

# Impact of the COVID-19 pandemic on physical activity, anxiety, and depression in patients with Parkinson's disease

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The coronavirus disease 2019 pandemic has yielded containment measures with detrimental effects on the physical and mental health of the general population. The impacts of lockdown on clinical features in Parkinson's disease are not well known. We aimed to compare the physical activity, anxiety–depression levels between Parkinson's disease patients and controls during lockdown. Forty-five Parkinson's disease patients and 43 controls were evaluated with the Physical Activity Scale for the Elderly (PASE) and Hospital Anxiety and Depression Scale (HADS) via telephone interview. The patients' disease-related symptoms were worsened during lockdown though regular Parkinson's disease medication use. The PASE scores were low in both groups. The HADS scores of groups were below the cutoff point of

anxiety–depression presence. Pandemic restrictions could lead to worsening of the motor and nonmotor symptoms in Parkinson's disease. *International Journal of Rehabilitation Research* 44: 173–176 Copyright © 2021 Wolters Kluwer Health, Inc. All rights reserved.

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## Introduction

The coronavirus disease 2019 (COVID-19) is ongoing to spread around the world. The first COVID-19 case in Turkey was declared on 11 March 2020. To protect all citizens against the spread of the infection, the government of Turkey has implemented precautions involving closure of schools and universities, public rest and entertainment venues (restaurant/cafe, shopping malls, sports centers, etc.), interprovincial travel restrictions. It has been instructed that all subjects keep in self-isolation and stay at home. The Turkish Ministry of Interior was announced that all individuals aged 65 years and older were restricted from leaving their homes, traveling by public transport, walking around in parks and outdoors since 21 March 2020. The exact hours of curfew were 24h/day. People living in their houses with gardens were only allowed to walk/work on their own gardens. These prohibitions were ended on 1 June 2020. No restrictions were imposed for individuals under the age of 65 years (The Turkish Ministry of Health, June 2020).

The COVID-19 pandemic has yielded a health emergency causing unprecedented lifestyle changes due to infection rates and lockdown measures throughout the world [1]. The isolation precautions may pose risks to the physical activity levels (PALs) of individuals, while coping with stress during pandemic may worsen the mental

health of people. We, therefore, aimed to examine the PALs, anxiety–depression severities of Parkinson's disease patients and healthy individuals under lockdown conditions.

## Methods

The study was approved by The Turkish Ministry of Health, and the Ethics Committee of Dokuz Eylul University (Protocol number: 5490-GOA; approval number: 2020/13-33). All procedures were performed in accordance with the Declaration of Helsinki principles.

The study included patients with Parkinson's disease and healthy individuals. Both Parkinson's disease patients and age and sex-matched healthy subjects were the participants of a previous study that we had conducted to assess the association of PALs with postural instability in Parkinson's disease patients comparing to healthy subjects [2]. The inclusion criteria for Parkinson's disease participants were determined as a clinical diagnosis of idiopathic Parkinson's disease according to the United Kingdom Parkinson's Disease Society Brain Bank [3], ability to ambulate without assistance/walking aid, and regular Parkinson's disease medication use. The exclusion criteria were the brain surgery history, presence of other neurological, musculoskeletal and cardiovascular diseases that negatively influence the PALs. The healthy subjects had no

**Table 1** Participants' characteristics

	Parkinson's disease group (n=45)	Healthy control group (n=43)	P
Age (years)	67.00 (60.00–73.50)	66.00 (58.00–71.00)	0.435 <sup>a</sup>
Gender, female/male, n (%)	15/30 (33.3/66.7)	19/24 (44.2/55.8)	0.382 <sup>b</sup>
Parkinson's disease duration (years)	8.00 (5.00–10.00)	N/A	N/A
The COVID-19 related questions, n (%)			
Living situation during lockdown			
Alone	6 (13.3)	6 (14.0)	0.902 <sup>c</sup>
With partner	22 (48.9)	24 (55.8)	
With family	14 (31.1)	11 (25.6)	
Other	3 (6.7)	2 (4.7)	
Housing situation during lockdown			
House	14 (31.1)	6 (14.0)	0.075 <sup>b</sup>
Flat/apartment	31 (68.9)	37 (86.0)	
Residential status during lockdown			
City center	29 (64.4)	36 (83.7)	0.111 <sup>c</sup>
Outskirts	13 (28.9)	5 (11.6)	
Rural	3 (6.7)	2 (4.7)	
Occupational status during lockdown			
Retired/not working	34 (75.6)	29 (67.4)	0.107 <sup>c</sup>
Housewife	9 (20.0)	6 (14.0)	
Working	2 (4.4)	8 (18.6)	
Regular exercise habit during lockdown			
No difference, I did regular exercise as prepandemic	6 (13.3)	4 (9.3)	0.353 <sup>c</sup>
I have no exercise habits	27 (60.0)	21 (48.8)	
I did less exercise than prepandemic	12 (26.7)	16 (37.2)	
I did more exercise than prepandemic	0	2 (4.7)	
How was your physical activity level affected during the COVID-19 lockdown?			
No difference	14 (31.1)	12 (27.9)	0.292 <sup>c</sup>
Decreased	31 (68.9)	28 (65.1)	
Increased	0	3 (7.0)	
How was the lockdown changed/affected your Parkinson's disease/health*?			
Negatively affected	31 (68.9)	29 (67.4)	1.000 <sup>b</sup>
No difference	14 (31.1)	14 (32.6)	

Continuous variables were presented as median (interquartile range).

N/A, not applicable.

<sup>a</sup>Statistical significance was determined by Mann–Whitney *U* test.

<sup>b</sup>Statistical significance was determined by Chi-square test.

<sup>c</sup>Statistical significance was determined by Fisher's Exact test.

\*While Parkinson's disease patients were asked to consider the disease specific changes, healthy subjects were asked to address the change in general health status.

neurological, musculoskeletal, and cardiovascular diseases that negatively influence their PALs.

A phone interview based on questionnaires about physical activity (PASE) and anxiety-depression (HADS) levels was done. Data were collected by two physiotherapists (S.B. and M.T.), 2 years and 1 year experienced in neurorehabilitation respectively. Before data collection, two investigators were trained in how to gather interview questions by focus group meeting. The participants were asked to reply all questions considering the time between 11 March (the declaration of the first COVID-19 case) and 1 June (the end of lockdown restrictions in Turkey) on 15–20 June 2020.

The Physical Activity Scale for the Elderly (PASE) evaluates the leisure-time, household, and work-related

activities during the previous 7 days [4]. Higher scores indicate greater physical activity. It is a valid and reliable questionnaire for elderly in Turkish population [5].

The Hospital Anxiety and Depression Scale (HADS) is a questionnaire screening anxiety–depression state among general outpatient clinic [6]. It comprises two subscales: anxiety (HADS-A) and depression (HADS-D). Higher scores indicate greater anxiety/depression severity [6,7]. For both subscales, the cutoff point to detect anxiety/depression is seven points [8]. It is a valid and reliable tool in Turkish [7].

All analyses were performed by using the IBM SPSS software. The Mann–Whitney *U* test was used to compare the medians of PASE and HADS between the groups. The significance level was set at  $P < 0.05$ .

## Results

In total, 114 people (56 Parkinson's disease patients and 58 healthy subjects) were enrolled in the previous study [2]. Twenty-six subjects were excluded from the current study due to unwillingness to participate (for healthy subjects  $n = 2$ ), irregular Parkinson's disease medication use ( $n = 4$ ), unable to reach via phone calls (for Parkinson's disease patients  $n = 7$ , for healthy subjects  $n = 13$ ). Finally, 45 Parkinson's disease patients and 43 controls were included with a response rate of 77.19%.

Characteristic features of participants are presented in Table 1. Curfew for over 65 years was valid in 27 (60.0%) patients and 23 (53.5%) controls. None of the participants were diagnosed with the COVID-19.

The worsening of motor and nonmotor symptoms during lockdown was reported by 31 (68.9%) patients. Twenty-two of 31 patients were 65 years and older, whereas 9 patients were younger than 65 years. The symptom that most frequently worsened was bradykinesia for patients  $\geq 65$  years and  $< 65$  years of age (Table 2). Also, two patients in group  $\geq 65$  years suffered from increased fatigue.

The PALs of patients and controls were low without a significant difference ( $P > 0.05$ ). No participants had anxiety–depression (Table 3).

## Discussion

Our findings showed that the PALs were reduced in both groups, and anxiety–depression levels of groups were similar. In lockdown, Parkinson's disease patients are in a serious threat due to physical inactivity [9]. According to our findings, the same danger of inactivity was valid for all people related to advancing age. However, two observations reported that Parkinson's disease patients had worse anxiety and physical activity than controls during COVID-19 pandemic [9,10]. Mandatory lockdown in Turkey for all people aged 65 years and older may inhibit physical-habitual activities.

**Table 2** The outcome of Parkinson's disease-related symptoms during lockdown, *n* (%)

	Parkinson's disease group ( <i>n</i> =45)				<i>P</i>
	≥ 65 years ( <i>n</i> =27)		<65 years ( <i>n</i> =18)		
	Worsening	No difference	Worsening	No difference	
Tremor (tremor of the extremity)	7 (25.9)	20 (74.1)	4 (22.2)	14 (77.8)	1.000 <sup>a</sup>
Dyskinesia	4 (14.8)	23 (85.2)	3 (16.7)	15 (83.3)	1.000 <sup>a</sup>
Bradykinesia (slowness of movements like turning in bed, rising of chair)	15 (55.6)	12 (44.4)	7 (38.9)	11 (61.1)	0.273 <sup>b</sup>
Rigidity*	13 (48.1)	14 (51.9)	5 (27.8)	13 (72.2)	0.172 <sup>b</sup>
Gait impairments (height of foot lift, stride length/speed, arm swing)	12 (44.4)	15 (55.6)	6 (33.3)	12 (66.7)	0.456 <sup>b</sup>
Freezing of gait	6 (22.2)	21 (77.8)	1 (5.6)	17 (94.4)	0.215 <sup>a</sup>
Balance problem	10 (37.0)	17 (63.0)	5 (27.8)	13 (72.2)	0.519 <sup>b</sup>
Cognitive impairment (paying attention, following conversations)	6 (22.2)	21 (77.8)	1 (5.6)	17 (94.4)	0.215 <sup>a</sup>
Sleep problems	7 (25.9)	20 (74.1)	2 (11.1)	16 (88.9)	0.279 <sup>a</sup>
Daytime sleepiness	6 (22.2)	21 (77.8)	1 (5.6)	17 (94.4)	0.215 <sup>a</sup>
Pain and other sensations (like aches, cramps and tingling)	10 (37.0)	17 (63.0)	5 (27.8)	13 (72.2)	0.519 <sup>b</sup>

\*Stiffness complaint in the extremities was accepted as 'rigidity'.<sup>a</sup>Statistical significance was determined by Fisher's Exact test.<sup>b</sup>Statistical significance was determined by Chi-square test.

**Table 3** The physical activity, anxiety–depression levels of groups during lockdown

	Parkinson's disease group ( <i>n</i> =45)	Healthy control group ( <i>n</i> =43)	<i>Z</i>	<i>P</i> <sup>a</sup>
<b>PASE</b>				
Leisure-time activities	23.50 (7.63–34.85)	27.09 (7.81–52.89)	−0.543	0.587
Household activities	60.00 (25.00–103.00)	60.00 (50.00–105.00)	−0.138	0.890
Work-related activities	0.00 (0.00–0.00)	0.00 (0.00–0.00)	−0.597	0.550
Total	87.09 (57.63–130.95)	92.78 (53.30–150.36)	−0.497	0.619
<b>HADS</b>				
Anxiety	4.00 (2.00–7.00)	5.00 (1.00–8.00)	−0.029	0.977
Depression	5.00 (2.50–7.00)	4.00 (1.00–8.00)	−0.637	0.524

Variables were presented as median (interquartile range).HADS, Hospital Anxiety and Depression Scale; PASE, Physical Activity Scale for the Elderly.<sup>a</sup>Statistical significance was determined using Mann–Whitney *U* test.

Moreover, COVID-19 pandemic induced the exacerbation of disease-specific symptoms in Parkinson's disease [11]. It has been stated that worsened symptoms were slowness, stiffness/rigidity, tremor, gait, freezing of gait, speech, easy fatigability, pain, sleep disorders, concentration, feeling stressed, anxiety–depression, constipation, and forgetfulness during the outbreak [12–16]. We found that Parkinson's disease-related symptoms of patients were aggravated though regular Parkinson's disease medication use. It may due to the stress resulting from pandemic [13], restriction of outdoor activities, social distancing [17], and staying away from other family members. It has become necessary to adapt exercise programs under home confinement conditions [11,12].

Because PA has a positive effect on physical and mental health [18], the general well-being is under great risk in lockdown conditions [19]. Anxiety–depression levels were similar in our groups. But these values were not ≥7 points to prove the presence of anxiety–depression. These findings may be related to the perception of health, the severity of disease, sociodemographical characteristics, environmental conditions (urban/rural lifestyle), and pre-pandemic social lifestyle.

This study has some limitations. The Parkinson's disease-related symptoms were not evaluated by the Unified Parkinson's Disease Rating Scale, Hoehn and

Yahr staging scale via phone interview. The feasibility of online and phone interviews of these instruments is controversial yet [20]. The information about physical activity and anxiety–depression levels was obtained with self-reported questionnaires via phone interview, which might increase the risk of bias and insufficient recall. Another limitation included our study method as a phone interview which was conducted by two investigators; however, they were well-trained for standardized data collection against bias risk.

### Conclusion

Lockdown could lead to worsening of the motor and non-motor symptoms in Parkinson's disease related to physical inactivity.

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B.B. and B.A. are the first joint authorship.

### Conflicts of interests

There are no conflicts of interest.

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