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ORIGINAL ARTICLE

Self-Reported Depression and Physical Activity in Adults With Mobility Impairments

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Abstract

Objective: To test hypothesized associations between depression and physical activity among adults with multiple sclerosis (MS), spinal cord injury (SCI), muscular dystrophy (MD), and postpolio syndrome (PPS).

Design: Cross-sectional survey.

Setting: Survey responses collected from individuals in the Washington state area (participants with SCI) and across the United States (participants with MS, MD, and PPS).

Participants: Convenience sample of participants were surveyed (N=1676; MD, n=321; PPS, n=388; MS, n=556; SCI, n=411).

Interventions: Not applicable.

Main Outcome Measures: The Patient Health Questionnaire-9 (PHQ-9) assessing depressive symptoms and the International Physical Activity Questionnaire (IPAQ) and Godin Leisure Time Exercise Questionnaire (GLTEQ) assessing physical activity.

Results: The average age was 56 years, 64% were women, 92% were white, 86% had a high school degree or higher, and 56% walked with an assistive device or had limited self-mobility. The IPAQ and GLTEQ explained a small but statistically significant and unique amount of the variance in PHQ-9 scores in all diagnostic groups, with no significant differences in the relation by condition, age, or mobility status (IPAQ $R^2=.004$; GLTEQ $R^2=.02$; both $P<.02$).

Conclusions: Both physical activity measures demonstrated a small but statistically significant association with depression in all 4 diagnostic groups. Research is needed to determine longitudinal relations and whether physical activity interventions could promote improved mood in adults with physical disabilities.

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Rates of depression are higher among some physical disability groups compared with the general U.S. population. In the general population, about 17% have a major depressive episode in their lifetime, whereas the lifetime prevalence of major depression may be as high as 50% in people with multiple sclerosis (MS).[1] About 25% to 30% of people with spinal cord injury (SCI) have significant depressive symptoms.[2]

One potentially modifiable risk factor for higher rates of depression among people with physical disabilities may be physical inactivity. Adults with any type of disability are less active than those without a disability.[3] In a large national sample of veterans with MS, 71% were inactive.[4] Among people with SCI, 1 study found that 50% reported no leisure time physical activity.[5] In cross-sectional and longitudinal studies, physical inactivity is associated with greater depression in nondisabled individuals.[6] Increased physical activity is associated with improved mood,[6] and structured aerobic exercise is an effective

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treatment for major depression in adults[7] and older persons.[8] One meta-analysis concluded that people with SCI who are physically active have lower levels of depression and higher levels of well-being.[9] Several studies suggest an inverse relation between physical activity and depression among people with MS.[10-12] The effect of physical activity on depression may be mediated by anti-inflammatory, dopaminergic, or neuroendocrine changes that have mood enhancing, anxiolytic, and stress buffering effects.[13]

Some cross-disability research suggests that the benefits of physical activity on depression and quality of life may be generalizable to people with other disabling conditions.[14,15] Yet, a scoping review of health promotion studies identified only 5 studies on the effects of physical activity on secondary outcomes (including mental health outcomes), indicating a dearth of research on this topic.[16] We are particularly interested in the relation between physical activity and depression among people with muscular dystrophy (MD) or postpolio syndrome (PPS). Our review of the literature did not uncover any studies that examined the association between physical activity and depression in these disability groups.

In summary, preliminary research indicates that physical inactivity may contribute to higher rates of depression among people with physical disabilities, such as SCI and MS. However, there is a lack of research examining the association between physical inactivity and depression among adults with other types of physical disabilities that result in mobility impairment, such as MD and PPS. To help address this knowledge gap, this study examined whether physical activity is related to depression among adults with MS, PPS, MD, and SCI. Based on previous research, we hypothesized that physical activity and depression would be inversely related and that physical activity would explain a significant unique amount of variance in depression scores. We also aimed to explore whether there were differences in the physical activity-depression relation as a function of diagnosis, age, or mobility status.

Methods

Participants

The study participants were recruited for an ongoing longitudinal survey of secondary health conditions in persons aging with a disability. In order to participate in the survey, the participants needed to be: (1) at least 18 years old; (2) able to read, write, and understand English; and (3) have a diagnosis of MS, SCI, MD, or PPS. The University of Washington Institutional Review Board reviewed and approved all study procedures (approval no. 35664).

Procedures

A number of sources were used to recruit the participants for the current study. Primary among these were: (1) disability-specific registries at the University of Washington and several other organizations (eg, Northwest Regional Spinal Cord Model Systems and the University of Rochester Neuromuscular Disease Research Registry); (2) web and print advertisements posted in clinics and with disability support organizations (eg, National MS Society, Post-Polio Health International, Muscular Dystrophy Foundation); and (3) friends or family members.

Surveys were mailed to eligible and interested individuals, along with a postage paid, preaddressed return envelope. Reminder letters were sent 3 to 6 weeks after the initial invitation to those who had not yet returned their survey. Research assistants reviewed each survey and made up to 3 follow-up calls to retrieve any missing or unclear responses. All participants who returned a completed survey were mailed a check for $25. Ninety-one percent of eligible participants completed a survey. A total of 1676 participants were included in the final dataset (MD, n=321; PPS, n=388; MS, n=556; SCI, n=411). Of these, 1642 (98%) completed the International Physical Activity Questionnaire (IPAQ) and 1651 (99%) completed the Godin Leisure Time Exercise Questionnaire (GLTEQ) and were included in the present study.

List of abbreviations:

BMI	body mass index
GLTEQ	Godin Leisure Time Exercise Questionnaire
IPAQ	International Physical Activity Questionnaire
MD	muscular dystrophy
MET	metabolic equivalent
MS	multiple sclerosis
PHQ-9	Patient Health Questionnaire-9
PPS	postpolio syndrome
SCI	spinal cord injury

Measures

Depression

The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms. The measure asks people to report how often in the past 2 weeks they have been bothered by 9 symptoms, which correspond to Diagnostic and Statistical Manual of Mental Disorders major depressive disorder criteria.[17] Response options range from 0 (not at all) to 3 (nearly every day). Responses are summed with total scores corresponding to minimal (1−4), mild (5−9), moderate (10−14), moderately severe (15−19), or severe (20−27) depression.[17] The PHQ-9 has been validated for assessment of depression in people with various disabilities,[18,19] including SCI,[20] and has been used to measure depression in people with MS.[21,22] A cutoff of ≥10 on the PHQ-9 has been shown to have high sensitivity (80%) and specificity (92%) for diagnosis of major depression among adults in various studies that have been examined in a meta-analysis.[23]

Physical activity

We measured physical activity with the short form of the IPAQ[24] and the GLTEQ. The IPAQ assesses minutes and hours per day spent engaging in moderate, vigorous, and walking activities. The descriptions of these activities were modified to be inclusive of activities performed by people using a wheelchair or assistive device (eg, vigorous activities including wheelchair racing and arm cranking; moderate activities and walking activities including walking or wheeling). Data were processed according to guidelines (available at: http://www.ipaq.ki.se/ipaq.htm). High physical activity was defined as engaging in vigorous-intensity activity 3 days per week, accumulating at least 1500 metabolic equivalent (MET)-minutes per week, or engaging in moderate-intensity activity or walking up to 7 days a week, which accumulated at least 3000 MET-minutes per week. Moderate physical activity was defined as doing at least ≥3 days of vigorous activity for 20 minutes per day or 5 days per week of moderate intensity or walking activity for 30 minutes per day or any combination of walking, moderate-intensity, or vigorous-intensity activity, accumulating at least 600 MET-minutes per week. For the total score, we derived total MET-minutes per week by adding the MET-minutes spent in moderate,