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MeSH TERMS
- activities of daily living
- health promotion
- multiple sclerosis
- occupational therapy
- patient care team
- treatment outcome

This article is the first part of a systematic review of studies on occupational therapy–related intervention for people with multiple sclerosis (MS). The objective of this systematic review was to critically appraise and synthesize the applicable findings to address the following focused question: What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice for people with multiple sclerosis? This article focuses on occupational therapy interventions aimed at activity and participation, including programs (e.g., inpatient and outpatient rehabilitation) in which an occupational therapy practitioner was one member of the team. Part 2 (Yu & Mathiowetz, 2014) focuses on interventions within the scope of occupational therapy to remediate impairment (e.g., exercise, cognition, emotional regulation).

Multiple sclerosis (MS) is a progressive disease of the central nervous system (CNS) that profoundly affects engagement in occupations. About 135 in 10,000 U.S. residents have MS, and about 200 people are diagnosed every week (Multiple Sclerosis International Federation, 2011). Worldwide, MS is estimated to affect 2.5 million people, most diagnosed between ages 20 and 50 yr (Keller & Stone, 2009). People with MS often experience symptoms of demyelination of the CNS, such as muscle stiffness, paralysis of involved extremities, fatigue, cognitive impairment, and psychological problems (Keller & Stone, 2009). These changes affect their occupational performance and social participation and necessitate medical and rehabilitative interventions.

Occupational therapy aims to optimize a person’s engagement in occupations required for various life roles. Interventions for people with MS are directed at impairments, such as cognitive retraining, endurance and strength exercise, and motor training, and at activity and participation, considering the balance among personal, occupational, and environmental factors, such as energy conservation programs (Keller & Stone, 2009). However, Steultjens, Dekker, Bouter, Leemrijse, and van den Ende (2005) suggested that insufficient evidence supports occupational therapy interventions for this population. Occupational therapy practitioners and researchers need to be informed about updated evidence to improve the quality of their clinical practice and research.

Method

Articles included in this review were the result of searches for articles published from January 2003 to May 2011. Detailed information about the methodology and a complete list of databases and search terms can be found in the article “Method for the Systematic Reviews on Occupational Therapy and
Neurodegenerative Diseases” in this issue (Arbesman, Lieberman, & Berlanstein, 2014). In addition to evaluating each article using the critically appraised paper format, we used the evaluation guidelines described in MacDermid (2004) to provide quantitative ratings of the quality of each included study. The first author rated the first 10 articles, and the second author checked for agreement. Any disagreements were resolved through discussion. Then the first author completed all of the reviews, and the second author randomly selected articles to check. The few disagreements were resolved again through discussion.

A study scoring ³80% of the total score (38 of 48) was considered to be of high quality. A study scoring 24–37 was considered to be of medium quality. Systematic reviews and meta-analyses were assigned a score of 48 because they represent the highest level of evidence. Within each intervention category, we calculated an average score to indicate the pooled strength of an intervention. Strong evidence of an intervention category was defined as an average score ³38; moderate evidence was defined as an average score of 24–37.

Results

Initial screening yielded a total of 3,484 titles and abstracts. Of these, 70 studies relevant to the focused question were included. Study information was abstracted into an evidence table and summarized and appraised using the critically appraised topic worksheet. Interventions in included articles were categorized as focusing on (1) activity and participation and (2) impairments. This article reports findings related to activity- and participation-based studies; Part 2 reports findings related to impairment-based studies (Yu & Mathiowetz, 2014).

Of the 70 studies relevant to the focused question on occupational therapy–related interventions for people with MS, 28 reported interventions aimed at activity and participation. We further classified these interventions as follows:

- Rehabilitation programs, including outpatient rehabilitation programs (2 Level I and 1 Level II), inpatient rehabilitation programs (2 Level I and 3 Level III), home-based programs (2 Level I and 1 Level III), rehabilitation programs in a variety of settings (2 Level I), vocational rehabilitation programs (1 Level I), and functional mobility programs (2 Level I and 1 Level II)
- Fatigue management courses, including face-to-face format (3 Level I and 1 Level II) and long-distance format (2 Level I and 2 Level III)
- Health promotion programs (3 Level I)

Summaries of studies’ objectives; level, design, and participant characteristics; intervention and outcome measures; results; and limitations from some of the articles with higher ratings are in Supplemental Table 1 (available online at http://ajot.aotapress.net; navigate to this article, and click on “Supplemental Materials”). One Level III study that examined the effectiveness of an occupational therapy intervention is also included in this table. However, 2 articles were not referenced in this article because 1 article did not examine the therapeutic effect and the other included few MS participants in a mixed-diagnosis sample.

Rehabilitation Programs

Research on multidisciplinary rehabilitation has shown short-term effects on activity and participation outcomes, particularly individualized and goal-directed programs (Khan, Pallant, Brand, & Kilpatrick, 2008; Khan, Turner-Stokes, Ng, & Kilpatrick, 2008). In inpatient and outpatient settings, multidisciplinary rehabilitation programs were shown to be beneficial in improving functional status (Grasso, Troisi, Rizzi, Morelli, & Paolucci, 2005; Khan, Pallant, et al., 2008), motor function (Craig, Young, Ennis, Baker, & Boggild, 2003), self-perceived quality of life, MS-related disability, mobility and transfers, arm and hand dexterity, balance, and walking speed (Patti et al., 2002, 2003; Vikman, Fielding, Lindmark, & Fredrikson, 2008).

Outpatient Rehabilitation Programs. Moderate evidence from medium-quality studies supports the immediate effect of interventions for people with MS in outpatient settings (average quality rating = 34.5, pooled sample size = 233). For example, Patti and colleagues (2002) found that people with MS benefited from an individualized and multidisciplinary outpatient rehabilitation program for improving activity of daily living (ADL) performance. This study found significant changes in fatigue impact and social functioning at 6-wk follow-up; however, no significant changes in disease severity or cognitive function were found at follow-up.

Inpatient Rehabilitation Programs. Moderate evidence from medium-quality studies supports individualized multidisciplinary rehabilitation programs in inpatient settings (average quality rating = 33.6, pooled sample size = 628). Mobility and ADL function among people with MS may improve as a result of these programs (Grasso et al., 2005; Maïtra et al., 2010; Vikman et al., 2008). Common multidisciplinary rehabilitation team members included physician, physical therapist, occupational therapist, speech pathologist, urologist, psychologist, and social worker. Occupational therapy interventions in inpatient settings were highly variable and included adapted...
equipment, fatigue and stress management (Craig et al., 2003), training in self-care (Grasso et al., 2005), therapeutic exercise, and occupation-based therapeutic activities (Maitra et al., 2010). Maitra et al. (2010) reported that participants who received functional training, such as ADL training, demonstrated greater improvement on the FIM™ than those who received therapeutic exercise. Increasing the intensity of training was found to be positively associated with improvement in ADL performance. However, the unique role and effectiveness of occupational therapy alone could not be determined because of the multidisciplinary nature of the intervention.

**Home-Based Programs.** Moderate evidence from medium-quality studies supports the effectiveness of home-based intervention for people with MS (average quality rating = 35.7, pooled sample size = 161). Interventions included home-based telerehabilitation systems, such as the Home Care Activity Desk (Huijgen et al., 2008), the Home Automated Telemanagement system (Finkelstein, Lapshin, Castro, Cha, & Provance, 2008), and a home-based educational intervention (Ward et al., 2004). Overall, telerehabilitation programs may benefit people with MS by improving functional status. However, mixed diagnoses and small sample size limit the strength of this research. No significant difference was found between people with MS assigned to the educational intervention and those simply provided with an information booklet (Ward et al., 2004). Thus, evidence for the effectiveness of interventions in this setting remains inconclusive.

**Rehabilitation Programs in a Variety of Settings.** Strong evidence from high-quality studies supports multidisciplinary rehabilitation in a variety of settings (e.g., inpatient and outpatient; average quality rating = 46.0, pooled sample size = 98). Comprehensive multidisciplinary rehabilitation programs may be beneficial for people with MS in improving ADL function (Khan, Pallant, et al., 2008; Khan, Turner-Stokes, et al., 2008). Khan, Turner-Stokes, et al. (2008) systematically appraised the effects of multidisciplinary rehabilitation programs for adults with MS on the basis of the type, setting, and intensity (time or expertise) of the programs. They found that programs with high intensity had short-term effects in reducing symptoms, whereas programs with low intensity but longer duration had long-term positive effects on quality of life.

**Vocational Rehabilitation Programs.** Because of limited research, diversity of target populations, and inconsistent outcome measures, no conclusion could be drawn about evidence for the effects of vocational rehabilitation programs for people with MS (Khan, Ng, & Turner-Stokes, 2009). **Functional Mobility Programs.** Esnouf, Taylor, Mann, and Barrett (2010) reported that participants with MS benefited from use of the Odstock Dropped Foot Stimulator combined with 18 wk of exercise training for core stability during ADL performance. Cattaneo, Marazzini, Crippa, and Cardini (2002) found that dynamic ankle-foot orthoses improved standing and walking balance. However, no conclusion could be drawn about functional mobility, because of the limited number of interventions included and the small pooled sample size.

**Fatigue Management Courses**

**Face-to-Face Format.** Strong evidence from high-quality studies supports face-to-face fatigue management programs (average quality rating = 38.7, pooled sample size = 231). Two studies examined the efficacy of the Managing Fatigue course (Mathiowetz, Finlayson, Matuska, Chen, & Luo, 2005; Sauter, Zebbenholzer, Hisakawa, Zeitlohofer, & Vass, 2008), and one investigated the effect of the Fatigue: Take Control course (Hugos et al., 2010). These two 6-wk courses encourage active engagement in occupations and emphasize the importance of balanced interaction between personal and environmental factors. People with MS may benefit from these courses in terms of improved fatigue impact, self-efficacy, and quality of life. In addition, the effect of the Managing Fatigue course was maintained 1 yr postintervention (Mathiowetz, Matuska, Finlayson, Luo, & Chen, 2007).

**Long-Distance Format.** Limited evidence from high-quality studies (average quality rating = 40, pooled sample size = 103) supports use of the Managing Fatigue course delivered in the long-distance (teleconference) format for people with MS (Finlayson, 2005; Finlayson & Holberg, 2007). People with MS may benefit from fatigue management delivered in this format in terms of improved fatigue impact and quality of life. Social support and normalization, as well as quality and usefulness of the resources, were identified as strengths of this format. A 7-wk online fatigue self-management program (adapted from the Managing Fatigue program) resulted in a significant reduction in fatigue impact (Ghahari, Leigh Packer, & Passmore, 2010), but this improvement was no better than that attained by the information-only group.

**Health Promotion Programs**

Limited evidence from high-quality studies supports the effectiveness of health promotion programs in improving self-efficacy and self-perceived quality of life in people with MS (average quality rating = 41.3, pooled sample size = 234). The three Level I health promotion studies included in the review were education-based programs that discussed disease-related knowledge and management of stress, fatigue, and physical activities. People with MS...
may benefit from this type of program in terms of improved physical activity (Ennis, Thain, Boggild, Baker, & Young, 2006; Plow, Mathiowetz, & Lowe, 2009), spiritual growth, and stress management (Bombardier et al., 2008; Ennis et al., 2006). The effect of one intervention was maintained up to 3 mo postintervention (Ennis et al., 2006). However, different intervention formats, different types of MS, and inconsistent timing of outcome measures limit the generalizability of this work. Although the role of occupational therapy in these programs was not explicitly identified, one program incorporated parts of the fatigue management course (Plow et al., 2009).

Discussion and Implications for Practice and Research

The results suggest that people with MS benefit from individualized, goal-directed interventions that address functional performance and promote participation, such as multidisciplinary rehabilitation programs, health promotion programs, and fatigue management courses.

A better understanding is needed of the length of benefit of the various occupational therapy–related interventions aimed at improving activities and participation among people with MS. Immediate or short-term effects (2 or 3 mo) were reported in most of the rehabilitation, fatigue management, and health promotion program studies. Only one study (Mathiowetz et al., 2007) reported long-term (1-yr) effects of the Managing Fatigue course. As Khan, Turner-Stokes, et al. (2008) suggested, inpatient multidisciplinary rehabilitation programs of high intensity may have shorter term effects, whereas outpatient and home-based programs of lower intensity but longer duration may result in longer term improvement in quality of life.

Multidisciplinary rehabilitation programs acknowledge the role of occupational therapy in rehabilitation for people with MS. Occupational therapy interventions within multidisciplinary programs focused mainly on activity and participation and ranged from ADL training to fatigue and stress management. However, the unique contribution of occupational therapy is hard to determine from these studies because the effects of these interventions cannot be separated out from the effects of the program as a whole.

Studies on fatigue management were conducted independent of other rehabilitation services and provide clearer evidence of the benefits of occupational therapy. People with MS may benefit from fatigue management in terms of reduction of fatigue impact and improvement in quality of life. Stronger evidence supports group management courses delivered in a face-to-face format. Weaker evidence supports teleconference and online formats. The efficacy of fatigue management courses in the individual format remains unknown. In addition, it may be important to determine whether group or individual formats for delivering fatigue management education are most effective.

The nature of health promotion interventions is compatible with occupational therapy philosophy. Health promotion highlights the value of individualization and self-perception of health-promoting behaviors. Occupational therapists teach self-management or behavioral change strategies to motivate clients to self-manage adverse health conditions, such as limited physical activity, fatigue, and reduced quality of life. Occupational therapy acknowledges the relationship between engagement in occupation and well-being and emphasizes the importance of actual doing. With knowledge about occupation, therapists in health promotion programs can contribute to clients’ health.

The results of Part 1 of our systematic review on occupational therapy interventions for people with MS support the use of a holistic perspective in occupational therapy evaluation and intervention to help clients improve their health and to promote their engagement in occupational roles. Interventions in both clinical and community-based settings should foster clients’ active learning and engagement in their chosen occupations. More studies examining the short-term and long-term effects of occupational therapy at the activity and participation level are required. Also, the unique role of occupational therapy in the effectiveness of the multidisciplinary rehabilitation team needs to be identified.

In summary, the findings of this review have the following implications for occupational therapy practice with people with MS:

- Occupational therapists can contribute to individualized and goal-directed multidisciplinary rehabilitation programs promoting engagement in occupational performance. Although occupational therapy services vary among programs and settings, the evidence indicates that direct training in functional performance results in greater improvement than therapeutic exercises.
- Occupational therapists can use group fatigue management courses delivered in a face-to-face or long-distance format to reduce the impact of fatigue on clients and improve their quality of life. Therapists can also use these courses to emphasize the balance between person, occupation, and environment and to encourage active engagement in occupations and fulfillment of life roles.
- Occupational therapists should have a role in the development of health promotion programs. They can incorporate concepts of occupation and actual doing.
into the program to motivate active learning and active engagement in occupations required for life roles. ▲

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References


*Indicates studies that were systematically reviewed for this article.


