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Occupation-Based Education for Fall Prevention in Community-Dwelling Older Adults: A Critically Appraised Topic Paper

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Occupation-Based Education for Fall Prevention in Community-Dwelling Older Adults: A Critically Appraised Topic Paper

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Focus question

What is the evidence for the effectiveness of individualized occupation-based wellness education sessions on fall prevention with an emphasis on environmental modifications, nutrition, and hydration among adults aged 65 and older living independently in rural communities?

Clinical scenario

Community-dwelling older adults are at a higher risk of falls due to many factors; including their environment and nutritional state. Falls have been described as "unintentionally coming to rest on the ground, floor, or other lower-level" (Buchner et al., 1993 as cited in Chase, Mann, Wasek, & Arbesman, 2012, p. 284). Community-dwelling older adults have been described in this research as individuals who are 65 years or older and who live independently**.** A rural community, according to the United States Census Bureau (2019) "encompasses all population, housing, and territory not included within an urban area" **(**para. 3**)**, and usually refers to a type of community that is less dense, has a sparse population, is not well built up, and has things that are at a distance (Ratcliffe, Burd, Holder, & Fields, 2016).

The prevalence of falls in the home affects more than one in four older adults aged 65 years or older, and women are more likely to be treated for fall injuries (Stevens et al., 2012; Bergen, Stevens & Burns, 2016). Among the community-dwelling older adult population, physiological and pathological changes related to normal aging, in particular sensory changes, have also been associated with increased risk of falls. These changes include, but are not limited to, vision, hearing, balance, poor reflex response, and declining muscle strength, which all contribute to challenges in seeing and avoiding obstacles in their environment (Ambrose, Paul, & Hausdorff, 2013). In addition, community-dwelling older adults may experience limiting factors such as chronic health conditions, mobility issues, a history of previous falls, and side effects caused by their medications (Zhao, Alderden, Lind, & Kim, 2018). Fall factors, such as medication side effects, mobility skills, and environmental hazards, has proven to be multifactorial in nature and are all reasons to anticipate future falls, possible institutionalization, and loss of independence (Bloch, et al., 2010). One reason why fall prevalence in people over the age of 65 years is such an important factor to consider is that it has been linked to causing a decline in cognitive abilities, traumatic brain injuries, and an overall reduced ability to perform activities of daily living. (Bergen, Stevens & Burns, 2016). Through the lens of the Person-Environment-Occupation (PEO) model, this suggests a poor fit between the person and their environment, which in turn will affect their occupational performance and participation (Baptiste, 2017).

Fall and nutrition

There is significant evidence that nutrition and hydration play a role in the prevalence of frailty and falls among community-dwelling older adults (Banu et al., 2020; Bialecka-Debek & Pietruszka, 2019; Hamirudin, Charlton, & Walton, 2016; Mangels, 2018). A compromised nutritional state increases the frequency of visits to the hospital, which can place a burden on health care services and resources (Hamirudin, Charlton, & Walton, 2016). Malnourished older

adults not only have greater hospital admissions; but longer hospital stays and a higher risk of falling compared to their well-nourished counterparts (Visvanathan et al., 2003). Malnutrition is often accompanied by loss of body weight, muscle mass, and strength, and results in decreased physical functions, such as leg power and mobility (Misu et al., 2016). Gait is a major physical activity in daily life and an important factor for independent living in older adults. According to Boulous, Salameh, and Barberger-Gateau (2016), in their study on malnutrition and frailty among community-dwelling older adults in rural settings, 36.4% of the studied population were considered frail and at risk of injury and falls. In community-dwelling older adults, good nutritional status is important to support independent living, and prevent diseases, falls, injuries, and functional decline (Van Den Broeke et al., 2018).

Fall and environment

Research on environmental modifications linked to reduced falls shows strong evidence of this intervention being effective in improving the functions of community-dwelling older adults. About one-third of older adults aged 65 years or older in the United States experience a fall in a given year, and in half of such cases, the falls are recurrent (Moylan & Binder, 2007; Tomita, Saharan, Rajendran, Nochajski, Schweitzer, 2017)

A study of individualized home modifications and training by an occupational therapist stated that those individuals who received environmental modification "reported significantly less difficulty completing activities of daily living (ADL) and instrumental activities of daily living (IADL), significantly less fear of falling, greater self-efficacy in managing daily activities, and fewer home hazards than the control group" (Stark, Keglovits, Arbesman, & Lieberman, 2017, p. 4). The combination of "individual and group sessions, education about strategies to remain safe and independent, and recommendations for assistive technology and home modifications" provide a monumental "role in successfully reducing the number of falls, limiting fear of falling, and preserving independence in community-dwelling older adults" (Chase, Mann, Wasek, & Arbesman, 2012, p. 288). By modifying the home and providing education sessions to the population of community-dwelling older adults, there is potential to have a positive effect on creating the ideal fit between the person, occupation, and environment (Baptiste, 2017).

The need for research

There is little to no research on community-dwelling older adults over the age of 65 years and fall prevention for those who live in rural areas. In addition, 20% of older adults are homebound or semi-homebound due to health concerns and disability, but even healthy older adults spend the majority of their time in their homes (Cohen-Mansfield, Shmotkin, & Kazan, 2012). This is why it is crucial to look at what interventions and preventative measures can be done to allow these individuals to stay safe and healthy in their preferred environment by creating the right fit between the environment and the person. This may increase their performance capacity, occupational performance, and ability to age in place (Baptiste, 2017).

The purpose of this critically appraised topic paper is to provide occupational therapy students and practitioners with the evidence supporting the use of occupation-based education sessions to improve areas of nutrition, mobility, and environment to prevent falls in community-dwelling older adults living in rural communities.

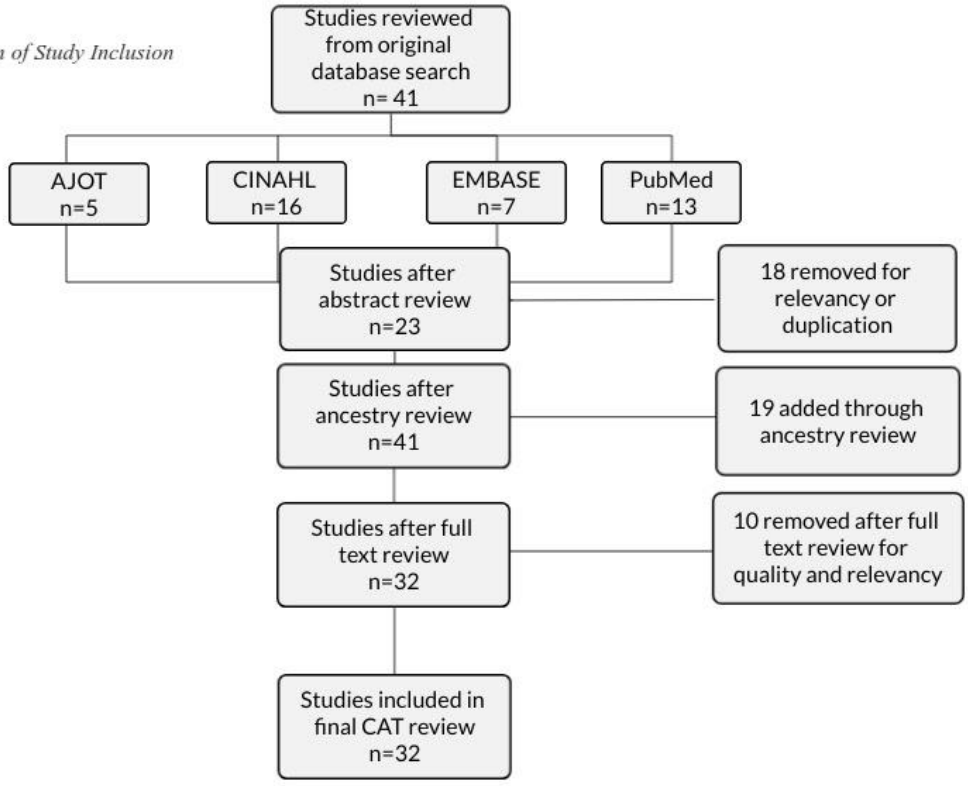
Methods and Summary of key findings

A review of relevant literature published from 2015 through March 2020 was conducted February 2020-March 2020 using multiple databases (PubMed, CINAHL, EMBASE, and AJOT). Boolean phrasing was used for all databases by all researchers including 'physical activity AND community dwelling older adults AND occupational therapy', 'community dwelling older adults AND falls', 'community dwelling AND malnutrition', and other variants including keywords like 'community-dwelling', 'falls', 'environment', 'malnutrition', 'hydration', and 'education'. Articles considered for review were published in English, included a sample of community-dwelling adults aged 60 or older, and were focused on falls, nutrition/hydration, and environmental modification interventions. Studies excluded included samples of populations younger than 60, or populations living within nursing homes, skilled nursing facilities, or not living independently.

The original database searches produced 41 studies for review. Following an abstract review of all articles, 18 were removed for relevancy of population or intervention and duplication. An ancestry review was completed of the 21 remaining studies, producing 19 additional relevant studies. After a full-text assessment for quality of evidence, 32 studies were included in this CAT.

Figure 1

Flow Diagram of Study Inclusion Process



Of the 32 included, 19 were considered Level I evidence, 2 were considered Level II evidence, 2 were considered Level III, 6 were considered Level IV, and 3 fell into the NA category of evidence due to their qualitative nature. All Level I studies included were

randomized control trials, and all Level IV studies were cross-sectional studies designed to investigate multiple factors within a population like nutrition, hydration, frailty, as an example. Qualitative and mixed-method studies were included to review self-efficacy and perceived satisfaction of community-dwelling older adults when given education-based intervention. Evidence assessment was conducted using Critical Review Forms from McMaster University (Law et al., 1998; Letts et al., 2007). and any questionable studies were reviewed by all team members to come to a conclusion on the level of evidence. All studies included a sample population of at least 20 and were determined to have moderate to strong internal and external reliability, determined by the research team.

It is important to note that 11 studies (Chan et al., 2012; Deandrea et al., 2010; Di Monaco et al., 2008; Fox et al., 2010; Gitlin et al., 2006; Keller, 2006; Luck et al., 2013; Stark et al., 2009; Stevens et al., 2012; Tomita, 2014; Visvanathan et al., 2003) were included that did not fall within the set inclusion criteria of being published between 2015 and 2020. These articles were included following ancestry review due to their high degree of relevancy and the limited amount of current evidence regarding this type of intervention for community-dwelling older adults.

Synthesis of Evidence Review

Personalized Education and Fall Prevention

Falls in the home are one of the biggest challenges community-dwelling older adults face with more than one in four adults experiencing a fall in a year (Bergen, Stevens & Burns, 2016; Stevens et al., 2012). Falls among the older population have been linked to a decline in cognitive abilities, traumatic brain injuries, and an overall reduction in the ability to perform activities of daily living (Bergen, Stevens & Burns, 2016). This challenge was identified already in 2006 by Gitlin et al. who evaluated how effective individualized programs could be in reducing challenges with completing activities of daily living, instrumental activities of daily living, improving self-efficacy, and reduce the fear of falling by providing five sessions provided by an occupational therapist examining environmental hazards and incorporation of problem-solving to identify environmental contributors to performance difficulties. Gitlin et al. concluded that multicomponent interventions that target behavioral and environmental modifications improve the overall quality of life in community-dwelling older adults. The intervention group reported less fear of falling (p=0.001, 95% CI=0.26-0.96), fewer home hazards (P=.05, 95% CI=-3.06-0.00), and greater use of adaptive strategies (P=.009, 95% CI=0.03-0.22). In more recent time, community-dwelling older adults were asked in the study conducted by Howard et al. (2018), a qualitative study on community-dwelling older adults' perception regarding falls prevention programs, what their perception of the issue was. It was found that the major barriers to participation were unawareness of programs available, that their doctor did not recommend fall prevention programs, lack of motivation, lack of availability or convenience, and pride. However, the authors also found that the major supporting factors for attending fall prevention programs were social participation, sharing lived experiences with peers, strength and balance training, and education. Findings in a study by Naseri et al. (2019) indicated that community-dwelling older adults find education a motivating factor for attending fall prevention programs. The findings of their randomized control trial showed that tailored education based on the individual may be optimally provided over an extended period including when patients are in the

hospital and after they return home. They did, however, find that a tailored education program delivered in the hospital did not significantly change older adults' fall prevention behaviors during the 6-month recovery period following hospital discharge (Naseri, et al., 2019).

Positive outcomes such as reductions in fall risk, number or rate of falls, injurious falls, and fear of falling or improvements in balance confidence, balance and mobility skills, awareness of fall reduction strategies, and use of measures to reduce fall risk, through different interventions were all found in the studies done by Di Monaco et al. (2008), Fox et al. (2010), and Kamei et al. (2015). Di Monaco et al. (2008) found that one home visit by an occupational therapist (OT) significantly reduced the risk of falling after discharge from a rehabilitation hospital in elderly women after a hip fracture in which "The absolute risk of experiencing one or more falls in our control group of home-dwelling women with a fall-related hip fracture was 26%[..] 183 days after discharge" (p. 448). Fox et al. (2010) reported that identifying individual risk factors as well as identifying the interaction among multiple risk factors are central to understanding why falls happen in older adults. In the study, a comprehensive health assessment (CHA), a balance test, and a chair stand test was conducted on the participants. The chair stand test included "Individually tailored fall risk factor assessment and education" (p. 836) as well as a written care plan with personalized goals related to fall prevention. Half of the intervention group also received a home hazard assessment. The 12 months following the assessment consisted of follow-up phone interviews every three months documenting fall frequencies, medical referrals and recommendations. The same assessments were done at the end of the 12-month period. The researchers found that there was an overall reduction of falls in both the control and the intervention group (odds ratio – 0.45, p <.04), which was explained by a better understanding of the importance of environmental modifications in order to prevent falls in the home (Fox, et al., 2010).

Environmental Modifications

Falls in community-dwelling older adults are usually multifactorial in nature, meaning that there are several components responsible for the fall, with environmental hazards being one of those factors (Bloch et al., 2010; Deandrea et al., 2010). Kamei et al. (2015) wanted to improve fall prevention awareness and home modification behaviors among community-dwelling older adults through a home hazard modification program (HHMP) and a one-year follow-up period. The randomized controlled trial consisted of education regarding fall risk factors, food and nutrition, foot self-care, and exercise sessions. The authors saw a 10.7% reduction in falls and concluded that "HHMP has the potential to improve fall prevention awareness and home modification behaviors, and specifically decrease overall and indoor falls in 12 weeks" (Kamei et al., 2015, p. 184). The study was conducted in Japan, and although the authors recognize that there may be a cultural difference to the results, they do acknowledge that many Japanese households have Western layouts and design, suggesting that the results may be applicable to other countries and societies.

Tomita, Saharan, Rajendra, Nochajski and Schweitzer (2014) identified the psychometric properties of the Home Safety Self-Assessment Tool (HSSAT) and how it can prevent falls in community-dwelling older adults. Tomita et al. (2014) concluded that the HSSAT has satisfactory content validity and high test-retest reliability as an instrument to identify fall risks in a home environment for community-dwelling older adults. The HSSAT provides resources to use tools that are on the market to aid in the prevention of falls. It is available in three online

versions to fit the needs of the individual; these three versions include downloadable, interactive, and accessible. This tool is free of cost and accessible through the internet.

Malnutrition and Dehydration

Malnourished elderly are more likely to injure themselves due to a fall than their well-nourished counterparts (Boulos et al., 2016; Verlaan et al., 2017). Visvanathan et al. (2003) conducted a cross-sectional study and found that malnourished older adults had more hospital stays than their well-nourished counterparts. There may be several reasons why older adults find it challenging to stay well-nourished and hydrated. Harris et al. (2019) found that one of the barriers to community-dwelling older adults maintaining a healthy eating habit was the inability to eat big portions. In this mixed-methods study, the intervention included providing nutritional or dietitian counseling addressing physiological barriers through self-help advice. The main approaches in the intervention included educating subjects on how to eat smaller portions by adding energy-rich food. The findings of the study suggested that education and strategy use was the only well-received treatment, which is consistent with previous findings regarding education.

To further support the claims of the benefits of education, Wu et al. (2018) found in their randomized control trial that individualized nutrition education was the only intervention that decreased frailty score, decreasing it by 60 percent. In order to provide older adults with this necessary education, Khong, Berlach, Hill, & Hill (2016, p. 254) found in their quasi-experimental study that "providing peer education raises older adults' levels of beliefs, knowledge and intention to engage in falls prevention", concluding that "peer-led presentations are an effective means of providing community-dwelling older adults with falls prevention education".

Atten et al. (2018) found that participants who received computer-tailored information or education about nutrition improved nutritional status in older adults at risk of undernutrition. The information education use also improved diet quality and physical activity levels of community-dwelling older adults, which in turn can help prevent falls in the home. This result is consistent with previous studies such as Luge et al. (2016), who indicated that the results from their randomized control trial supported the theory that home-based physical training, educational, and social support intervention completed by nonprofessionals is feasible and can help to tackle malnutrition and frailty in community-dwelling older adults. This can further help in preventing falls in the home in community-dwelling older adults.

Summary points

The evidence suggesting the effectiveness of occupation-based wellness education sessions on fall prevention is clearly stated in the areas of environmental modifications, nutritional state, and hydration among community-dwelling adults. It was found that studies specifically focused on rural areas seemed to have a gap in the literature. Finding articles published in the United States also proved to be a challenge. Environmental or home modifications "are a common compensatory strategy used by occupational therapy practitioners to reduce environmental barriers and improve the occupational performance of clients with functional limitations" (Stark et al., 2017, p. 1). Malnutrition and dehydration is a known problem that is seen within older adults and accounts for a portion of the number of falls we see

in this age group living at home. By looking at the factors that contribute to the successful outcomes for adults 60 years and above living independently in the community; we can understand why educational interventions are an important component related to sustaining function and independence for older adults in their homes.

The Clinical Bottom Line

Occupational therapy is unique in the way that it looks at the environment when thinking about interventions for their clients. Occupation based wellness education using the environment and occupation to create the best fit has been a hallmark of occupational therapy for many years (Baptiste, 2017).

Community-dwelling older adults aged 60 years and older could benefit from receiving individualized occupation-based interventions for fall prevention by using education in the areas of fall prevention, environmental modifications, malnutrition and dehydration because community-dwelling older adults are often at higher risk of falls due to their environment and nutritional state (Buchner et al., 1993 as cited in Chase).

Fall prevention has been proven to be most efficient when the interventions are multifactorial, meaning that they target more than just one fall risk factor at the time (Bloch et al., 2010; Deandrea et al., 2010). Environmental modifications and education on nutrition and hydration have proven to be two very important factors when it comes to fall and fall injury prevention (Bloch, et al., 2010; Boulos et al., 2016; Deandrea et al., 2010; Iizaka, Nagata, & Sanada, 2017; Misu et al., 2016; Picetti et al., 2017; Verlaan et al., 2017; Visvanathan et al. 2003). Strong evidence has been linked to personalized education and the likelihood of greater adherence to recommendations and guidelines to prevent falls in community-dwelling older adults (Atten et al., 2018; Chan et al., 2012; Chingwong, Wong, & Chang, 2019; Fox et al.,2010; Harris et al., 2019; Howard et al., 2018; Kamei et al., 2015; Khong, Berlach, Hill, & Hill, 2016; Luge et al., 2016; Naseri et al., 2019; Wu et al., 2018). However, the evidence is mainly on community-dwelling older adults living in urban areas or bigger cities in countries outside of the United States. There is a lack of research and evidence on community-dwelling older adults living in rural communities in the United States and beyond, which suggests further research is needed in this area. Occupational therapists have been identified as professionals who can provide guidance and information in all areas mentioned above in the prevention of falls among older adults living at home (Chase, Mann, Wasek, & Arbesman, 2012; Di Monaco et al., 2008; Stark et al., 2009).

As stated above, the purpose of this critically appraised topic paper is to provide occupational therapy students and practitioners with the evidence supporting the use of occupation-based education sessions to improve areas of nutrition, mobility, and environment to prevent falls in community-dwelling older adults living in rural communities. The evidence gathered and reviewed in this CAT can be applied to clinical practice in a variety of ways.

- Practitioners can utilize individualized education on fall prevention based on perception, willingness, and functional abilities in older adults aged 60 years or older.
- Despite the lack of evidence on community-dwelling older adults aged 60 years or older living in rural communities, the research suggests potential generalizability to this population, therefore clinicians can use this intervention with a variety of populations.

Research in occupational therapy has the ability to further the evidence of the use of individualized occupation-based wellness education intervention in rural communities, to support community-dwelling older adults aged 60 years and older, age in place.

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