

# Occupational Therapy in Fall Prevention: Current Evidence and Future Directions

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## KEY WORDS

- accident prevention
- accidental falls
- evidence-based practice
- occupational therapy
- professional role

Falls are a serious public health concern among older adults in the United States. Although many fall prevention recommendations exist, such as those published by the American Geriatrics Society (AGS) and the British Geriatrics Society (BGS) in 2010, the specific role of occupational therapy in these efforts is unclear. This article presents a scoping review of current published research documenting the role of occupational therapy in fall prevention interventions among community-dwelling older adults, structured by the AGS and BGS guidelines. We identified evidence for occupational therapy practitioner involvement in fall prevention in environmental modifications, exercise, and multifactorial and multicomponent interventions. Although research documenting the efficacy of occupational therapy interventions is identified as part of the *Occupational Therapy Practice Framework: Domain and Process* (2nd ed.; American Occupational Therapy Association, 2008), we identified little or no such research examining interventions to modify behaviors (e.g., fear of falling), manage postural hypotension, recommend appropriate footwear, and manage medications. Although occupational therapy is represented in the fall prevention research, the evidence for the profession's role in many areas is still lacking.

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Thirty percent of community-dwelling older adults  $\geq 65$  yr old fall each year; of that group, 10% suffer a severe injury (Anderson, Miniño, Fingerhut, Warner, & Heinen, 2006). Falls are associated with limitations in activity, loss of independence, and institutionalization (Stevens, Corso, Finkelstein, & Miller, 2006; Tinetti, Inouye, Gill, & Doucette, 1995) often caused by a combination of medical, social, and environmental factors (Chang & Ganz, 2007). Occupational therapy practitioners are uniquely qualified to address the multifactorial nature of falls, given their knowledge of factors that influence occupational performance (Peterson & Clemson, 2008). The specific role of occupational therapy in fall prevention, however, is unclear.

Fall prevention research, in general, has been synthesized and translated into clinical practice recommendations such as the guidelines updated in 2010 by the American Geriatrics Society (AGS) in collaboration with the British Geriatrics Society (BGS). These evidence-based guidelines outline strategies for fall risk screening and highlight areas of risk for which research evidence supports intervention. Recommended intervention areas include modifying the environment; using exercise to improve strength, balance, and gait; managing and minimizing medications; managing postural hypotension; recommending appropriate footwear and managing existing foot problems; and modifying behavior, such as reducing the fear of falling. According to the *Occupational Therapy Practice Framework: Domain and Process* (2nd ed.; American Occupational Therapy Association [AOTA], 2008), occupational therapy has a role in supporting each intervention area. Although modifying the environment has been a traditional occupational therapy role in fall prevention, given the occupational therapy perspective of treating people within context, occupational therapy practitioners

can address other fall risk factors as part of a multidisciplinary team. For instance, exercise interventions that improve strength, range of motion, balance, coordination, and endurance address the motor and praxis skills needed to support occupational performance. In addition, behavioral factors, such as fear of falling, can negatively affect activity performance, thereby increasing fall risk (Walker & Howland, 1991; Zijlstra et al., 2009). Occupational therapists can use education to change behavior and improve older adults' *falls self-efficacy*—that is, their confidence in performing activities without falling (Cheal & Clemson, 2001; Peterson & Murphy, 2002).

As part of a multidisciplinary team, occupational therapy practitioners potentially have a role in the other recommended areas listed in the AGS and BGS (2010) guidelines, including medication management, postural hypotension management, and recommendation of appropriate footwear, because those areas also affect occupational performance. For example, occupational therapy practitioners can provide interventions to address performance skills and performance patterns associated with older adults' ability to take their medications in a timely manner or reduce the effects of postural hypotension, which, unaddressed, may decrease participation in desired occupations and increase fall risk.

The purpose of the literature review described in this article is to summarize the existing occupational therapy-related fall prevention literature to elucidate information on occupational therapy's current involvement in these efforts and offer suggestions for future opportunities for occupational therapy in fall prevention for community-dwelling older adults. An initial search of the literature did not reveal sufficient occupational therapy evidence within the targeted AGS and BGS intervention areas to support a systematic review or meta-analysis. Therefore, we undertook a scoping review. Whereas a systematic review evaluates the quality of the literature, a *scoping review* informs future research needs by summarizing the current evidence on a given topic and identifying gaps in the literature (Arksey & O'Malley, 2005). Our research question was, "What is known from the existing literature about the role of occupational therapy in evidence-based fall prevention interventions for community-dwelling adults age 65 and older?"

## Method

We conducted a bibliographic search of the Medline/Pubmed, CINAHL, Google Scholar, and Cochrane databases. The search was limited to articles published between January 1990 and October 2010. Most research before 1990 focused on identifying risk factors associated with falls

(e.g., Tinetti, Speechley, & Ginter, 1988) rather than on examining occupational therapy-led interventions to decrease fall risk. We therefore felt that 1990 was an appropriate starting point for this study. To be included, articles had to be written in English, include a sample of community-dwelling older adults  $\geq 65$  yr old, include an intervention that involved occupational therapy (e.g., occupational therapy practitioners conducted and/or designed the intervention), and evaluate falls or a fall-related outcome. We included only articles that were published in peer-reviewed journals, as opposed to clinical practice journals (e.g., *OT Practice*) or newsletters (e.g., *Gerontology Special Interest Section Newsletter*), and that described a quantitative research study that evaluated a fall-related intervention. Articles that examined solely the cost-effectiveness or the structure and process of implementing a fall prevention program were excluded. Systematic reviews and meta-analyses were also excluded; however, we reviewed the reference lists of included articles to identify any relevant articles not already captured by the initial search. In addition, we excluded articles focusing on specialized populations (e.g., multiple sclerosis, low vision, diabetes, arthritis, Parkinson's disease, stroke); our rationale was that such populations may have unique fall prevention intervention needs that may not be pertinent to most community-dwelling older adults.

The initial search used the terms *occupational therapy* and *fall prevention* and each of the AGS and BGS (2010) intervention areas (i.e., *environmental modification*, *exercise*, *medication management*, *managing postural hypotension*, *managing existing foot problems and recommending appropriate footwear*, and *behavior modification*). This search resulted in an initial sample of 198 articles. We reviewed article abstracts to determine whether our initial inclusion criteria were met and to categorize each article into one of the mutually exclusive intervention areas; multifactorial or multicomponent interventions (i.e., interventions that address multiple fall risk factors) were grouped into their own intervention area. The AGS and BGS guidelines distinguish between these two terms; specifically, *multifactorial interventions* are those administered to one person targeting his or her specific fall risk factors, and multicomponent interventions are group-based interventions that incorporate multiple intervention areas into one fall prevention program. We then summarized the resulting sample of articles.

## Results

We identified 15 articles that addressed the seven intervention areas, which we divided into three categories:

environmental modifications, exercise, and multifactorial and multicomponent interventions. Most of the studies were randomized controlled trials (80%,  $n = 12$ ). Forty percent ( $n = 6$ ) were conducted in Australia; other countries represented included Finland, France, Germany, the Netherlands, New Zealand, the United Kingdom, and the United States.

### *Environmental Modification Interventions*

The initial search for environmental modification interventions resulted in 45 articles. We excluded articles that were not intervention studies ( $n = 18$ ), were not falls-related ( $n = 12$ ), were published in practice journals ( $n = 4$ ), did not incorporate occupational therapy ( $n = 3$ ), or involved a specialized population (significant visual impairment;  $n = 1$ ). The final sample ( $n = 7$ ) is summarized in Table 1.

The study interventions involved home modification recommendations and had differing effects on fall incidence and other fall-related outcomes and varying success rates with participants (see Table 1 for details). In addition, home assessment interventions varied among studies, and some articles did not report adequate detail on the intervention itself. Some studies (e.g., Di Monaco et al., 2008; Peel, Steinberg, & Williams, 2000) outlined an approach that addressed multiple factors in the home assessment, such as performance of activities of daily living and education. In other studies, financial assistance was provided for home modifications (Peel et al., 2000); not all studies identified the financial aspect of home modification, however. In addition, the studies had various control groups that, for example, received education only, a minimal home hazard assessment, or no intervention.

### *Exercise Interventions*

During the initial article search, we identified 47 exercise-related articles. We excluded 44 because they were unrelated to falls ( $n = 30$ ), did not have occupational therapy involvement ( $n = 1$ ), were not research based ( $n = 7$ ), or were systematic reviews or meta-analyses ( $n = 6$ ). Table 2 summarizes the final sample of articles ( $n = 3$ ).

The exercise interventions were classified into two different categories: (1) functional exercises (Clemson et al., 2010; Luukinen et al., 2007) and (2) complementary or alternative exercises (Mihay, Boggs, Breck, Dokken, & Nathalang, 2006). The administration of exercises varied among the studies and included individualized exercise interventions with older adults (Clemson et al., 2010), group interventions (Mihay et al., 2006), and individual and group exercise interventions (Luukinen et al., 2007). These studies showed varying effectiveness in reducing fall risk but were difficult to compare because of the different

methodologies and types of exercise examined. For example, one study determined that functional exercise embedded in daily routines was effective in decreasing fall risk (Clemson et al., 2010), whereas another study (Luukinen et al., 2007) determined that functional exercises such as walking, self-care, or home or group exercise were ineffective in decreasing fall risk. A third study (Mihay et al., 2006) determined that strengthening exercises and tai chi-inspired exercise improved balance, which might in turn have lessened fall risk. Additionally, the methodological descriptions of these studies did not make clear the details of occupational therapy's specific role in the intervention. None of the studies compared rote exercises to occupation-based exercise in decreasing the number of falls or fall risk.

### *Multifactorial and Multicomponent Interventions*

We identified 22 articles categorized as multifactorial or multicomponent interventions. Articles excluded were nonresearch articles ( $n = 3$ ), did not meet the age minimum ( $n = 2$ ), involved a specialized population (adult day center participant,  $n = 1$ ; psychiatric ward resident,  $n = 1$ ; significant vision impairment,  $n = 2$ ), had no fall-related outcome ( $n = 3$ ), did not incorporate an occupational therapy practitioner ( $n = 3$ ), or were process or evaluation studies ( $n = 2$ ). The five remaining articles (see Table 3) were classified into two categories: those in which an occupational therapist was part of a multidisciplinary multifactorial intervention team ( $n = 4$ ) and those that examined the efficacy of an occupational therapy-led multicomponent intervention ( $n = 1$ ).

Two of the four multidisciplinary team intervention articles used an occupational therapist as the home assessment and modification interventionist (Davison, Bond, Dawson, Steen, & Kenny, 2005; Nikolaus & Bach, 2003). In the other two multidisciplinary team articles, an occupational therapist addressed environmental modifications and completed a functional assessment (Close et al., 1999; Hendriks et al., 2008). Only one study examined the role of occupational therapy in a multicomponent intervention. The occupational therapy group intervention involved fall risk identification; environmental modifications; use of exercises to improve strength, balance, and gait; medication management; improvement of community safety; recommendations to address footwear and foot problems, management of vision deficits; and improvement in mobility (Clemson et al., 2004). The role of the occupational therapy practitioner in these five studies varied; only one intervention was not efficacious in decreasing fall risk (Hendriks et al., 2008). None were conducted in the United States. The four multidisciplinary

**Table 1. Environmental Modification Interventions to Decrease Fall Risk (N = 7)**

Author	Study Purpose	Study Type	Sample	Intervention	Conclusions
Cumming et al. (1999)	Determine whether occupational therapist home visits targeted at addressing environmental hazards reduce the risk of falls	RCT	N = 530 Mean age = 77 yr Australia	<i>Intervention group:</i> An occupational therapist completed an assessment of environmental hazards, facilitated necessary home modifications (approximately 1 hr duration), and followed up via phone call at 2 wk to check that the modifications had been made and to encourage compliance with recommendations. <i>Control group:</i> No home visit was provided.	Participants in the intervention group had a reduced likelihood of falling in the 12-mo follow-up period. It is not clear, however, how much this result can be attributed to the intervention because falls were reduced both in and out of the home environment.
Cumming et al. (2001)	Examine adherence to home modification recommendations made by an occupational therapist in Cumming et al. (1999) study	RCT (secondary analysis)	N = 178 participants from the intervention arm of the Cumming et al. (1999) study Mean age = 76 yr Australia	Same intervention as for Cumming et al. (1999) study.	65% of participants adhered to ≥50% of recommendations. Those who adhered to recommendations were more likely than those who did not to believe that home modifications can reduce the risk of falling.
Di Monaco et al. (2008)	Assess the effectiveness of a single home visit by an occupational therapist in reducing fall risk after hip fracture in older adult women	Quasi-RCT	N = 95 women admitted to a rehabilitation hospital after sustaining a fall-related hip fracture Mean age = 80 yr Italy	<i>Intervention group:</i> Participants completed a home safety checklist in the hospital with an occupational therapist and received a 1-hr home visit after discharge that focused on hazard assessment, behaviors during ADLs, and recommendations. <i>Control group:</i> Participants completed only a home safety checklist in the hospital with an occupational therapist.	No significant difference was found in fall rate between the intervention and control groups. However, participants who complied with the intervention (i.e., followed ≥50% of recommendations) were significantly less likely to experience one or more falls than control participants.
Greene, Sample, & Fruhauf (2009)	Report a partial inventory of fall hazards for community-dwelling older adults and characterize older adult responses to fall prevention	Pretest–posttest design	N = 35 community-dwelling older adults Mean age of those with a history of a fall = 79.3; mean age of those with no fall history = 75.3 United States	All participants received a home visit in which fall risks were evaluated and recommendations for home modifications were made. Follow-up interviews were conducted 6 mo later.	One or more modifications were made in 81% of homes. Seven participants fell in the follow-up period. Only one fall was related to recommended modifications. The authors suggest that it is important to address unique fall situations by addressing behavior, raising awareness, and improving problem solving among older adults.

Lannin et al. (2007)	Investigate the feasibility of an RCT in a clinical setting and the effect of predischARGE home visits on functional performance in older people undergoing rehabilitation	RCT	<i>N</i> = 18 patients admitted to a metropolitan rehabilitation unit who were referred to an occupational therapist and who planned to return to the same community dwelling on discharge Mean age = 81 yr Australia	<i>Intervention group:</i> Participants received a predischARGE home visit that involved assessment of their function and environment. <i>Control group:</i> Participants received routine care that included a hospital-based interview and provision of information on community access and use of adaptive equipment.	Observed performance of functional abilities did not differ between groups. Patient-perceived functional performance on ADLs was higher at follow-up in the intervention group than in the control group, although both groups experienced improvement on this measure at 3-mo follow-up.
Pardessus et al. (2002)	Investigate whether home visits by an occupational therapist reduce fall risk and improve autonomy of older patients	RCT	<i>N</i> = 60 participants who were hospitalized for falling and were able to return home after being hospitalized Mean age = 84 yr France	<i>Intervention group:</i> Participants received one 2-hr visit from several members of the physical medicine team who assessed ADLs, functional mobility, and home hazards. <i>Control group:</i> Participants received routine care.	No significant difference was found in the number of falls between the intervention and control groups. Autonomy (measured by ADL independence indexes) was better preserved in intervention vs. control participants at 6- and 12-mo follow-up.
Peel, Steinberg, & Williams (2000)	Examine the effectiveness of a home safety assessment as part of a randomized trial of fall prevention interventions among older community dwellers	RCT	<i>N</i> = 252 people in 4 groups, 2 that received a home assessment and 2 that did not Mean age = 69 yr Australia	<i>Intervention groups:</i> Participants received one home visit to address home modifications, financial assistance to make modifications, and the same education and exercise components as the control group. Half of the home assessment group also received a clinical assessment addressing fall risk factors. <i>Control groups:</i> All received education (an oral presentation and video on home safety and modifications), and half were offered a monthly exercise class.	59% of participants in the home assessment group made at least one home modification, compared with 32% of control participants. A trend was found toward reduced fall incidence in the home assessment group compared with the control group during the follow-up period, although the result was nonsignificant.

*Note.* ADLs = activities of daily living; RCT = randomized controlled trial.

**Table 2. Exercise Interventions to Decrease Fall Risk (*n* = 3)**

Author	Study Purpose	Study Type	Sample	Intervention	Conclusions
Clemson et al. (2010)	Examine whether LIFE intervention methods (balance and strength exercises within daily activities) were pragmatic and effective in reducing falls in older adults	RCT with single blinding of assessors	<i>N</i> = 34 participants who had had ≥2 falls or one fall-related injury in the previous year  Intervention group mean age = 81 yr; control group mean age = 82 yr  Australia	<i>Intervention groups:</i> Participants engaged in exercises during everyday activities to improve balance (e.g., standing on one foot while working at the kitchen counter) and strength (e.g., crouching to pick up a dropped item).  <i>Control group:</i> No exercise intervention was offered.	LIFE exercises were effective in reducing the number of falls.
Luukinen et al. (2007)	Investigate the effectiveness of a fall prevention intervention planned and conducted by a geriatric team	RCT	<i>N</i> = 555  Mean age = 88 yr  Finland	<i>Intervention groups:</i> Participants engaged in walking exercises, group exercises, self-care exercises, or home exercises.  <i>Control group:</i> Participants received routine care.	The intervention was ineffective in lowering fall risk but did slow the deterioration of balance skills.
Mihay, Boggs, Breck, Dokken, & Nathalang (2006)	Compare tai chi–Inspired Exercise (TCIE) with strengthening for reducing fall risk in community-dwelling older adults	Pilot study using a quantitative quasi-experimental design	<i>N</i> = 22  Tai chi group: <i>n</i> = 12, mean age = 80.3 yr  Strength-training group: <i>n</i> = 10, mean age = 78 yr  United States	<i>TCIE group:</i> Participants engaged in TCIE that incorporated balance, shifting weight, and fall reduction principles 2×/weekly for 18 mo.  <i>Strength-training group:</i> Participants did strengthening exercises that “emphasized repetitive target movement while distributing weight evenly through both legs” (p. 23) 3×/weekly for 18 mo.	Both interventions were beneficial. The strength-training group showed greater improvements in movement and directional control for repetitive movements. The TCIE group showed a higher level of performance during functional tasks.

*Note.* LIFE = Lifestyle approach to reducing Falls through Exercise; RCT = randomized controlled trial.

**Table 3. Multifactorial and Multicomponent Interventions to Decrease Fall Risk (n = 5)**

Author	Study Purpose	Study Type	Sample	Intervention	Conclusion
Clemson et al. (2004)	Evaluate the effectiveness of Stepping On, a community-based multicomponent fall prevention program	RCT	N = 310 older adults age 70+ yr with history of falling in the past 12 mo or concern about falling  Intervention group mean age = 78.3 yr; control group mean age = 78.5 yr  Australia	<i>Intervention group:</i> An occupational therapist facilitated a 7-wk multicomponent intervention program incorporating risk identification, exercise, home hazards identification, community safety, footwear management, vision, medication management, mobility, and a home assessment.  <i>Control group:</i> Participants received social visits.	The Stepping On participants experienced decreased fall risk.
Close et al. (1999)	Evaluate the effectiveness of a structured interdisciplinary assessment for people with a history of falling in limiting further falls	RCT	N = 397 participants who presented to the ER  Mean age = 78.2  United Kingdom	<i>Intervention group:</i> Participants received a multidisciplinary, multifactorial intervention that included a comprehensive medical assessment (assessment of vision, balance, cognition, affect, medications, and hypotension) followed by an occupational therapy assessment (home and functional assessment, recommendations and education on safety in the home and modifications). Referral to further services was made as needed.  <i>Control group:</i> Participants received usual care.	The intervention group experienced decreased fall risk.
Davison, Bond, Dawson, Steen, & Kenny (2005)	Examine the effectiveness of a multifactorial fall prevention program for cognitively intact community-dwelling older adults	RCT	N = 313 older adults age 65+ yr who visited the ER after a fall or fall-related injury  Mean age = 77 yr  United Kingdom	<i>Intervention group:</i> Participants received a multidisciplinary, multifactorial intervention incorporating a medical assessment (medication, vision, cardiovascular, blood, EKG), physical therapy assessment (gait balance assessment [POMA]; assessment of feet, footwear, and assistive devices), and occupational therapy assessment (home safety checklist).  <i>Control group:</i> Participants received usual care.	The intervention group experienced reduced recurrent falls.

(Continued)

**Table 3. Multifactorial and Multicomponent Interventions to Decrease Fall Risk (n = 5) (cont.)**

Author	Study Purpose	Study Type	Sample	Intervention	Conclusion
Hendriks et al. (2008)	Examine the efficacy of a multifactorial intervention vs. usual care	RCT	N = 335 older adults age 65+ yr seen in ER after a fall  Intervention group mean age = 74.5 yr; control group mean age = 75.2 yr  Netherlands	<i>Intervention group:</i> Participants received a multidisciplinary, multifactorial intervention, including medical and occupational therapy assessments, to assess and address potential risk factors for new falls (i.e., assessment of vision, sense of hearing, locomotor apparatus, feet and footwear, peripheral nervous system, balance and mobility, anthropometry, cognition, affect, blood tests, and medication use).  <i>Control group:</i> Participants received usual care.	The intervention was not effective in decreasing falls.
Nikolaus & Bach (2003)	Examine the effect of a multidisciplinary team intervention aimed at reducing falls	RCT	N = 360 older adults admitted from community to geriatric hospital  Intervention group mean age = 81.2 yr; control group mean age = 81.9 yr  Germany	<i>Intervention group:</i> Participants received a multidisciplinary, multifactorial intervention that included a comprehensive geriatric assessment; a home evaluation completed by an occupational therapist, nurse, or physiotherapist; a follow-up home visit to educate on fall risk and adaptive equipment use; and suggestions for home modifications.  <i>Control group:</i> Participants received a geriatric assessment with usual care.	The intervention group experienced decreased fall risk.

*Note.* EKG = electrocardiogram; ER = emergency room; POMA = Performance Oriented Mobility Assessment; RCT = randomized controlled trial.

team interventions were administered individually to older adults, whereas the occupational therapy–led intervention was a small-group intervention.

### *Other Intervention Areas*

During the initial search for interventions examining management of medications to reduce fall risk, we identified 23 articles. We excluded all articles because they did not pertain to falls ( $n = 14$ ) or were population based ( $n = 9$ ; Parkinson's disease, psychiatric disorders). The two articles we initially identified in the intervention area addressing postural hypotension were later eliminated because they did not relate to falls. Of the 16 studies we identified in the footwear area, 7 pertained to foot care in diabetes, 5 were published in practice journals, 3 were nonresearch articles, and 1 was a nonintervention study. We found no studies of occupational therapy interventions that linked footwear to falls.

In the behavioral intervention area, we identified 24 articles (7 behavioral interventions, 17 fear-of-falling interventions). All behavioral intervention articles were excluded because they did not examine falls ( $n = 2$ ), were population based ( $n = 1$ ), did not meet the age requirement ( $n = 1$ ), were not published in a peer-reviewed journal ( $n = 2$ ), or were not research based ( $n = 1$ ). All fear-of-falling articles were excluded because they did not examine falls or did not have fear of falling as an outcome measure ( $n = 2$ ), did not involve occupational therapy ( $n = 3$ ), were population based ( $n = 5$ ), were not quantitative ( $n = 2$ ), involved a special population ( $n = 1$ ), or were not published in a peer-reviewed journal ( $n = 4$ ).

### **Limitations**

Studies included in this scoping review were limited to intervention studies that examined an outcome related to falls and that involved an occupational therapy practitioner. We excluded studies evaluating the effectiveness of an occupational therapy intervention (e.g., environmental modification) that did not include the number of falls or fall risk as an outcome. We identified studies for this review through bibliographic searches; alternate search terms may have resulted in additional articles. Additionally, we may have inadvertently excluded articles because we did not identify occupational therapy or fall prevention intervention terms in our examination of key words, titles, and abstracts.

### **Conclusion**

This scoping review highlights seven fall intervention areas in which further research is needed to provide evidence

supporting occupational therapy interventions to decrease falls among community-living older adults. Specifically, there is a dearth of research documenting interventions focusing on modifying fall risk behaviors (e.g., reducing fear of falling), managing postural hypotension, managing medications, and recommending appropriate footwear to decrease fall risk among community-dwelling older adults. Little of the research documenting occupational therapy's role in intervention areas identified by the AGS and BGS (2010; i.e., environmental modifications, exercise, and multifactorial and multicomponent interventions) was conducted in the United States. More research is needed to document occupational therapy evidence-based interventions in the United States across fall prevention intervention areas. Additionally, translational studies are needed to ensure that programs such as Stepping On (an Australian occupational therapy–led, multicomponent intervention program; Clemson et al., 2004) can be efficaciously carried out among community-dwelling older adults in the United States.

### **Implications for Occupational Therapy Research**

Of the current evidence documenting the role of occupational therapy in three fall prevention intervention areas—environmental modifications, exercise, and multifactorial and multicomponent interventions—only 15 articles met the criteria for this study, highlighting the need for further occupational therapy research in these areas. In addition, this evidence comes largely from international studies; this review underscores the dearth of research conducted in the United States among community-living older adults. Cross-national differences in health care systems may influence the ability to translate successful fall prevention programs to practice in the United States. The limited occupational therapy research we identified addressing the efficacy of fall risk interventions among U.S. community-dwelling older adults also highlights the paucity of such research published in peer-reviewed journals. Further research is needed to identify the efficacy of occupational therapy–led multicomponent group interventions versus individualized multifactorial interventions to decrease fall risk.

Although fall prevention interventions are within the occupational therapy scope of practice as identified in the *Framework* (AOTA, 2008), important gaps were evident in the literature documenting the occupational therapy practitioner's role in fall-related interventions addressing managing medications, managing postural hypotension,

recommending appropriate footwear and managing existing foot problems, and modifying behaviors such as fear of falling among community-dwelling older adults. For example, Clemson and colleagues (2004) incorporated footwear management and medication management into their randomized controlled trial of a multicomponent intervention; however, they did not test the efficacy of these interventions independently. Although the profession has begun to outline occupational therapy's role in targeting the minimization of fall risk in community-dwelling older adults in these areas (e.g., Juarbe & Bondoc, 2009; Peterson & Clemson, 2008), research is needed that clearly demonstrates the contribution of occupational therapy and efficacy of occupational therapy-led interventions. Guided by the *Framework*, we outline in the sections that follow the potential contributions occupational therapy practitioners can make to fall prevention intervention in the areas outlined in the AGS and BGS (2010) guidelines in which, at present, no occupational therapy research on efficacy exists.

### *Managing Medications*

There is no research examining the efficacy of occupational therapy interventions targeting medication management to reduce fall risk. Studies are needed that evaluate teaching older adults compensatory strategies to open medication containers; ensuring the timeliness with which they take medications by using visual cueing, checklists, medication boxes, or automatic pill dispensers; simplifying medication routines; or integrating the medication routine into established performance patterns (e.g., taking medications at meals or bedtime) as interventions to decrease fall risk.

### *Managing Postural Hypotension and Recommending Appropriate Footwear*

Occupational therapy practitioners have the knowledge to understand how joint deformities, blood pressure changes, and the presence of wounds affect occupational performance (AOTA, 2008). Using this knowledge, fall prevention research is needed to examine the efficacy of interventions focusing on gradually accommodating to postural changes, establishing routines to facilitate consistent blood pressure medications consumption, and compensatory strategies for donning and doffing footwear to limit risk of skin breakdown and fall risk. The evidence base to support the occupational therapy practitioner's role in providing interventions for older adults that include education on appropriate footwear to support balance, mobility, and skin integrity needs to be developed.

### *Making Behavioral Changes and Reducing Fear of Falling*

Occupational therapy practitioners have promising preliminary evidence supporting the effectiveness of facilitating behavior change (Peterson & Murphy, 2002; Walker & Howland, 1991). The limitation in this area of research involves the use of fall risk as the identified outcome. Occupational therapy practitioners can facilitate behavioral changes by addressing changes in a person's routines to decrease fall risk and fear of falling (e.g., instructing older adults to use stair railings consistently; Peterson & Clemson, 2008). Additionally, behavioral interventions may be incorporated into multifactorial interventions such as home modifications and home safety education (AGS & BGS, 2010; Walker & Howland, 1991), exercises (Harling & Simpson, 2008), assertiveness training (Walker & Howland, 1991; Zijlstra et al., 2009), self-efficacy training (e.g., Cheal & Clemson, 2001; Zijlstra et al., 2009), and multicomponent interventions that address fear of falling such as A Matter of Balance (Peterson & Clemson, 2008) and Stepping On (Clemson et al., 2004; Peterson & Clemson, 2008). Occupational therapy practitioners can also reduce fear of falling in older adults by having them practice fear-provoking daily tasks to increase confidence, assisting them with cognitive restructuring (Peterson & Murphy, 2002; Zijlstra et al., 2009), and using guided imagery (Juarbe & Bondoc, 2009).

### *Implications for Occupational Therapy Practice*

This scoping review elucidates the contribution of occupational therapy interventions in the pursuit of fall prevention, specifically, environmental modification interventions, exercise, and multifactorial and multicomponent interventions. Occupational therapy practitioners working with community-living older adults should be cognizant of these trends within fall prevention research and mindful of the need for further research demonstrating the efficacy of occupational therapy interventions addressing fall prevention in the areas of medication and postural hypotension management, behavior modification, and recommendations of appropriate footwear. To summarize,

- Occupational therapy contributes to fall prevention among community-living older adults through environmental modification interventions, exercise, and multicomponent or multifactorial interventions.
- Clinicians should be cognizant of the evidence supporting the efficacy of fall interventions. Much of this research has not been carried out in the United States,

and barriers to carrying out these programs may exist in the U.S. context.

- Occupational therapy research examining the efficacy of fall prevention interventions targeting the modification of fall risk behaviors (e.g., reducing the fear of falling), management of postural hypotension, medication management, and recommendation of appropriate footwear among community-dwelling older adults is needed.

The *Framework* supports the role of occupational therapy in the intervention areas identified in the AGS and BGS (2010) intervention guidelines, and occupational therapy is represented in fall prevention research. Nevertheless, the evidence for occupational therapy's role in many areas is still limited, and research targeting the effectiveness of occupational therapy interventions in addressing fall-related outcomes is needed. ▲

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