Objectively Quantified Physical Activity in Persons with MS

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Introduction

Researchers have demonstrated that persons with multiple sclerosis (MS) are less physically active than controls, despite the evidence of health benefits. There is limited research objectively quantifying the levels of moderate-to-vigorous physical activity (MVPA) and the rates of meeting public health guidelines (i.e., 30 minutes per day) for MVPA in persons with MS compared to controls.

Purpose

This study examined levels of MVPA in a large sample of persons with MS and controls using accelerometry as a valid, objective, and calibrated measure of physical activity. We further compared the rates of meeting public health guidelines for MVPA between persons with MS and controls.

Participants

This sample included 800 persons with MS and 137 controls. The characteristics of the participants are included in Table 1.

Measures

ActiGraph accelerometer (7164 model) worn on a belt around the waist during the waking hours of the day over a 7-day period.

Method

We conducted a secondary analysis on the combined data set from 13 previous investigations of physical activity and its associations with specific outcomes. The same university institutional review board approved all studies. After telephone screening for inclusion and provision of a signed informed consent, all participants received an accelerometer, a log sheet, and instructions for wearing the device. We computed time spent in MVPA using appropriate cut-points for persons with MS and controls through ActiLife software.

Data Analysis

The data were analyzed using SPSS v.18.0. Only participants with two or more valid days of accelerometer data were included in the analysis (Ns=800 and 137 for MS and healthy controls, respectively). The primary analytic model involved a between-subjects analysis of covariance (ANCOVA) on minutes of MVPA per day. The between-subjects factors were based on group (i.e., MS vs. healthy control), sociodemographic and clinical variables. The initial analysis included MS and control samples, whereas the other analyses only included the MS sample. We controlled for wear time as a covariate in all analyses, and further controlled for sociodemographic variables in the analysis of MVPA in MS versus control groups.

Results

After controlling for covariates (i.e., age, sex) and wear time, there was a statistically significant difference in minutes of MVPA per day between MS (18.7) and controls (31.8); see Figure 1. There was a difference between groups in the percent of persons meeting public health guidelines, with 20% and 47% for MS and controls, respectively; see Figure 2.

Within the persons with MS, there was a significant difference in MVPA based on employment, education, clinical course of MS, disease duration, and device type (Figure 1).

Conclusion

This is the first study, to our knowledge, that provides data from an objective physical activity outcome in a large sample indicating that only a small proportion of persons with MS are achieving adequate amounts of daily MVPA to gain health benefits. This underscores the importance of designing and implementing interventions for increasing MVPA in persons with MS, specifically targeting those who are least active.

Figure 2. Percentage of Persons with MS and Controls Meeting Public Health Guidelines

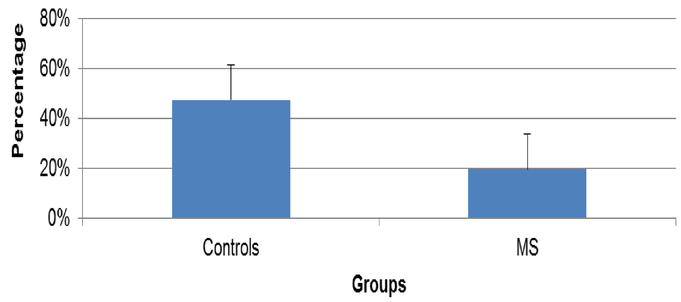

Table 1 Sociodemographic and Clinical Characteristics of Persons with MS and Controls

Variable	MS (N=800)	Controls (N=137)	*p*-value
Age (years)	47.3 (10.1)	43.7 (10.3)	.001
Height (cm)	167.3 (8.5)	166.6 (7.5)	.424
Weight (kg)	76.2 (19.8)	74.4 (16.8)	.367
Sex (% female)	84%	93%	.005
Income (% > 40,000/year)	68%	80%	.003
Education (% college graduate)	58%	80%	.001
Race (% Caucasian)	91%	76%	.001
MS Type (% RRMS)	92%		
Disease duration (years)	10 (7.5)		
PDDS score (mdn, IQR)	2.0, 3		

Note. Values are mean (standard deviation), unless otherwise noted. MS = multiple sclerosis.
RRMS = relapsing-remitting multiple sclerosis.
PDDS = Patient Determined Disease Steps scale

Figure 1. Minutes of MVPA Between Groups as a Function of Sociodemographic and Clinical Characteristics Among Persons with MS