



SCIENTIFIC LETTER

Effects of Nordic walking on endurance, fatigue, and quality of life in people with post-COVID syndrome. A case series study[☆]



Efectos de la marcha nórdica sobre la resistencia, la fatiga y la calidad de vida en personas con síndrome post-COVID. Estudio de una serie de casos

Roberto Cano-de-la-Cuerda^{a,b}, Carmen Jiménez-Antona^{a,*},
Víctor Navarro-López^{a,b,*}, Sofía Laguarda-Val^a

^a Department of Physical Therapy, Occupational Therapy, Rehabilitation and Physical Medicine, Faculty of Health Sciences, Universidad Rey Juan Carlos (URJC), Alcorcón, Madrid, Spain

^b Movement Analysis, Biomechanics, Ergonomics and Motor Control Laboratory (LAMBECOM), Faculty of Health Sciences, Universidad Rey Juan Carlos (URJC), Alcorcón, Madrid, Spain

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Nordic walking is a form of aerobic physical activity, which can be performed individually or in a group. This exercise involves the whole body through a program of physical activity, presenting beneficial effects in terms of improving quality of life and development of motor skills in various pathological conditions.¹ This type of exercise responds to the rehabilitation needs of people with disabilities associated with post-COVID-19 syndrome, such as reduced cardiorespiratory capacity, fatigue, or musculoskeletal disorders.²

The aim of this study was to evaluate the effects of a Nordic walking protocol in terms of aerobic capacity and endurance, fatigue, and quality of life in people with post-

COVID-19 syndrome. For this purpose, a case series study was conducted in sixteen participants with post-COVID-19 syndrome, with a diagnosis of post-COVID-19 syndrome according to international guidelines³ by a medical doctor. The characteristics of the patients are shown in Table 1. All the participants performed twelve 90-min Nordic walking sessions, 1 time per week, for 12 weeks. The sessions were performed outdoors in a natural setting from February to May 2023.

Participants were evaluated before and after completing the protocol. Outcome measures were the 6-minute walking test (6MWT) (assessed using the RUNZI® free mobile application), the Modified Fatigue Impact Scale (MFIS), the Short Form-36 Health Survey (SF-36), and the EQ-5D-5L.

After the Nordic walking sessions protocol, significant pre-post differences were found in the MFIS scale ($p=0.009$), and in the physical ($p=0.011$) and cognitive ($p=0.031$) subscales of the same scale. Significant differences were observed in the SF36 ($p=0.007$), and in the physical function ($p=0.004$), pain ($p=0.004$), and social

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* Corresponding authors.

E-mail addresses: carmen.jimenez@urjc.es (C. Jiménez-Antona), victor.navarro@urjc.es (V. Navarro-López).

Table 1 Demographic characteristics and main results.

	Min-max	Mean (SD)	95% CI	Median	Percentile 25; 75
Weight (kg)	48.8–132.4	70.2 (20.7)	59.1; 81.1	63.3	57.9; 76.2
Height (m)	1.53–1.74	1.63 (.06)	1.60; 1.66	1.63	1.62; 1.66
BMI (kg/m ²)	18.20–45.28	26.19 (7.07)	22.42; 29.95	25.52	21.38; 27.68
Leg length (cm)	78–93	85 (5)	82; 87	86	80; 88
Time since symptoms (weeks)	11.00–24.00	19.69 (4.94)	17.06; 22.32	22.00	15.00; 24.00
Outcome measure	Mean (SD)		MD (SD)	95%CI	<i>p</i>
	Baseline	Post-treatment			
6MWT	584.81 (88.27)	606 (88.17)	21.19 (48.29)	–46.92; 4.55	.100
MFIS	59.56 (14.49)	48.63 (16.81)	10.94 (14.64)	3.14; 18.74	.009*
MFIS physical	28.63 (5.31)	23.63 (7.7)	5 (6.9)	1.32; 8.62	.011*
MFIS cognitive	25.44 (9.9)	20.5 (10.03)	4.94 (8.29)	.52; 9.36	.031*
	Median (IQR)		Z	<i>p</i>	
	Baseline	Post-treatment			
SF36	37.33 (18.72)	48.06 (22.37)	–2.69	.007*	
SF36 physical function	60 (29)	67.5 (30)	–2.9	.004*	
SF36 physical role	0 (0)	0 (19)	–1.89	.059	
SF36 pain	22.5 (24.4)	45.5 (35)	–2.87	.004*	
SF36 vitality	27.5 (10)	35 (28)	–1.9	.057	
SF36 general health	35 (20)	42.5 (25)	–1.24	.216	
SF36 emotional role	66.67 (100)	83.33 (66.67)	–1.32	.187	
Sf36 mental health	60 (29)	62 (20)	–1.32	.186	
MFIS psychosocial	6 (3)	5 (3)	–1.41	.158	
SF36 social function	27.5 (41.9)	56.25 (46.9)	–2.54	.011*	
EQ5D-5D overall health state	40 (16)	57.5 (38)			
EQ5D-5D mobility	2 (2)	1.5 (1)	–2.45	.014*	
EQ5D-5D self-care	1.5 (1)	1 (1)	–1.63	.102	
EQ5D-5D activities	3 (1)	3 (1)	–.259	.796	
EQ5D-5D pain/discomfort	3 (1)	3 (1)	–2.31	.021*	
EQ5D-5D anxiety/depression	3 (1)	2 (1)	–1.77	.077	

Demographic characteristics, and results of pre–post intervention comparisons for the main outcome measures. Paired sample *t*-test for comparison of means; Wilcoxon test for comparison of medians.

* Statistical significance considered < .005.

6MWT: 6 meters walking test; BMI: body mass index; EQ5D-5D: EuroQol-5 Domains; IQR: interquartile range; MD: mean difference; MFIS: Modified Fatigue Impact Scale; SD: standard deviation; SF36: SF-36 Health Questionnaire.

function ($p=0.011$) domains of the same test. Significant differences were observed in the mobility ($p=0.014$) and pain ($p=0.077$) domains of the EQ5D-5D questionnaire. The results are detailed in Table 1.

Studies on rehabilitation of aerobic capacity and endurance through walking in patients with post-COVID-19 syndrome are scarce. Some have shown significant improvements in the 6-Minute Gait Test (6MWT) in exercise groups compared to control groups.⁴ However, our study found no significant differences in the 6MWT, although it did observe significant differences in fatigue assessed with the MFIS scale. Exercise-based intervention appears to be effective in improving fatigue and physical capacity perception in patients with post-COVID-19 syndrome. Other studies have also evaluated rehabilitation programs focused on fatigue reduction in people with COVID-19, with positive results.⁵ Overall, rehabilitation programs appear to be effective in reducing fatigue in people with post-COVID-19 syndrome. In

terms of quality of life, to our knowledge, this is the first study that has evaluated quality of life following the use of Nordic walking as a treatment modality for patients with post-COVID-19 syndrome, observing that Nordic walking can be effective in this regard, as has been observed in other pathologies.⁶

A 12-week Nordic walking program with post-COVID-19 syndrome patients improved the fatigue assessed by MFIS and the quality of life assessed by SF-36 and EQ5D. However, the total distance performed in meters recorded by a mobile application following the 6MWT instructions improved clinically but not statistically.

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Conflicts of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest to report.

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