Physical Activity, Self-Efficacy, and Health-Related Quality of Life in Persons with Multiple Sclerosis: Analysis of Change Over One Year

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Introduction

Multiple sclerosis (MS) is a chronic disease of the central nervous system (CNS) that results in worse health-related quality of life (HRQOL) compared to both non-disabled controls and persons living with other chronic diseases. Accordingly, researchers and clinicians have become interested in improving the HRQOL of persons with MS, and this might be accomplished by understanding modifiable factors associated with this patient-centered outcome. Such modifiable factors would become the direct targets of a well-designed intervention program for improving HRQOL in MS.

Physical activity and self-efficacy represent behavioral and psychological factors, respectively, that are compromised in persons with MS, but that might be modifiable through intervention and result in better HRQOL. Physical activity and self-efficacy have been associated with better HRQOL in MS, and the association between physical activity and HRQOL has been mediated by self-efficacy for effectively coping with the challenges of MS.

Importantly, one of the major limitations of previous research on modifiable factors associated with HRQOL in persons with MS has been the reliance upon a cross-sectional research design. Such a research design only allows for inferences, but not direct examination, regarding the functional dynamics of the association between individual changes in variables over time. There is need for evidence from studies using a longitudinal design that shows the association between individual level changes in physical activity, self-efficacy, and HRQOL; this is a prerequisite before investing considerable time, effort, and resources into testing interventions in persons with MS.

Method

Sample

The present study involved an analysis of data from a larger, longitudinal investigation of symptoms and physical activity in persons with relapsing-remitting MS (RRMS). Briefly, the sample was recruited through a research advertisement that was posted on the website of the National Multiple Sclerosis Society (NMSS) and distributed by 12 chapters of the NMSS. The inclusion criteria were: (a) diagnosis of relapsing-remitting MS that was confirmed in writing by the patient's neurologist; (b) relapse free in the last 30 days; and (c) ambulatory with minimal assistance (i.e., walk independently or walk with a cane). Overall, there were 269 persons with MS who provided baseline data and 254 of them provided follow-up data 12-months later (94% of total sample); this 5% attrition involved change in residential addresses.

Measures

Physical Activity: The Godin Leisure-Time Exercise Questionnaire (GLTEQ) is a self-administered measure of usual physical activity behavior with no specified time component. The GLTEQ has three open-ended items that measure the frequency of strenuous activity (e.g., jogging), moderate (e.g., fast walking), and mild (e.g., easy walking) physical activity for periods of more than 15 minutes during one's free time in a typical week. The weekly frequencies of strenuous, moderate, and mild physical activities are multiplied by 9, 5, and 3 metabolic equivalents, respectively, and summed into an overall measure of total leisure activity. The overall scores range from 0 and 110 with higher scores reflecting more self-reported physical activity.

Self-efficacy: The Multiple Sclerosis Self-Efficacy (MSSE) scale is an 18-item, disease-specific measure of self-efficacy for functioning with MS (i.e., confidence for functional abilities; 9 items) and controlling MS (i.e., confidence for managing symptoms and coping with demands of illness; 9 items). The scores range between 0 and 100 with higher MSSE scores representing higher self-efficacy for functioning with MS and controlling MS.

HRQOL: Multiple Sclerosis Impact Scale-29 (MSIS-29) is a 29-item, disease-specific measure of the physical (20 items) and psychological (9 items) impact of MS from the patient’s perspective. The scores can range between 0 and 100 and were recorded such that higher MSIS-29 scores represent higher HRQOL.

Method (cont.)

Procedure

The study materials included a battery of questionnaires that were sent to all participants through the U.S. postal service, along with a pre-stamped and pre-addressed envelope for the return of materials through the postal service. Upon return, we checked the questionnaires for missing data and called participants up to 3 times to collect those data. The same packet and procedures were completed at baseline and 12-months later at follow-up, and participants received $40 remuneration that was prorated for each assessment period.

Data analysis

Panel analysis was undertaken using the robust maximum likelihood (MLR) estimator in Mplus 3.0. The first panel model predicted an indicator of the cross-sectional and prospective associations between individual levels and changes, respectively, in physical activity and HRQOL. The second panel model provided an indicator of individual levels changes in self-efficacy variables as a pathway in the association between individual levels changes in physical activity and HRQOL over time.

Results

The results of the panel analyses are presented in Figure 1 (SRMR = .03, CFI = .99) and Figure 2 (SRMR = .05, CFI = .98) and both models provided acceptable fit for the data.

Conclusion

Physical activity and self-efficacy might both be important targets of subsequent behavioral and self-management interventions for improving the HRQOL of persons with MS, although self-efficacy is seemingly more important than physical activity.

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