

# Despite the Covid-19 Pandemic, People With Chronic Neurological Disease (Multiple Sclerosis) are Trying to Maintain Physical Activity

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## **ABSTRACT**

Multiple sclerosis (MS) is a chronic autoimmune neurodegenerative disease. This disease can manifest itself in many different neurological symptoms such as (gait and balance impairment, sensory deficits, muscle weakness, spasticity, bladder impairment, fatigue, cognitive impairment etc.). For successful disease management not only pharmacological treatment is important, but also a healthy lifestyle including regular physical activity. However, pandemic restrictions limited access to sport facilities and together with home-office regimen, increased the sedentary behaviour in all population. The pandemic level of physical activity in people with MS in the Czech Republic remains unclear. Therefore, using an online cross-sectional survey we aimed to evaluate physical activity (PA) level in people with MS during Covid-19 pandemic. Two hundred ninety-seven persons with MS filled out online survey, 83 % women, with a mean age 43.7 years (SD 11.3). Most respondents had mild to moderate disability (74 %). During pandemic year 2020, 23 % persons with MS ceased their PA, 18 % reduced their PA, 25 % continued their PA as before, 11 % increased their PA, and 20 % did not perform any PA in the past and did not do so during the pandemic. Aerobic activity was the main type of performed PA, followed by health exercise and yoga. Total of 37 % people reported that their fitness level had decreased during the pandemic.

**Keywords:** Covid-19, physical activity, exercise, multiple sclerosis

## INTRODUCTION

Multiple sclerosis (MS) is a chronic autoimmune neurodegenerative disease affecting especially young adults. This disease can manifest itself in many different neurological symptoms (gait and balance impairment, sensory deficits, muscle weakness, spasticity, bladder impairment, fatigue, cognitive impairment etc.). For successful disease management, not only pharmacological treatment is important but also a healthy lifestyle including regular physical activity (Giovannoni et al.2016). Exercise in people with MS is acknowledged as safe symptomatic treatment (Tallner et al.2012). Some exercise experts consider regular training as primary prevention for MS (Dalgas et al.2019, Riemenschneider et al.2018). However, during the year 2020, pandemic restrictions limited access to sport facilities and together with work place restrictions (home-office regimen, lockdown) increased the sedentary behaviour in all population.

The new coronavirus was first described in December 2019 in China and in March 2020 the first case of Covid-19 appeared in the Czech Republic. Pandemic restrictions applied from March to May 2020 and then in autumn during next pandemic wave from October to December 2020 (unfortunately followed by next pandemic waves in 2021) limited physical activity for general population as well as people with chronic diseases (such as MS). Social distancing and the closure of sport venues together with a reduction of rehabilitation services limited opportunities for physical activity (PA). In Czech Republic sport venues were closed during spring months 2020 and from autumn 2020 to spring 2021. Regular physical activity (PA) is an integral part of disease management, but nevertheless the pandemic level of physical activity in people with MS in the Czech Republic remains unclear. Therefore, using an online cross-sectional survey we aimed to evaluate physical activity level in people with multiple sclerosis during Covid-19 pandemic.

## MATERIALS AND METHODS

An online survey questionnaire for people with MS was distributed via e-mail and common local social websites of patient organizations dedicated to MS. The survey was anonymous and depends on the patient will to respond with total number of 16 closed questions. Specifically, participants were asked to report on whether and to what extent the pandemic conditions had altered their physical activity level. Then type, common duration and frequency of PA were reported. Data collection took place for 2 months (during summer 2021). Descriptive information to characterize the population was collected. The questionnaire was the same as Israeli researchers used to evaluate pandemic physical activity in their MS population (Kalron et al.2021).

The Ethical Committee of Sport College Palestra approved the survey (date 3.2.2021, VŠP/0382/2021). Statistical analysis was performed using MS Excel. Data are expressed as absolute scores and percentage distribution.

Total number of two hundred ninety-seven people with MS filled out the online survey with a mean age 43.7 years, 83 % of respondents were women. Most respondents had mild disability (74 %), 22 % walk with support (moderate disability) and 4 % use a wheelchair (severe limitation). For more details about the patient's characteristics see Table 1.

## RESULTS

**Table 1** Demographic characteristics

Parameter N=279	Number (percent)
Mean age	43.7 years (SD 11.3)
Gender - Female	249 (83 %)
<b>Disease duration</b>	
up to 1 year	17 (5.7 %)
1–5 years	61 (20.5 %)
6–10 years	68 (22.8 %)
over 10 years	151 (50.8 %)
<b>Covid disease</b>	
No	203 (68.3 %)
Yes with mild symptoms only	46 (15.5 %)
Yes with moderate symptoms	46 (15.5 %)
Yes with severe symptoms (hospitalization needed)	2 (0.7 %)
After Covid-19, I still feel some difficulties (respiratory, pain, fatigue etc.) – mild only	40 (13.4 %)
After Covid-19, I still feel some difficulties (respiratory, pain, fatigue etc.) – moderate to severe	14 (4.7 %)

During pandemic year, in spring 2020 the 23 % people with MS ceased their PA, 18 % reduced their PA, 25 % continued their PA as before, 11 % increased their PA during the pandemic, and 20 % did not perform any PA in the past and did not so during the pandemic. Very similar situation occurred during autumn 2020 when a new pandemic wave came and restrictions again limited public life (Table 2).

**Table 2** Physical activity behaviour during the pandemic

Physical activity behaviour during spring 2020	Number (percent)
I have not performed any physical activity in the past and did not so during the pandemic	61 (20.5 %)
I stopped performing physical activity during spring 2020, although I had done so before pandemic	69 (23.2 %)
I performed less physical activity	56 (18.8 %)
I continued performing my physical activity	77 (25.9 %)
I performed more physical activity than usual	34 (11.4 %)
Physical activity behaviour during autumn 2020	Number (percent)
I have not performed any physical activity in the past and did not so during the pandemic	55 (18.5 %)
I stopped performing physical activity during autumn 2020, although I had done so before pandemic	66 (22.2 %)
I performed less physical activity	59 (19.8 %)
I continued performing my physical activity	80 (26.9 %)
I continued performing my physical activity	37 (12.4 %)

Subjectively perceived fitness level.	Number (percent)
My fitness level has improved.	35 (11.7 %)
I feel no change in my fitness level.	151 (50.8 %)
My fitness level has decreased.	111 (37.4 %)

As for the patient's self-reported fitness level, 37.3 % reported their fitness level decreased during the pandemic, 50.8 % felt no change, and 11.7 % reported an improvement. The main type of performed PA was aerobic activity (53.5 %), followed by health exercise (35.6 %) and yoga (17.5 %). All results of the survey are presented in Table 3.

**Table 3** Physical activity characteristic

Parameter	Number (percent) All N=297	Mild disability N=220 (74,1 %)	Moderate disability (walking with support) N=64 (21,5 %)	Severe disability (wheelchair user) N=13 (4,4 %)
<b>Main performed physical activity?</b>				
Aerobic physical activity	159 (53.5 %)	133 (60.5 %)	23 (35.9 %)	3 (23 %)
Muscle strength exercise	29 (9.7 %)	22 (10 %)	4 (6.2 %)	3 (23 %)
Combined aerobic and muscle strength	26 (8.7 %)	18 (8,2 %)	5 (7.8 %)	3 (23 %)
Yoga	52 (17.5 %)	41 (18.6 %)	11 (17.2 %)	0 (0 %)
Health exercise	106 (35.6 %)	65 (29.5 %)	33 (51.5 %)	8 (61.5 %)
I do not perform exercise at all	40 (13.4 %)	32 (14.5 %)	7 (10.9 %)	1 (7.7 %)
<b>How long was your typical physical activity session?</b>				
15 min	32 (10.7 %)	19 (8.6 %)	13 (20.3 %)	0 (0 %)
15-45 min	119 (40 %)	83 (37.7 %)	29 (45.3 %)	7 (53.8 %)
More than 45 minutes	71 (23.9 %)	60 (27.3 %)	6 (9.4 %)	5 (38.5 %)
No regular physical activity	74 (24.9 %)	57 (25.9 %)	16 (25 %)	1 (7.7 %)
<b>How many PA sessions were performed on average within a week?</b>				
1	26 (8.7 %)	17 (7.7 %)	7 (10.9 %)	2 (15.4 %)
2-3	99 (33.3 %)	77 (35 %)	19 (29.7 %)	3 (23 %)
4-5	52 (17.5 %)	39 (17.7 %)	9 (14 %)	4 (30,7 %)
daily	31 (10.4 %)	17 (7.7 %)	11 (17.2 %)	3 (23 %)
No regular activity	89 (29.9 %)	70 (23.5 %)	18 (28.1 %)	1 (7.7 %)
<b>Meeting PA guidelines</b>	105 (35.3 %)	81 (36.8 %)	16 (25 %)	9 (69 %)

## DISCUSSION

According to the results of our online survey, 41 % of the Czech people with MS who responded, stopped or reduced their leisure time PA during the Covid-19 pandemic year 2020. However,

regular exercise or physical activity is for people with MS very important for managing their disease. Even without pandemic period, people with MS face many barriers to engaging to physical activity, such as fatigue, physical disability, safety concerns and lack of accessibility (Vanner et al.2008, Learmonth et al.2016). During pandemic time, this was compounded by loss of in person group physical activity, and closure of spaces for physical activities for people with disabilities (Koopmans and Peletier, 2021). The most limited activity of people with MS during pandemic was aerobic training and technology-assisted rehabilitation interventions. On the other hand home exercise or walking has become more popular and widespread (Kahraman et al.2022).

Recent data on the impact of Covid-19 in the general European population show the reduction of physical activity ranged from 7 % to 38 %. Based on step counts from Fitbit devices, the reduction of PA in the Czech Republic during spring 2020 was 20 % (Staff, 2020). So the reduction of PA in the present cohort of Czech people with MS was more pronounced than in healthy peers. This finding might be influenced by fear from Covid-19 and increased anxiety and depression among people with MS during pandemic time (Stojanov et al.2020, Alnajashi and Jabbad 2020).

Our findings show that majority of our responders (75 %) reported performing regular physical activity. Although only 35.3 % participants meet the recommended amount of physical activity for people with MS, which is  $\geq 150$  min weekly (Kalb et al.2020). This finding is very positive considering the challenging pandemic situation.

Comparing our results with an Israeli study using the same questionnaire, the percentage of people with MS who stopped or reduced their PA was lower than in Israel (41 % vs. 50 %). The percentage of people who continued their PA as before was similar (25 % vs. 20 %). Fewer people in our sample increased PA during the pandemic (11 % vs. 18 %). This could be related to the longer disease duration in our sample. In the Israeli sample, 48.3 % of people have disease duration shorter than 5 years, whereas in our sample only 26 %. More than fifty percent have a disease duration longer than 10 years, so our sample of MS population is more representative. In both samples aerobic activities were the most common (53.5 % vs. 72.1%). These activities, including indoor (home exercise on aerobic exercises machines such as stationary bicycle, elliptical etc.) or outdoor activities like walking, cycling or jogging, could be performed even when there were restrictions on gyms and fitness centres. And pools and some other sport facilities were closed, and it was recommended to keep social distance. Health exercises were also popular in our sample (35.6 %), followed by yoga exercise (17.5 %) and muscle strength training (9.7 %). These physical activities could be more easily performed even in more disabled persons with MS. A positive finding from our study is the fact that in challenging time of the Covid-19 pandemic, even more disabled people using walking aid and wheelchair users, a significant proportion of participants did not stop their physical activity and were still active (50.6 % continued in some type of PA). A European multicentre study looking at participation in physical activity among people with MS also describes a decline in exercise participation (from an initial 83 % pre-pandemic to 75 % during the pandemic). Overall, the intensity of PA has also decreased. The most common activity performed by all European patients was walking (Moumdjian et al.2022).). In another international study looking at the impact of the pandemic on 131 patients with progressive MS, 71% engaged in some form of physical activity, with aerobic activities predominating (Chiaravalloti et al.2020). These findings are similar to those

in our sample of Czech patients, where aerobic activities, including walking, were also the most frequently performed.

A limitation of our study is that in the subgroup of severely disabled people with MS, only physically active persons completed our survey. Unfortunately, we know from clinical practice that this group of people often do not engage in exercise activities. However, the other groups seem to be more evenly represented by active and less active persons.

## CONCLUSION

Our results show that despite the pandemic restrictions, one-third of people with MS who responded to the survey maintained regular physical activity (mainly aerobic activities).

On the other hand, 40 % of people with MS ceased or decreased their leisure-time physical activity. Even in the COVID-19 pandemic, people with chronic neurological disease (multiple sclerosis) are trying to maintain physical activity. Therefore, it seems appropriate to offer them suitable telerehabilitation and motivational programs to help maintain compliance with regular physical activity.

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