OBJECTIVE. The objective of this study was to examine the effectiveness of delivering Managing Fatigue: A Six-Week Course for Energy Conservation via telehealth for a 70-yr-old man with poststroke fatigue (PSF).

METHOD. For this pilot case study, a questionnaire developed by the authors and the Patient-Reported Outcomes Measurement Information System Fatigue Short Form 7a were used for screening. The study was implemented via teleconference over an 8-wk period. The Fatigue Impact Scale (FIS) and the Canadian Occupational Performance Measure (COPM) were used to gather pretest and posttest data.

RESULTS. After the participant completed the course, decreased fatigue impact was noted on the FIS, and modestly improved occupational performance and satisfaction were evidenced by the COPM.

CONCLUSION. For this single participant experiencing PSF, performance and satisfaction on the COPM guardedly improved and fatigue impact decreased after participation in the energy conservation course offered by teleconference, a form of telehealth delivery. Further research is recommended with larger sample sizes.

According to the Centers for Disease Control and Prevention (CDC; 2014), more than 795,000 people in the United States experience a stroke each year, 665,000 of whom, on average, survive their stroke (CDC, 2014). However, people continue to live with symptoms of their stroke after hospitalization, including poststroke fatigue (PSF), a chronic feature that impairs both physical and mental functioning. PSF is not mediated by rest and is exacerbated by increased stress and physical activity (De Groot, Phillips, & Eskes, 2003; Kirkevold, Christensen, Andersen, Johansen, & Harder, 2012; Zedlitz, Fasotti, & Geurts, 2011). It hinders the rehabilitation process and can lead to impaired ability to regain functions affected by the stroke (Park et al., 2009). It negatively affects the quality of life of clients by limiting recovery, which reduces the opportunities to return to work and leisure activities (Kutlubaev, Duncan, & Mead, 2012; Park et al., 2009). PSF also contributes to increased mortality, depression, and sleeping difficulties (Kutlubaev et al., 2012; Park et al., 2009).

Recent studies summarizing the prevalence of PSF internationally reported a range of 23%–77% among persons poststroke (Acciarresi, Bogousslavsky, & Paciaroni, 2014; Choi-Kwon & Kim, 2011). Mild PSF has been reported at an incidence level of 70%, whereas moderate PSF occurs in 18% of cases and severe PSF in 11% of cases (Choi-Kwon & Kim, 2011). Often appearing within the first 2 yr poststroke, PSF may persist beyond 2 yr (Baylor, Yorkston, Jensen, Truitt, & Molton, 2014; Ingles, Eskes, & Phillips, 1999). Mixed results have been found regarding age and its correlation with PSF (Baylor et al., 2014; Choi-Kwon & Kim, 2011). Older adults are reported to have lasting PSF or are excluded from PSF study participation (Choi-Kwon & Kim, 2011). The relationship between location of the stroke and PSF is uncertain. One study found that a basal ganglia infarct was an independent predictor of PSF (Tang et al., 2010). Additionally, several studies concluded that the prevalence of PSF is higher after a transient ischemic attack (Kutlubaev...
et al., 2012; Winward, Sackley, Metha, & Rothwell, 2009). Another study established that 100% of participants with a large-vessel ischemic stroke and 77.8% with a small-vessel ischemic stroke experienced PSF (Chestnut, 2011).

**Telehealth**

Telehealth is an overarching term for the use of technology for service delivery in health care and may involve telephone, Internet, computer programs, and interactive videos. Potential services delivered via telehealth include “assessment, monitoring, prevention, intervention, supervision, education, consultation, and counseling” (Brennan et al., 2011, p. 663). The American Occupational Therapy Association (AOTA) has reported telehealth as a feasible method for occupational therapy practitioners to provide skill training, environmental modifications, and education on assistive technology and adaptive techniques (AOTA, 2013).

Telehealth can remove barriers to service delivery, such as travel time and expenses; workforce shortages; and social, socioeconomic, and cultural barriers and stigmas (AOTA, 2013). According to Johansson and Wild (2011), health care professionals, people poststroke, and caregivers were satisfied with interventions delivered by means of telehealth. Additionally, Kizony et al. (2014) found that after stroke, study participants increased their performance, effort, and enjoyment while completing a rehabilitation program through telehealth. The positive outcomes associated with telehealth technology could benefit rehabilitation professionals and their clients if the technology were to be used more frequently.

Even with these positive features, telehealth has some barriers to use, including licensure regulations, decreased funding and reimbursement, and the need for technology support (Silva, Farrell, Shandra, Viswanathan, & Schwamm, 2012). Additional obstacles to telehealth include logistical and time management problems, lack of professional knowledge and skill levels regarding telehealth, and difficulty building rapport (Dunleavy, Preissner, & Finlayson, 2013; Finlayson & Holberg, 2007). From a client perspective, some may not feel adequately supported by health care professionals to overcome barriers when care is provided via telehealth (Miller, Chumble, Carlson, & Daggett, 2014). As professionals are trained and the technology continues to grow in health care, these barriers may disappear with time and practitioner experience. However, today’s use of telehealth may be best determined on a case-by-case basis.

**Current Poststroke Fatigue Interventions**

People poststroke experience difficulty participating in meaningful occupations and role limitations as a result of PSF symptoms (Carlsson, Möller, & Blomstrand, 2004; Flinn & Stube, 2010; White et al., 2012). Interventions available for PSF are minimal (McGeough et al., 2009). Cognitive and Graded Activity Training is a 12-wk experimental program for PSF intervention. It uses cognitive–behavioral therapy, education, and compensatory strategy practice provided by neuropsychologists with physical endurance, strengthening, and graded flexibility activity provided by physiotherapists (Zedlitz et al., 2011; Zedlitz, Rietveld, Geurts, & Fasotti, 2012).

In addition, it has been demonstrated that clients with PSF as well as caregivers benefit from psychoeducation regarding general information on stroke and its interventions, particularly coping with stress and problem-solving skills (Cheng, Chair, & Chau, 2014). Education may be provided in either individual or group sessions using the telephone or Internet (Cheng et al., 2014). Currently, people with PSF do not routinely receive advice from health care professionals to manage this symptom, often precipitating seeking information on their own (White et al., 2012). Thus, a need exists for intervention that involves a broader health care team, including occupational therapy.

Occupational therapy interventions addressing PSF focus on energy conservation techniques, specifically pacing and balancing rest with activity, client education, and wellness and self-management strategies (Woodson, 2014). To our knowledge, only one occupational therapy–based energy conservation intervention program exists, *Managing Fatigue: A Six-Week Course for Energy Conservation* (hereinafter *Managing Fatigue*), developed by Packer, Brink, and Sauriol (1995). This course has been effective in treating fatigue associated with other neurological diagnoses such as multiple sclerosis (MS), Parkinson’s disease, and postpolio syndrome (Ghahari & Packer, 2012; Ghahari, Packer, & Passmore, 2010; Holberg & Finlayson, 2007; Matuska, Mathiowetz, & Finlayson, 2007). It provides education and self-management strategies to clients, often in a group setting, on pacing and relaxation, body mechanics, environmental modification, and activity modification and graded activity (Packer et al., 1995). In addition, homework is frequently assigned to assist in reinforcing the concepts covered.

The *Managing Fatigue* course has been used in several telehealth studies that examined outcomes (Finlayson, Preissner, Cho, & Plow, 2011), efficacy and effectiveness (Finlayson, Preissner, & Cho, 2012), and occupational therapist perspective and experience (Dunleavy et al., 2013; Finlayson & Holberg, 2007). Finlayson et al. (2011) demonstrated that this course reduced the impact but not the severity of fatigue and improved clients’ physical ability. Because the course is manualized, has been demonstrated to be effective with populations with several neurological conditions, and has been delivered by telehealth methods (specifically, teleconferencing), it was selected to be used in the current study.

The evidence clearly indicates that occupational therapy practitioners and other health care professionals are called upon to address the unmet needs of people with PSF. To our knowledge, no occupational therapy studies have been done on PSF interventions. By using a well-researched, manualized program for occupational therapy fatigue intervention and selecting teleconferencing, a method whereby people can receive education without undue potential to increase mental and physical fatigue symptoms in the process, our aim was to pilot test the *Managing Fatigue* course to provide for the occupational needs of people with PSF. This study asked the following research question: How does participation in the *Managing Fatigue* course influence fatigue...
levels and self-perceived occupational performance and satisfaction in people post-stroke? It was hypothesized that the course administered via teleconference would decrease fatigue levels and increase occupational performance and satisfaction.

Method

Research Design

A pilot study using a pretest–posttest case study design was implemented to study the effectiveness of a teleconference-delivered Managing Fatigue course for a person with PSF. Procedures were approved by the institutional review boards at the University of North Dakota and Altru Health System. Informed consent was obtained from the participant before participation.

Participant

Recruitment occurred by referral from occupational therapists at Altru Health System Rehabilitation Center. Participation in the study depended on meeting the inclusion criteria: resident of the state of North Dakota, self-reported diagnosis of a mild to moderate stroke in the past 5 yr, minimum age of 41 yr, minimum score of 21 on the Patient-Reported Outcomes Measurement Information System (PROMIS; 2013) Fatigue Short Form 7a indicating fatigue, telephone accessibility once a week for at least 8 wk, and functional English literacy and cognitive capacity for study participation. Exclusion criteria included history of a severe stroke, age <41 yr, lack of fatigue, and severe cognitive or literacy challenges.

Mild to moderate stroke was selected as an inclusion criterion because of current evidence indicators for PSF and the probability that a participant with this condition would benefit from the educational sessions. The study had to rely on self-reporting of a past medical history of mild to moderate stroke because the principal investigators did not have access to potential participants’ medical information. The age criterion was chosen with a goal of a more homogenous participant collection. Finlayson et al. (2012) hypothesized that younger people tend to have higher initial rates of fatigue and older adults have more life experience to relate to course information. Cognitive capacity was ascertained during the screening process on the basis of clinical judgment of the potential participant’s ability to answer the PROMIS Fatigue Short Form 7a questions.

Once a potential participant contacted one of the researchers, telephone screening included information provided on the study followed by completion of a demographic questionnaire and the PROMIS Fatigue Short Form 7a. Two people met the inclusion criteria for the study and were screened. Of the 2, 1 declined participation, resulting in recruitment of a 70-yr-old man who met the participation qualifications. The participant had experienced a left-side ischemic stroke 5 yr before the study. He reported a moderate level of stroke severity, experiencing fatigue secondary to his stroke, and was not receiving occupational therapy services during study participation. The participant lived alone in his own home.

Instrumentation

Screening Instruments. A demographic questionnaire developed by the authors was administered to screen for inclusion and exclusion criteria to determine eligibility. The PROMIS Fatigue Short Form 7a consists of seven questions about perceived fatigue and uses a 5-point Likert scale (PROMIS, 2013). This instrument was designed to be generic, rather than disease specific, for use with a variety of diagnoses (Cella et al., 2010; PROMIS, 2013). Higher scores indicate a greater level of fatigue (PROMIS, 2013). Convergent and discriminant validity of the PROMIS items for fatigue are consistent when administered by different methods, including phone interactive voice response, paper, personal digital assistant, and computer (Bjorner et al., 2014).

Outcome Measures. The Canadian Occupational Performance Measure (COPM; Law et al., 2005) and the Fatigue Impact Scale (FIS; Fisk et al., 1994) were administered by two researchers (Muehlberg [COPM] and Boehm [FIS]), via telephone, before and after the intervention. The COPM assesses perceived performance, satisfaction, and importance of the occupations of self-care, productivity, and leisure through the use of a semistructured interview (Cup, Scholte Reime, Thijsen, & van Kuyk-Minis, 2003). Using the COPM with people who previously experienced a stroke, Cup et al. (2003) found both the Performance and Satisfaction subscores to have good test–retest reliability. Compared with other standardized measures, the COPM demonstrates good discriminant, construct, and criterion validity (Cup et al., 2003; McColl, Paterson, Davies, Doubt, & Law, 2000).

The FIS is a self-report tool designed to assess the impact of fatigue on the quality of life related to everyday tasks and activities for people with MS (Mathiowetz, 2003; Vanage, Gilbertson, & Mathiowetz, 2003). It includes 40 statements rated on a 4-point Likert scale (Mathiowetz, 2003; Vanage et al., 2003). It has been found to have high internal consistency between the Physical, Cognitive, and Social subscales (Fisk et al., 1994). The test–retest reliability, convergent validity, and sensitivity are strong enough to support its use in clinical settings and for research with people with mild to moderate MS as an outcome measure (Mathiowetz, 2003). However, these psychometric properties have yet to be examined in the population of people with stroke.

Intervention

The Managing Fatigue course was developed as a tool for occupational therapy practitioners to use when working with a client experiencing increased fatigue secondary to chronic illness (Packer et al., 1995). It was originally used for people with MS and consists of six sessions discussing rest, communication and body mechanics, activity application of ergonomics and activity modification, prioritizing and planning, balancing one’s schedule, and course review and future plans. This course was developed as a result of gaps in research on the impact of fatigue severity on self-care, productivity, and leisure (Packer et al., 1995). Sessions are clearly defined in the manual, with outlines for education, practice, and homework.

Course participants were found to have statistically significant (p < .05) improvements in scores on the FIS, with 80% of participants implementing positive lifestyle...
changes (Packer et al., 1995). Holberg and Finlayson (2007) conducted a qualitative study with people with MS, who completed the course via teleconference. Participants experienced not only decreased effects of fatigue but also increased self-efficacy (Holberg & Finlayson, 2007), demonstrating promising implications for use of the course in decreasing fatigue secondary to chronic neurological conditions.

Procedures and Data Collection

One study participant met inclusion criteria and provided informed consent for study participation. Before the intervention, the researchers administered the COPM and the FIS via telephone to the participant. The three researchers prepared together before the intervention implementation so that each of the six sessions of the Managing Fatigue course would be covered and the protocol followed accurately, with client homework given out and reported back before each successive session.

The participant received a packet of all six course session handouts before intervention began. All interactions and stages of data collection throughout this study occurred via teleconference, with the participant using his home phone and the three researchers using an office speaker phone. Two of the three researchers (Boehm and Muelhberg) cotaught the course, with the third researcher (Stube) present as an advisor and educator. The three researchers debriefed at the end of each session and planned for the upcoming week’s session.

The participant actively and thoroughly participated in the course during hourly sessions, once per week, for 5 consecutive weeks. The participant frequently completed homework, as delineated in the course; his homework participation increased after the first two sessions. Upon conclusion of the course, the participant was contacted, by the same researchers who conducted the preassessments, for a final telephone interview in which the FIS and the COPM were completed.

Data Analysis

All data obtained during the study were tracked using IBM SPSS Statistics (Version 21; IBM Corp., Armonk, NY). Changes in data from the initial to the final evaluation using the aforementioned assessments were analyzed to infer effectiveness of the Managing Fatigue course and the telehealth service delivery.

Results

Fatigue Impact

The participant had an initial score of 47 out of a possible 160 on the FIS, indicating high levels of physical, cognitive, and social fatigue. Upon completion of the Managing Fatigue course, he had a final score of 13 out of a possible 160. Lower scores on the FIS indicate lower perceived amounts of fatigue severity. These scores are further described in Table 1. Overall, the changes in scores from the initial to the final evaluation indicate decreased fatigue impact after participation in the course.

Occupational Performance and Satisfaction

Upon completion of the COPM during the initial evaluation, the participant prioritized putting on compression socks, showering, cutting food, bowling, and golfing as areas of occupation important to him; he was experiencing decreased self-perceived performance and satisfaction for these occupations. After participation in the Managing Fatigue course, the participant reported the same or improved performance and satisfaction scores in his prioritized areas of occupation. His average performance score improved by 0.4 points, and his average satisfaction score increased by 0.8 points. Table 2 shows the performance and satisfaction scores for each of the participant’s prioritized occupations. Although these outcome scores indicate either the same or improved participant-perceived performance and satisfaction after participation in the course, the scores are well below what is considered meaningful change on the COPM. One may not infer that these scores reflect real change.

The results of this pilot study indicate evolving potential for the telehealth method of providing energy conservation content through the Managing Fatigue course for PSF intervention. Additionally, when the participant was questioned about his perception of the teleconference delivery, he indicated that the delivery was adequate. However, he also noted that face-to-face delivery and group participation with peers would have been his preferred modes of service delivery.

Discussion

After participation in the Managing Fatigue course administered by means of teleconferencing, the participant reported decreased fatigue impact and, to a lesser extent, increased occupational performance and satisfaction in his prioritized areas of occupation. Because of the improvement in scores, the course may hold promise as an intervention for PSF, but further controlled study is required. Because of the limitations of this study, it cannot be inferred that participation in the course was the cause of lowered fatigue impact or increased occupational performance and satisfaction. The outcomes experienced by this study’s participant parallel those of prior studies using the same course for people with other neurological causes of fatigue, including a reduction of fatigue impact (Finlayson et al., 2011) and improvement on primarily the FIS Physical subscale with other fluctuating results (Ghahari et al., 2010).

Benefits exist in the use of manualized intervention programs such as the Managing Fatigue course for both research validity and client outcomes. This study’s participant was able to read the manual content and follow along with the researchers, commenting that he found it “helpful to go to pages in a workbook” along with us or for clarification at his own choosing. The combined fieldwork and practice experience of the researchers permitted them to individualize the course’s energy conservation strategies to meet the participant’s goals. For example, we

Table 1. Physical, Cognitive, and Social Fatigue Scores on the FIS

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical fatigue</td>
<td>22/56</td>
<td>8/56</td>
<td>-14</td>
</tr>
<tr>
<td>Cognitive fatigue</td>
<td>17/52</td>
<td>4/52</td>
<td>-13</td>
</tr>
<tr>
<td>Social fatigue</td>
<td>8/52</td>
<td>1/52</td>
<td>-7</td>
</tr>
</tbody>
</table>

Note: FIS = Fatigue Impact Scale.
provided suggestions for using a lumbar support to improve sitting posture at his home desk and types of tools to help put on compression stockings to reduce his energy expenditure while dressing in the morning. Perhaps a benefit of a single study participant is the time available for application of client-centered and individualized intervention strategies.

Because of the limitations in the research design and technology, it cannot be inferred that teleconferencing was an effective means of occupational therapy service delivery. The occupational therapy process (AOTA, 2008, 2014) provided a helpful background for us to individualize the manualized content, only as needed, for teleconference delivery. For example, after course education was provided on ergononics, the participant was asked to assess his own home environment for challenges or barriers. At the next session, we were able to ask the session content questions with the participant providing answers and asking his own questions. This seemed to be a relatively effective way for us to understand his home context. We were then able to appreciate that his home office and other sitting areas of the home could be enhanced through improved positioning techniques, such as using a lumbar cushion. Additionally, the establishment of early and ongoing rapport with the participant was crucial in the teleconferencing format because we did not have the ability to observe in-person cues while communicating content.

The use of client-centered principles and therapeutic use of self, such as a collaborative approach (AOTA, 2008, 2014; Taylor, 2008), allowed us to discover the participant’s interests and needs and emphasize relevant examples to promote goal achievement. We found that a simple technique of encouraging the participant to write down his ideas for the next session improved his ability to “remember” and to experience success. This strategy, in itself, seemed to encourage the participant’s application of intervention methods, motivation, and sense of active participation or engagement, a benefit that has been reported by study participants with other neurological conditions in fatigue management programming (Twomey & Robinson, 2010).

Last, in our summary session, we asked the participant for his view of education provided by telephone. He replied that it worked well, but he said, “I prefer face-to-face” methods. Therefore, investigation of the preferred client educational delivery method would enhance the client-centeredness and possible outcomes of further clinical adoption of intervention or future research studies.

Limitations and Future Research

The current pilot study is limited by several factors, including single case study design. Limited inclusion and exclusion criteria and recruitment from a small geographic area were barriers to obtaining a larger sample size. For example, we would expand the age criteria for a future cohort study of this important issue. Moreover, the single-participant sample size prevented the participant from having discussions with other participants who may have provided alternative methods of task completion, support, and validation throughout the Managing Fatigue course. This study’s participant reported that he would have liked “more people in the group.”

The literature acknowledges that positive adjustment poststroke is influenced by the interconnection among the person, satisfactory social relationships, and the social environment (Reed, Wood, Harrington, & Paterson, 2012). Additionally, the Hawthorne effect, in which a person improves behavior as a result of being monitored, may have been demonstrated, because the participant was aware of session content and when he was completing assessments. Measurement bias may also have been introduced because the same researchers conducted both the pre- and postoutcome measures. Finally, this study used self-report measures that likely affected the perception of severity and therefore influenced fatigue and performance scores. We recommend that future studies also include categorization and measurement of PSF severity.

Because assessment scores improved after participation in the Managing Fatigue course compared with baseline, future cohort research on the use of this course with people experiencing PSF using telehealth technology is warranted. However, given the limitations of the current study, it is recommended that future research use a larger sample size, including diversity of gender, age, and culture, and compare face-to-face delivery to telehealth delivery methods. In addition, future research should address the effectiveness of occupational therapy service delivery through alternative methods of telehealth (e.g., use of mobile devices such as tablets, videoconferencing, podcasts, online discussion boards). If other telehealth delivery methods are investigated, use of a secure network connection is recommended to ensure patient confidentiality and compliance with the Health Insurance Portability and Accountability Act (Pub. L. 104–191).

Implications for Occupational Therapy Practice

The findings of this study have the following implications for occupational therapy practice:

- Manualized fatigue management occupational therapy programming, individualized or group based, for adults poststroke has the potential to improve occupational participation outcomes in the community phase of occupational therapy service delivery.
- Teleconferencing technology is an emerging area for occupational therapy service
delivery; when client choice, secure networks, and licensure rules are adhered to, this approach will likely advance a beneficial service for clients who experience accessibility barriers to health care after neurological events.

Conclusion

Results of this study suggest that the impact of physical, cognitive, and social fatigue declines after participation in the active, discussion-based occupational therapy Managing Fatigue course. Further, self-reported occupational performance and satisfaction outcomes may improve after participation in the course, as measured by the COPM. Although the single case study research design has limitations, these results prove promising for the future study of individual or group occupational therapy intervention for people experiencing PSF. Ongoing research is needed to investigate the benefits of telehealth delivery of PSF management strategies. This research may include the study of face-to-face and group formats and the inclusion of diverse groups of people with PSF and their potential caregivers. As a profession, occupational therapy is encouraged to continue the policy discussion about secure use of telehealth technology in practice and to promote licensure and reimbursement policy changes to remove barriers to telehealth use in practice. ▲

Acknowledgments

The investigators gratefully acknowledge all occupational therapy practitioners and managers at Altru Health System, our kind study participant, and the University of North Dakota occupational therapy faculty for their support of our work.

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