COVID-19 and home confinement: data on physical activity

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do: 10.18176/archmeddeporte.00024

In March 14th 2020, the Spanish Government declared the “State of Emergency” due to the pandemic caused by the COVID-19 and all the population was forced to “shelter-at-home” for two weeks. Citizens had less than 24 hours to prepare for the self-quarantine. The goal of the present was to assess Spanish citizens’ physical activity practice at the end of the first week of the home quarantine. A total of 1858 Spanish citizens, 674 males and 1184 females (M = 40.18, SD = 15.84 years) agreed to participate. The study is descriptive in nature, based on an on-line questionnaire conducted seven days after the mandatory shelter-at-home health order issued by the Spanish Government. It included The International Physical Activity Questionnaire, Anthropometric parameters, Sociometric and COVID-19 information. Global results showed that the vast majority of the confined population was below the World Health Organization recommendations on Vigorous Physical Activity, Moderate Physical Activity or a combination. Physical activity practice was dependent on personal factors such as gender, age or weight, but also on contextual factors such as living with a dependent person or the type of house (square meters, having a balcony or a backyard). Insufficient physical activity has been considered a prominent risk factor for non-communicable diseases, mental health and, consequently, quality of life. Mandatory shelter-at-home orders like the ones issued due to COVID-19 could be repeated in the future. National authorities should consider the findings from the present study to prevent citizens from putting their health at jeopardy while in confinement.

Key words: Pandemic. Quarantine. Behavior. Exercise. Health.

COVID-19 y confinamiento en casa: datos de actividad física

Resumen

El 14 de marzo de 2020, el gobierno español decretó el “estado de emergencia” debido a la pandemia provocada por la COVID-19 y la población fue forzada a confinarse en sus casas durante dos semanas. Los ciudadanos tuvieron menos de 24 horas para prepararse. El objetivo del estudio fue evaluar la práctica de actividad física de los españoles al final de la primera semana de la cuarentena en el hogar. Un total de 1858 ciudadanos españoles, 674 varones y 1184 mujeres (M = 40.18, SD = 15.84 años) accedieron a participar. El estudio siguió un diseño descriptivo, basado en un cuestionario on-line distribuido siete días después de decretarse por el Gobierno de España la orden de confinamiento de la población. Incluía el International Physical Activity Questionnaire, medidas antropométricas, sociométricas e información relacionada con el COVID-19. Los resultados globales mostraron que la amplia mayoría de la población confinada estaba por debajo de las recomendaciones de la Organización Mundial de la Salud sobre Actividad Física Vigorosa, Actividad Física Moderada o una combinación. La práctica de actividad física dependió de factores personales como el género, la edad o el peso, pero también de factores contextuales como convivir con una persona dependiente o el tipo de casa (metros cuadrados, disponer de un balcón o de un patio). Una insuficiente cantidad de actividad física ha sido considerada como un factor de riesgo importante para el desarrollo de enfermedades no-comunicables, para la salud mental y, consecuentemente, para la calidad de vida y los ciudadanos españoles confinados tenían niveles por debajo de los recomendados. Ordenes de confinamiento como las que se han decretado a raíz del COVID-19 podrían repetirse en el futuro. Las autoridades nacionales deberían tener en cuenta los resultados del presente estudio para prevenir que los ciudadanos pongan en riesgo su salud durante el confinamiento.

Palabras clave: Pandemia. Cuarentena. Comportamiento. Ejercicio. Salud.

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Introduction

December 2019 is considered the beginning of COVID-19 in Wuhan, China. The outbreak was declared a Public Health Emergency of International Concern on January 30th, 2020 by the World Health Organization (WHO). On March 13th, Europe became the epicentre of the pandemic. Finally, in March 14th, the Spanish Government declared the “State of Emergency” and population was forced to ‘shelter-at-home’ for two weeks, except for public service (i.e., health, safety, social assistance, food, transport…). To our knowledge, it was the first time that the vast majority of a country’s population had to face two weeks of isolation / confinement at their homes. Other countries like China, Korea, Italy, France, Belgium or India issued similar orders, but in some of them only parts of the country were confined and in others, individuals were allowed to go out on the streets to exercise during different periods of time. In Spain, citizens had to remain indoors 24 hours, and they were only allowed to walk their dogs or buy food (except those who had ‘essential’ jobs, previously mentioned). Therefore, the vast majority of the population was facing two weeks of compulsory home quarantine.

In a recent review, Brooks et al.1 identified 24 articles describing the psychological impact of a quarantine. They were conducted across 10 countries and they included five different diseases (SARS, Ebola, 2009 and 2010 H1N1 influenza pandemic, Middle East respiratory syndrome and Equine influenza), participants ranged from 10 health-care workers to 6231 Korean residents, and isolation conditions were very different. Similar isolation / confinement contexts could be found in a prison2, in Antarctic exploration bases3, or in space-mission simulated areas4. However, in all these contexts, individuals were prepared to face those confinement conditions, and in most cases, they volunteered to be there. In the compulsory shelter-at-home health order issued in Spain in March, a whole country was involved (47 million people aprox.), individuals were not given much time to prepare (less than 24 hours), and they were forced to accept it. Therefore, they were facing a completely new scenario, which could be repeated in the future. Researchers have the duty to study this phenomenon and provide insights for public health policies.

The positive connections between physical activity (PA) and individuals’ physical (i.e., musculoskeletal health and function, diabetes, cardiovascular disease…) and psychological (i.e., depression, anxiety…) well-being have been highlighted in many different studies5,6. The evidence backing up the starring role of PA in the prevention and supervision of chronic diseases has helped move forward the public health agenda with the goal of improving individuals’ quality of life and society healthcare system’s cost-effectiveness7,8. Unfortunately, recent systematic reviews have pointed out that there is a global pandemic of physical inactivity9. Furthermore, the negative trend between 2001 and 2016 increased more in high-income western countries to reach 31% of their population, and in women, who reached a high 42% in Latin America and the Caribbean10. The World Health Organization11 recommends 150 minutes/week of moderate intensity PA (MPA) or 75 minutes/week of vigorous intensity (VPA) or a combination of both, and it believes that these recommendations can still be achieved even at home, with no special equipment, and limited space! Is this possible under the COVID-19 shelter-at-home mandatory health order in Spain?

Articles published on the COVID-19 crisis have focused on vicarious traumatization12 or psychological effects13. Very little is known about their side-effects like the compulsory shelter-at-home health order issued in Spain. Based on the aforementioned, the goal of this study was to assess Spanish citizens’ PA practice at the end of the first week of confinement. The first hypothesis was that it will be below WHO recommendations. The second hypothesis was that it will be different depending on the individual’s living conditions.

Material y method

Participants

The present study is descriptive in nature, based on an on-line questionnaire conducted on Friday, April 21st 2020, seven days after the compulsory Shelter-at-Home health order was issued by the Spanish Government. A total of 1858 Spanish citizens, 674 males and 1184 females (M = 40.18, SD = 15.84, age range 16-82 years) from all regions in Spain agreed to participate.

Procedure

First, permission to conduct the study was obtained from the researchers’ State Ethics Research Committee (no 2020.165). Second, the research team developed an on-line questionnaire to obtain the needed information. Third, it was distributed via e-mail, WhatsApp, Twitter, Facebook and newspapers. In the first page of the questionnaire, participants were informed that it was completely anonymous, and that they could ‘stop and exit the questionnaire at any time if you feel emotional discomfort, because participation is voluntary’. The STROBE guidelines for reporting observational studies were followed14.

Instruments

The International Physical Activity Questionnaire (IPAQ)15. This tool was designed to assess physical activity (including inactivity) at a cross-national level. The IPAQ has shown sensible measurement properties for the analysis of individuals’ physical activity levels between 15 and 65 years of age16. In this study, the short version of the questionnaire, 7-day recall, was used17. According to Silsbury, Goldsmith and Rushton18 the IPAQ-7 is “the most appropriate outcome measure for clinical and research use, as it has excellent reliability and moderate correlation with Accelerometry. The short version makes it efficient for clinicians, also making it more cost-effective”. The Spanish validated version was obtained from www.ipaq.ki.se. It provides information on the time the individual spends in three physical activity intensity levels (walking, moderate and vigorous), and in sedentary activities. The Metabolic Equivalent of Task (MET) was used to indicate physical activity intensity. It represents 3.5 mJO/kg.min⁻¹ (energy needed for the basal metabolic rate), and it was grouped in three levels: a) Light (1.6-2.9 METs), b) Moderate (3 – 5.9 METs), and c) High (≥ 6 METs)19.
Anthropometric parameters. Participants’ height, current weight and weight before the compulsory shelter-at-home health order were requested. Based on this information, individual’s body mass index was calculated using the following formula: weight (kg) / [height (m)]² and these categories: underweight: < 18.5, normal weight: 18.5-24.9, overweight: 25.0-29.9, and obese: ≥30.0.

Sociometric information. To obtain a global picture of each individual’s isolated context, additional questions were included in the study’s questionnaire: How many days have you been shelter-at-home? Have you been out on the streets? For what reason? How many square meters does the house where you are living have? Can you step out to a terrace/balcony? Can you step out to a porch/backyard? How many people are currently living in the house, including you?

COVID-19 information. To gather information on the coronavirus pandemic, these questions were included: have you tested positive for COVID-19? Are you living with someone who has tested positive for COVID-19? Do you live with someone diagnosed with a COVID-19 risk condition or related disease? Do you live with any dependent person?

Data analyses

All data were analysed using SPSS version 24.0 (IBM Co. LTD, Chicago, IL, USA). Initial analyses showed that data was not normally distributed. Therefore, non-parametric statistics were used. The Mann-Whitney U test was used to assess group differences. Results included size (n) and frequency (%) for categorical variables. Results were considered significant at $p < 0.05$.

Results

Table 1 shows global results on VPA, MPA, LPA ad METs, and individuals who met WHO recommendations of PA weekly practice (VPA, MPA and MVPA) during the compulsory shelter-at-home health order issued in Spain. Globally, participants were far from meeting the recommended 75 minutes/week of VPA, 150 minutes/week of MPA or a combination (MVPA). Based on gender, data showed that only 30% of males and 21.7% of females met the VPA recommendation, 24.9% and 20.9%, respectively, the MPA recommendation, and these numbers increased to 40.9% and 32.5% for those who reached the minimal amount of MVPA weekly.

Table 2 shows means of all the variables assessed, grouped according to PA practice. Regarding VPA, results in males were significantly higher than females, and they, as average (some scored high and others low), met WHO recommendations for weekly PA practice. VPA levels significantly decreased with age, and it was significantly lower in overweight and obese individuals and those who had lost weight during the confinement. It was significantly higher in those who did not have a dependent person in their homes and those who had been out on the streets during the confinement. Finally, the context where the individuals were enclosed was important, because VPA significantly increased in larger houses, in those with a backyard and among large families (≥5 family members). Regarding MPA, it was significantly higher in males, in older individuals, in those who had lost weight, participants who had been in confinement for a longer time (≥8 days), those who had been on the streets, and those in larger houses, who had a balcony or a backyard. Finally, light PA (LPA) was significantly higher in females, in individuals over 40 years of age, in those who lost weight, in those who lived with a dependent person, and in larger houses with a backyard.

On the other hand, data obtained from those individuals who tested positive on Coronavirus or had someone in the house tested positive were included in Table 2, but they cannot be considered conclusive, because the number of subjects were extremely low. Results should be placed “on hold” until more data are obtained.

Discussion

The goal of this study was to assess Spanish citizens’ PA practice at the end of the first week of confinement. Global results showed that the vast majority of the population was below WHO recommendations for VPA, MPA or a combination. Moreover, PA practice was dependent on personal factors such as gender, age or weight, but also contextual factors such as living with a dependent person or the type of house.

The first hypothesis was that participants’ physical activity would be below WHO recommendations and results confirmed it. Globally, Spanish citizens confined in their houses were far from the recommended

Table 1. Physical activity during confinement.

|               | n  | %   | VPA  | MPA  | LPA  | METs  |
|---------------|----|-----|------|------|------|-------|
| Global results| 1858 | 100 | 61.42 | 98.20 | 336.13 | 1967.75 |
| VPA recommendations met | | | | | | |
| Males | 199 | 29.5 | 230.39 | 155.92 | 311.09 | 3423.84 |
| Females | 255 | 21.5 | 213.33 | 146.67 | 633.82 | 3372.47 |
| MPA recommendations met | | | | | | |
| Males | 168 | 24.9 | 122.37 | 325.06 | 453.42 | 3770.27 |
| Females | 247 | 20.9 | 114.82 | 312.88 | 555.58 | 3982.91 |
| MVPA recommendations met | | | | | | |
| Males | 276 | 40.9 | 159.06 | 224.13 | 346.93 | 3311.94 |
| Females | 385 | 32.5 | 136.61 | 225.98 | 442.63 | 3443.98 |

N: number; %: percentage; VPA: Vigorous Physical Activity; MPA: Moderate Physical Activity; MVPA: Moderate-to-Vigorous Physical Activity.
Table 2. Variables under study Regarding Vigorous Physical Activity (VPA), Moderate Physical Activity (MPA), Light Physical Activity (LPA) and METs.

|                        | n   | %    | VPA   | MPA   | LPA   | METs   |
|------------------------|-----|------|-------|-------|-------|--------|
| **Gender**             |     |      |       |       |       |        |
| Male                   | 674 | 36.3 | 76.30a| 108.19a| 259.75a| 1854.58a|
| Female                 | 1184| 63.7 | 52.98b| 92.20b| 379.93b| 2032.28b|
| **Age**                |     |      |       |       |       |        |
| <25                    | 474 | 25.5 | 90.58a| 97.71a| 243.28a| 1908.05a|
| 25-39                  | 418 | 22.5 | 62.60a| 85.28b| 287.30a| 1768.52a|
| 40-54                  | 551 | 29.0 | 51.64a| 101.53a| 381.59a| 2039.29a|
| >54                    | 415 | 22.3 | 38.96a| 107.38a| 431.33a| 214.89a|
| **BMI**                |     |      |       |       |       |        |
| Underweight            | 69  | 3.7  | 64.85a| 66.50a| 443.35a| 2229.47a|
| Normal weight          | 1064| 56.9 | 71.47a| 101.01a| 327.34a| 2021.43a|
| Overweight             | 471 | 25.0 | 46.94a| 95.44a| 334.33a| 1845.12a|
| Obese                  | 173 | 9.5  | 40.52a| 101.15a| 346.27a| 1865.25a|
| **Weight difference**  |     |      |       |       |       |        |
| Increased > 1 kg       | 94  | 5.1  | 49.74a| 71.96a| 205.32a| 1341.79a|
| Increased 1kg - 0.1kg  | 299 | 16.0 | 53.23a| 77.16a| 293.82a| 1677.97a|
| No difference          | 1008| 54.4 | 57.74a| 104.90b| 355.84b| 2039.71a|
| Decreased 0.1kg–1kg    | 203 | 10.9 | 86.96a| 101.94a| 290.30a| 2056.21a|
| Decreased > 1 kg       | 114 | 6.1  | 94.99a| 119.48b| 426.84a| 2477.46a|
| **Coronavirus tested** |     |      |       |       |       |        |
| Negative               | 1852| 99.7 | 61.55a| 98.32a| 336.83a| 1971.00a|
| Positive               | 6   | .3   | 20.00a| 13.33b| 47.50a| 370.08a|
| **Someone Corona positive** |     |      |       |       |       |        |
| No                     | 1852| 99.7 | 61.56a| 98.26a| 333.96a| 2219.65a|
| Yes                    | 5   | .3   | 8.00a | 50.00b| 75.00a| 511.50a|
| **Someone at risk**    |     |      |       |       |       |        |
| No                     | 1392| 74.9 | 62.09a| 97.08a| 323.76a| 1960.54a|
| Yes                    | 466 | 25.1 | 59.41a| 101.53a| 338.20a| 1989.46a|
| **Living with dependent** |     |      |       |       |       |        |
| No                     | 1645| 88.5 | 63.71a| 97.08a| 323.76a| 1960.54a|
| Yes                    | 213 | 11.5 | 43.72a| 101.53a| 338.20a| 1989.46a|
| **Days shelter-at-home** |     |      |       |       |       |        |
| 5 days                 | 611 | 34.0 | 60.42a| 103.04a| 334.52a| 1973.09a|
| 6 days                 | 594 | 32.0 | 64.50a| 95.59a| 337.39a| 2006.37a|
| 7 days                 | 434 | 23.4 | 60.95a| 99.76a| 348.22a| 2031.23a|
| 8 or more days         | 197 | 10.6 | 56.50a| 75.61a| 292.65a| 1637.19a|
| **Out on the streets?**|     |      |       |       |       |        |
| No                     | 357 | 19.2 | 47.34a| 73.57a| 330.81a| 1738.85a|
| Yes                    | 1501| 80.8 | 64.77a| 104.05a| 337.38a| 2022.20a|
| **House size in M²**   |     |      |       |       |       |        |
| <70                    | 445 | 24.0 | 54.05a| 86.95a| 297.43a| 1761.11a|
| 70-90                  | 522 | 28.1 | 61.12a| 89.58a| 301.34a| 1780.25a|
| >120                   | 391 | 21.0 | 58.78a| 109.92a| 333.87a| 2000.47a|
| **Do you have a balcony?** |     |      |       |       |       |        |
| No                     | 815 | 43.9 | 59.80a| 88.23a| 310.86a| 1840.55a|
| Yes                    | 1043| 56.1 | 62.68a| 105.99a| 355.89a| 2067.32a|
| **Do you have a backyard?** |     |      |       |       |       |        |
| No                     | 1409| 75.8 | 58.02a| 91.39a| 309.44a| 1840.88a|
| Yes                    | 449 | 24.2 | 72.05a| 119.67a| 419.90a| 2367.61a|
| **People in the house?** |     |      |       |       |       |        |
| 1                      | 202 | 10.9 | 57.61a| 110.44a| 306.71a| 1886.60a|
| 2                      | 502 | 27.0 | 57.13a| 99.78a| 317.16a| 1876.81a|
| 3                      | 503 | 27.1 | 66.71a| 97.62a| 361.87a| 2099.12a|
| 4                      | 497 | 26.7 | 59.76a| 91.56a| 333.65a| 1910.14a|
| ≥5                     | 153 | 8.2  | 68.87a| 100.48a| 362.94a| 2141.41a|

Note: Different superscripts in the same column show statistically significant differences at p < 0.050; M²: Squared meters; PA: physical activity.
Conflict of interest

The authors do not declare a conflict of interest.