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The effect of social distancing due to the COVID-19 on adult and elderly exercises. Exercise and social distancing

O efeito do distanciamento social devido à COVID-19 nos exercícios de adultos e idosos. Exercício e distanciamento social

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ABSTRACT

Objective: Social distancing due to COVID-19 pandemic could lead people to lower exercise engagement. The objective of this paper is to describe and compare the types of physical exercises participants were engaged, as well their frequency, duration, and intensity, in three different periods: 2019 (1), Jan/Feb 2020 (2), and during the social distancing period due to the COVID-19 pandemic (3). **Methods:** This is a cross-sectional study and its population was composed of adults and elderly from a public recreation center. The participants were invited by social media to answer a survey on Google Forms dealing with the characteristics of the physical exercises practiced in the three periods covered in this research. The survey was made available during October 2020. **Results:** Took part in this study 194 participants (63.49±14.14 years; 93.2% women). During period 1 the most practiced exercises was strength/aerobic class, twice/week, from 46 minutes to 1 hour/session, at intensity 6. During period 2, walking was the most mentioned, three times/week, from 31 to 45min/session, at intensity 7. During period 3, strength/aerobic class was the most frequent, three times/week, from 31 to 45min/session, at intensity 5. **Conclusion:** When compared to the period 1, there was a decrease ($p < 0.05$) in the total time of exercise in periods 2 and 3, and there was also, in these last two periods, a decrease in the number ($p < 0.05$) of participants who reached WHO guidelines of 150min/75min per week of exercise.

Keywords: COVID-19; Exercise; Sedentary behavior; Elderly; Adults.

RESUMO

Objetivo: O distanciamento social devido à pandemia COVID-19 pode levar as pessoas a diminuir o envolvimento com exercícios. O objetivo deste artigo é descrever e comparar os tipos de exercícios físicos os participantes se engajaram, assim como sua frequência, duração e intensidade em três períodos distintos: 2019 (1), jan/fev 2020 (2) e durante o período de distanciamento social devido à pandemia COVID-19 (3). **Métodos:** Trata-se de um estudo transversal e sua população foi composta por adultos e idosos de um centro recreativo público. Os participantes foram convidados pelas redes sociais a responder um questionário disponibilizado pelo Formulários Google tratando das características dos exercícios físicos praticados nos três períodos abrangidos por esta pesquisa. O questionário ficou disponível durante o mês de outubro de 2020. **Resultados:** Participaram deste estudo 194 participantes (63,49 ± 14,14 anos; 93,2% mulheres). No período 1 os exercícios mais praticados foram força/aeróbica, duas vezes/semana, de 46 minutos a 1 hora/sessão, na intensidade 6. No período 2, a caminhada foi o mais citado, três vezes/semana, de 31 a 45min/sessão, na intensidade 7. No período 3, a aula de força/aeróbica foi a mais frequente, três vezes/semana, de 31 a 45min/sessão, na intensidade 5. **Conclusão:** Quando comparado ao período 1, houve diminuição ($p < 0,05$) no tempo total de exercício nos períodos 2 e 3, e também nestes dois últimos períodos, diminuição no número ($p < 0,05$) de participantes que alcançaram as diretrizes da OMS de 150min/75min de exercícios por semana.

Palavras-chave: COVID-19; exercício físico; comportamento sedentário; idosos; adultos.

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INTRODUCTION

The COVID-19 pandemic, recognized by the World Health Organization (WHO) on March 11, 2020¹, triggered recommendations for social distancing in different countries at different times in different levels of strictness, especially among the population over 60 years of age due to their weaknesses and pre-existing diseases. In the city of Porto Alegre, Brazil, the municipal government took the initiative to restrict movement on March 16, 2020², with the suspension of all school activities. Movement restriction measures were later expanded, until the beginning of their easing on April 24, 2020³, in some industrial and commercial sectors. The service sector (public and private) that includes the promotion of physical exercise was hit hard. Gyms were authorized to reopen in a reduced manner on May 5⁴, but on July 7⁵ they were forced to close again, only to reopen on August 11⁶. Although officially authorized to reopen, public recreation centers did not return to offering physical exercise sessions in person to the population until the beginning of November.

Online exercise offered to the general population was highly recommended during the COVID-19 pandemic. The WHO European Regional Office promoted a “stay physically active” campaign for those in self-quarantine⁷, encouraging people to exercise at home while outdoor and indoor sites were closed. In Brazil, the Ministry of Health published at least two web pages with tips on how to keep fit during the enforced need to stay home and social distancing period (SDP)⁸⁻⁹. Unfortunately, these important suggestions for staying healthy have not spread to most of the population due to differences in how the federal administration and state and municipal administrations are dealing with this new disease.

Fortunately, within the public service sector, some personal initiative from civil servants at the beginning of the COVID-19 outbreak offered citizens a web-based opportunity to continue exercising while at home¹⁰⁻¹². Initially, these gym classes were aimed at closed groups using a personal messaging app. Subsequently, these individual actions became institutional activities through social and corporate networks¹³⁻¹⁴. More recently, the city of Porto Alegre started offering a set of classes for pregnant women, including physical exercises and nutritional and psychological assistance¹⁵.

All these individual and institutional initiatives were developed to keep people, especially the elderly, active. Although these social and corporative social media could not definitively reach all of the city's population, these short videos (ranging from 4 to 20min) were viewed more than 40,000 times from March to November 2020.

The decrease in the frequency, duration, and intensity of physical exercise imposed by the need for social distancing can cause damage to general health, especially among the older population. The WHO recommends that people over 18 years of age perform at least 150 minutes of moderate activities or 75 minutes of intense activities per week¹⁶⁻¹⁷. The difficulty of maintaining this frequency

and intensity of exercise at a time when there is a need to stay at home can facilitate the emergence of health problems, especially those caused by the loss of muscle strength.

The main objective of this article is to quantify and compare people's engagement in physical exercise during three different periods: (1) in 2019, (2) in January and February 2020 (Jan/Feb 2020), i.e., summer break in Porto Alegre, and (3) during the SDP due to the COVID-19 pandemic that began in March 2020.

METHODS

This is a cross-sectional study in which the participants' information was accessed from a survey that investigated their lifestyle habits, focusing on their physical exercise practices in the years 2019 and 2020. While the original focus of this study was people aged 18 or over who regularly exercised in a public recreation center, the study included a random sample of 194 people from 30-89 years old ($\bar{x} = 63.49 \pm 14.14$). Most of the sample were women (92.3%) and were over 60 years old (75.6%).

All procedures in this research were conducted remotely. The Google Forms platform was used to create a questionnaire about physical exercise practices in the years 2019 and 2020. The questionnaire was made available through social networks, and it was kept available to respondents over the month of October 2020.

The questionnaire about physical exercise practices in the years 2019 and 2020 contained 22 questions about the exercises participants did during three different time periods: 1) in the year 2019, 2) in the months of Jan/Feb 2020, i.e., summer break in Porto Alegre, and 3) during the SDP due to the COVID-19 outbreak. The questions addressed the type of physical exercise (16 different types were presented – basketball, indoor cycling or on the street, biodance, cambio, walking on a treadmill or on the street, running on a treadmill or on the street, dance, strength and aerobic class, water aerobics, jogging in the pool, weight training, swimming, pilates, tennis or beach tennis, volleyball, yoga and one last option “other”) and its frequency (once a week, twice a week, three times a week, four times a week, five times a week, six times a week, and every day of the week), duration (up to 15min, 16 to 30min, 31 to 45min, 46min to 1h, 1h to 1h and 15min, and over 1h and 15min), and intensity (0-10 scale). It was also asked how often participants left home for essential needs during the SDP (I never leave home, once a week, twice a week, three times a week, four times a week, five times a week, six times a week, and every day of the week).

Data were firstly analyzed according its distribution using Kolmogorov-Smirnov and Shapiro-Wilk tests. Data were described using frequencies, means, standard deviations, medians, and ranges. Differences between time periods and age ranges were verified using Friedman's Two-Way Analysis (with Bonferroni's correction), Independent Samples Median Test, and Chi-Squared Test. SPSS®26

software was used to perform data descriptions and inferences; the confidence interval assumed was 95%.

Ethics

All procedures mentioned earlier were analyzed and approved by the Ethics Committee of the city of Porto Alegre (CAAE #32661620.3.0000.5338). All participants, prior to answering the online form, had to give their consent to the use of their information.

Limitation

This research dealt with physical exercises engaged by the participants in the year before the outbreak of COVID-19 and in the current year. The questions were not about details of their activities, but about what they did most of the time, how many times a week, for how long and with what intensity. Participants were encouraged to remember what they usually did in the period covered in the research, so there is potential recall bias in their responses. In an attempt to avoid this bias, the alternatives to the questions were written as openly as possible, so that the participants were not obligated to give a very precise answer. In addition, all participants regularly attended the same recreational center, and most of them for a long time, making this memory bias less likely.

RESULTS

The following sections present, first, a descriptive overview of the data and then several inferential attempts to understand the phenomena herein described. Nonparametric statistics were used as normality tests have shown that the data comes from a non-normal sample.

The types of regular physical exercise people engaged in

When participants were asked what kind of physical exercise they were regularly engaged in, 19 different activities emerged. The types of exercise mentioned, in order of frequency, were: strength and aerobic class, walking on a treadmill or on the street, weight training, dance, yoga, Pilates, indoor cycling or on the street, stretching, water aerobics, running on a treadmill or on the street, biodance, volleyball, swimming, tennis or beach tennis, cardio, jogging in the pool, Chinese exercises, elliptical trainer, and functional exercises. In 2019, the three most frequent exercises were strength and aerobic class (29.76%), weight training (15.77%), and walking (11.90%). When the question focused on the Jan/Feb 2020 time period, the three most frequent exercises were the same but in a reverse order of frequency: walking (48.34%), weight training (10.60%), and strength and aerobic class (8.61%). During the SDP, strength and aerobic class was mentioned by 34.25% of the participants, walking by 29.83%, and yoga by 8.84%.

Social distancing adherence

Participants were asked whether they stayed at home and how often they went out for any essential demands during the SDP. Almost one-half (43%) of the participants mentioned they never left home for essential demands or only once a week (Table 1).

Categorizing participants' information according to age range, all groups except <60 years old said they mostly left home for essential demands during the SDP once a week (Table I). According to an independent sample median test ($X^2(6) = 8,987; p > 0.05$), there was no difference regarding how often participants left home during the SDP between all age ranges.

Table I. The frequency of participants leaving home for essential demands during the SDP, Porto Alegre – RS, 2020.

	Social distancing adherence per age range (%)							
	Total	<60	60-64	65-69	70-74	75-79	80-84	85-89
I never leave home.	10.6	6.3	-	10.3	22.7	18.2	18.8	50.0
Once a week	32.4	20.8	38.9	35.9	22.7	36.4	43.8	50.0
Twice a week	22.9	25.0	33.3	20.5	13.6	27.3	12.5	-
Three times a week	15.1	20.8	11.1	15.4	13.6	9.1	18.8	-
Four times a week	4.5	8.3	-	7.7	4.5	-	-	-
Five times a week	2.2	2.1	5.6	-	-	9.1	-	-
Six times a week	2.8	4.2	-	2.6	9.1	-	-	-
Every day of the week	9.5	12.5	11.1	7.7	13.6	-	6.3	-

Regular physical exercise frequency

Participants were then asked how many times a week they engaged in physical exercise. The most comment overall frequency was twice a week (52.27%). Looking at the responses for each period, in 2019, 74.91% of the participants said they exercised twice a week, in Jan/Feb 2020, 26.04% of the participants said they exercised three times a week, and during the SDP, 26.61% of the participants said they exercised three times a week. Table II shows the frequency of participants' exercise participation.

Regular physical exercise duration

The next question asked participants how much time they spent exercising. Overall, the most frequent duration was from 46min to 1h (43.91%). During 2019, 58.25% said they spent from 46min to 1h exercising per session, for Jan/Feb 2020, 31.91% answered from 31 to 45min, and during the SDP, 42.45% answered from 31 to 45min. Table II shows the time participants spent exercising per session.

Regular physical exercise intensity

Participants were also asked how intense they exercised, using a scale from 0 (lowest intensity) to 10 (highest intensity). The most frequent intensity for the whole sample was 6. Considering 2019, 60.57% of the participants said they exercised at 6 in intensity, for Jan/Feb 2020, 20.21% chose intensity 7, and during the SDP, an intensity of 5 was mentioned by 19.27%. Table II presents the frequency of the intensities participants mentioned in their answers.

Table II. The frequency, duration, and intensity of the exercise that the participants engaged in, Porto Alegre – RS, 2020. (%)

		Total	2019	Jan/Feb 2020	SDP
Frequency	Once a week	5.17	4.66	3.13	8.26
	Twice a week	52.27	74.91	23.96	19.27
	Three times a week	16.32	8.96	26.04	26.61
	Four times a week	10.33	5.38	18.75	15.60
	Five times a week	7.23	4.30	12.50	10.09
	Six times a week	2.48	0.72	2.08	7.34
	Every day of the week	6.20	1.08	13.54	12.84
Duration	Up to 15min	2.54	1.55	1.06	5.66
	16 to 30min	10.41	7.22	11.70	15.09
	31 to 45min	28.93	20.10	31.91	42.45
	46min to 1h	43.91	58.25	29.79	30.19
	1h to 1h and 15min	6.85	6.19	12.84	2.83
	Over 1h and 15min	7.36	6.70	12.70	3.77
Intensity	0	7.88	5.73	11.70	10.09
	1	1.45	-	3.19	3.67
	2	2.90	2.87	5.32	0.92
	3	3.32	1.08	7.45	5.50
	4	3.94	2.15	2.13	10.09
	5	10.37	5.38	14.89	19.27
	6	39.42	60.57	8.51	11.96
	7	12.45	10.04	20.21	11.90
	8	10.79	6.45	17.02	16.51
	9	3.32	2.87	3.19	4.59
	10	4.15	2.87	6.38	5.50

The total time of regular physical exercise

The total time spent exercising per week was not asked on the questionnaire, but rather it was calculated according to their answers concerning frequency and duration. The mean overall total time spent exercising was 115.46 min/week (± 89.29 ; CI=102.82-128.11) During 2019, the mean total time spent per week was the highest of the three periods studied (167.83 ± 100.03 ; CI=153.66-181.99 min/week), followed by Jan/Feb 2020 (93.51 ± 132.97 ; CI=74.68-112.34 min/week), and the SDP (85.05 ± 108.62 ; CI=69.66-100.43 min/week).

According to the previous calculations of total time exercising per week and intensity, it was possible to classify participants according to the WHO recommendations for exercise (150min of moderate intensity exercise or 75min of vigorous intensity exercise). Across all periods, 67.01% of the participants did not reach the WHO recommendation, while 32.99% reached it. There was a decrease in the number of participants who reached the WHO recommendation from 2019 to 2020. In 2019, 45.88% reached the WHO recommendation, but in Jan/Feb 2020 and during the SDP, only 26.29% and 26.80% reached it, respectively.

Total time spent doing exercise comparisons

Friedman's Two-Way Analysis showed a statistically significant difference between total time spent exercising in 2019, in Jan/Feb 2020, and during the SDP ($X^2(2) = 106.93$; $p < 0.05$). The total time spent exercising in 2019 is statistically greater than during Jan/Feb 2020 and the SDP. The last two periods showed no statistical difference between each other. The significance values were adjusted using Bonferroni's correction. Figure 1 presents the total time exercising range according to period.

The independent samples median test showed no statistically significant differences between age ranges in 2019 ($X^2(6) = 8.273$; $p > 0.05$), in Jan/Feb 2020 ($X^2(6) = 6.464$; $p > 0.05$), and during the SDP ($X^2(6) = 3.002$; $p > 0.05$). Figure 1 presents the medians and the range for each period across all age ranges.

The total time spent exercising was also analyzed according to age range across the three time periods. Friedman's Two-Way Analysis showed a statistically significant decrease between 2019 and Jan/Feb 2020 throughout all age groups except for those participants 75-79 years old, and it also showed a statistically significant decrease between 2019 and the SDP throughout all age groups except for those participants 80-84 years old. No differences were found between Jan/Feb 2020 and the SDP, and there were no differences in the 85-89 age range across the time periods. Significance values were adjusted using Bonferroni's correction. Figure 1 presents the medians and ranges for total time spent exercising for each age group across the time periods.

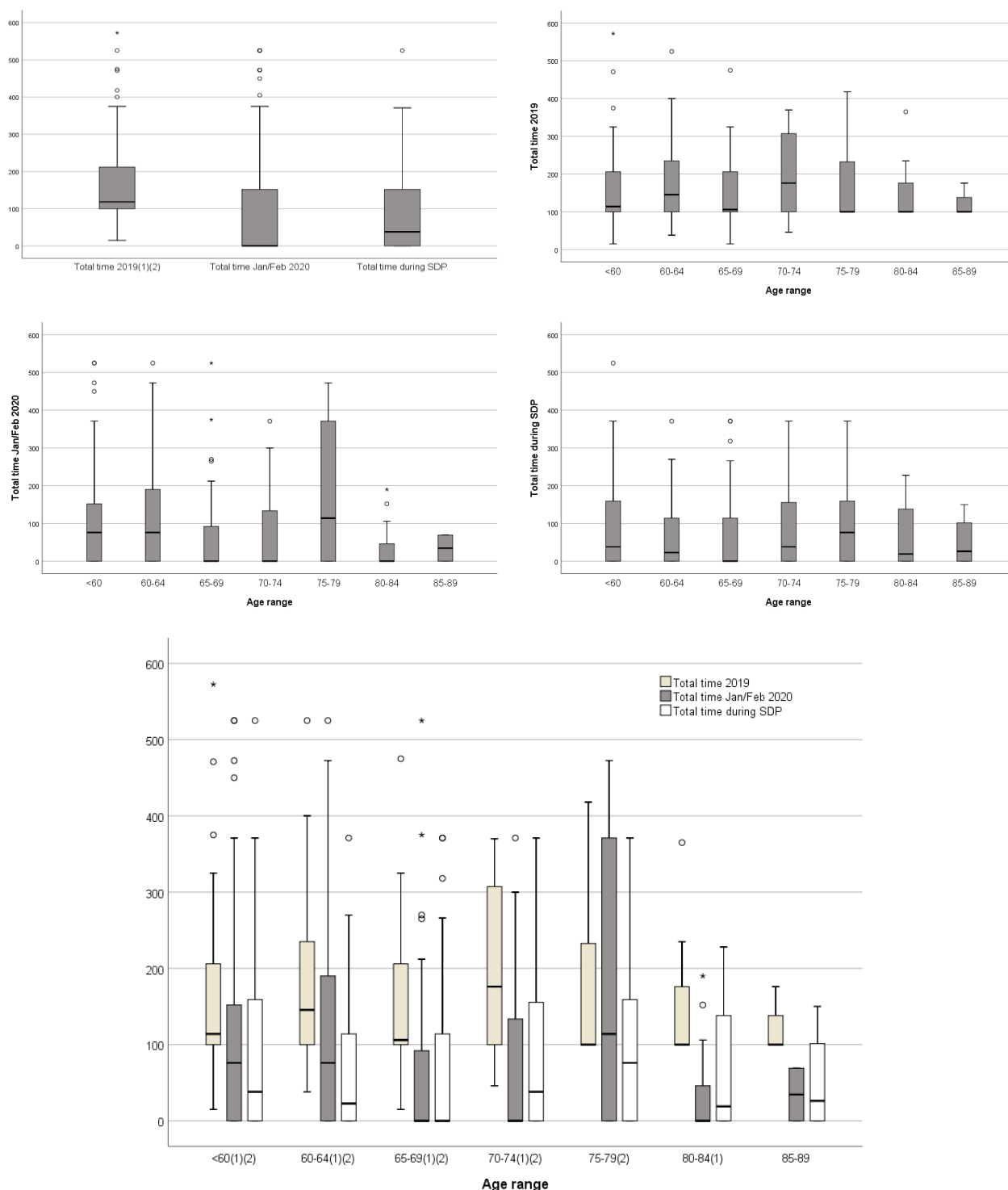


Figure 1. The median and range of the total time spent exercising in different time periods for all the sample and by age group, Porto Alegre – RS, 2020.

(1) Statistically significant difference between 2019 and Jan/Feb 2020; (2) Statistically significant difference between 2019 and SDP.

Total time spent exercising according to the WHO recommendations

The time spent exercising was classified according to the WHO recommendations¹⁵⁻¹⁶. Almost half of the participants reached the WHO recommendations in 2019, but this prevalence dropped to almost a quarter in both periods in 2020 (Figure 2).

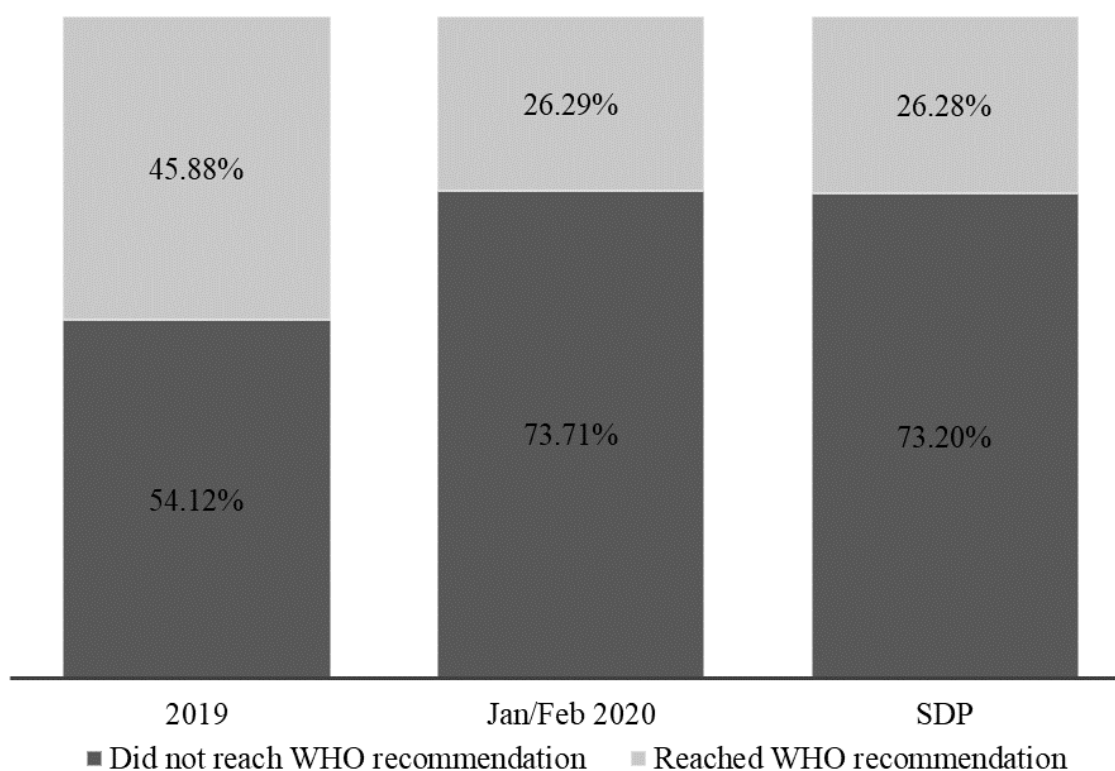


Figure 2. The prevalence of participants who reached or did not reach the WHO recommendations on exercise, Porto Alegre – RS, 2020.

This prevalence was analyzed using a chi-squared test. There was a weak but statistically significant association between the WHO recommendation for exercise and period ($X^2(2)=21.872$; $p<0.05$; Cramér's $V = 0.194$). There were more participants that reached the WHO recommendation in 2019 than expected. On the other hand, there were fewer participants that reached this WHO recommendation in Jan/Feb 2020 and during the SDP. Thus, there was a statistically significant association for “reach the WHO recommendation” in 2019 and a statistically significant association for “didn't reach the WHO recommendation” in Jan/Feb 2020 and the SDP.

Personal performance

For the time periods covered in this research, participants informed how active they were, as measured by total time spent exercising per week. Individually, participants could present a decrease, an increase, or unchanged total time spent exercising from 2019 to 2020. From 2019 to Jan/Feb 2020 and to the SDP, most of the participants greatly decreased their engagement in exercise. Concerning

the periods Jan/Feb 2020 and the SDP, there was an equal distribution in personal performance (Figure 2).

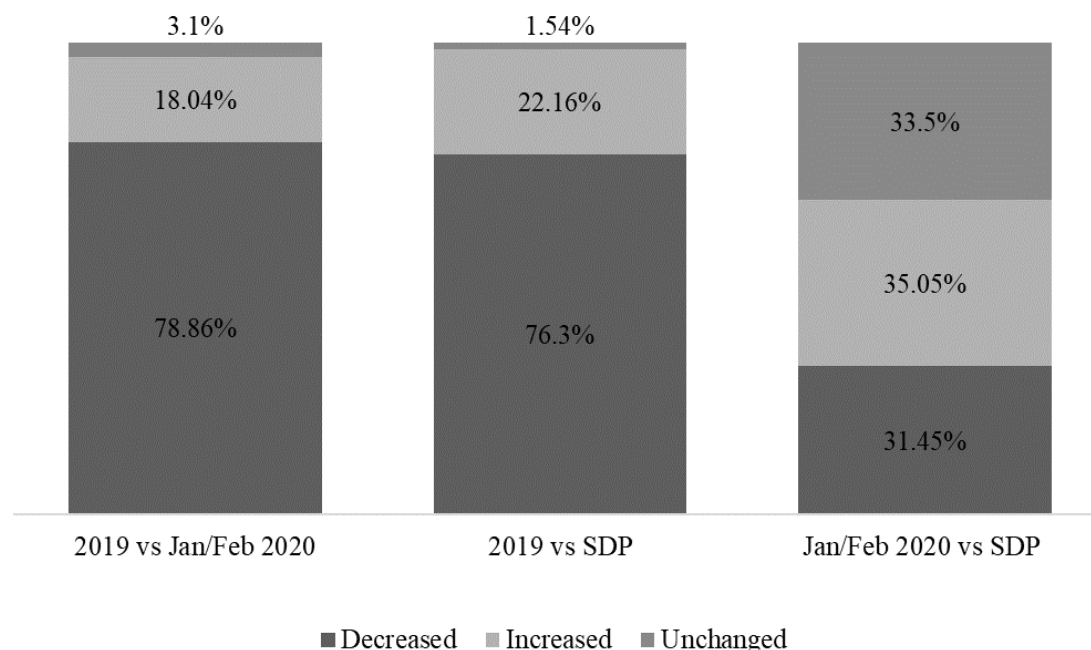


Figure 3. Personal performance over different time periods, Porto Alegre – RS, 2020.

This prevalence was also analyzed using a chi-squared test. There was a weak but statistically significant association between personal achievement and time period ($X^2(4)=155.645$; $p<0.05$; Cramér's $V = 0.366$). There were more participants than expected who decreased exercise engagement in 2020 when compared to 2019. Hence, there is an association for decreased total time spent doing exercise in both 2020 periods.

DISCUSSION

The reduction of adequate time exercising just before the COVID-19 outbreak (Jan/Feb 2020) and during the SDP was 42.7% and 41.6%, respectively, when compared to 2019. Similar results were presented by Malta et al. (2020)¹⁸, who found a mean decrease of 60.14%. Both studies used age groups to present the results but differ in the way they clustered borderline ages: Malta et al. clustered participants who were over 60 years old, while this study clustered participants below 60 years old. But they both agreed that all age groups presented a decrease in the proportion of adequate time doing exercise. Participants in both researches reduced the amount of exercise during the pandemic due to COVID-19, and almost half of them were not active enough to help prevent disease (e.g., cancer, diabetes mellitus (type 2), metabolic syndrome, overweight/obesity, and sarcopenia)¹⁹. The inactivity during the SDP could also lead to a state of greater anxiety, stress, and depression²⁰⁻²¹.

Among younger adults it was possible to notice a decrease in exercising in 2020, as observed by Huber et al. (2020)²², although by a different percentage. Their cohort was composed of young adults (23.3±4 years old; 71.5% women) from Bavaria-Germany. Most of them (44.5%) decreased their amount of activity after a lockdown was imposed in the state of Bavaria, while 32.8% increased their amount of activity and 22.7% maintained their exercise participation. This change in behavior due to the need to stay at home was also observed in a study conducted in northern Brazil²³. The results of the present study, which included participants 30-89 years old, are worrisome: 76.3% of the participants decreased their total time of exercise, 22.2% increased their time, and 1.5% maintained the total time they exercised. When a below 60-year-old sub-sample (n=61; 49.16±14.94 years old; 95.1% women) was analyzed, the results were almost the same (70.6% decreased, 26.2% increased, and 3.3% unchanged), showing an important difference from the younger samples from Germany and from northern Brazil. This seems to demonstrate that adults and the elderly restricted their movement more than younger people, perhaps because they were able to do so because they were retired or perhaps because they were more afraid of the disease due to their health status. It is particularly important to consider that older people are more likely to lose muscle mass due to inactivity, which could negatively impact their functional ability and, therefore, their quality of life²⁴.

Participants over 60 years old (except for the 80-84 year old group) showed a statistically significant decrease in total time spent doing exercise during the SDP. A similar result was presented by Yamada et al. (2020)²⁵ for a population in a continuing care retirement community in Japan. Yamada et al., using a pace counter, observed two major decreases in daily walking distance among the community's residents (67-92 years old; 70.4% women). The total decrease was about 24% of daily walking distance. In the present study, it was possible to create a sub-sample with similar characteristics (67-89 years old; n=82; 89% female), but they differed in their place of residence; the latter participants were not institutionalized. Also observed in this sub-sample, as in Yamada et al.'s study, was a major decrease in exercise after the city of Porto Alegre declared, on March 16, restrictions of movement, especially among older people. This large drop was 58.2% when comparing 2019 and the SDP, almost twice the decrease seen in the Japanese study. This difference may be associated with the more controlled environment a continuing care retirement community can offer its residents, making them feel safer and thus allowing them to continue exercising. Finally, another study, this time analyzing the behavior of a group of patients (n=82; 58-72 years old; median age=65; 35.4% women) using an implantable cardiac electronic device with remote monitoring in Riyadh, Saudi Arabia, examined physical activity during the COVID-19 pandemic²⁶. The authors observed, after monitoring the participants for a period of 77 days (including a 38-day lockdown), a

27.1% reduction in physical activity. These results were very similar to those in Japan, but still very different from what was observed in this research.

CONCLUSION

The reduction of total time spent on physical activities after COVID-19 outbreak is an undeniable reality. People from different countries, of different ages, and with different previous exercise behavior became less active or even inactive during the pandemic in 2020. This unhealthy change was caused by the need to stay at home and to socially distance from others. There was a huge choice of online exercise programs—free or paid—of all kinds, but these programs were not suitable for everyone, especially for the elderly or low-income families due to complexity in the use of technology or to the cost of accessing a reliable high speed internet connection. The reduction or absence of activity for a short period can be harmful to people in general. For older people, a long period of self-isolation can be especially deleterious to their health. Porto Alegre and Brazilian authorities were advising older people to stay at home as much as they could from March until December, at least. Now it is time to look forward and start to create programs to encourage people of all ages to get back on the track of healthy exercise behaviors or even to encourage people that were inactive before the pandemic to join exercise programs. This is the great challenge that all governments must now face: getting all the apparatus of their cities ready for the new and old practitioners of exercises for the post-vaccine era.

CONFLICT OF INTEREST

The author certify that there is **NO** conflict of interest either in the execution of this research or in the writing of the manuscript. This manuscript is under peer review in a scientific journal.

AUTHOR CONTRIBUTIONS

Conception, design of the research, data analysis, and writing of the manuscript all done by the author, Alexandre Luis Ritter.

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