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Original article

Physical activity behavior in people with multiple sclerosis during the COVID-19 pandemic in Israel: Results of an online survey

Alon Kalron^{a,b,c,*}, Mark Dolev^c, Michal Greenberg-Abrahami^c, Shay Menascu^{c,e}, Lior Frid^{a,c}, Sharon Avrech-Shezifi^c, Gil Harari^d, David Magalashvili^c, Anat Achiron^{b,c,e}^a Department of Physical Therapy, School of Health Professions, Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel^b Sagol School of Neurosciences, Tel-Aviv University, Tel-Aviv, Israel^c Multiple Sclerosis Center, Sheba Medical Center, Tel Hashomer, Israel^d Medistat, Tel-Aviv, Israel^e Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel

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ABSTRACT

Multiple sclerosis (MS) itself and first-line disease modifying therapies do not increase the risk of contracting COVID-19. However, home isolation is likely to result in a significant decrease in participation in leisure time physical activities and an increase in sedentary behavior. Therefore, using an online cross-sectional survey we examined the impact of the COVID-19 epidemic on physical activity (PA) behavior and fitness level in an Israeli cohort of people with multiple sclerosis (PwMS). The survey PA questionnaire included 10 questions. Specifically, participants reported on whether, and to what extent, the pandemic conditions had altered their PA behavior. One hundred and twenty PwMS filled out the online survey, 78 were females with a mean age of 43.0 (S.D.=12.9) years. PA behavior during the pandemic demonstrated that 17.5% who were engaged in PA before the COVID-19 pandemic, ceased PA, 33.3% reduced their PA, 20.0% continued their PA as before, 18.3% increased their PA during the pandemic, and 10.8% did not perform any PA in the past and did not so during the pandemic. As for the patient's self-reported fitness level, 31.7% reported that their fitness level had decreased during the pandemic, 60.0% felt no change, and 8.3% reported an improvement. Our findings serve as a call of action for all professionals involved in MS management to address physical activity behavior in PwMS during the COVID-19 epidemic.

1. Introduction

Coronavirus disease 2019 (COVID-19) was first identified in December 2019 and has been described as a pneumonia-like disease exhibiting clinical symptoms such as fever, fatigue, dry cough and dyspnea (Zhu et al., 2020). The outbreak initially began in China but rapidly expanded across the globe reaching pandemic proportions. To date (October 2020), the virus has affected approximately 44 million people worldwide with a death toll of over 1,100,000. The absence of specific preventive or therapeutic medical interventions for the COVID-19 infection, in conjunction with its rapid transmission rate, has led to the recommendation that individuals, including people with MS

(PwMS), must avoid being exposed to the virus by restrictive measures based on physical distancing (Brownlee et al., 2020). Although, these recommendations are essential for infection control, this strategy has potential behavioral and clinical repercussions, especially for elders and people with chronic diseases, including PwMS.

Multiple sclerosis (MS) itself and first-line disease modifying therapies do not increase the risk of contracting COVID-19 (Willis and Robertson, 2020). However, home isolation is likely to result in a significant decrease in participation in leisure time physical activities and an increase in sedentary behavior (Hubbard et al., 2015). This avoidance behavior might be harmful for essential functions such as mobility, cognition, and physical fitness, resulting in a reduced quality of life in

* Corresponding author: Department of Physical Therapy, School of Health Professions, Sackler Faculty of Medicine, Tel-Aviv University, Israel; Multiple Sclerosis Center, Sheba Medical Center, Tel Hashomer, Israel.

E-mail addresses: alonkalr@post.tau.ac.il, alkalron@gmail.com (A. Kalron), mark.dolev@sheba.health.gov.il (M. Dolev), michal.greenbergabrahami@sheba.health.gov.il (M. Greenberg-Abrahami), shay.menascu@sheba.health.gov.il (S. Menascu), lior.frid@sheba.health.gov.il (L. Frid), sharon.avrechshazifi@sheba.health.gov.il (S. Avrech-Shezifi), david.magalashvili@sheba.health.gov.il (D. Magalashvili), anat.achiron@sheba.health.gov.il (A. Achiron).

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PwMS, exceeding the typical impact of the MS disease (Wilski et al., 2019).

As of September 2020, according to the PubMed database, 172 studies have investigated the impact of COVID-19 on PwMS during the past year, mainly on issues relating to neurological signs and symptoms and immunomodulatory treatment. In this report, we have expanded the data as to the impact of the epidemic on physical activity (PA) behavior and fitness level in an Israeli cohort of PwMS.

2. COVID-19 pandemic and lockdown in Israel

On February 21, 2020, Israel confirmed the first case of COVID-19 when a female citizen tested positive for COVID-19 after her return from quarantine on the Diamond Princess cruise ship which was docked in Japan. Beginning on March 11th, 2020, Israel began enforcing social distancing and other rules to limit the spread of the infection. Gatherings were restricted to no more than 10 people, with attendees advised to keep a distance of 2 m between one another. Israelis were not allowed to leave their homes unless absolutely necessary. Essentially, this meant gym, public parks, sporting grounds and outdoor playing areas were closed. The quarantine conditions together with the social distancing measures, created a situation where people were forced to seek new and creative ways to preserve their physical activity level. On May 4th, 2020, there was a gradual easing of lockdown restrictions. Changes included allowing outdoor meetings, removal on the limit of venturing from homes, and allowing meetings with family members, including the elderly.

3. Materials and methods

During the 30-day period of May 15th and June 15th, 2020 an online survey questionnaire related to physical activity was distributed via e-mail and common local social websites dedicated to MS. According to the updated Atlas of MS (September 2020), the total number of PwMS in Israel is 12,861, with a prevalence of 151 (The Multiple Sclerosis International Federation September, 2020). The online survey was distributed directly to ~500 patients whose emails were stored in the Sheba MS Center database. The Sheba MS Center is the largest MS center in Israel, following over 3000 PwMS across the country.

As the survey questionnaire was anonymous and dependent on the patient will to respond, the need for consent was waived.

3.1. Online survey

The survey PA questionnaire included 10 questions. Descriptive information was collected in order to characterize the population (age, gender, disease duration, and use of walking support). Specifically, participants reported on whether, and to what extent, the pandemic conditions had altered their PA behavior. Participants were asked to report the frequency per week they took part in PA sessions, the duration and the type of activity they were engaged in. In addition, participants were asked to rate their level of physical fitness compared to the period prior to the COVID-19 pandemic.

Statistical analyses were performed using SPSS software version 26 (SPSS 26.0 IBM Corporation, Armonk, New York, USA). Data are expressed as absolute scores and percentage distribution, based on the total responses.

4. Results

One hundred and twenty PwMS filled out the online survey, 78 were females with a mean age of 43.0 (S.D.=12.9) years. In the majority of responders (48.3%) disease duration was short, up to 5 years, and 88.3% did not need any walking support. PA behavior during the pandemic demonstrated that 17.5% who were engaged in PA before the COVID-19 pandemic, ceased PA, 33.3% reduced their PA, 20.0% continued their

PA as before, and 18.3% increased their PA during the pandemic. Aerobic exercises were the main type of PA performed by 72.1% of patients. As for the patient's self-reported fitness level, 31.7% reported that their fitness level had decreased during the pandemic, 60.0% felt no change, and 8.3% reported an improvement. Results of the survey are presented in Table 1.

5. Discussion

According to our online survey, 50.8% of the Israeli PwMS responders ceased or decreased their leisure time PA during the COVID-19 epidemic. Moreover, 31.7% reported that their fitness level had decreased during this period. Worth noting, our results are significant when taking into account that the majority of PwMS responders (88.5%) did not use a walking aid for mobility, indicating patients with mild-moderate disability.

Although, our data does not include PA behavior of the general Israeli population, we compared our results with recent data on the

Table 1
Online survey – Physical activity behavior during the COVID-19 epidemic.

1. Mean age	43.0 (S.D.=12.9)	
2. Gender:		
Male	42 (35%)	
Female	78 (65%)	
3. Disease duration:		
Up to one year	7 (5.8%)	
1-5 years	51 (42.5%)	
6-10 years	28 (23.3%)	
Over 10 years	34 (28.3%)	
4. During daily living activities I usually:		
Do not need support for walking	106(88.3%)	
Walk with support	13 (10.8%)	
Use a wheelchair	1 (0.9%)	
5. Please state the sentence that best describes your behavior during the corona pandemic:		
I have not performed any physical activity in the past and did not do so during the pandemic	13 (10.8%)	
I stopped performing physical activity during the pandemic, although I had done so before the pandemic	21 (17.5%)	
I performed less physical activity during the pandemic	40 (33.3%)	
I continued performing my physical activity as usual during the pandemic	24 (20.0%)	
I performed more physical activity than usual during the pandemic	22 (18.3%)	
6. In case of a change in physical activity behavior during the pandemic, please estimate the amount of time spent:		
	Performed less (n = 40)	Performed more (n = 22)
10–30%	15 (37.5%)	8 (36.3%)
30–50%	10 (25.0%)	9 (40.9%)
Over 50%	15 (37.5%)	5 (22.7%)
7. What was the main focus of your physical activity sessions performed during the pandemic? (n = 86)		
Aerobic	62 (72.1%)	
Muscle strength	9 (10.4%)	
Combined aerobic and muscle strength	4 (4.7%)	
Stretching and/or flexibility	2 (2.3%)	
Other	9 (10.5%)	
No physical activity	(n = 34)	
8. How many physical activity sessions were performed on average within a week during the pandemic? (n = 86)		
Once	8 (9.3%)	
2–3	26 (30.2%)	
4–5	21 (24.4%)	
Daily	31 (36.1%)	
No physical activity	(n = 34)	
9. How long was a typical physical activity session? (n = 86)		
15–45 min	61 (70.9%)	
More than 45 min	25 (29.1%)	
No physical activity	(n = 34)	
10. Please rate your fitness level today compared to the period before the corona pandemic:		
My fitness level has improved	10 (8.3%)	
I feel no change in my fitness level	72 (60.0%)	
My fitness level has decreased	38 (31.7%)	

impact of COVID-19 on PA worldwide (Mazza et al., 2020). According to one-week's average steps measured by the Fitbit® device in 30 million users, there was a fundamental reduction during March 2020 compared with March 2019, in almost all countries worldwide (*The Impact of Coronavirus on Global Activity*). During the week of March 22, 2020, there was a 12% decline in step count in the USA. The severity of the decline in steps varied from country to country, with European countries showing a reduction, ranging from 7% to 38%. Accordingly, it seems that the PA reduction in the present Israeli MS cohort exceeded that of the general population. This finding might be explained due to increased anxiety and/or depression of PwMS during the lockdown and/or fear of falling ill from COVID-19. These immediate psychological responses were recently demonstrated during the pandemic amongst Italian PwMS (Mazza et al., 2020).

The positive side of our findings was that despite the lockdown, 38.3% of the patients reported continuing or even performing more PA than usual. Furthermore, 68.3% reported that their level of fitness was maintained (or even improved) compared to the period before the epidemic. We acknowledge that regardless of the current epidemic situation, PwMS have been known to be considerably less physically active and usually adopt a sedentary behavior pattern compared with the general adult population (Veldhuijzen van Zanten et al., 2016). Acknowledging this fact, maintaining the amount of physical activity performed during the pandemic is critical in sustaining the PwMS's health.

We were unable to postulate the definite cause as to why half of the PwMS maintained their PA level. Therefore, we raise several speculations. Firstly, during the past two decades an increasing amount of scientific data has emphasized the benefits of PA in PwMS (Dalgas et al., 2019). Benefits of PA have shown not only symptomatic relief but also disease-modifying effects (Motl, 2020). Thanks to the social media, global and local MS health care networks, this important message is continuously being transmitted to the MS population (*Living well with MS*). We believe that these efforts have succeeded during the COVID-19 pandemic in motivating a large segment of PwMS to maintain their PA habits, despite the lockdown conditions. An additional explanation might involve the rapid development and use of digital applications promoting PA, including applications specifically addressed to PwMS (Dennett et al., 2018; Remy et al., 2020; Flachenecke et al., 2020). Recently Remi et al. (2020) investigated the compliance of PwMS in using telecommunication technologies for rehabilitation. The authors found that 62% of the cohort was interested in receiving physical exercise program, and 69% were interested in information and personalized advice about PA and MS (Flachenecke et al., 2020). Although, access to these technologies was not feasible for all PwMS, there was a possibility that a relatively large portion of patients benefited from these novel technologies during the lockdown. However, these assumptions can be clarified only through further research. Specifically, a qualitative study, including personal interviews, is warranted in order to clarify the reasons why PwMS changed their regular physical activity habits.

In conclusion, our findings serve as a call of action for all professionals involved in MS management to address physical activity behavior in PwMS during the COVID-19 epidemic. Future longitudinal studies are encouraged to examine the effect of changes in PA behavior during the Israeli lockdown on the PwMS's quality of life.

CRedit authorship contribution statement

Alon Kalron: Conceptualization, Methodology, Visualization,

Writing - original draft. **Mark Dolev:** Investigation, Writing - review & editing. **Michal Greenberg-Abrahami:** Software, Writing - review & editing. **Shay Menascu:** Investigation, Writing - review & editing. **Lior Frid:** Investigation, Writing - review & editing. **Sharon Avrech-Shezifi:** Conceptualization, Visualization. **Gil Harari:** Formal analysis. **David Magalashvili:** Writing - review & editing. **Anat Achiron:** Conceptualization, Methodology, Writing - original draft, Visualization, Supervision.

Declarations of Competing Interest

Authors have no competing interest to declare.

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