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1 **Moderate to vigorous physical activity and sedentary behavior changes in self-**
2 **isolating adults during the COVID-19 pandemic in Brazil: A cross-sectional survey**
3 **exploring correlates**

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47 **Abstract:**

48 **Background:** The COVID-19 pandemic imposed major changes on daily life-routine
49 worldwide. To the best of our knowledge, no study quantified the changes on moderate
50 to vigorous physical activity (MVPA) and sedentary behaviors (SB) and its correlates in
51 Brazilians. This study aimed to (i) evaluate the changes (pre-versus during pandemic) in
52 time spent in MVPA and SB in self-isolating Brazilians during the COVID-19
53 pandemic, and (ii) to explore correlates.

54 **Methods:** A cross-sectional, retrospective, self-report online web survey, evaluating the
55 time spent in MVPA and SB pre and during the COVID-19 pandemic in self-isolating
56 people in Brazil. Sociodemographic, behavioral, and clinical measures, and time in self-
57 isolation were also obtained. Changes in MVPA and SB and their correlates were
58 explored using generalized estimating equations (GEE). Models were adjusted for
59 covariates.

60 **Results:** A total of 877 participants (72.7% women, 53.7% young adults [18-34 years])
61 were included. Overall, participants reported a 59.7% reduction (95%CI: 35.6 to 82.2)
62 in time spent on MVPA during the pandemic, equivalent to 64.28 (95% CI: 36.06 to
63 83.33) minutes per day. Time spent in SB increased 42.0% (95%CI: 31.7 to 52.5),
64 corresponding to an increase of 152.3 (95%CI: 111.9 to 192.7) minutes per day. Greater
65 reductions in MVPA and increases in SB were seen in younger adults, those not
66 married, those employed, and those with a self-reported previous diagnosis of a mental
67 disorder.

68 **Conclusions:** People in self-isolation significantly reduced MVPA levels and increased
69 SB. Public health strategies are needed to mitigate the impact of self-isolation on
70 MVPA and SB.

71

72 **Keywords:** Physical activity, Sedentary behavior, COVID-19, Pandemic

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76 **Introduction**

77 The coronavirus disease 2019 (COVID-19) pandemic, caused by the spread of the severe acute
78 respiratory coronavirus 2 (SARS-CoV-2), has infected more than 13 million people in more than 200
79 countries around the world resulting in nearly 570 thousand deaths on the 14th of July 2020 according to
80 the World Health Organization (WHO)[1]. As a response to reduce the virus spread, the WHO
81 recommended national governments to adopt non-pharmacological strategies based on social and physical
82 distancing, such as lockdown, quarantine, and self-isolation.

83 In Brazil, the epidemiological report number 05 of the Ministry of Health has recommended the
84 adoption of social distancing measures, including self-isolation in areas with community transmission [2]
85 . When self-isolating, people were advised to stay at home, and only go out in public for essential
86 activities, such as going to the supermarket, to the pharmacy, or to use essential services, such as medical
87 assistance. All other non-essential services, including gyms, parks, stadiums, and other places where
88 people exercised were closed.

89 Self-isolation measures impose a drastic and sudden disruption of daily life routine, resulting in
90 limited physical and social mobility, and fewer opportunities to be active [3]. Moreover, the emotional
91 burden [4, 5] of the pandemic likely resulted in additional barriers to remain focused and motivated to be
92 and/or stay physically active, potentially reducing the time spent in physical activity (PA), defined as any
93 bodily movement produced by skeletal muscles that result in energy expenditure [6]. The negative impact
94 of the pandemic and self-isolation measures on PA levels, both on light PA and moderate to vigorous PA
95 (MVPA), defined as any activities that result in energy expenditure above 3 metabolic equivalents
96 (METs) [7] noted in many countries including Australia [8, 9], Canada [10], Croatia [11], France [12],
97 Italy [13], Spain [14], the UK [15, 16], and the USA [17-19]. However, some moderating factors on PA
98 changes in this period were identified. For example, age [13, 15], sex [14], and the presence of chronic
99 physical diseases or mental disorders moderated the pandemic impact on PA levels [15]. Further,
100 increases in time spent in sedentary behavior (SB), defined as any waking behavior characterized by an
101 energy expenditure ≤ 1.5 METs, while in a sitting, reclining or lying posture,[20] were noted during the
102 pandemic in the US [18, 19], France and Sweden [21], and Spain [14]. In Spain, sex moderated the
103 increase in time spent in SB [14].

104 To the best of our knowledge, no study has evaluated how the COVID-19 pandemic changed PA
105 and SB during self-isolating Brazilians. The present study aimed (i) to examine the changes (pre-versus
106 during COVID-19 pandemic) on PA and SB in self-isolating Brazilians, and (ii) to evaluate whether
107 sociodemographic (sex, age, ethnicity, marital status, employment, monthly household income),
108 behavioral (smoking, current alcohol consumption), clinical (presence of chronic physical diseases or
109 mental disorders), and contextual factors (i.e., number of days of self-isolation) moderated these changes.

110

111 **Methods**

112 This paper presents pre-planned interim analysis of data from a cross-sectional study. Data
113 collection was performed through an online survey (www.qualtrics.com). The study was launched on 11
114 April 2020 and data collection continued until 05 May. The study was approved by the Federal University
115 of Santa Maria Research Ethics Committee and by the National Commission of Ethics in Research
116 [CONEP] (30244620.1.0000.5346).

117

118 **Participants and recruitment**

119 Participants were recruited through social media (Facebook, Instagram, Twitter), and by
120 distributing an invitation to participate through existing researcher networks. The inclusion criteria were:
121 (1) Brazilians adults (18-65 years), (2) currently residing in Brazil, and (3) in self-isolation due to the
122 COVID-19 pandemic. Self-isolation was defined as staying-at-home and only leaving for essential
123 activities such as food shopping, visiting the pharmacist or other health professionals. Participants who
124 self-reported the presence of COVID-19 symptoms, assessed through a list of symptoms (fever, cough,
125 dry mouth, coriza, sore throat), were removed from this analysis.

126

127 **Moderate to vigorous physical activity (MVPA) and sedentary behavior (SB) assessment**

128 Participants were asked to recall the amount of time in vigorous and moderate physical activity,
129 and sedentary behavior they undertook on an average day, separately both pre- and during self-
130 isolation[16]. Participants were asked: (1) “How much time on an average day have you spent in vigorous

131 activity before/since social distancing?"; (2) "How much time on an average day have you spent in
132 moderate activity since/before social distancing?" and (3) "How much time on an average day have you
133 spent sitting since/before social distancing?" Responses were given in hours and minutes. MVPA and SB
134 were analyzed as continuous variables (minutes per day). We also categorized PA levels (≥ 30
135 minutes/day or < 30 minutes/day of MVPA), which is in accordance with the WHO recommendations.
136 Next, four categories were derived to identify patterns of change: (1) persistent inactive (< 30
137 minutes/day of MVPA pre and during the pandemic), (2) decreased PA (≥ 30 minutes/day of MVPA pre
138 and < 30 minutes/day of MVPA during the pandemic), (3) increased PA (< 30 minutes/day of MVPA pre
139 and ≥ 30 minutes/day of MVPA during the pandemic) and (4) persistent active (≥ 30 minutes/day of
140 MVPA pre and during the pandemic).

141

142 Covariates

143 Demographic data were collected, including sex (men or women), age (in 10-year age bands),
144 ethnicity (Caucasian, Black, Asian, mixed, others), marital status (single, divorced, widowed or married),
145 employment (employed, student, military, unemployed), monthly household income \leq R\$1254, R\$1255-
146 R\$2004, R\$2005-R\$8640, R\$8641-R\$11261 \geq R\$11262). Health behaviors data included current smoking
147 (y/n) or alcohol consumption (y/n). Clinical data included self-reported previous diagnosis of physical
148 diseases or mental disorders, such as: obesity, hypertension, myocardial infarction, angina pectoris, and
149 other coronary diseases, other cardiac diseases, varicose veins of lower extremities, osteoarthritis, chronic
150 neck pain, chronic low back pain, chronic allergy (excluding allergic asthma), chronic bronchitis,
151 emphysema or chronic obstructive pulmonary disease, type 1 diabetes, type 2 diabetes, diabetic
152 retinopathy, cataract, peptic ulcer disease, urinary incontinence or urine control problems,
153 hypercholesterolemia, chronic skin disease, chronic constipation, liver cirrhosis and other hepatic
154 disorders, stroke, chronic migraine/others, depression, anxiety disorders, bipolar disorder and
155 schizophrenia/others. Number of days (extension) in self-isolation was registered with a single question.

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159 Statistical analyses

160 Data were analyzed using mean and standard deviation (SD) or 95% confidence interval
161 (95%CI) for continuous data and the raw numbers and % for categorical variables. Normality was
162 checked with the Kolmogorov-Smirnov test. Due to the non-normal distribution, the mean changes (pre-
163 versus during the pandemic) of MVPA levels and SB were evaluated using two generalized estimating
164 equations models (GEE), one with changes in MVPA and one with change in SB as the dependent
165 variable. The models were run testing the time effects (pre/during) and the interactions between time and
166 the factors included in the model. The factors included in the models were (sex [male versus female], age
167 [young adults {18-34 years} versus middle-age adults {35-54 years} versus older adults {55-65 years}],
168 ethnicity [Caucasian versus Asian/Black/mixed/others], marital status [married versus
169 single/divorced/widowed], employment [employed/students/military versus unemployed/retired], monthly
170 household income [<R\$2,005 versus R\$2,005-R\$8,640 versus R\$8,641-R\$11,261 versus >R\$11,261],
171 current smoking [yes versus no], alcohol consumption [yes versus no], self-reported previous diagnosis of
172 any chronic diseases [yes versus no] or any mental disorders [yes versus no]). When the interaction
173 between time and any factor was significant, the Bonferroni test was applied. The results of the models
174 are presented using estimated marginal means and 95%CI. We also calculated the delta% change (pre to
175 during), together with 95% CI as the effect size measure. The associations between the time (in days) in
176 self-isolation and the change in MVPA and SB were tested using linear regression models. Days in self-
177 isolation were collected as a continuous variable, and linear regression models were used to test the
178 association of time in self-isolation with changes in MVPA and SB. The level of statistical significance
179 was set at p-value < 0.05. All analyses were performed using SPSS (v. 21).

180

181 **Results**

182 A total of 1354 participants responded to the survey. Of these, 877 participants reported being in
183 self-isolation and provided complete data for the present analysis. The sample was predominantly
184 comprised of women (n=635, 72.7%), young adults ranging from 18-34 years (n=471, 53.7%),
185 Caucasians (n=669, 76.3%), singles (n=442, 50.9%), currently employed/students/military (n=723,
186 92.6%), with a monthly income ranging from R\$2005 to R\$8640 (n=364, 41.5%), non-smokers (n=836,
187 95.3%), currently consuming alcohol (n=605, 69.1%), with a self-reported previous diagnosis of a

188 physical chronic disease (n=824, 94%) and without a self-reported previous diagnosis of a mental
189 disorder (n=523, 59.6%). More than half of the participants were from the Rio Grande do Sul state (80%),
190 11% from the Rio de Janeiro, and about 6% from Ceará. Participants were on average 27.13 (6.57) days
191 in self-isolation. The full details of the sample can be seen at Table 1.

192

193 Mean changes in MVPA and SB (pre versus during pandemic)

194 A total of 432 (49.3%) of participants persisted to be active during the pandemic, 32 (3.6%)
195 increased MVPA levels during the pandemic, 306 (34.9%) reduced MVPA levels during the pandemic,
196 and 107 (12.2%) persisted to be inactive. We found an overall reduction of 64.28 (95%CI: 36.06 to 83.33)
197 minutes per day on time spent in MVPA, corresponding to a reduction of 59.7% (95%CI: 35.64 to 82.21,
198 $p < 0.001$). The average time spent in SB increased 42.0% (95%CI: 31.74 to 52.50, $p < 0.001$) during the
199 pandemic, corresponding to additional 152.3 (95%CI: 111.9 to 192.7) minutes per day in SB. The mean
200 time spent in MVPA and SB at baseline and during the pandemic can be found at figure 1.

201

202 Correlates of MVPA change

203 Significant interactions in MVPA change were found for age ($p = 0.013$), marital status ($p =$
204 0.006) and employment ($p = 0.008$). Bonferroni post hoc test found that young adults (mean change= -
205 71.37, 95%CI: -99.76.51 to -42.98) and middle age adults (mean change= -66.76, 95%CI: -94.50 to -
206 39.01) had greater decreases in time spent in MVPA when compared to older adults (mean change= -
207 54.70, 95%CI: -86.25 to -23.16). Also, those not married (single/divorced/widowed) had greater
208 reductions (mean change= -75.50, 95%CI: -102.00 to -49.00) when compared to those married (mean
209 change= -53.05, 95%CI: -79.36 to -26.75), and those with an occupation (employed/student/military) had
210 greater reductions (mean change= -78.69, 95%CI: -105.21 to -52.16) when compared to those without
211 occupation (unemployed/retired. Mean change= -49.87, 95%CI: -78.83 to -20.90). The detailed results of
212 the MVPA model with mean changes can be seen in Table 2. Those not married (mean difference= 22.08,
213 95%CI: 6.79 to 37.36, $p = 0.005$), and with no occupation (mean difference= 38.55, 95%CI: 14.08 to
214 63.03, $p = 0.002$) had greater MVPA levels at baseline (pre and during pandemic means are shown in

215 supplementary material 1). The number of days in self-isolation was not associated with changes in
216 MVPA (unstandardized beta coefficient= 0.234, 95%CI: -0.816 to 1.284, p= 0.662, R²= 0.00).

217

218 Correlates of SB changes

219 The interactions found for the SB model were age (p<0.001), marital status (p= 0.024),
220 employment (p=0.03), and self-reported previous diagnosis of mental disorders (p= 0.003). Young adults
221 had greater increases (mean change= 190.48, 95%CI: 149.65 to 231.30) in time spent in SB when
222 compared to middle age (mean change= 143.35 95%CI: 99.48 to 187.21) or older adults (mean change=
223 136.71, 95%CI: 77.88 to 195.54). Also, greater increases in time spent in SB were found in those not
224 married (mean change= 176.15, 95%CI: 133.74 to 218.56) compared to those married (mean change=
225 137.96, 95%CI: 96.85 to 178.24), in those with an occupation (mean change= 179.85, 95%CI: 142.15 to
226 217.55) compared to those with no occupation (mean change= 133.84, 95%CI: 79.26 to 188.42), and in
227 those with a self-reported previous diagnosis of mental disorders (mean change= 173.16, 95%CI: 129.97
228 to 216.34) compared to those with no history of mental disorders (mean change= 140.53, 95%CI: 101.07
229 to 180.00). The detailed results of the SB model with interactions can be seen in Table 2. Younger adults
230 spent more time in SB than middle-age adults (mean difference= 39.99, 95%CI: 5.27 to 74.71, p=0.017),
231 but not more than older adults (mean difference= 43.28, 95%CI: -13.15 to 99.75, p= 0.20). Those with a
232 self-reported previous diagnosis of a mental disorder spent more time in SB at baseline (mean difference=
233 24.09, 95%CI: 0.41 to 48.66, p=0.046) than those without (pre and during pandemic means are shown in
234 supplementary material 2). The number of days in self-isolation was not associated with changes in SB
235 (unstandardized beta coefficient= 0.306, 95%CI: -1.732 to 2.345, p= 0.77, R²= 0.00). The sample size
236 (n=1000) was calculated for evaluating the association of MVPA with mental health outcomes, published
237 elsewhere [22].

238

239 Discussion

240 The present study is, to the best of our knowledge, the first study demonstrating the impact of the
241 self-isolation during the COVID-19 pandemic on Brazilians for self-reported MVPA and SB.
242 Approximately 35.0% of the sample became insufficiently active during the self-isolation period. Only

243 3.6% became active with self-isolation. On average, there was a reduction of about 1 hour/day of time
244 spent in MVPA, which corresponds to a reduction of 60.0% of their MVPA pre-pandemic levels.
245 Participants reported spending 2.5 hours/day more in SB during the pandemic than before the pandemic,
246 corresponding to an increase of 40.0%.

247 The reduction in MVPA levels in Brazilians is consistent with the findings of previous studies in
248 other countries. For example, we found that roughly 35.0% of respondents became inactive during the
249 self-isolation period as did about 50.0% in similar studies collected in France [12], the USA [17], and
250 Australia [9]. Our results included reductions of 60.0% of the time spent in MVPA in Brazil, which is
251 comparable to the reductions found in the USA, where there was a decrease of 47.0% on time spent in
252 moderate PA [17]. Additionally, we observed an increase of about to 2.5 hours/day on time spent in SB,
253 which is consistent with other studies that have found an increase of about 2 to 3 hours/day of SB in
254 multiple countries [14, 23]. These findings highlight the urgent need for public health strategies to
255 mitigate the impact of self-isolation on MVPA and SB.

256 Greater reductions in MVPA and increases in SB were found among younger adults, which is
257 line with the findings from Italy and the UK [13, 15]. It is possible that this age group had fewer
258 resources and greater difficulty coping with emotional responses to this situation [24]. In addition, those
259 not married and currently working had higher MVPA levels at baseline, but decreased their MVPA to
260 similar levels to those not married and with no work during the pandemic. Of note, those currently
261 employed might have reduced their commuting-related PA and have likely increased their SB time due to
262 online meetings and activities. Lastly, those with a self-reported previous pandemic diagnosis of a mental
263 disorder spent more time in SB and reported the greatest increases in time spent in SB during the
264 pandemic. This finding is in accordance with a study in the UK [15] that found a greater reduction in
265 MVPA in people with depression. This finding is also consistent with previous studies showing that
266 people with mental disorders have higher SB levels than people without mental disorders [25-27] and
267 suggests that self-isolation during the pandemic might be specifically detrimental to people with a
268 previous diagnosis of a mental disorder.

269 There is ample evidence to justify making PA promotion a global public health priority during
270 the coronavirus pandemic [3]. The COVID-19 pandemic appears to have impacted mental health globally,
271 increasing rates of depression and anxiety symptoms and disorders [5]. On the other hand, physical

272 activity is a protective factor for mental disorders [28-30]. During the pandemic, cross-sectional and
273 longitudinal evidence suggests that those with higher PA or lower SB levels are less likely to present
274 depressive symptoms [22, 31]. Promoting MVPA and reducing SB during the pandemic is also essential
275 for physical health. Higher mortality due to COVID-19 is seen in those with clinical comorbidities such
276 as hypertension, diabetes, and coronary heart disease [32]. Increasing time spent in MVPA and reducing
277 time spent in SB seems to reduce the risk of developing multiple chronic diseases, including those
278 associated with a higher risk of COVID-19 mortality [33]. For example, people with higher PA levels
279 have 35% and 23% less risk of developing diabetes [34] and heart failure [35], respectively. In addition,
280 achieving the public health recommendations of 150 minutes of MVPA per week reduces the risk of all-
281 cause and cardiovascular mortality [36]. Lastly, initial evidence has suggested that physical inactivity
282 may be a risk factor for hospitalization due to COVID-19 [37], further underlining the potential
283 importance of promoting PA during the pandemic.

284 The present study has some limitations. First, MVPA and SB were assessed using self-reported
285 questionnaires. Self-reported questionnaires are commonly associated with overestimations of MVPA
286 [38] and underestimation of SB [39]. Second, pre-pandemic MVPA and SB were assessed
287 retrospectively, and both can be susceptible to memory bias. Third, the representativeness of the sample is
288 limited. However, participants were drawn from 24 of the 27 federative units of Brazil, with most
289 participants being from the Rio Grande do Sul state, Rio de Janeiro, and Ceará. Also, some groups such
290 as adults aging 55-64, Asian and Black people, and those with a household income lower than <R\$1,254
291 are poorly represented. Fourth, we could not explore changes in light PA, such as walking. Also, we
292 could not explore the changes in time spent on MVPA across the different PA domains
293 (work/occupational, leisure, transportation, household). It is possible, for example, that some participants
294 reduced the time spent in leisure, transportation, or work/occupational activities, but increased the time
295 spent in household activities. This is important since we know that some mental health benefits are more
296 likely to be associated with time spent in leisure activities [40]. The strengths of the manuscript are the
297 large sample size of self-isolating Brazilians and the possibility to explore a variety of moderators.
298 Although the sample size was calculated for estimating the association of MVPA and mental health
299 outcomes, the large sample size is sufficiently powered for the present analyses.

300

301 **Conclusion**

302 Self-isolation during the pandemic significantly reduced time spent in MVPA and increased time
303 spent in SB in Brazilian adults, particularly in younger adults, those who were single, and those who were
304 employed. These findings highlight the urgent need of the adoption of public health strategies to address
305 the impact of self-isolation during the COVID-19 pandemic on MVPA and SB.

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Table 1. Sample characteristics

	Category/Mean (Standard deviation)	Overall N=877* (%)
Sex	Male	238 (27.3)
	Female	635 (72.7)
Age	18-24 years	131 (14.9)
	25-34 years	340 (38.8)
	35-44 years	220 (25.1)
	45-54 years	108 (12.3)
	55-64 years	78 (8.9)
Ethnicity	Asian	3 (0.3)
	Black	24 (2.7)
	Mixed	163 (18.6)
	Caucasian	669 (76.3)
	Others	16 (1.8)
Marital Status	Married	363 (41.4)
	Widowed	4 (0.5)
	Divorced	60 (6.9)
	Single	442 (50.9)
Employment	Employed	558 (63.6)
	Unemployed	43 (1.6)
	Student	235 (26.8)
	Military	19 (2.2)
	Retired	22 (2.5)
Monthly household income	<R\$1254 (\$232)	30 (3.4)
	R\$1255 (\$232)-R\$2004 (\$371)	94 (10.7)
	R\$2005 (\$371)-R\$8640 (\$1600)	364 (41.5)
	R\$8641 (\$1600)-R\$11261 (\$2085)	139 (15.8)
	>R\$11262 (\$2085)	250 (28.5)
Current smoking	No	836 (95.3)
	Yes	41 (4.7)
Current alcohol consumption	No	271 (30.9)
	Yes	605 (69.1)
Self-reported previous diagnoses of physical disease	No	53 (6)

	Yes	824 (94)
Self-reported previous diagnoses of mental disorder	No	523 (59.60)
	Yes	354 (40.4)
Days in self isolation	Mean (standard deviation)	27.07 (6.71)

460 * Total sample with available data. Number of cases can be different for each variable due to missing
461 cases (minimum=869)

Table 2. Moderate to vigorous physical activity change (pre-post pandemic) in self-isolated adults during the SARS-CoV-2 pandemic in 2020 in Brazil

Characteristics	Category	MVPA change (pre versus during)						Interaction p value
		Mean change in minutes	95% CI		Delta%	95% CI		
Sex	Male	-65.86	-92.26	-39.52	-61.24%	-85.79%	-36.75%	0.778
	Female	-62.71	-89.37	-36.05	-58.18%	-82.91%	-33.44%	
Age	Young adults (18-35 years)	-71.37a	-99.76	-42.98	-72.68%	-101.51%	-43.77%	0.013
	Middle age adults (36-55 years)	-66.76a	-94.50	-39.01	-64.53%	-91.34%	-37.07%	
	Older adults (55-64 years)	-54.70b	-86.25	-23.16	-45.08%	-71.08%	-19.08%	
Ethnicity	Black/Asian/Mixed/Others	-66.00	-95.52	-36.48	-62.67%	-90.70%	-34.64%	0.216
	White	-62.55	-86.72	-38.38	-56.59%	-78.87%	-34.98%	
Marital status	Single/divorced/widowed	-75.50a	-102.00	-49.00	-63.60%	-85.93%	-41.28%	0.006
	Married	-53.05b	-79.36	-26.75	-54.91%	-82.14%	-27.68%	
Employment	Employed/students/military	-78.69a	-105.21	-52.16	-61.99%	-82.88%	-41.09%	0.008
	Unemployed/retired	-49.87b	-78.83	-20.90	-56.42%	-89.19%	-23.64%	
Monthly household income	<R\$2005 (\$371)	-82.58	-114.49	-50.66	-63.52%	-88.15%	-39.00%	0.647
	R\$2005 (\$371) -R\$8640 (\$1600)	-57.53	-82.31	-32.75	-56.57%	-80.94%	-32.20%	
	R\$8641 (\$1600) - R\$11261 (\$2085)	-56.72	-89.26	-24.19	-58.06%	-91.38%	-24.76%	
	>R\$11261	-60.28	-88.92	-31.63	-59.44%	-87.69%	-31.19%	
Current smoking	Yes	-70.76	-112.95	-28.57	-67.02%	-106.9%	-27.06%	0.090
	No	-57.80	-77.29	-38.30	-52.77%	-70.43%	-34.90%	
Current alcohol consumption	Yes	-58.39	-84.85	-31.93	-57.09%	-82.97%	-31.22%	0.378
	No	-70.16	-97.22	-43.10	-62.06%	-85.29%	-38.12%	
Self-reported previous diagnosis of mental disorders	Yes	-67.46	-95.88	-39.05	-63.37%	-90.07%	-36.68%	0.112
	No	-61.09	-85.60	-36.58	-56.11%	-78.63%	-33.60%	
Self-reported previous diagnosis of physical diseases	Yes	-67.42	-89.62	-45.23	-59.64%	-79.28%	-40.01%	0.803
	No	-61.13	-96.90	-25.63	-59.77%	-94.74%	-25.63%	

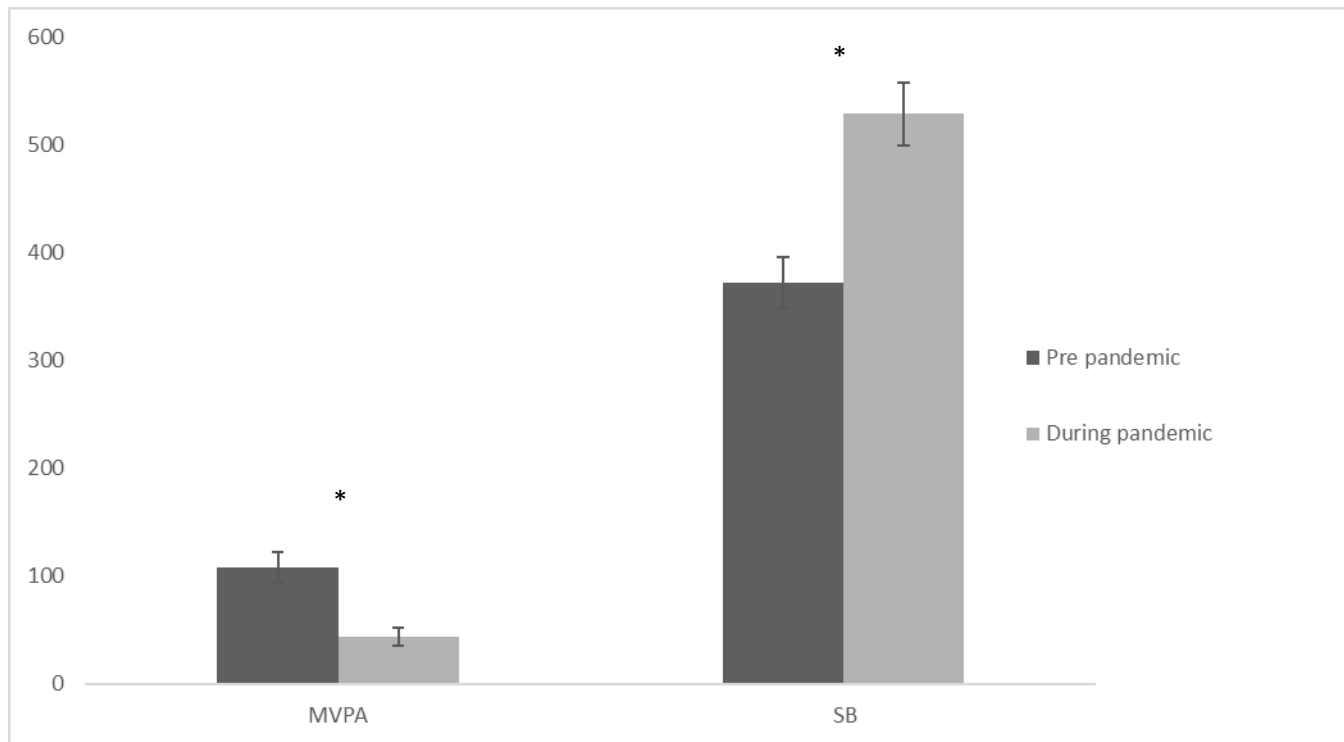
Different letters mean significant differences according the Bonferroni post-hoc test ($p < 0.05$).

Table 3. Sedentary behavior change (pre-post pandemic) in self-isolated adults during the SARS-CoV-2 pandemic in 2020 in Brazil

Characteristics	Category	SB change (pre versus during)						
		Mean change in minutes	95% CI		Delta%	95% CI		Interaction p value
Sex	Male	161.41	119.48	203.35	42.51%	31.47%	53.56%	0.380
	Female	152.28	111.87	192.69	41.72%	30.61%	52.78%	
Age	Young adults (18-35 years)	190.48a	149.65	231.30	47.62%	37.42%	57.81%	<0.001
	Middle age adults (36-55 years)	143.35b	99.48	187.21	39.87%	27.62%	51.99%	
	Older adults (55-64 years)	136.71b	77.88	195.54	38.34%	21.82%	54.80%	
Ethnicity	Black/Asian/Mixed/Others	155.43	109.04	201.81	41.42%	29.07%	53.81%	0.940
	White	158.26	121.24	195.29	42.81%	32.80%	52.83%	
Marital status	Single/divorced/widowed	176.15a	133.74	218.56	46.87%	35.58%	58.15%	0.024
	Married	137.54b	96.85	178.24	37.29%	26.18%	48.32%	
Employment	Employed/students/military	179.85a	142.15	217.55	45.58%	36.02%	55.14%	0.030
	Unemployed/retired	133.84b	79.26	188.42	38.22%	22.63%	53.81%	
Monthly household income	<R\$2005 (\$371)	171.17	118.64	223.70	47.39%	32.85%	61.94%	0.632
	R\$2005 (\$371) -R\$8640 (\$1600)	166.74	125.52	207.95	45.81%	34.49%	57.14%	
	R\$8641 (\$1600) - R\$11261 (\$2085)	150.63	102.05	199.21	40.36%	27.34%	53.38%	
	<R\$2005 (\$371)	138.85	92.10	185.59	35.50%	23.54%	47.45%	
Current smoking	Yes	158.87	108.25	209.49	42.72%	29.10%	56.33%	0.984
	No	154.82	116.98	192.66	41.53%	31.38%	51.68%	
Current alcohol consumption	Yes	173.39	134.25	212.53	46.86%	36.28%	57.44%	0.091
	No	140.30	96.75	183.85	37.44%	25.82%	49.06%	
Self-reported previous diagnosis of mental disorders	Yes	173.16a	129.97	216.34	45.02%	33.79%	56.25%	0.003
	No	140.53b	101.07	180.00	39.03%	28.07	49.99%	
Self-reported previous diagnosis of physical diseases	Yes	139.60	107.20	172.00	37.85%	29.07%	46.64%	0.358
	No	174.09	117.49	230.69	46.31%	31.25%	61.37%	

Different letters mean significant differences according the Bonferroni post-hoc test (p<0.05).

Figure 1. Moderate to vigorous physical activity and sedentary behavior, pre and during COVID-19 pandemic in 2020 in Brazil



Values are shown as the estimated marginal means, in minutes per day, of moderate to vigorous physical activity (MVPA) and sedentary behavior (SB) together with their standard error. Significant changes across time were found for MVPA ($p < 0.001$) and SB ($p < 0.001$).