O Impacto do Confinamento durante a Pandemia de COVID-19 na Atividade Física: Inquérito *Online*

The Impact of Lockdown during COVID-19 Pandemic on Physical Activity: A Web-based Cross-sectional Survey

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RESUMO

INTRODUÇÃO: O confinamento imposto durante a pandemia COVID-19 pode ter afetado o estilo de vida dos indivíduos e, possivelmente, os seus níveis de atividade física (AF). O objetivo deste estudo foi avaliar o impacto destas medidas nos níveis de AF dos Portugueses.

MÉTODOS: Foi realizado um inquérito *online*, com base no eurobarómetro do desporto e atividade física, a fim de recolher dados sobre os níveis de AF em Portugal antes e durante o período pandémico. A AF foi avaliada através de 3 *outcomes*: (i) cumprimento com as recomendações de AF aeróbia da Organização Mundial da Saúde (OMS); (ii) tempo diário sentado; (iii) tempo de caminhada semanal. Utilizaram-se modelos de regressão multinomial de forma a identificar variáveis que pudessem estar associadas a mudanças nos níveis de AF.

RESULTADOS: Obtivemos 1281 respostas (36,4% do sexo masculino). A maioria dos participantes tinha um nível académico alto (73%) e estava empregada (76,3%). O confinamento associou-se a uma redução significativa nos níveis de AF aeróbica (50,0% dos participantes cumpriam com as recomendações de AF aeróbica da OMS antes *versus* 38,8% durante; *p*<0,001), uma redução do tempo médio de caminhada semanal (97,2 *versus* 72,4 minutos; *p*<0,001), bem como um aumento do tempo diário sentado (*p*<0,001). Não foram identificadas variáveis associadas ao aumento ou diminuição da AF durante o confinamento.

CONCLUSÃO: O confinamento imposto durante a pandemia COVID-19 associou-se a uma redução nos níveis de AF dos portugueses. Estes dados podem ser usados para melhor preparar e promover AF durante esse período em futuras vagas e/ou situações similares.

PALAVRAS-CHAVE: COVID-19; Comportamento Sedentário; Exercício; Pandemia; Quarentena

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ABSTRACT

INTRODUCTION: Home lockdown enforced during COVID-19 pandemic may have affected individuals' lifestyles and, possibly, their physical activity (PA) levels. In this study, we aimed to assess changes in Portuguese PA levels during lockdown.

METHODS: We conducted an online survey based on the special eurobarometer public opinion survey on sports and physical activity in April 2020 in order to collect data about the Portuguese PA levels before and during the home confinement period. PA was assessed by three outcome variables: (i) compliance with World Health Organization (WHO) aerobic PA recommendations, (ii) daily sitting time, (iii) and weekly walking time, with pre- lockdown and during lockdown levels being compared for each. Multinomial regression models were used to identify variables that were associated to changes in PA levels.

RESULTS: We obtained 1281 responses (36.4% males). Most participants had high academic levels (73%) and were employed (76.3%). Lockdown was associated with significant decreases in aerobic PA levels (50.0% participants met WHO recommendations for aerobic PA levels before lockdown versus 38.8% during that period; $p<0.001$) and average weekly walking time (97.2 versus 72.4 minutes; $p<0.001$), as well as with increases in daily sitting time ($p<0.001$). We did not identify variables consistently associated with increasing or decreasing PA during lockdown.

CONCLUSION: Home lockdown during COVID-19 pandemic is associated with a decrease in PA levels. In the likely event of another waves, when confinement may again be implemented, these data can be used to better prepare and to promote PA during that period.

KEYWORDS: COVID-19; Exercise; Pandemics; Quarantine; Sedentary Behavior

INTRODUCTION

Coronavirus disease 2019 (COVID-19), an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),[1] has widely spread over the world since the beginning of 2020.[1,2] In the absence of an effective vaccine or treatment, classical public health measures – including social distancing, isolation, quarantine and closure of services – were implemented by most governments to curb the pandemic.[1-3] These measures affected individuals' lifestyles and, possibly, their physical activity (PA) levels.[1-5] In fact, Ammar A *et al*[3] concluded that the COVID-19 home confinement has had a negative effect on all PA levels (vigorous, moderate and overall), being associated with an increase in the daily sitting time. Furthermore, Fitbit, Inc.,[4] an American company that develops wearable devices that track individuals' PA, has recently shared data that reveals a substantial reduction in average daily step counts during one week in the quarantine period, as compared with the same period last year, especially in European countries. Nevertheless, to the best of our knowledge, no studies have explored the effect of the COVID-19 pandemic in the compliance with the World Health Organization (WHO) aerobic PA recommendations.[6] The effect of COVID-19 in the different dimensions of PA has also been insufficiently explored. Such assessment, however, is particularly important for devising preventive measures in case isolation measures are required to be re-implemented. In this study, we aimed to assess changes in Portuguese PA levels during COVID-19 lockdown, including changes in aerobic PA, daily sitting time, and weekly walking time.

METHODS
STUDY DESIGN AND PARTICIPANTS

We applied an online survey (Annex 1) based on the special eurobarometer public opinion survey on sports and physical activity[7] to collect data about the Portuguese PA levels before and during the lockdown period. The survey was available from April 12 to April 19, and respondents consisted of a non-random volunteer sample who had access to it through email or social media. This study was exempt from ethics committee approval, as it study consisted on a survey whose participation was voluntary and anonymous, and in which informed consent was obtained. Non-Portuguese subjects were excluded from the analysis. All subjects reported their socio-demographic data, employment status, frequency, and levels of pre- lockdown engagement in PA. In addition, we retrieved information on work and PA during lockdown. PA before and during lockdown was assessed by three outcome variables, namely (i) compliance with WHO aerobic PA recommendations, (ii) daily sitting time, and (iii) weekly walking time.

OUTCOMES
RECOMMENDED LEVELS OF AEROBIC PHYSICAL ACTIVITY

Compliance with the recommended levels of aerobic PA was defined according to the WHO global recommendations levels.[6] In brief, children and youth aged 5-17 years old should accumulate at least 60 minutes per day of moderate-to-vigorous-intensity PA, while adults (i.e., individuals aged ≥ 18 years old) should do at least (i) 150

minutes of moderate-intensity aerobic PA throughout the week, or (ii) at least 75 minutes of vigorous-intensity aerobic PA throughout the week, or (iii) an equivalent combination of moderate- and vigorous-intensity activity. Aerobic activity should be performed in bouts of at least 10 minutes duration.

DAILY SITTING TIME

Daily sitting time is a risk factor for all-cause and cardiovascular mortality independent of leisure time PA.[8,9] Therefore, we assessed the number of hours each participant spent sitting each day (considering transportation, working and leisure settings), excluding the time spent sleeping.

WEEKLY WALKING TIME

The total weekly time spent walking was also defined as an outcome variable since a greater number of steps has been significantly associated with lower all-cause mortality.[10]

DATA ANALYSIS

Data are expressed as means and standard deviations for continuous variables, and as absolute and relative frequencies for categorical variables. The McNemar test was used to compare pre-lockdown and lockdown (i) compliance of PA recommendations, and (ii) daily sitting time. Pre- lockdown and lockdown daily walking time were compared using paired-samples T-test. For each individual, we assessed whether, in the lockdown, they (i) started being compliant with PA recommendations, (ii) ceased to be compliant with PA recommendations, or (iii) maintained their compliance (or lack of it) with PA recommendations. We sought to identify any variables associated with such changes in compliance by means of univariable and multivariable multinomial logistic regression models. In addition, we built multinomial logistic regression models to identify variables associated with increase, decrease, or maintenance of daily sitting time during lockdown. Factors associated with changes in daily walking time were assessed by means of univariable and multivariable linear regression models. For multivariable regression models, independent variables were selected based on their clinical relevance and results in univariable models up until reaching the limit on the available degrees of freedom. Exponentials of logistic regression coefficients were interpreted as odds ratio (OR). *P*-values <0.05 were considered statistically significant. All statistical analyses were performed using SPSS Statistics Version 25.0.

ETHICAL CONSIDERATIONS

This study was exempt from ethics committee approval, as it study consisted on a survey whose participation was voluntary and anonymous, and in which informed consent was obtained.

RESULTS

We obtained a total of 1321 responses, of whom 40 were excluded (28 for lack of consent, and 12 for being from non-Portuguese citizens). Therefore, a total of 1281 participants were included in this study. The characteristics of participants are presented in Table 1. Of the 1281 participants, 466 (36.4%) were males. Most participants were employed (n=977; 76.3%), of whom 927 (94.8%) maintained their professional activity, mostly by telework (n=592; 63.9%).

Most participants (n=776; 60.6%) underwent over 21 days of lockdown. Half of the participants (n=641; 50.0%) met the aerobic levels of PA recommended by the WHO before the lockdown. However, such frequency decreased significatively during the lockdown, where only 38.8% (n=497) met those recommendations (*p*<0.001). The multivariable regression models (Table 2)

TABLE 1. Characteristics of the study population.

Variables	N (%)
Gender - Male	466 (36.4)
Age (Years)	
< 20	67 (5.2)
20-29	443 (34.6)
30-39	305 (23.8)
40-49	295 (23.0)
50-59	126 (9.8)
60+	45 (3.5)
Schooling Level	
< 12 years	60 (4.7)
12 years	286 (22.3)
Licentiate or Bachelor's Degree	534 (41.7)
Master's or Doctorate Degree	401 (31.3)
Employment Status Before Quarantine	
Employed	977 (76.3)
Unemployed	37 (2.9)
Student	248 (19.4)
Retired	19 (1.5)
Employment Status During Quarantine	
Employed Homeworking Presential Work	**927 (75.7)** 592 (63.9) 335 (36.1)
Unemployed	298 (24.3)
Days of Quarantine	
< 7	246 (19.2)
7-14	130 (10.1)
15-21	129 (10.1)
> 21	776 (60.6)
Individual Perception about Physical Condition Before and After Quarantine	
Improved	249 (19.4)
Equal	404 (31.5)
Worsened	604 (47.2)
Does Not Know	24 (1.9)

identified that male participants had higher odds of ceasing to comply with aerobic PA levels during lockdown (adjusted OR=1.4; 95%CI=1.0-1.9; *p*=0.023). An opposite trend – with increased odds of complying with aerobic PA levels - was observed for participants aged under 20 years old (adjusted OR=2.3; 95%CI=1.2-4.3; *p*=0.008).

We found a significant increase of the daily sitting time during the lockdown period (*p*<0.001). Multivariable regression models (Table 3) have identified that male participants had non-significant lower chances to either decrease (adjusted OR=0.7; 95%CI=0.5-1.1; *p*=0.117) or increase (adjusted OR=0.8; 95%CI=0.6-1.0; *p*=0.078) daily sitting time.

Lockdown associated with an average reduction of 24.8 minutes (25.5%) in walking time (average walking time before and after the lockdown were of 97.2 and 72.4 minutes, respectively; *p*<0.001). Except for the number of days with PA before home confinement, no variables were identified to be significantly associated with walking time changes in multivariable models (Table 4).

DISCUSSION

This study presents data from an online survey comparing PA before and during home lockdown in the context of COVID-19. We observed that lockdown was associated with significant decreases in aerobic PA levels and total weekly walking time, as well as with increases in daily sitting time. Despite the recommendation that

TABLE 2. Results of the multinomial logistic regression models assessing variables associated with ceasing or starting to comply with aerobic physical activity (PA) levels recommendations defined by the World Health Organization.

	Ceased to comply with aerobic PA levels		Started to comply with aerobic PA levels	
	Crude OR (95% CI) [*p* value]	Adjusted OR (95% CI) [*p* value]	Crude OR (95% CI) [*p* value]	Adjusted OR (95% CI) [*p* value]
Gender - Male	1.6 (1.3 - 2.1) [<0.001]	1.4 (1.0 - 1.9) [0.023]	0.9 (0.7 - 1.3) [0.646]	1.0 (0.7 - 1.5) [0.849]
Age (Years)				
<20	0.6 (0.3 - 1.2) [0.167]	0.7 (0.3 - 1.5) [0.345]	2.2 (1.3 - 3.9) [0.004]	2.3 (1.2 - 4.3) [0.008]
20-29	1.1 (0.8 - 1.4) [0.587]	1.1 (0.8 - 1.4) [0.748]	1.0 (0.7 - 1.3) [0.902]	1.1 (0.8 - 1.5) [0.678]
30-39	1.3 (1.0 - 1.7) [0.089]		0.7 (0.5 - 1.0) [0.077]	
40-49	1.0 (0.7 - 1.3) [0.845]		0.9 (0.6 - 1.2) [0.391]	
50-59	0.8 (0.5 - 1.2) [0.274]		1.3 (0.8 - 2.1) [0.234]	
60+	0.5 (0.2 - 1.1) [0.071]	- *	1.1 (0.6 - 2.3) [0.720]	- *
Schooling Level				
<12 years	0.6 (0.3 - 1.1) [0.088]	-*	0.9 (0.5 - 1.7) [0.742]	-*
12 years	0.8 (0.6 - 1.1) [0.194]		1.1 (0.8 - 1.6) [0.452]	
Licentiate or Bachelor's Degree	1.0 (0.8 - 1.3) [0.932]		0.9 (0.7 - 1.3) [0.636]	
Master's or Doctorate Degree	1.3 (1.0 - 1.7) [0.067]	1.3 (1.0 - 1.8) [0.088]	1.0 (0.7 - 1.4) [0.978]	1.1 (0.8 - 1.6) [0.517]
Employment Status Before Quarantine				
Employed	1.4 (1.0 - 1.9) [0.029]		0.7 (0.5 - 1.0) [0.024]	
Unemployed	0.4 (0.2 - 1.1) [0.067]		1.1 (0.5 - 2.4) [0.760]	
Student	0.8 (0.5 - 1.1) [0.122]		1.4 (1.0 - 2.0) [0.050]	
Retired	0.9 (0.3 - 2.9) [0.926]		1.8 (0.6 - 5.2) [0.288]	
Employed During Quarantine	**1.3 (0.9 - 1.7) [0.133]**		**1.0 (0.7 - 1.4) [0.889]**	
Homeworking	- *	0.9 (0.6 - 1.3) [0.452]	- *	1.3 (0.9 - 2.0) [0.141]
Presential Work	1.2 (0.9 - 1.6) [0.281]	1.2 (0.7 - 1.9) [0.471]	0.7 (0.5 - 1.0) [0.038]	0.8 (0.5 - 1.4) [0.445]
Days of Quarantine				
<7	1.0 (0.7 - 1.4) [0.948]	- *	0.7 (0.4 - 1.0) [0.046]	- *
7-14	1.2 (0.8 - 1.9) [0.311]	1.1 (0.6 - 1.9) [0.712]	1.4 (0.9 - 2.2) [0.183]	1.6 (0.8 - 2.9) [0.161]
15-21	1.4 (0.9 - 2.1) [0.125]	1.5 (0.9 - 2.7) [0.148]	1.0 (0.6 - 1.7) [0.966]	1.2 (0.6 - 2.3) [0.673]
>21	0.8 (0.6 - 1.0) [0.106]	1.1 (0.7 - 1.7) [0.735]	1.1 (0.8 - 1.5) [0.444]	1.0 (0.6 - 1.8) [0.950]
N **Days with PA Before Quarantine**				
Never or Unknown	<0.1 (<0.1 - 0.2) [<0.001]	- *	1.9 (1.2 - 2.9) [0.003]	- *
<1-3 times/month	0.1 (<0.1 - 0.2) [<0.001]	2.3 (0.2 - 23.1) [0.471]	1.1 (0.7 - 1.7) [0.607]	0.6 (0.3 - 1.1) [0.077]
1-3 times/month	0.2 (0.1 - 0.4) [<0.001]	9.3 (1.2 - 75.6) [0.036]	2.5 (1.7 - 3.7) [<0.001]	1.2 (0.7 - 2.0) [0.601]
1-2 times/week	0.6 (0.4 - 0.8) [<0.001]	25.3 (3.4 - 186.2) [0.002]	1.1 (0.8 - 1.5) [0.615]	0.5 (0.3 - 0.9) [0.010]
3-4 times/week	3.4 (2.6 - 4.4) [<0.001]	81.8 (11.2 - 599.3) [<0.001]	0.4 (0.3 - 0.7) [<0.001]	0.2 (0.1 - 0.4) [<0.001]
≥5 times/week	2.3 (1.6 - 3.3) [<0.001]	76.3 (10.2 - 568.3) [<0.001]	0.1 (<0.1 - 0.3) [<0.001]	<0.1 (<0.1 - <0.1) [<0.001]

CI=confidence interval; OR=odds ratio; PA=physical activity
* Reference category(ies)

TABLE 3. Results of the multinomial logistic regression models assessing variables associated with decreasing or increasing daily sitting time during COVID-19 pandemic quarantine period.

	Decreased Daily Sitting Time		Increased Daily Sitting Time	
	Crude OR (95% CI) [*p* value]	Adjusted OR (95% CI) [*p* value]	Crude OR (95% CI) [*p* value]	Adjusted OR (95% CI) [*p* value]
Gender - Male	0.7 (0.5 - 1.0) [0.079]	0.7 (0.5 - 1.1) [0.117]	0.8 (0.6 - 1.0) [0.034]	0.8 (0.6 - 1.0) [0.078]
Age (Years)				
<20	0.9 (0.4 - 2.3) [0.866]	0.7 (0.2 - 3.3) [0.696]	1.0 (0.6 - 1.7) [0.923]	1.2 (0.4 - 3.0) [0.756]
20-29	0.9 (0.6 - 1.4) [0.694]	0.7 (0.2 - 2.4) [0.591]	1.2 (1.0 - 1.6) [0.072]	1.2 (0.5 - 2.8) [0.628]
30-39	0.9 (0.6 - 1.4) [0.641]	0.8 (0.2 - 2.7) [0.749]	0.8 (0.6 - 1.0) [0.052]	1.0 (0.4 - 2.3) [0.969]
40-49	1.3 (0.8 - 2.0) [0.242]	1.1 (0.3 - 3.6) [0.894]	0.9 (0.7 - 1.2) [0.521]	1.1 (0.5 - 2.5) [0.812]
50-59	0.8 (0.4 - 1.7) [0.646]	0.7 (0.2 - 2.5) [0.534]	1.2 (0.8 - 1.7) [0.463]	1.4 (0.6 - 3.4) [0.416]
60+	1.2 (0.4 - 3.2) [0.761]	- *	1.0 (0.5 - 1.9) [0.978]	- *
Schooling Level				
<12 years	0.6 (0.2 - 1.6) [0.293]	0.7 (0.2 - 2.0) [0.463]	0.7 (0.4 - 1.3) [0.261]	0.7 (0.4 - 1.2) [0.188]
12 years	1.1 (0.7 - 1.7) [0.760]		0.9 (0.7 - 1.2) [0.519]	
Licentiate or Bachelor's Degree	1.1 (0.8 - 1.7) [0.488]	- *	1.0 (0.8 - 1.3) [0.769]	- *
Master's or Doctorate Degree	0.9 (0.6 - 1.4) [0.608]		1.1 (0.9 - 1.4) [0.432]	
Employment Status Before Quarantine				
Employed	0.9 (0.6 - 1.4) [0.711]		1.0 (0.7 - 1.3) [0.900]	
Unemployed	0.6 (0.1 - 2.7) [0.519]		1.3 (0.7 - 2.6) [0.407]	
Student	1.2 (0.7 - 1.9) [0.555]		1.0 (0.7 - 1.3) [0.767]	
Retired	1.2 (0.2 - 5.5) [0.849]		1.1 (0.4 - 2.9) [0.821]	
Employed During Quarantine	**0.7 (0.4 - 1.0) [0.075]**	**0.8 (0.5 - 1.2) [0.251]**	**1.1 (0.9 - 1.5) [0.365]**	**1.2 (0.9 - 1.6) [0.228]**
Presential Work	1.0 (0.6 - 1.7) [0.953]		0.9 (0.7 - 1.3) [0.703]	
Days of Quarantine				
<7	0.5 (0.3 - 0.8) [0.009]	- *	0.8 (0.6 - 1.1) [0.123]	- *
7-14	1.3 (0.7 - 2.5) [0.442]	2.5 (1.1 - 5.8) [0.031]	1.5 (1.0 - 2.2) [0.047]	1.7 (1.1 - 2.7) [0.022]
15-21	0.8 (0.4 - 1.5) [0.438]	1.5 (0.6 - 3.4) [0.380]	0.6 (0.4 - 0.9) [0.023]	0.8 (0.5 - 1.3) [0.332]
>21	1.6 (1.1 - 2.4) [0.026]	2.1 (1.1 - 4.0) [0.018]	1.2 (0.9 - 1.5) [0.150]	1.2 (0.9 - 1.7) [0.176]
N Days with PA Before Quarantine				
Never or Unknown	1.0 (0.5 - 2.2) [0.956]	- *	1.4 (0.9 - 2.2) [0.101]	- *
<1-3 times/month	0.9 (0.4 - 1.8) [0.732]	0.8 (0.3 - 2.4) [0.756]	1.0 (0.7 - 1.5) [0.875]	0.9 (0.5 - 1.5) [0.583]
1-3 times/month	0.5 (0.2 - 1.2) [0.119]	0.6 (0.2 - 1.8) [0.362]	1.4 (1.0 - 2.0) [0.081]	1.1 (0.6 - 1.9) [0.719]
1-2 times/week	1.4 (0.9 - 2.1) [0.104]	1.5 (0.7 - 3.5) [0.292]	1.0 (0.7 - 1.2) [0.724]	0.8 (0.5 - 1.2) [0.264]
3-4 times/week	1.1 (0.7 - 1.6) [0.750]	1.2 (0.5 - 2.7) [0.660]	1.0 (0.8 - 1.3) [0.921]	0.8 (0.5 - 1.3) [0.311]
≥5 times/week	0.7 (0.4 - 1.3) [0.875]	0.9 (0.4 - 2.4) [0.875]	0.6 (0.4 - 0.9) [0.011]	0.5 (0.3 - 0.9) [0.031]

CI=confidence interval; OR=odds ratio; PA=physical activity
* Reference category(ies)

home lockdown should not hinder people from being physically active,[6] our results suggest that there was a decline in PA levels among the Portuguese population during that period. This finding is in accordance with other studies suggesting a negative effect of lockdown in sports and PA engagement.[3,4,11] For example, Ammar *et al*[3] reported a 24% decrease in the average number of days per week in which participants practiced PA, a 34% decrease in the daily number of walking minutes, and a three-hour average increase (from 5 to 8 hours) in the daily sitting time. Furthermore, the devices company Fitbit, Inc.[4] has recently shared PA data that pointed to a substantial reduction in average daily step counts during the lockdown period, as compared to the same period last year (ranging from 7% to 38% across different countries). The decrease in PA levels may go beyond the lockdown period itself - Goethals *et al*[11] observed that even

before lockdown was enforced, the COVID-19 epidemic had already negatively affected the number of seniors attending group PA programs in two different French study territories, possibly due to the fear of potentially contacting infected people.

We were not able to identify a set of characteristics associated with greater propensity to change PA levels during lockdown. This could be explained by the multiple ways by which COVID-19 pandemic may affect PA (thus affecting individuals with different characteristics/profiles), including (i) the fact that the closure of nurseries and schools forced many of the parents to stay at home to take care of their children; (ii) the loss of work activity and subsequent loss of income (loss of work was observed in one-quarter of respondents in our sample); and (iii) the greater social isolation allied to the closing of the gyms[2,11] it was in the latter that almost half respondents performed their PA).

TABLE 4. Results of the simple and multiple linear regression models assessing variables associated with changes in weekly walking during COVID-19 pandemic quarantine period.

	Regression coefficient (95% CI) [P value]	Adjusted regression coefficient (95% CI) [P value]
Gender - Male	8.5 (-12.3; 29.3) [0.423]	
Age (Years)		
<20	-24.6 (-69.6; 20.4) [0.283]	- *
20-29	38.2 (-8.7; 85.0) [0.110]	14.8 (-66.1; 95.6) [0.720]
30-39	34.9 (-13.3; 83.1) [0.156]	46.2 (-22.3; 114.7) [0.186]
40-49	15.3 (-33.1; 63.7) [0.535]	46.0 (-23.2; 115.1) [0.192]
50-59	-6.7 (-60.8; 47.3) [0.807]	28.2 (-40.9; 97.4) [0.423]
60+	-29.2 (-98.1; 39.7) [0.406]	2.0 (-71.6; 75.5) [0.958]
Schooling Level		
<12 years	-34.2 (-81.7; 13.1) [0.156]	- *
12 years	36.2 (-14.7; 87.2) [0.163]	22.8 (-31.2; 76.8) [0.408]
Licentiate or Bachelor's Degree	29.0 (-19.9; 77.8) [0.245]	14.8 (-38.8; 68.3) [0.589]
Master's or Doctorate Degree	40.1 (-9.5; 89.7) [0.113]	18.4 (-36.4; 73.1) [0.510]
Employment Status Before Quarantine		
Employed	-7.4 (-67.5; 52.6) [0.808]	
Student	-12.8 (-76.6; 50.4) [0.692]	
Retired	-83.3 (-184.5; 17.9) [0.107]	
Employed During Quarantine	**-1.6 (-25.5; 22.3) [0.894]**	**8.2 (-21.3; 37.7) [0.588]**
Homeworking	- *	-8.3 (-34.4; 17.7) [0.531]
Presential Work	22.1 (-2.6; 46.7) [0.079]	
Days of Quarantine		
<7	11.3 (-14.2; 36.7) [0.384]	- *
7-14	-0.9 (-39.9; 38.0) [0.962]	
15-21	-14.9 (-53.9; 24.1) [0.453]	
>21	-12.4 (-38.7; 13.8) [0.354]	
***N* Days with PA Before Quarantine**		
Never or Unknown	37.5 (1.3; 73.6) [0.042]	- *
<1-3 times/month	-43.0 (-91.0; 4.9) [0.079]	-38.5 (-88.2; 11.2) [0.129]
1-3 times/month	-57.4 (-104.0; -10.8) [0.016]	-57.6 (-105.4; -9.8) [0.018]
1-2 times/week	-30.8 (-70.1; 8.6) [0.125]	-32.6 (-73.0; 7.8) [0.114]
3-4 times/week	-25.9 (-64.8; 13.0) [0.191]	-26.2 (-66.2; 13.8) [0.200]
≥5 times/week	-61.7 (-106.5; -17.0) [0.007]	-57.0 (-103.2; -10.7) [0.016]

CI=confidence interval; OR=odds ratio; PA=physical activity
* Reference category(ies)

There are several limitations of this study that warrant discussion. Firstly, this study included a convenience sample, in which younger and more-schooled individuals were overrepresented and its timeframe reflected a particular week during lockdown when more severe restrictions were imposed by the Portuguese government. Nevertheless, our data on the daily sitting time and on the setting where individuals practiced PA before lockdown are close to those published in 2017 in the Sport and Physical Activity Report[7] (the other outcomes we assessed were not evaluated in this reports), which assessed a representative sample of the Portuguese population and, to the best of our knowledge, is the study which assessed the largest number of Portuguese individuals about the PA levels. The authors also acknowledge that the reported levels of parameters such as sitting time reflect the perception of the individuals that answered to the survey and therefore may somehow differ from the effective times. Another important limitation concerns the possibility of information bias, particularly the possibility (i) of overestimation or underestimation of PA levels before the lockdown (recall bias), and (ii) of providing incorrect answers subsequent to misunderstanding of questions (e.g., in the questions and examples provided for the respondent to distinguish between moderate *vs* vigorous PA). Finally, we collected data from only one country, which had already low PA levels,[7] potentially limiting the generalization of our results. Nevertheless, this study has also several strong points, including its large sample size, the use of validated definitions and the simultaneous evaluation of multiple outcomes. Another strong point concerns its novelty, being one of the first and largest studies assessing the impact of CO-VID-19 pandemic on PA. In addition, the authors built multinomial logistic regression models to try to identify characteristics associated with greater chances of changing PA levels during lockdown.

CONCLUSION

In this study, we observed that home lockdown during COVID-19 pandemic was associated with a significant reduction in PA levels, including a decrease in total weekly walking time, and an increase in daily sitting time. These results are particularly relevant considering the negative impact of physical inactivity on cardiovascular health.[2] Healthcare providers must be aware of available home fitness options, to increase the chances that patients maintain their PA levels in case of new enforcement of lockdown measures in the wake of an eventual new wave of COVID-19.

PRIZES AND PREVIOUS PRESENTATION

This work was presented at the "XII Encontro Coração e Família" having won the "Fundação Portuguesa de Cardiologia" award-first place.

AUTHORS CONTRIBUTION/ CONTRIBUIÇÃO AUTORAL

FC: Main author, designed the inquiry, data analysis, writing and reviewing

FP and BP: Data analysis and reviewing

PC: Design, writing and reviewing

JB: Reviewing the study

FC: Autor principal, desenho e elaboração do inquérito, análise de dados, escrita e revisão

FP e BP: Análise de dados e revisão

PC: Desenho, escrita e revisão do estudo

JB: Revisão do estudo

RESPONSABILIDADES ÉTICAS

CONFLITOS DE INTERESSE: Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

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ETHICAL DISCLOSURES

CONFLICTS OF INTEREST: The authors have no conflicts of interest to declare.

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CONFIDENTIALITY OF DATA: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

PROTECTION OF HUMAN AND ANIMAL SUBJECTS: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki as revised in 2013).

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ANNEX 1

Impacto da Quarentena na Atividade Física dos Portugueses

Como é do conhecimento público, encontramo-nos a enfrentar uma verdadeira pandemia. Nesse contexto, e dado o facto de uma das medidas essenciais para contenção do surto da COVID-19 a nível mundial ser o isolamento social e o confinamento ao domicílio, os investigadores pretendem, através deste questionário, recolher informação acerca do impacto da quarentena na atividade física dos portugueses. Para tal gostaríamos de pedir a sua colaboração para preencher o seguinte questionário (duração aproximada de 4 MINUTOS), de carácter voluntário (não remunerado) e totalmente ANÓNIMO. Agradecemos desde já o tempo disponibilizado.
*Obrigatório

Consentimento

1. Compreendo que a minha participação neste estudo é voluntária, podendo desistir a qualquer momento, sem que essa decisão se reflita em qualquer prejuízo para mim. Ao participar neste trabalho, estou a colaborar para o desenvolvimento do nosso entendimento sobre o impacto da quarentena devido ao COVID-19 na área da atividade física, não sendo, contudo, acordado qualquer benefício direto ou indireto pela minha colaboração. A participação neste estudo não acarreta qualquer risco para mim, para além daquele que advier da leitura e preenchimento do questionário em si. Entendo, ainda, que toda a informação obtida neste estudo será estritamente confidencial e que não é possível identificar-me através das respostas às questões que são colocadas, sendo os dados armazenados via Google Docs. Eu concedo permissão para que os dados gerados deste inquérito sejam utilizados nas publicações dos investigadores sobre este tópico. Na eventualidade de uma perturbação desencadeada ou agravada pela participação no presente estudo, devo contactar de imediato o investigador principal através do endereço de email de (fcabral@arsnorte.min-saude.pt) *

   Marcar apenas uma oval.

   ⬭ Li e dou o meu consentimento

   ⬭ Li e não dou o meu consentimento

   Impacto da Quarentena na Atividade Física dos Portugueses

   Dados Sociodemográficos

2. Nacionalidade *

   Marcar apenas uma oval.

   ⬭ Portuguesa

   ⬭ Outra

3. Local de Residência (por favor assuma como resposta válida o seu concelho ou cidade de residência) *

   _____

4. Sexo *

   Marcar apenas uma oval.

   ⬭ Masculino

   ⬭ Feminino

5. Idade *

Marcar apenas uma oval.

◯ < 20 anos

◯ 20-29 anos

◯ 30-39 anos

◯ 40-49 anos

◯ 50-59 anos

◯ 60 ou mais anos

6. Escolaridade *

Marcar apenas uma oval.

◯ < 4.º ano de escolaridade

◯ 4.º ano de escolaridade

◯ 6.º ano de escolaridade

◯ 9.º ano de escolaridade

◯ 12.º de escolaridade

◯ Bacharelato

◯ Licenciatura

◯ Mestrado

◯ Doutoramento

7. Situação Profissional antes do início da quarentena *

Marcar apenas uma oval.

◯ Não ativo / Desempregado   *Avançar para a pergunta 10*

◯ Ativo / Empregado

◯ Estudante

◯ Reformado   *Avançar para a pergunta 10*

Impacto da Quarentena na Atividade Física dos Portugueses

8. Mantém exercício da sua atividade profissional? *

Marcar apenas uma oval.

◯ Sim

◯ Não   *Avançar para a pergunta 10*

Impacto da Quarentena na Atividade Física dos Portugueses

9. Se sim de que forma? *

Marcar apenas uma oval.

◯ Trabalho/aulas a partir de casa / Teletrabalho

◯ Trabalho/aulas presenciais

Impacto da Quarentena na Atividade Física dos Portugueses

◯ 50-59

10. Quantos dias de quarentena / isolamento cumpriu no total? *

Marcar apenas uma oval.

◯ <7 dias

◯ 7-14 dias

◯ 15-21 dias

◯ >21 dias

Avaliação da atividade física ANTES do início da quarentena	Seleccione a resposta que mais se adequa relativamente ao nível de Atividade Física que desempenhava ANTES do início da Quarentena

11. ANTES do início da quarentena com que frequência praticava exercício físico ou algum tipo de desporto? *

Marcar apenas uma oval.

◯ 5x por semana ou mais

◯ 3 a 4x por semana

◯ 1 a 2x por semana

◯ 1 a 3x por mês

◯ Menos frequentemente

◯ Nunca

◯ Não sei

12. E com que frequência se envolvia noutro tipo de atividade física como deslocar-se de um local para o outro de bicicleta, dançar, jardinagem, etc.? *

Marcar apenas uma oval.

◯ 5x por semana ou mais

◯ 3 a 4x por semana

◯ 1 a 2x por semana

◯ 1 a 3x por mês

◯ Menos frequentemente

◯ Nunca

◯ Não sei

13. Considerando uma semana típica ANTES do início da quarentena quantos dias fazia atividade física vigorosa como levantar materiais pesados (halteres/pesos ou não), exercícios aeróbica ou ciclismo rápido? *

Marcar apenas uma oval.

◯ 1 dia por semana

◯ 2 dias por semana

◯ 3 dias por semana

◯ 4 dias por semana

◯ 5 dias por semana

◯ 6 dias por semana

◯ 7 dias por semana

◯ Nenhum

◯ Não sei

14. Nos dias em que fazia uma atividade física vigorosa, quanto tempo dispendia em média por dia? (retirando os intervalos ou transições) *

Marcar apenas uma oval.

- ( ) 30 minutos ou menos
- ( ) 31 a 60 minutos
- ( ) 61 a 90 minutos
- ( ) 91 a 120 minutos
- ( ) > 120 minutos
- ( ) Não sei

15. Considerando uma semana típica ANTES do início da quarentena quantos dias fazia atividade física moderada como levantar materiais/pesos leves, ciclismo a um ritmo normal, ou jogar ténis? Por favor NÃO inclua caminhadas. *

Marcar apenas uma oval.

- ( ) 1 dia por semana
- ( ) 2 dias por semana
- ( ) 3 dias por semana
- ( ) 4 dias por semana
- ( ) 5 dias por semana
- ( ) 6 dias por semana
- ( ) 7 dias por semana
- ( ) Nenhum
- ( ) Não sei

16. Nos dias em que fazia uma atividade física moderada, quanto tempo dispendia em média por dia? (retirando os intervalos ou transições) *

Marcar apenas uma oval.

- ( ) 30 minutos ou menos
- ( ) 31 a 60 minutos
- ( ) 61 a 90 minutos
- ( ) 91 a 120 minutos
- ( ) > 120 minutos
- ( ) Não sei

17. Considerando uma semana típica ANTES do início da quarentena em quantos dias fazia uma caminhada de pelo menos 10 minutos? *

   Marcar apenas uma oval.

   ◯ 1 dia por semana

   ◯ 2 dias por semana

   ◯ 3 dias por semana

   ◯ 4 dias por semana

   ◯ 5 dias por semana

   ◯ 6 dias por semana

   ◯ 7 dias por semana

   ◯ Nenhum

   ◯ Não sei

18. Nos dias em que fazia uma caminhada de pelo menos 10 minutos, quanto tempo no total passava a caminhar? *

   Marcar apenas uma oval.

   ◯ 30 minutos ou menos

   ◯ 31 a 60 minutos

   ◯ 61 a 90 minutos

   ◯ 91 a 120 minutos

   ◯ > 120 minutos

   ◯ Não sei

19. Quanto tempo passava em média, ANTES da quarentena, sentado por dia? Inclui o tempo passado no carro ou outros transportes, numa secretária, no computador, a ver TV, a ler, durante as refeições, etc. Por Favor não inclua o tempo que passa a dormir (seja de noite ou em sestas durante o dia). *

   Marcar apenas uma oval.

   ◯ Menos de 3 horas por dia

   ◯ 3 a 6 horas por dia

   ◯ 6 a 9 horas por dia

   ◯ > 9 horas por dia

20. Onde / recorrendo a que recursos costumava praticar a sua atividade física? (selecione as opções que mais se adequam) *

   Marcar tudo o que for aplicável.

   ☐ Ginásio

   ☐ Clube / Associação Desportiva

   ☐ Escola / Universidade

   ☐ Parques, outdoors, etc

   ☐ Em casa (autodidata)

   ☐ Em casa (recorrendo a vídeos no youtube ou outro tipo de canais online)

   ☐ Em casa (aulas do ginásio via web)

   ☐ Não pratico Atividade Física

Avaliação da atividade física DURANTE a quarentena

Seleccione a resposta que mais se adequa relativamente ao nível de Atividade Física que desempenhou/desempenha DURANTE a Quarentena

21. Durante a quarentena com que frequência praticou/pratica exercício físico ou algum tipo de desporto? *

Marcar apenas uma oval.

- ( ) 5x por semana ou mais
- ( ) 3 a 4x por semana
- ( ) 1 a 2x por semana
- ( ) 1 a 3x por mês
- ( ) Menos frequentemente
- ( ) Nunca
- ( ) Não sei

22. E com que frequência se envolveu/envolve noutro tipo de atividade física como deslocar-se de um local para o outro de bicicleta, dançar, jardinagem, etc.? *

Marcar apenas uma oval.

- ( ) 5x por semana ou mais
- ( ) 3 a 4x por semana
- ( ) 1 a 2x por semana
- ( ) 1 a 3x por mês
- ( ) Menos frequentemente
- ( ) Nunca
- ( ) Não sei

23. Considerando uma semana típica DURANTE a quarentena quantos dias fez/faz atividade física vigorosa como levantar materiais pesados (halteres/pesos ou não), exercícios aeróbica ou ciclismo rápido? *

Marcar apenas uma oval.

- ( ) 1 dia por semana
- ( ) 2 dias por semana
- ( ) 3 dias por semana
- ( ) 4 dias por semana
- ( ) 5 dias por semana
- ( ) 6 dias por semana
- ( ) 7 dias por semana
- ( ) Nenhum
- ( ) Não sei

24. Nos dias em que fez/faz uma atividade física vigorosa, quanto tempo dispendeu/dispende em média por dia? (retirando os intervalos ou transições) *

Marcar apenas uma oval.

- ( ) 30 minutos ou menos
- ( ) 31 a 60 minutos
- ( ) 61 a 90 minutos
- ( ) 91 a 120 minutos
- ( ) > 120 minutos
- ( ) Não sei

25. Considerando uma semana típica DURANTE a quarentena quantos dias fez/faz atividade física moderada como levantar materiais leves, ciclismo a um ritmo normal, ou jogar ténis? Por favor NÃO inclua caminhadas. *

Marcar apenas uma oval.

- ◯ 1 dia por semana
- ◯ 2 dias por semana
- ◯ 3 dias por semana
- ◯ 4 dias por semana
- ◯ 5 dias por semana
- ◯ 6 dias por semana
- ◯ 7 dias por semana
- ◯ Nenhum
- ◯ Não sei

26. Nos dias em que fez/faz uma atividade física moderada, quanto tempo dispendeu/dispende em média por dia? (retirando os intervalos ou transições) *

Marcar apenas uma oval.

- ◯ 30 minutos ou menos
- ◯ 31 a 60 minutos
- ◯ 61 a 90 minutos
- ◯ 91 a 120 minutos
- ◯ > 120 minutos
- ◯ Não sei

27. Considerando uma semana típica DURANTE a quarentena em quantos dias fez/faz uma caminhada de pelo menos 10 minutos? *

Marcar apenas uma oval.

- ◯ 1 dia por semana
- ◯ 2 dias por semana
- ◯ 3 dias por semana
- ◯ 4 dias por semana
- ◯ 5 dias por semana
- ◯ 6 dias por semana
- ◯ 7 dias por semana
- ◯ Nenhum
- ◯ Não sei

28. Nos dias em que fez/faz uma caminhada de pelo menos 10 minutos, quanto tempo no total passou/passa a caminhar? *

Marcar apenas uma oval.

- ◯ 30 minutos ou menos
- ◯ 31 a 60 minutos
- ◯ 61 a 90 minutos
- ◯ 91 a 120 minutos
- ◯ > 120 minutos
- ◯ Não sei

29. Quanto tempo passou/passa em média, DURANTE a quarentena, sentado por dia? Inclui o tempo passado no carro ou outros transportes, numa secretária, no computador, a ver TV, a ler, durante as refeições, etc. Não inclua o tempo que passa a dormir (seja de noite ou em sestas durante o dia). *

Marcar apenas uma oval.

◯ Menos de 3 horas por dia

◯ 3 a 6 horas por dia

◯ 6 a 9 horas por dia

◯ > 9 horas por dia

30. Onde / recorrendo a que recursos praticou/pratica a sua atividade física DURANTE a quarentena? (selecione as opções que mais se adequam) *

Marcar tudo o que for aplicável.

☐ Ginásio

☐ Clube / Associação Desportiva

☐ Escola / Universidade

☐ Parques, outdoors, etc

☐ Em casa (autodidata)

☐ Em casa (recorrendo a vídeos no youtube ou outro tipo de canais online)

☐ Em casa (aulas do ginásio via web)

☐ Não pratico Atividade Física

Avaliação da atividade física

31. Globalmente como considera a sua condição/aptidão física Antes e Durante a Quarentena? *

Marcar apenas uma oval.

◯ Penso que a minha condição/aptidão física piorou com a quarentena

◯ Igual

◯ Penso que a minha condição/aptidão física melhorou com a quarentena

◯ Não sei