Effectiveness of Occupation-Based Interventions to Improve Areas of Occupation and Social Participation After Stroke: An Evidence-Based Review

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MeSH TERMS
- activities of daily living
- evaluation studies as topic
- human activities
- social participation
- stroke

This evidence-based review examined the evidence supporting the use of occupation-based interventions to improve areas of occupation and social participation poststroke. A total of 39 studies met the inclusion criteria and were critically evaluated. Most of the literature targeted activity of daily living (ADL)–based interventions and collectively provided strong evidence for the use of occupation-based interventions to improve ADL performance. The evidence related to instrumental ADLs was much more disparate, with limited evidence to support the use of virtual reality interventions and emerging evidence to support driver education programs to improve occupational performance poststroke. Only 6 studies addressed leisure, social participation, or rest and sleep, with sufficient evidence to support only leisure-based interventions. The implications of this review for research, education, and practice in occupational therapy are also discussed.

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Occupational therapy practitioners can help people with stroke improve their occupational performance and social participation using many different intervention strategies, including but not limited to remediation or development of skills, use of compensatory strategies, activity modifications, and environmental accommodations. The foundation of any of these approaches is helping clients engage in occupations, using occupation-based interventions, occupation-based interventions, or both. The objective of this evidence-based review was to identify, evaluate, and synthesize the literature related to the focused question, What is the evidence for the effectiveness of activity- and occupation-based interventions to improve areas of occupation and social participation after stroke?

Background Literature and Statement of Problem

Strokes vary in severity and subsequent functional impact depending on the extent of the neurological damage and potential recovery. After a stroke, many survivors experience some form of functional impairment that will require a period of rehabilitation. For those with mild impairment, rehabilitation can be accomplished through a brief period of inpatient rehabilitation or through home-based or outpatient programs (Teasell, Foley, Bhogal, Chakravertty, & Bluvol, 2005). Chronic symptoms may include hemiparesis, balance deficits, mobility challenges, visual changes, sensory loss, cognitive deficits, speech disruption, fatigue, and sensory processing problems (Jørgensen et al., 1995).

Any or all of these deficits may require ongoing assistance and in some cases require institutionalized care (Kelly-Hayes et al., 2003). Occupational therapy is

an essential component in the rehabilitation of patients after stroke (Langhorne & Pollock, 2002). Stroke care may be provided in the acute care, rehabilitation, home health, outpatient, and specialty clinic settings in which occupational therapists work (Krug & McCormack, 2009). The complex nature of stroke symptoms and the diversity of the stroke population require occupational therapy practitioners to have a strong knowledge base of best-practice methods to support people after stroke.

Occupational therapy focuses on assisting people to engage in daily life activities that they find meaningful (American Occupational Therapy Association [AOTA], 2014). In 1997, Law, Polatajko, Baptiste, and Townsend defined occupation as every activity people do to occupy themselves—including activities of daily living (ADLs), enjoying life, and social participation—that has meaning and value to them. For the purposes of this review, *occupation-based interventions* are defined as activities that support performance in the following areas of occupation: ADLs, instrumental activities of daily living (IADLs), rest and sleep, education, work, play, leisure, and social participation (AOTA, 2014).

Occupational therapy practitioners across all settings can help stroke survivors improve their occupational performance through multiple approaches. At times, practitioners use a skills remediation, or bottom-up, approach in which specific sensory and motor deficits are addressed with a goal of general function return across occupations. At other times, practitioners may use an occupation-based, or top-down, approach that emphasizes looking at all components of an individual, determining how they relate, and developing a holistic view of the patient that is considered in all aspects of treatment (Baum & Christiansen, 2005). The purpose of this evidence-based review was to provide occupational therapy practitioners with the current evidence supporting the use of occupation-based interventions to improve areas of occupation and social participation after stroke. Skill remediation–based interventions, although a relevant part of occupational therapy treatment of stroke patients, were not considered in this evidence-based review.

Method for Conducting the Evidence-Based Review

This evidence-based review was completed in collaboration with AOTA as part of an evidence-based review project on interventions for adults with stroke. This review included peer-reviewed articles published between 2003 and March 2012. Detailed information about the methodology for the entire literature review can be found in the article "Method for the Evidence-Based Reviews on Occupational Therapy and Stroke" in this issue (Arbesman, Lieberman, & Berlanstein, 2015). This article includes all of the specific search terms and search methods for this evidence-based review. Also, the results of this evidence-based review have been published as a Critically Appraised Topic available on the AOTA website (Wolf, Chuh, McInnis, & Williams, 2014).

The initial search yielded a total of 83 abstracts that were forwarded to the research team. All 83 abstracts were reviewed by at least two members of the research team, and the team then met to discuss whether they fit with the focused question. Five abstracts were eliminated, and the remaining 78 abstracts were reviewed by at least two members of the research team to determine whether they fit the focused question of this study. The final selection for inclusion in this review was determined by the research team in collaboration with representatives from AOTA.

Results

This evidence-based review included 39 studies: 26 Level I studies, 4 Level II studies, and 9 Level III studies. The articles were then clustered into the five areas of occupation based on the *Occupational Therapy Practice Framework: Domain and Process* (see AOTA, 2014): ADLs, IADLs, leisure, social participation, and rest and sleep. If necessary, the articles were then further classified within each area of occupation by the treatment setting in which the study was conducted: inpatient, outpatient, home health, and community. Summaries of selected Level I articles determined to be of particular interest to the field of occupational therapy are provided in Supplemental Table 1 (available online at http://otjournal.net; navigate to this article, and click on "Supplemental"). The full evidence table is available in the *Occupational Therapy Practice Guidelines for Adults With Stroke* (Wolf & Nilsen, 2015).

Activities of Daily Living

Of the 39 articles included in this evidence-based review, 21 addressed ADL performance. We examined the results of 10 Level I randomized controlled trials (RCTs), 5 Level I systematic reviews, 2 Level II non-RCTs, and 4 Level III studies. We further classified the studies by the area of practice in which they were conducted.

Interventions in Inpatient Settings. Seven studies providing Level I (3 studies), Level II (2 studies), and Level III (2 studies) evidence evaluated the use of occupation-based interventions to improve ADL performance in an inpatient setting. Haslam and Beaulieu (2007) found limited evidence to support the use of functional (task training) over remedial (not activity-based) interventions to improve ADL performance. They compared the repetitive practice

of functional daily tasks, incorporating compensatory strategies and adaptations, with the use of remedial skill building intended to carry over to functional tasks. Haslam and Beaulieu concluded that although more research has supported functional training than remedial interventions, the results are inconclusive because of limitations of the studies and the small number of articles included ($N = 11$) in their systematic review. Abizanda et al. (2011) found no difference between occupational therapy intervention (ADL retraining with family involvement) coupled with conventional treatment (medicine and physical therapy) and conventional treatment alone.

A small study ($N = 4$) by Mew (2010) found insufficient evidence that Bobath-based normal movement interventions to normalize tone and avoid abnormal movements were associated with better motor recovery and that functional interventions, such as the use of environmental adaptation, adaptive equipment, or compensatory strategies when performing ADLs, were associated with greater independence in ADLs.

Sonoda, Saitoh, Nagai, Kawakita, and Kanada (2004) compared the Full-time Integrated Treatment (FIT) rehabilitation program (high-intensity dose of occupational and physical therapy in 40-min sessions 7 days/wk) with the standard care model (lower intensity gait and exercise related to ADL performance with occupational and physical therapy in 40-min sessions 5 days/wk). This Level II study demonstrated support for FIT high-intensity-dose occupational and physical therapy in improving ADL functioning at discharge compared with standard care.

Teasell et al. (2005) described a Level III pre–post study of an interdisciplinary rehabilitation program (occupational therapist, physical therapist, speech–language pathologist, social worker, dietitian, and members of the medical team) that also included therapeutic recreation and a rehabilitation specialist at a specialized stroke rehabilitation unit for highly involved stroke patients in England. The role of therapeutic recreation was to facilitate carryover of skills learned in other therapies while participating in leisure activities. The rehabilitation specialist played a supporting role that allowed participants additional opportunities for practice. Family members also participated in a support group as a part of the program. The results of the study revealed that participants showed greater independence in ADLs and improved FIM™ scores from admission to discharge (Teasell et al., 2005).

Mount et al. (2007) compared an errorless learning intervention and a trial-and-error learning intervention for people with memory deficit poststroke. Participants were randomly assigned into intervention groups and learned two tasks: wheelchair transfer and sock donning using a sock donner. No significant difference in ADL performance was found between the two interventions.

Finally, Gustafsson and McKenna (2010) compared two rehabilitation units in two different facilities. Unit A had occupational therapy assistants on staff who supplemented individual therapy by offering occupation-based groups, including daily breakfast preparation, daily life skills groups, and weekly community shopping. Unit B had individual therapies and usual care with a weekly recreational cooking group. When metrics from Unit A and Unit B were compared, no significant differences in self-efficacy and well-being were found between the occupation-based group program and standard care (Gustafsson & McKenna, 2010).

Evidence generally supports the use of occupation-based interventions to improve ADL performance in the inpatient setting. Although several of the studies did not support the use of occupation-based interventions over the control condition, most of these studies lacked methodological rigor in terms of an adequate sample, appropriate comparison group, or a sensitive outcome measure that could adequately measure change.

Interventions in Outpatient Settings. Four Level I studies, 1 Level II study, and 1 Level III study evaluated occupation-based interventions targeting improvement in ADL performance in an outpatient setting. Hershkovitz, Beloosesky, Brill, and Gottlieb (2004) found significant improvements in functional independence within participants from admission to discharge in a day rehabilitation program; however, the article did not provide specifics about the program.

Bode, Heinemann, Zahara, and Lovell (2007) compared ADL performance outcomes after participation in either a day rehabilitation or an outpatient program poststroke. Results of the study indicated that most day rehabilitation patients received more units of occupational therapy than physical therapy, and outpatients received more units of physical therapy than occupational therapy. The differences in ADL performance between the day rehabilitation and outpatient programs were significant (Bode et al., 2007). For people who received day rehabilitation, more intense therapy was associated with greater life satisfaction and improved mobility and activity level. Those who received more intense outpatient therapy experienced poorer health and had a lower activity level.

Guidetti, Andersson, Andersson, Tham, and Van Koch (2010) evaluated the effect of a client-centered self-care intervention against that of a traditional self-care intervention over a 3-mo period in three different clinics. The client-centered group used a structured protocol that allowed participants to set self-care goals with the treating occupational therapist. Once goals were identified, clients

were responsible for the use of a training diary that allowed them to take responsibility for the goals while also communicating them to others in this format. The traditional self-care group received the self-care training program at its respective clinic. No significant differences in ADL performance were found between the two groups. In 2011, Guidetti and Ytterberg used the same client-centered self-care protocol described in the 2010 study, collecting results at 3, 6, 9, and 12 mo postintervention, and compared these results with the standard self-care training on ADL performance. They found no differences between the client-centered intervention and standard self-care training on ADL performance.

Katz et al. (2005) compared the effect of two virtual reality (VR) interventions on ADL performance. The experimental group completed a computer-based, occupation-centered street-crossing training, and the control group completed a skills training computer-based visual scanning activity. Both interventions were conducted for 12 sessions (for a total of 9 hr) over the course of 4 wk. Both groups improved from pre- to posttest on the ADL checklist used. Despite the improvement noted, Katz et al. found no significant difference in ADL performance between the experimental and control groups.

Schmid et al. (2012) compared the efficacy of yoga-based rehabilitation on balance, balance self-efficacy, and fear of falling. Participants were randomized into three groups: group yoga, yoga plus (group yoga and at-home yoga and a relaxation recording), and control (wait-list, usual-care intervention). The group yoga interventions were completed in 1-hr sessions biweekly for 8 wk. Although balance improved clinically with the yoga intervention, Schmid et al. found no statistically significant differences between the yoga groups and the control group on quality of life or level of disability.

Overall, the evidence from these studies to support occupation-based interventions to improve ADL performance in the outpatient setting is limited. Limitations of the studies include poor description of the intervention, mixed results in terms of the effect of the occupation-based intervention, and small sample sizes to evaluate the effect.

Interventions in Home Health Settings. The strongest evidence to support the use of occupation-based intervention in the home health setting comes from three Level I systematic reviews that reported that ADL-specific home-based interventions are associated with higher levels of ADL independence and decreased odds of death and other negative outcomes (Legg & Langhorne, 2004; Legg et al., 2007; Legg, Drummond, & Langhorne, 2009).

In addition to these systematic reviews, 2 Level I RCTs also found support for occupation-based interventions to improve ADL in the home health setting. Chieu and Man (2004) compared the efficacy of home-based ADL assistive technology training with traditional ADL assistive technology training. The treatment group received two to three home-based training sessions regarding their prescribed bathing assistive technology (instruction, demonstration, question–answer, assessment of fit). Treatment and control groups both received usual care or training in use of the prescribed bathing device before inpatient discharge. This training occurred in the inpatient setting for 95% of participants. Both groups were assessed preintervention and at 3 mo postintervention. The authors found that home-based assistive technology training resulted in higher rates of assistive technology use than standard training.

Sahebalzamani, Aliloo, and Shakibi (2009) examined the impact of self-care education on hemiplegic stroke survivors. Both the control and the experimental groups completed an ADL scale on discharge and then again 45 days after discharge. The experimental group received education on hygiene, bathing, nutrition, toileting, grooming, dressing, bowel and bladder control, mobility, and transfers on discharge. The experimental group followed the program for six to eight sessions over the 45 days before reassessment. Sahebalzamani et al. found that the self-care education improved ADL performance in the experimental group compared with the control group.

In contrast, Askim, Rohweder, Lydersen, and Indredavik (2004) compared the effect of ordinary service with an early supported discharge program in three rural communities. The ordinary service group received treatment combined with further follow-up organized by either a rehabilitation clinic or a primary health care system after discharge from inpatient care. The supported early discharge program was a home-based rehabilitation program coordinated by a mobile stroke team comprising a nurse, physiotherapist, occupational therapist, and consulting physician in conjunction with primary health care system services available in the community on discharge. The mobile team provided intervention for 4 wk post-discharge through phone contact and home visits. In cases in which multiple patients were in the same community, families were invited to a meeting to receive education on issues with stroke care and to share personal experiences. Askim et al. found no differences in functional gains between individuals who were discharged early with a home program versus standard care. Overall, a significant amount of evidence supports the use of occupation-based interventions to improve ADL performance in people with stroke in the home health setting.

Interventions in Community Settings. Wilkins, Jung, Wishart, Edwards, and Norton (2003) found that

occupational therapy education and functional training programs, particularly short-term community-based interventions focused on specific performance issues, are effective in improving ADL performance in older adults with stroke. In a Level I RCT, Harrington et al. (2010) compared the efficacy of a community-based education and exercise program for stroke survivors with that of traditional care. The experimental group received the community-based program in addition to standard care, and the control group received only standard care. Harrington et al. found that an exercise and education intervention did not improve quality of life or community reintegration at 12 mo compared with standard care. The intervention condition in this study was very broad based, and the rate of attrition was very high.

Overall, evidence supports occupation-based interventions in the community setting; however, larger scale powered studies are needed to confirm the use of occupation-based interventions in this setting with people with stroke.

Instrumental Activities of Daily Living

Twelve studies included in this review addressed IADL performance: 1 Level I systematic review, 4 Level I RCTs, 2 Level II nonrandomized controlled studies, and 5 Level III studies. The studies were further classified by the area of practice in which they were conducted.

Interventions in Inpatient Settings. Several studies evaluated the use of VR-based intervention programs to improve various areas of occupation poststroke. Saposnik et al. (2010) compared the impact on upper-extremity function of using Nintendo Wii gaming VR (VRWii) with that of using recreational therapy in standard care. All participants received the standard therapy after stroke (average of 2 hr/day of physiotherapy and occupational therapy per patient tolerance). Participants in the VRWii group participated in eight 60-min sessions over a 14-day period using sporting games and cooking activities. Participants in the recreational therapy group engaged in leisure activities (card games, playing Bingo or Jenga) and were directed to use the affected arm as much as possible to complete the activity. The results of the study support the use of VR over recreational therapy to improve upper-extremity function.

Kim et al. (2007) conducted a study examining the effect of the occupation-based VR activity of safely crossing the street on skill development of patients with unilateral neglect. The control groups were assigned on the basis of level of comfort with computers (i.e., a computer-friendly control group and a computer-unfriendly control group). Kim et al. found limited evidence for the use of VR to improve various skills deemed essential for safe street crossing (i.e., reaction time for safe street crossing). Specifically, they found a significant improvement in reaction time, need for visual and auditory cueing, and success in street crossing compared with the two control groups; however, the description of the comparison intervention was very limited.

Rand, Weiss, and Katz (2009) found insufficient evidence to support the use of a VR program to improve executive functioning and multitasking within shopping tasks in a small study using the Multiple Errands Test as an outcome measure. Participants completed ten 60-min sessions with an occupational therapist using a VR system over a 3-wk period. Participants interacted with a virtual environment on a video screen. In each session, participants used VMall for 45 min and other multitasking VR programs for 15 min. Although the data were trending in a positive direction, the sample was too small to detect a difference ($N = 4$). Overall, these studies provide limited evidence to support the use of VR interventions to improve occupational performance.

The remaining IADL-focused studies included in this review each addressed a different occupational outcome. A study completed by Song, Oh, Kim, and Seo (2011) examined the efficacy of a sexual rehabilitation intervention program for stroke patients and spouses. The intervention was found to be effective in improving sexual knowledge, satisfaction, and frequency of activity. The experimental group participated in a 40- to 50-min education session 1 day before discharge from inpatient care that addressed common sexual problems and causes of changes poststroke, general instructions for a healthy sexual life, and specific strategies for sexual reactivation. This information was also compiled in a booklet and given to the participants in the experimental group. Song et al. found a significant difference between the experimental group and wait-list controls in participation in and satisfaction with sexual activity after a rehabilitation program targeting sexual function.

In a Level III study, Mountain et al. (2010) found limited evidence for the use of the Wheelchair Skills Program (WSP) to teach powered wheelchair skills. Participants each completed five 30-min training sessions using the WSP. The authors found a significant improvement in powered wheelchair performance (maneuvering, assembly, reaching objects from chair, transfers, etc.) after participating in the WSP, which included topics such as safety, variability and distribution of practice, simplification of skills, transfers to and from the wheelchair, and more.

Finally, in a Level I RCT, Devos et al. (2009) examined the carryover effect of driving skills from a comprehensive training program in a driving simulator when

compared with a cognitive training program. Participants were randomized into two groups: simulator group and cognitive group. All participants received a total of 15 training sessions for 1 hr 3 times/wk in addition to traditional rehabilitation services. Those in the simulator group who were trained in a stationary simulator with an automatic transmission completed 12 modules to train six specific driving skills. Those in the cognitive group engaged in commercially available games involving cognitive skills identified as necessary for driving. Devos et al. found moderate evidence for the use of driving simulation training over commercially available cognitive training programs to improve on-the-road driving skills. The intervention group demonstrated significantly improved skills while on the road; however, no difference was found between groups in actual driving performance (Devos et al., 2009).

Although each of these studies found a positive effect of the test intervention, the studies in general were underpowered and do not provide sufficient evidence for the interventions' use at this time.

Interventions in Outpatient Settings. Logan et al. (2004) evaluated the efficacy of occupational therapy intervention that exposed participants to mobility aids and general community mobility education. All participants received one session of occupational therapy in which paper resources were provided. The session also included education on local mobility services as well as advice and encouragement. The experimental group additionally received an assessment of barriers and three to seven occupational therapy intervention sessions at home for as long as 3 mo. Intervention sessions included information on returning to driving, alternative resources to cars and buses, use of adaptations, and overcoming fear. Logan et al. found moderate evidence for this intervention over the provision of leaflets of information concerning local mobility services. Additionally, they found that participants were making significantly more trips outside the home after the intervention.

In a Level III study, Yip and Man (2009) showed insufficient evidence for a VR rehabilitation training (a computer-based program with a joystick to control movement) to increase community mobility. The training showed positive changes in community mobility skills (e.g., a decrease in the time taken to travel to the grocery store and the amount of dangerous behaviors); however, results were not significant because of the small sample size ($N = 4$). Although Yip and Man found that participants' community mobility skills improved, the study was underpowered to determine statistical significance of the change.

Both of these studies had methodological issues (e.g., lack of dosed-matched control, underpowered) and thus did not provide sufficient evidence to support the use of these occupation-based interventions in the outpatient setting.

Interventions in Community Settings. Limited to moderate evidence generally supports occupation-based interventions to improve occupational performance in IADLs in the community setting. One systematic review by Graven, Brock, Hill, and Joubert (2011) found limited evidence for activity- and occupation-based interventions that addressed depressive symptoms and decreased participation and quality of life poststroke. The study found that a comprehensive rehabilitation program (frequent attendance at a day hospital or outpatient clinic) or rehabilitation that addressed leisure activity resulted in decreased depression and increased participation and quality of life. Conversely, they found no evidence for the use of self-management programs, interdisciplinary management (intermittent home visits and phone calls), or information provision. The evidence from this study is limited by the broad inclusion criteria in the review that included a wide array of interventions.

Hartman-Maeir et al. (2007) compared the functional status, leisure activity, and satisfaction of stroke survivors engaged in a community rehabilitation program with those of people who were not participating in a program. The goal of the community rehabilitation program was to increase function by providing a structure to the participants' day, decrease social isolation, and increase coping strategies to reduce caregiver burden. The study found limited evidence for the use of a rehabilitation program targeting community participation compared with a nonactive control group. The authors found a significant increase in activity participation and satisfaction in the intervention group; however, the control group had higher functional performance at the conclusion of the study.

A Level III single-group study by Pettersson, Törnquist, and Ahlström (2006) provided limited evidence to support the use of a powered wheelchair or scooter over not using a device at all. They found a positive effect on community, social, and civic life participation. For example, after the use of the powered device, participants reported having either no or little difficulty with community mobility (i.e., going for a walk or going to the library).

Finally, in the community setting, Söderström, Pettersson, and Leppert (2006) found limited evidence for a driver's education program combining classroom instruction and on-the-road training to improve driving performance after a failed government driver's test. In this Level III

pretest–posttest study, 13 of 15 participants passed the driving test after the intervention. A limitation of this study is that it used no active control group for comparison.

Leisure

Only 2 Level I RCTs examining leisure addressed the focused question and met the inclusion and exclusion criteria of this review. Corr, Phillips, and Walker (2004) found limited evidence for a day rehabilitation program that included a focus on leisure activity to improve self-rated ADL and IADL performance. Participants in this randomized crossover study were placed into two groups: Group A (who received intervention immediately after discharge for 6 mo and then did not receive it for an additional 6 mo) and Group B (who did not receive the intervention for 6 mo postdischarge but then received the service for the next 6 mo). The intervention, provided 1 day/wk, consisted of arts and crafts, social events, outings, and the opportunity to learn a new skill (e.g., computer training). The study found improvement in self-rated performance and satisfaction with performance averaged across areas of self-care, leisure, and productivity. The study found no improvements in extended ADL scores after the intervention.

A Level I RCT by Desrosiers et al. (2007) found moderate evidence for a home-based leisure program in Canada to increase both self-reported participation in and satisfaction with leisure pursuits. An occupational therapist and recreational therapist facilitated leisure participation through leisure awareness, self-awareness, and competency development in the treatment group. The recreational therapist also administered the control treatment, which was home visits consisting of discussions unrelated to leisure. After the intervention, the treatment group reported significant increases in satisfaction with leisure pursuits, time spent in active leisure activities (vs. passive, home-based leisure requiring no physical activity), and total number of leisure activities compared with the control group.

Together, these studies found some evidence to support occupation-based interventions to increase participation in leisure occupations.

Social Participation

Three Level I studies evaluated the use of occupation-based interventions to increase social participation after stroke. Egan, Kessler, Laporte, Metcalfe, and Carter (2007) found insufficient evidence for a client-centered, occupation-based intervention to improve occupational performance poststroke compared with usual care. This small Level I RCT found no significant increase in reported performance in areas of self-care, leisure, and productivity for the group receiving occupational therapy compared with a control group receiving usual care (which typically excluded occupational therapy). The treatment group reported a significant increase in satisfaction with their performance. Egan et al. explained that participants reporting on performance may have continued to compare their performance to prestroke levels, in spite of trends in treatment notes that showed resumption of occupations through activity modification.

In a Level I RCT, Kendall et al. (2007) found limited evidence to support the use of the Chronic Disease Self-Management Program to improve occupational performance and social and family role participation poststroke. Both the treatment and the control groups received standard poststroke rehabilitation during the intervention period. Although the intervention was generally associated with a more stable adjustment in maintaining family roles, self-care, and work productivity at all four assessment times over 1 yr, the final outcomes were not significantly different between groups. Moreover, Kendall et al. found no differences in performance in social roles between groups at any time during the study. The authors reported that the intervention group had more stable adjustment over the course of the study; however, they found no statistically significant difference between groups at the conclusion of the study.

In a Level I RCT pilot study, Polatajko, McEwen, Ryan, and Baum (2012) found moderate evidence for the Cognitive Orientation to daily Occupational Performance (CO–OP) strategy-based intervention in supporting client-centered occupational performance goals compared with a remediation-based usual-care group. The CO–OP group reported significantly greater improvements in occupational performance. Specifically, the small sample ($N = 8$) showed significantly greater improvements in self-rated occupational performance in identified goal areas.

Overall, these 3 studies provide limited evidence to support the use of occupation-based interventions to address social participation goals for people with stroke.

Rest and Sleep

One RCT by Taylor-Piliae and Coull (2012) examined the safety and appropriateness of a Tai Chi program to address sleep quality poststroke. Participants in the Tai Chi group participated in the class 3 times/wk for 12 wk, and the usual-care group received weekly phone calls along with written materials for engagement in community-based physical activities. The results of the study did not support the use of a Tai Chi program over information about community exercise programs to improve sleep

quality poststroke. The results of this study do not provide evidence to support the use of occupation-based interventions to improve rest and sleep poststroke.

Discussion and Implications for Practice, Education, and Research

Implications for Practice

The majority of the literature that addressed the focused question of this review supports the use of occupation-based interventions to improve ADLs, with the best available evidence supporting the use of occupation-based interventions to improve ADLs in the home (Legg & Langhorne, 2004; Legg et al., 2007, 2009). Overall, more evidence supports the use of occupation-based interventions to improve ADL performance in the inpatient, outpatient, and community settings than supports impairment remediation approaches; however, the literature in this area is limited by several methodological issues, including small samples that did not allow for statistical comparison, poor description of interventions, lack of an appropriate control condition, and lack of an appropriate or sensitive outcome measure.

Given the broad spectrum of specific IADL activities, it is not surprising that the evidence in this area was much more disparate than with ADL activities. The studies that were evaluated provided limited evidence to support the use of VR-based interventions to improve IADL performance poststroke. Also, emerging evidence from preliminary studies has supported driver education and wheelchair skills training. The remaining studies reviewed were inconclusive and provided little to no evidence to support occupation-based interventions to improve IADL performance. A strength and limitation of this evidence-based review was that it was focused on evaluating studies that used not only an occupation-based intervention but also an occupation- or participation-based outcome measure. This limited the breadth of the articles, specifically with regard to IADLs, that were included because much of the literature in this area evaluated interventions using much more proximal outcome measures, that is, impairment reduction. Practitioners should look to the literature related to specific IADL occupation-based interventions to evaluate the evidence related to their use to improve other outcomes poststroke.

Very few studies evaluated the use of occupation-based interventions to improve leisure, social participation, and rest or sleep poststroke. The studies that were included in this review were almost all preliminary studies evaluating the primary effect of the intervention with a pilot sample. These studies provide insufficient evidence to support the use of occupation-based interventions to address these areas of occupation; the findings can be summarized as follows:

- The evidence supports the use of occupation-based interventions to improve occupational performance after stroke.
- The majority of the evidence supports interventions targeting ADL performance.
- The evidence related to IADL performance is disparate and more difficult to draw definitive conclusions from.
- Limited to no evidence supports occupation-based interventions to address other areas of occupation beyond ADLs and IADLs.
- Several of the studies included were preliminary in nature or had methodological issues that could limit the generalizability of the findings.

Implications for Education

Educational programs preparing occupational therapy practitioners for evidence-based practice can use the results of this review to help students understand and support occupational therapy's role in using occupation-based interventions. Moreover, it is also important that educational programs emphasize to future practitioners the importance of being able to articulate to their patients, other health care providers, and the public what occupational therapy intervention is and why they are doing it. Poor descriptions of interventions limit the ability to understand and replicate the intervention with future patients. Finally, the results of this review can also be used by practitioners and future practitioners to understand the importance of measuring outcomes of their interventions. The use of inappropriate outcome measures (e.g., a measure that does not match the intervention or a measure that lacks sensitivity) limits the ability to evaluate interventions.

Implications for Research

With the exception of the studies that evaluated ADL performance, the studies used disparate and at times undeveloped outcome measures to evaluate interventions. This finding speaks to the need within the occupational therapy profession to develop well-validated, sensitive, performance-based outcome measures that can be used to evaluate clinical and research outcomes. The development of science in occupational therapy will be hindered until practitioners have the appropriate tools to evaluate their interventions. Another implication of this evidence-based review is highlighted by the overemphasis on ADL performance. In general, regardless of diagnosis, occupational therapy is too focused on ADL performance, which limits practitioners' role in the other areas of occupation that are meaningful to clients. Interventions targeting IADLs, leisure, social participation,

rest and sleep, work and productivity, and so forth need to be developed and evaluated. Finally, a very acute need that can easily be addressed by the research community is that to better develop and describe interventions. Several of the articles in this review described interventions in vague terms, which limits the generalizability of the findings and their replicability in future work.

Limitations

One of the primary limitations of this review is that the focused question involved evaluating studies that used both an occupation-based intervention and an occupation- and participation-based outcome measure. As mentioned in the discussion, addressing this question drastically limited the number of articles that fit with this review. Investigators, specifically in early-phase intervention development studies, often use more proximal measures to evaluate the effect of an intervention. This review highlighted the fact that occupation often is not a primary outcome, which should be addressed in future work.

In terms of the articles evaluated, several consistent methodological issues should also be noted because they limit the generalizability of the findings. As previously mentioned, these issues include small samples that limit the ability to conduct statistical evaluation of the data, lack of an appropriate control condition, lack of an appropriate outcome measure, and lack of an adequate description of the intervention being evaluated.

Conclusion

The results of this evidence-based review support the use of occupation-based interventions to improve areas of occupation after stroke. The majority of the available evidence supports the use of occupation-based interventions to address ADL performance. The evidence related to other areas of occupation is much less conclusive and leaves several gaps that need to be addressed in future research. Future work in this area needs to better describe interventions being evaluated, needs an appropriate control condition, and should use sensitive outcome measures to capture the effect of the interventions. ▲

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