



Barriers to physical activity during the COVID-19 pandemic in adults: a cross-sectional study

Breno Quintella Farah^{1,2} · Wagner Luiz do Prado³ · Neal Malik⁴ · Mara Cristina Lofrano-Prado⁵ · Paulo Henrique de Melo² · Joao Paulo Botero⁶ · Gabriel Grizzo Cucato⁷ · Marília de Almeida Correia⁸ · Raphael Mendes Ritti-Dias⁹

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Abstract

Social isolation due to the coronavirus disease 2019 (COVID-19) pandemic has reduced physical activity levels in both men and women. The identification of barriers to physical activity may assist in developing strategies to increase levels of physical activity during this pandemic. The study aim was identify the barriers to regular participation in physical during the COVID-19 pandemic in Brazilian adults. This cross-sectional study included 1570 [56.6% women; aged: 39.1 (37.7–40.7) years old] in social isolation due COVID-19. Barriers to physical activity were obtained using the validated questionnaires. “Laziness and fatigue” (50.2%), “lack of motivation” (31.2%), “lack of appropriate facilities/equipment/space” (17.4%), and “lack of time” (13.0%) were the barriers most prevalent in the study. Lack of motivation (OR = 1.49; 95% CI = 1.19–1.86) and lack of appropriate facilities/equipment/space (OR = 2.11; 95% CI = 1.57–2.83) were most associated with impacting physical activity levels due to the COVID-19, independent of sex, age, education level, days of social isolation and status weight. In conclusion, personal barriers to physical activity are common between both sexes, with lack of motivation and lack of appropriate facilities/equipment/space most associated with a decreased level of physical activity due to the COVID-19 pandemic.

Keywords Physical activity · Barriers · Adults · Coronavirus infections

✉ Breno Quintella Farah
brenofarah@hotmail.com

¹ Federal Rural University of Pernambuco, Rua Dom Manuel de Medeiros, s/n Dois Irmãos, Recife, PE 52171-900, Brazil

² Graduate Program in Physical Education, Federal University of Pernambuco (UFPE), Recife, Brazil

³ Department of Kinesiology, California State University San Bernardino, San Bernardino, USA

⁴ Department of Health Science and Human Ecology, California State University San Bernardino, San Bernardino, CA, USA

⁵ California, USA

⁶ Human Movement Science and Rehabilitation Graduation Program, Sao Paulo Federal University, Santos, São Paulo, Brazil

⁷ Department of Sport, Exercise and Rehabilitation, Northumbria University, Newcastle upon Tyne, England, UK

⁸ Graduated Program in Medicine, Universidade Nove de Julho, São Paulo, Brazil

⁹ Graduated Program in Rehabilitation Sciences, Universidade Nove de Julho, São Paulo, Brazil

Introduction

Social isolation is being promoted as a means to reduce the spread of Coronavirus 2019 (COVID-19) [1]. However, social isolation may lead to a subsequent reduction in physical activity levels [2–4], that can bring several consequences to health, particularly the immune, neuromuscular, cardiorespiratory and metabolic, systems, in addition to being associated with reduced incidence of cancer, cardiovascular disease, diabetes of type 2 and all-cause and specific mortality [5–10].

Aware of the consequence of physical inactivity several institutions, such as World Health Organization [11] and American College of Sports Medicine [12], have recommended the physical activity practice. However, several studies have reporting increases in physical inactivity during COVID-19 in different countries [13, 14], indicating difficulties in follow the recommendations to stay active during this period.

The identification of barriers to physical activity is important point when developing interventions to promote

physical activity [15–17]. Among adults, lack of time, social influence and lack of motivation are frequently reported barriers to regular participation in physical activity [15, 18–20]. Given these unprecedented times due to the COVID-19 pandemic, lifestyle habits have been dramatically altered [13, 14]. It is plausible that barriers to physical activity may have changed due social isolation.

Until now (October 2020), no study has been identified at Medline database that investigated the barriers to physical activity in people in social isolation, which would allow the development of specific strategies to increase the physical activity level of the population during social isolation and consequently improve the health indicators [10, 21]. Thus, the aim of the present study was identify the barriers to regular participation in physical during the COVID-19 pandemic in Brazilian adults.

Methods

Study design, sample and ethics

This cross-sectional study was conducted in line with the STROBE checklist [22]. A survey was conducted in Brazil between May 5th and May 17th, 2020. Participants were invited through social media (Facebook, Twitter, Whatsapp and Instagram) to answer a structured electronic questionnaire. The inclusion criteria were: (a) adults ≥ 18 years old of both sexes; (b) participate in regular physical activity prior to the COVID-19 pandemic (it was asked “Were you engaged in this physical activity before the COVID-19 pandemic?” possible answers: “yes” and “no”), and; (c) complete all responses within the survey. Similar procedures have been used by recent studies [23–25].

This study was approved by the institution’s Ethics Committee before data collection (#30890220.4.0000.5511 approved on May 1st 2020). Prior to the survey, respondents were asked to provide informed consent. Data were collected anonymously and only those that provided consent were included in the analysis. All procedures followed national legislation and the Declaration of Helsinki of 1964 (revised in 2013).

Procedures

After approval by the ethics committee, a questionnaire using Google Forms was sent to the participants. Data were then transferred to an MS Excel 2019 spreadsheet (Redmond, WA, USA) for further analysis. The survey consisted of 70 questions presented in seven domains: (a) personal information; (b) COVID-19 personal care; (c) physical

activity; (d) eating behavior; (e) overall health behavior; (f) mental health; (g) overall health. The instrument was developed for senior researchers with PhD in different areas (public health, science, nutrition, physiology, human movement science, neuroscience and behavior), which is common in clinical practice [26–28]. It was based in many questionnaires [15, 29–32] and put together as one 70 questions instrument referenced in each domain. Questions related to the COVID-19 pandemic were created based on face validity. Given that some domains have not related to the physical activity level or barriers, we used only the domains: (a) personal information, (c) physical activity, and (e) overall health behavior to answer the objective of the present study. Following we present the questions used in the present analysis.

Personal information and overall health behavior

Information about sex (“woman” or “man”), date of birth (DD/MM/YYYY), type of residence (“house” or “apartment”), educational level (“elementary”, “high school”, “undergraduate”, and “graduate”), and days of social isolation (open question), were obtained.

Smoker (yes or no), alcohol consumption (yes or no) and self-reported chronic diseases (open question) were obtained. Participants anthropometric variables were assessed by self-report of weight (kg) and height (m), and body mass index (BMI) was calculated by dividing body weight by squared height. Previous studies showed height and weight are commonly self-reported in population health and useful tool for estimating the prevalence of overweight and obesity [33]. Overweight was defined as a BMI ≥ 25.0 kg/m².

Physical activity

Physical activity habits

To assess physical activity habits, participants were asked about: (a) how many times are you exercising a week? (possible answers: none to seven days a week); (b) for how long are you exercising? (possible answers: “none”; “less than 30 min”; “between 30 and 60 min”, and; “more than 60 min”); (c) for how long have you engaged in this physical activity? (possible answer: “less than 1 month”; “between 1 and 3 months”; “between 3 and 6 months”; “more than 6 months”, and; “I am not exercising”); (d) What is the intensity of the physical activity? (possible answers: “low—i.e. to bathe, to shave, to drive, wash the dishes, make the bed”; “medium/moderate—i.e. gardening, play volleyball, water aerobics, pedal, brisk walking”; “high—i.e. climb stairs, swimming, jump rope, play soccer, running”, and; “I am not exercising”). (e) What type of exercise are you doing? (possible answers: “walking/jogging”; “resistance

training”; “core exercise”; “I am not exercising”; “others—open question”.

Based on these responses, time spent during each exercise session during the week was multiplied by the number of days spent exercising each week. Those that reached 150 min or more of moderate-vigorous physical activity (MVPA) were considered, “physically active” whereas those that fell below this threshold were classified as “inactive” [34].

Impact on physical activity level due to COVID-19—outcome

The impact COVID-19 on physical activity level was assessed through the question: “How much has the COVID-19 pandemic interfered with your daily physical activity habits?” The subjects were grouped into the following categories: “No” (if their response was either “none” or “a little”) and “Yes” (if they indicated “a lot”).

Barriers to physical activity—predictors

Personal and environmental barriers to physical activity were obtained using a validated questionnaire for adults [citation?], elderly [16], and clinical populations [15, 18]. From the list of the barriers, the participant should mark all that applied for them. Personal barriers included: “laziness and fatigue (tiredness, physical exhaustion)”, “lack of motivation”, “lack of time”, “lack of partner”, “pain, injury”, “I am not able to”, “I have no way to commute for exercising”, “It is not fun”, “need to relax and rest”, “lack of money”, “lack of competence”, “fear of injuries”, “lack of support”, “I do not understand why it is important” and “body shame”. Environmental barriers included: “due to the COVID-19 pandemic”, “lack of appropriate facilities/equipment/space” and “weather”.

Statistical analysis

All statistical analyses were made using the Statistical Package for the Social Sciences software (SPSS/PASW) version 20 (IBM Corp, New York, USA). Frequencies and means (95% confidence interval—95% CI) were used for descriptive analysis. The chi-square test was used to compare the prevalence of barriers to physical activity between men and women.

Binary logistic regression was used to analyze the relationship between barriers to physical activity and impact on physical activity due to the COVID-19 pandemic. This model was adjusted for common confounders (sex, age, education level and overweight), type of residence and number of days spent in social isolation. To this end, only barriers with a prevalence greater than 10% were analyzed. The results were presented in Odds Ratio (OR) and 95% CI.

Multicollinearity analysis was performed assuming variance inflation factors (VIF) less than five and tolerance below 0.20. The Hosmer–Lemeshow test was used to assess the model’s goodness-of-fit. The significance level was set at $p < 0.05$ for all analyses.

Results

From the 1895 subjects enrolled in the present study, three did not respond to the gender identification question and 322 did not practice physical activity before the pandemic. Therefore, the final sample included 1570 respondents. Table 1 shows the general characteristics, comorbid conditions, anthropometric and lifestyle habits variables of subjects.

Physically inactive was present in 71.3 and 61.2% felt an impact on physical activity level during the COVID-19 pandemic. Table 2 shows the barriers to physical activity in men and women. “Laziness and fatigue”, “lack of motivation”, “lack of appropriate facilities/equipment/space”, and “lack of time” were the barriers most prevalent in the study among both sexes. Compared to men, women more often reported “lack of appropriate facilities/equipment/space” as a barrier ($p = 0.007$).

Tables 3 shows the association between barriers to physical activity and its impact on physical activity level due to COVID-19. Lack of motivation (OR = 1.49; 95% CI = 1.19–1.86) and lack of appropriate facilities/equipment/space (OR = 2.11; 95% CI = 1.57–2.83) were most associated with impacting physical activity levels due to the COVID-19, independent of sex, age, education level, days of social isolation and status weight. In this sense, lack of motivation increases the likelihood of impact on physical activity level during the COVID-19 pandemic by 49%, whereas the lack of appropriate facilities/equipment/space increases it by 111%.

Discussion

The aim of the present study was identify the barriers to regular participation in physical during the COVID-19 pandemic in Brazilian adults. The main results of this study were: (a) “laziness and fatigue”, “lack of motivation”, “lack of appropriate facilities/equipment/space”, and “lack of time” were the barriers most reported during social isolation; (b) “lack of motivation” and “lack of appropriate facilities/equipment/space” were associated with impacting physical activity levels due to the COVID-19, independently of sex, age, education level, days of social isolation and status weight.

Social isolation has been identified as a crucial step in reducing the spread of COVID-19 [1]. However, this

Table 1 General characteristics, anthropometric and lifestyle habits variables of subjects included in this study ($n = 1570$)

Variables	Values
Age (years)	39.1 (37.7–40.7)
Social isolation (days)	43.5 (42.8–44.2)
Self-reported weight (kg)	73.6 (72.9–74.4)
Self-reported height (m)	1.69 (1.68–1.69)
Body mass index (kg/m^2)	25.8 (25.8–26.0)
Sex (% women)	56.6
Educational level (% low) ^a	8.1
Smoker (% yes)	5.4
Alcoholic beverages (% yes)	65.7
Physically inactive (% yes)	67.7
Overweight (% yes)	49.0
Hypertension (% yes)	9.2
Diabetes mellitus (% yes)	1.3
Dyslipidemia (% yes)	8.6
Cardiac disease (% yes)	1.4
Depression (% yes)	4.5
Asthma (% yes)	6.1
Arthrosis (% yes)	3.8

Continues data are present as mean (95% confidence interval) and categorical data in frequency

practice may have unintended negative consequences leading increase in sedentary behavior and reduction in physical activity levels [13, 14, 35]. Our study was the first to describe barriers to physical activity in physically active adults before the COVID-19 pandemic. In our sample, more

than 60% of participants indicated that COVID-19 pandemic influenced severely in their physical activity levels. Because of low physical activity levels, individuals may experience an increased risk for the development or worsening of health conditions as weight gain, high blood pressure, glycemic and lipid control and impaired fitness [36, 37]. Additionally, moderate intensity physical activity has been recommended as a non-pharmacological, inexpensive, and viable way to cope with COVID-19 virus, also due to the benefits on the immune system and its ability to reduce systemic inflammation [13, 38].

Personal barriers such as “laziness and fatigue”, “lack of motivation”, and “lack of time” were the most prevalent. Interestingly, these barriers were identified previously in clinical populations [15, 18] and healthy [19, 20] before the COVID-19 pandemic. However, some results were somewhat surprising, given that individuals are probably under social isolation, lack of time or laziness and/or fatigue were not expected as the most prevalent personal barriers. On the other hand, both lack of time and laziness and/or fatigue could be associated with domestic activities and working at home, which would need to be further investigated. Previous studies [19, 39] have shown that both lack of time and fatigue are prevalent barriers in the population.

Lack of appropriate facilities/equipment/space was the most reported environmental barrier to physical activity and was associated with affecting physical activity levels due to the COVID-19. Therefore, it is possible to assume that many individuals under social isolation do not consider the home as an environment conducive to physical activity [14]. As closures of parks, trails, gyms and beaches make it

Table 2 Frequency of reported barriers to physical activity of women and men during COVID-19 pandemic

Variables	All	Male	Female	<i>p</i>
Laziness, fatigue	50.2 (47.7–52.7)	48.1 (44.4–51.8)	51.8 (48.5–55.1)	0.145
Lack of motivation	31.2 (29.0–33.6)	30.1 (26.8–33.7)	32.1 (29.1–35.3)	0.388
Lack of appropriate facilities/equipment/space	18.0 (16.2–20.0)	15.1 (12.6–17.9)	20.3 (17.8–23.1)	0.007
Lack of time	13.0 (11.5–14.8)	13.5 (11.1–16.7)	12.8 (10.8–15.2)	0.718
Weather	9.4 (8.1–11.0)	10.4 (8.3–12.9)	8.8 (7.1–10.8)	0.283
Lack of partner	9.2 (7.8–10.7)	9.1 (7.1–11.5)	9.3 (7.6–11.1)	0.843
Pain, injury or I am not able to do	8.5 (7.2–9.9)	7.9 (6.1–10.2)	8.9 (7.3–11.1)	0.426
I have no way to commute for exercising	7.4 (6.4–9.0)	7.2 (5.5–9.3)	8.0 (6.4–9.9)	0.529
It is not fun	6.3 (5.2–7.6)	6.0 (4.5–8.0)	6.6 (5.2–8.5)	0.588
Need to relax and rest	5.3 (4.3–6.6)	5.8 (4.3–7.9)	5.1 (3.8–6.7)	0.503
Lack of Money	3.0 (2.3–4.0)	3.4 (2.3–5.0)	2.8 (1.9–4.1)	0.542
Lack of competence	2.7 (2.0–3.6)	2.8 (1.8–4.3)	2.7 (1.8–4.0)	0.952
Fear of injuries	1.8 (1.2–2.6)	1.8 (1.0–3.0)	1.9 (1.2–3.0)	0.775
Lack of support	1.7 (1.2–2.5)	2.0 (1.2–3.4)	1.6 (0.9–2.6)	0.496
I do not understand why it is important	1.5 (1.0–2.3)	1.3 (0.7–2.5)	1.8 (1.1–2.9)	0.399
Body shame	0.8 (0.5–1.4)	1.0 (0.5–2.1)	0.8 (0.4–1.6)	0.645

Data are present as frequency (95% confidence interval)

Table 3 Adjusted binary logistic regression modeling for the association between barriers to physical activity and impact on physical activity level due to the COVID-19 pandemic

	OR	95% CI	<i>p</i>
Laziness, fatigue	1.15	0.94–1.42	0.170
Lack of motivation	1.49	1.19–1.86	<0.001
Lack of appropriate facilities/equipment/space	2.10	1.57–2.83	<0.001
Lack of time	1.16	0.87–1.56	0.321

Adjusted for sex, education level, status weight, age, type of residence, and days of social isolation

OR odds ratio, 95% CI 95% confidence interval

more difficult for individuals to be active, it is important that health professionals should provide information to population about different possibilities of home exercise programs [40–42].

Lack of motivation was the second most prevalent barrier in the current study, although in relative terms it was less than other studies conducted before the pandemic. Herazo-Beltrán et al. [19], analyzed 2102 Colombians and observed that 54.6% reported lack of motivation as a barrier, compared with 30.1% in this study. However, this barrier also was associated with affecting physical activity levels due to the COVID-19. Some recommendations to overcome this barrier are invite a friend to exercise with you on a regular basis and write it on both your calendars and join an exercise group or class [43]. However, due to social isolation these alternatives are not possible. On the other hand, make physical activity a regular part of your daily or weekly schedule and write it on your calendar or exercising with relatives can be options.

This study has limitations that are worth highlighting. The cross-sectional design of this study is an evident limitation because no causality can be inferred. Additionally, online surveys are susceptible to information and social biases. Furthermore, rather than spontaneously reporting barriers through open-ended questions, dichotomous questions were created which may have limited the scope of responses. However, this was necessary to conduct our analyses. Due to the high number of barriers, we analyzed in binary logistic regression only those with a prevalence $\geq 10\%$, whose value was arbitrary. Finally, the measurement of physical activity before the COVID-19 pandemic did not take into consideration volume and intensity. However, our study's large sample size and its timely assessment of health behaviors makes our findings important and quite relevant.

In conclusion, “Laziness and fatigue”, “lack of motivation”, “lack of appropriate facilities/equipment/space” and “lack of time” were the barriers most reported. In addition, “lack of motivation” and “lack of appropriate facilities/equipment/space” were most associated barriers

with decreased physical activity levels due to COVID-19. These results add important information that could support police markers to develop effective public policies to reduce the jeopardizing effects of stay-at-home orders during the COVID-19 pandemic.

Author contributions BQF conceptualized and designed the study, carried out the analyses and drafted the initial manuscript. WLdP designed the data collection instruments, coordinated and supervised data collection, reviewed the manuscript. NM contributed to the interpretation of the data, and reviewed the manuscript. MCL-P contributed to the interpretation of the data, and reviewed the manuscript. PHdM contributed to the interpretation of the data, and reviewed the manuscript. JPB contributed to the interpretation of the data, and reviewed the manuscript. GGC conceptualized and designed the study, and reviewed the manuscript. MAC conceptualized and designed the study, and reviewed the manuscript. RMR-D designed the data collection instruments, coordinated and supervised data collection, conceptualized and designed the study, and reviewed the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Compliance with ethical standards

Conflict of interest The authors declare that there are no conflicts of interest. BQ Farah was responsible for starting the writing of the manuscript. In addition, no person received any honorarium, grant, or other form of payment to produce the manuscript.

Ethical approval The study was approved by the University Nove de Julho (#30890220.4.0000.5511 approved on May 1st 2020) and complies with the guidelines of both the Brazilian National Research Ethics System as well as the Helsinki declaration of 1975 (revised in 1983).

Informed consent All participants signed an informed consent form.

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