

Differences in Work, Active Transportation, Domestic and Garden, and Leisure Domains of Physical Activity by Disability Level in Multiple Sclerosis

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Background

Decreased physical activity (PA) can lead to increased comorbidities, loss of function, and decreased overall quality of life in persons with multiple sclerosis (PwMS).¹⁻³ PA has been shown to be lower in PwMS compared to healthy controls, and inversely related to disability.¹ While there have been guidelines presented on exercise and lifestyle PA for PwMS by disability level,² there is no current literature that demonstrates how PA is different across different domains of life such as work, active transportation, domestic and garden, and leisure domains by disability level. This information would be beneficial to help clinicians determine what domains can be focused on to increase PA in PwMS.

Objectives

- To compare PA levels of the work, active transportation, domestic and garden, and leisure domains between disability levels in PwMS.

Methods

Participants

- A total of 183 PwMS were included in this secondary analysis of a larger study.

Study Design

- One-time research visit in which the following variables were captured:

Demographics and characteristics	Age, gender, race, ethnicity, disease duration, self-reported disability	
PA: International Physical Activity Questionnaire-Long Form (IPAQ-LF)	Domains	Work (MET/min/week)
		Active Transportation (MET/min/week)
		Domestic and Garden (MET/min/week)
		Leisure-time (MET/min/week)
	Totals	Total PA (MET/min/week)
	Total Sitting (min/week)	

- Participants were divided into disability sub-groups:

Disability: Patient Determined Disease Steps (PDDS)	PDDS	Disability Level
	PDDS: 0-1	Mild
	PDDS: 2-3	Moderate
	PDDS: 4-6	Severe Ambulant
	PDDS: 7-8	Severe Non-ambulant

Statistical Analysis

- The Kruskal-Wallis test was used to compare PA between disability subgroups
 - Significance values were adjusted with a Bonferroni correction for multiple comparisons.
- Analyses were performed using SPSS version 26 (SPSS, Chicago, IL).

Results

Table 1. Descriptive Statistics of Physical Activity Domains and overall, between-group differences

PA Measure (MET/min/week)	Mild (0-1)	Moderate (2-3)	Severe Ambulant (4-6)	Severe Non-Ambulant (7-8)	P-value
Work	154.3 (1426.5)	0.0 (1239.8)	0.0 (24.8)	0.0 (0.0)	0.001
Active Transportation	16.5 (383.6)	0.0 (235.1)	0.0 (280.5)	0.0 (0.0)	0.142
Domestic and Garden	0.0 (120.0)	0.0 (65.0)	0.0 (0.0)	0.0 (180.0)	0.024
Leisure-Time	565.0 (1327.5)	346.5 (1039.5)	255.8 (1243.9)	640.0 (2310.0)	0.393
Total PA Score	3506.3 (7227)	2558.8 (5431.6)	1474.5 (3414.0)	1680.0 (2430.0)	0.001
Total Sitting (min/week)	2250.0 (1657.5)	2295.0 (1350.0)	3360.0 (2460.0)	3720.0 (2205.0)	<0.001

Presented as median (IQR)
Mild: n=80; Moderate: n=50; Severe Ambulant: n=48; Severe Non-Ambulant: n=5.
Bolded denotes significance (p<0.05)

Demographic and Characteristic Descriptive Statistics:

- Participants had a median age of 53.0 (21.0-75.0) years old and a disease duration of 12.8 (0.3-44.4) years.
- Of the participants, 77.0% were female, 92.3% were not Hispanic or Latino, 86.9% was White, 12.0% were Black, and 1.0% was "other" race.

Demographic and Characteristic Comparisons:

- No difference was found between disability subgroups for gender, race, or ethnicity ($P > 0.05$).
- An overall difference found for age ($H(3) = 22.109$, $P < 0.001$) and disease duration ($H(3) = 14.910$, $P = 0.002$).

Table 2. Comparisons between disability subgroups for significant Physical Activity Domains

PA Measure (MET/min/week)	Mild v. Severe Ambulant	Mild v. Severe Non-Ambulant	Moderate v. Severe Ambulant	Moderate v. Severe Non-Ambulant
Work	0.001	0.105	0.078	0.296
Active Transportation	-----	-----	-----	-----
Domestic and Garden	0.019	1.000	0.113	1.000
Leisure-Time	-----	-----	-----	-----
Total PA Score	<0.001	1.000	0.040	1.000
Total Sitting (min/week)	<0.001	0.001	<0.001	0.003

Bolded denotes significance (p<0.05)
Comparisons for Mild v. Moderate and Severe Ambulant v. Severe Non-ambulant are not shown due to no significant differences for any of the PA variables.

Discussion

- In each of the disability sub-groups, PA was highest during Leisure-time.
- PA differs the most between mild and severe ambulant disability levels.
 - PwMS have a significantly lower level of Total, Work, and Domestic and Garden PA as disability increases.
 - Suggesting that PwMS with higher disability may not be working any longer or tend to work in non-physically demanding jobs.
 - As disability increases, completing physically demanding domestic chores and gardening decreases, and ultimately PwMS with greater disability may need more help in carrying out those activities of daily living.
- Total sitting time was the only PA measure that was different among the other group comparisons.
- Compared to current recommendations of PA for PwMS, the participants in this study had a median Total PA MET/min/week higher than the recommended PA (450 MET/min/week) for all disability sub-groups.
 - For each sub-group, at least half of them are achieving the recommended amount of PA, even those in the highest disability sub-groups.
 - 450 MET/min/week is based on the current recommendation to complete 150 minutes per week of physical activity (7,500 steps per day)² at a light-intensity MET level such as walking (3.0 MET/min)
- One limitation of this analysis is that the severe non-ambulant group only had five PwMS, which means we may not be able to generalize our findings of the severe non-ambulant group.

Conclusion

The findings of this analysis suggest total sitting time may be the largest difference of PA between all disability levels. Additionally, as disability increases, Total PA and PA during Work and Domestic and Garden activities decrease, while Sitting Time increases. As disability increases, these findings can help clinicians understand which aspects of PA in PwMS are affected the most and can be utilized to help them make recommendations to PwMS to increase PA in those specific domains.

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