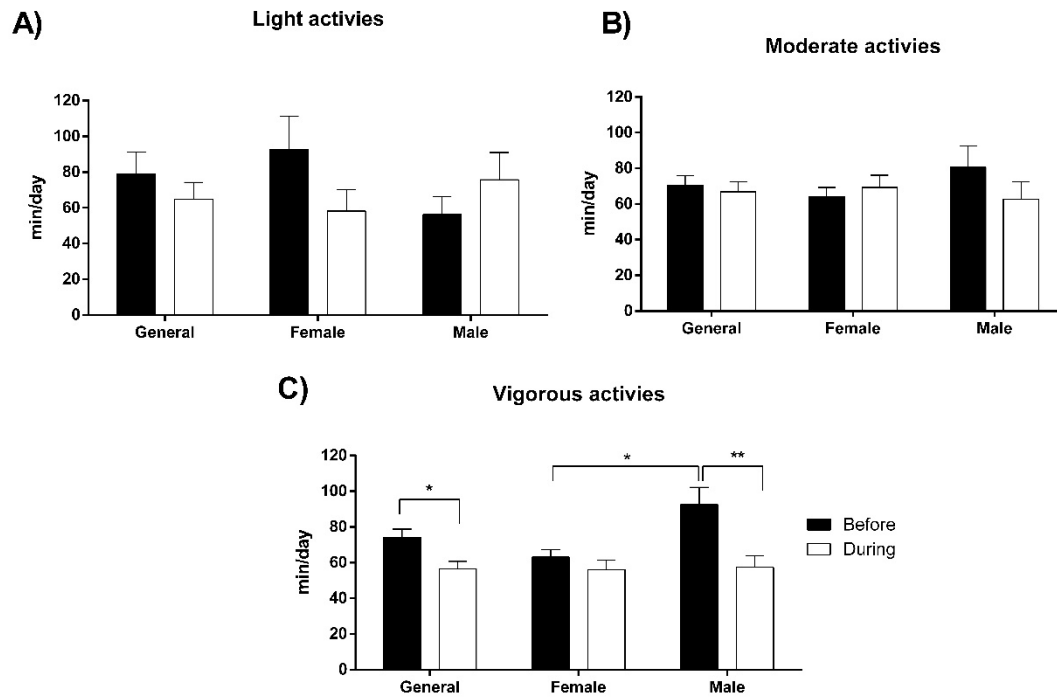
Figure 1 – Days of the week on which participants performed physical activities



Legend: The results were expressed days of the week when light (A), moderate (B) and vigorous (C) activities were performed * $p < 0.05$ and ** $p < 0.01$ when compared before and during social isolation.

In figure 2 we evaluate the mean daily time that the participants performed light (figure 3-A), moderate (figure 3-B), and vigorous (figure 3-C) activities in the period before and during the social isolation measures in the male, female, and total groups.

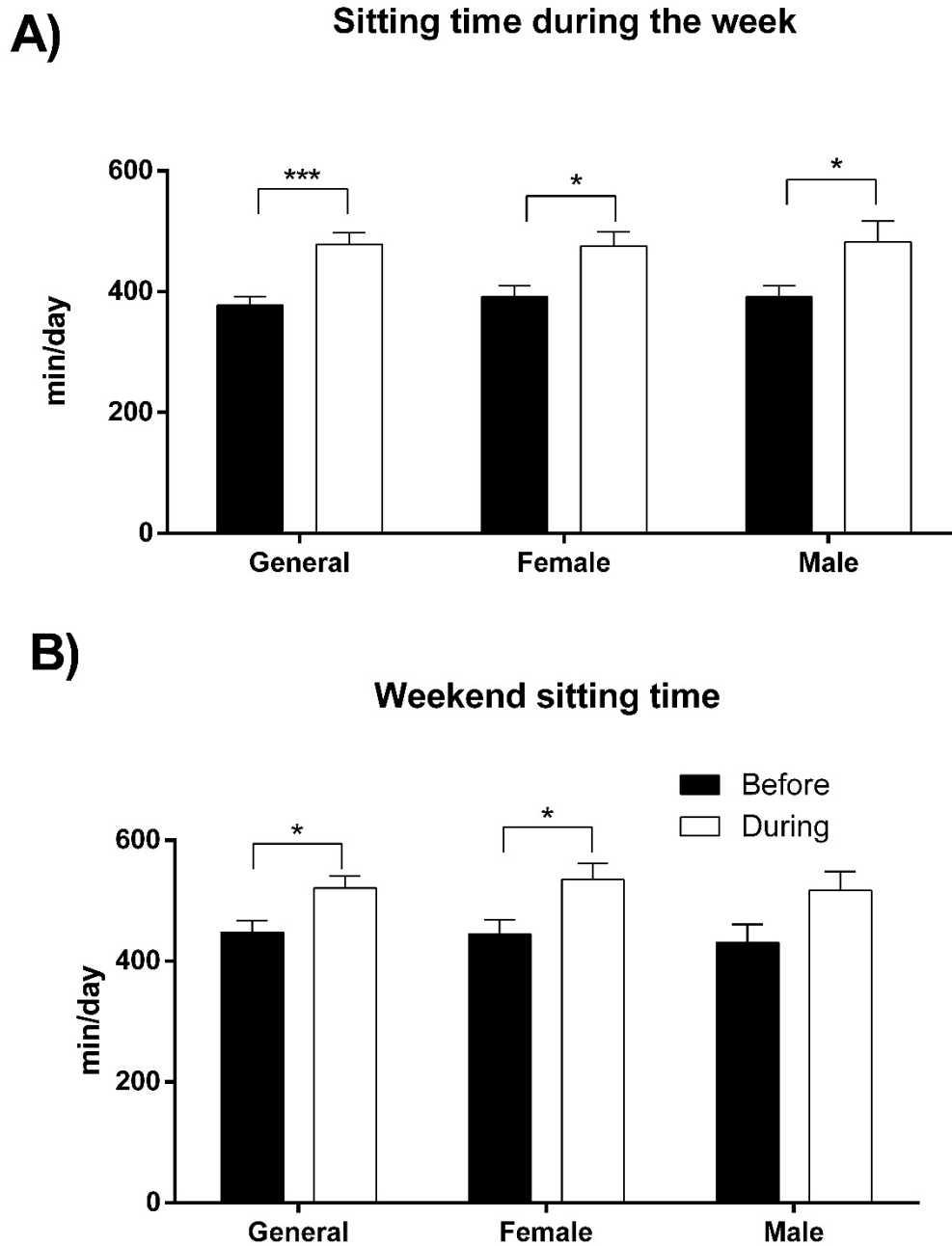
Figure 2 – Mean daily time during which the participants performed light, moderate, and vigorous activities.



Legend: The results were expressed in minutes per day of activities (A), moderate (B) and vigorous (C) activities were performed *p < 0.05 and **p < 0.01 when compared before and during social isolation.

We also evaluated the mean daily time that the research participants spent sitting during the week (Figure 3-A) and on weekends (Figure 4-B) before and during the social isolation measures in the female, male, and total groups.

Figure 3 – Mean daily time the participants spent sitting during the week and on weekends



Legend: The results were expressed in minutes per day in which the individual spends sitting during the week (A) and on weekend (B) * $p < 0.05$ and ** $p < 0.01$ when compared before and during social isolation.

3 Discussion

A total of 199 volunteers participated in the study by answering the questionnaire through the Google Questionnaire virtual environment in the period of approximately 28 days when it was made available. This high participation was achieved even during the toughest period of social isolation measures in Brazil, reinforcing the importance of using virtual environments to conduct research in the health area, where this tool represents a possibility for greater speed of information and scientific production. In addition, internet surveys provide greater practicality and convenience to study participants, which may result in improvement in the number of responses obtained (FALEIROS; KÄPPLER; PONTES; DA COSTA SILVA *et al.*, 2016).

Physical activity is a behavior influenced by several factors, including demographic factors, such as sex, age group, and skin color; socioeconomic factors, such as (SÁVIO; COSTA; SCHMITZ; SILVA, 2008) the economic level, education, and unemployment; and lifestyle factors, such as smoking, alcohol consumption, eating habits, social relationships, and stress (HALLAL; VICTORA; WELLS; LIMA, 2003; THOMAZ; COSTA; SILVA; HALLAL, 2010).

In the study of SÁVIO; COAST; SCHMITZ and SILVA (2008) a positive relationship was found in men in the association between the level of physical activity, less education, and income. Other studies have also shown an increase in sedentarism in the young female population, a fact explained by the possible double burden faced by women (GARCIA; PENDER; ANTONAKOS; RONIS, 1998). These results do not corroborate with our research, where practically no difference was observed between the classification of physical activity between men and women throughout the study; only an increase in the number of days and mean time spent performing vigorous activities was found.

Regarding the schooling of the population that answered the questionnaire, more than 80% of the participants had at least completed high school and more than 40% had at least completed higher education. From the results of the study, the education parameter also did not appear to change the level of physical activity of the participants.

The pandemic caused by the coronavirus has generated a great turmoil worldwide and was declared a pandemic by the WHO in March 2020 (ORGANIZATION, 2020). As a tool to control the pandemic, social isolation measures were launched worldwide, including in Brazil. These measures have made it difficult to maintain an exercise routine, since it is necessary to avoid crowds of people and sharing equipment, thus inhibiting access to gyms, training centers, and even outdoor activities.

With these difficulties generated by social isolation measures, there has been an increase in the number of individuals migrating from more active to less active classifications during social isolation measures. An increase was observed in sedentarism, which before the social isolation measures was reported by only 2 participants, while during the measures this number rose to 15. There was also an increase in the number of insufficiently active A and B from 37 to 67 and a decrease in active individuals from 132 to 43, resulting in fewer days of the week and mean time spent in light, moderate, and vigorous activities and more sitting time during the middle and end of the week.

Physical activity is recognized for its great cost-benefit. A systematic review was conducted to investigate the multisystem benefits of strength training. The authors found that strength training presents benefits to the musculoskeletal system in healthy people and/or with common osteoarticular disorders. These benefits are well known in the area of rehabilitation, however, in addition to these benefits, strength training has advantages in the prevention and treatment of cardiovascular and metabolic diseases, cancer, depression, sleep-related disorders and dementia (MAESTRONI; READ; BISHOP; PAPADOPOULOS *et al.*, 2020).

According to the *American College of Sports Medicine* (ACSM), regular physical activity is important for maintaining health and is directly related to immune system function. In addition, physical activity can reduce symptoms of stress and anxiety, which tend to be accentuated in the pandemic.

Regarding our results, before the isolation measures, 66.33% of participants were considered active, while during the measures, only 21.6% were considered active in the IPAC evaluation. Costa *et al.* also investigated how measures of social distance affect levels of physical activity. A questionnaire was applied on practices related to the pre-pandemic and distancing periods. The participants lived in 5 Brazilian regions and the authors found a reduction in the level of physical activity during the pandemic. With regard to the profile of participants who practiced more physical activity, corroborating with our findings, they were

mainly men, who live in the metropolitan regions, and are not part of the risk groups (COSTA; COSTA; BARBOSA FILHO; BANDEIRA *et al.*, 2020).

Some studies sought to identify the effects of reduced activity from approximately 10,000 steps/day to 2500 steps/day for 14 days, and found metabolic alterations with accumulation of intra-abdominal fat, decreased cardiorespiratory fitness, and muscle atrophy of lower limbs, while in older adults, there was an increase in inflammatory cytokines, harmful alterations in glucose metabolism – insulin, and protein synthesis (BOWDEN DAVIES; PICKLES; SPRUNG; KEMP *et al.*, 2019; OIKAWA; HOLLOWAY; PHILLIPS, 2019).

A very important result found in the current study was the increase in the percentage of sedentary individuals during the period of social isolation. The study by NARICI; DE VITO; FRANCHI; PAOLI *et al.* (2020) described the impacts of the decrease in physical activity and physical inactivity caused by social isolation during the Covid-19 pandemic. Among the most serious effects were the loss of muscle mass, decreased insulin resistance, decreased aerobic capacity, increased caloric intake with consequent weight gain, and accumulation of adipose tissue. As a consequence of these effects is the increased incidence of chronic non-communicable diseases, such as diabetes, hypertension, and obesity.

The treatment of diseases related to overweight and obesity and sedentarism has a great social and economic impact, leading to a substantial increase in health expenditures for the different health systems.

Conclusion

From the findings presented, it is possible to conclude that there was a difference between the moments pre the pandemic of Sars-Cov2 and during the measures of social isolation. We observed an increase in sedentarism, which was reported by only 2 participants before the pandemic, while during the isolation measures this number rose to 15. There was also an increase in the number of insufficiently active A and B from 37 to 67 and a decrease in active individuals from 132 to 43. This result reflected in fewer days of the week and less mean time spent in light, moderate, and vigorous activities, and more time sitting during the middle of the week and weekend. Thus, before social isolation measures, 66.33% of the

volunteers were considered active, while during social isolation, only 21.6% were considered active based on the IPAC evaluation.

In view of these results, the importance of health care in the preventive scenario for sedentarism is highlighted, as well as in the consequences that arise from sedentarism. Actions can be taken on awareness measures, with kinesiotherapy groups for at-risk populations, with initial contact for totally sedentary individuals and professional follow-up including individualized exercises, focused on generating physical conditioning.

The data presented constitute specific characteristics of a population of people considered active in the pre-pandemic period in the studied region. It is believed that these findings have clinical relevance from a preventive and therapeutic point of view in a practical environment, as they enable the implementation of specific actions, based on the needs verified, as well as being important in the theoretical environment, forming the basis for further studies to be carried out.

Agreements

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