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Person-Environment Interactions: the Psychological Implications of Behaviors, Confidence, and Self-Efficacy in Falls Management.

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PERSON-ENVIRONMENT INTERACTIONS: THE PSYCHOLOGICAL IMPLICATIONS OF BEHAVIORS, CONFIDENCE, AND SELF-EFFICACY IN FALLS MANAGEMENT

Presented in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Occupational Therapy

Eastern Kentucky University
College of Health Sciences
Department of Occupational Science and Occupational Therapy

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EASTERN KENTUCKY UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY

Certification

We hereby certify that this Capstone project, submitted by Lisa Roberson, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the project requirement for the Doctor of Occupational Therapy degree.

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This project, written by Lisa Roberson under direction of Dr. Cindy Hayden, Faculty Mentor, and approved by members of the project committee, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF OCCUPATIONAL THERAPY

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Executive Summary

Background: Strong evidence supports medication review and management, health and safety education, and home modifications as a holistic approach to falls prevention. Current research demonstrates that individual interventions reduce the risk of falls yet do not statistically reduce the number of falls (Gallo, Stelmach, Frigeri, & Ahn, 2018). The problem this Capstone project addressed was the limited psychological considerations, awareness of behaviors, confidence, and self-efficacy, as they relate to falls prevention. These psychological factors have not been previously studied in a single study.

Purpose: To determine the relationship or significance of psychological considerations as they relate to fall prevention. Increase older adults understanding of the multifactorial problems of fall risks, behavioral prevention strategies, and how fear can increase fall risk. Does increasing awareness through education, being mindful of the psychological considerations, improve adherence to home modifications with patient-environment interactions for the purpose of falls prevention?

Theoretical Framework: Social Cognitive Theory: occupations are often influenced by what, where, and with whom the activity is performed (Law, 2002). Participation can be positively impacted by an individual's self-efficacy (Law, 2002). The Transtheoretical Model: Occupational therapy plays a vital role in raising awareness, exploring the value, and facilitating the understanding of this connection and its effect of a person's everyday life based on understanding and willingness to change. Lawton and Nahemow's Press Competency Model or Environment Fit: A complex relationship exists between the person, environment, and participation in occupation (Law, 2002; Fange, & Iwarsson, 2007; Oakes, 2015).

Methods: This was a quantitative pre-experimental design 30-day study of 21 community-dwelling adults aged 65 and older with normal to mildly impaired cognition on the Six Item Cognitive Impairment Test (6CIT). A pretest 6CIT, pretest and posttest Falls Behavioural Scale (FaB), Activities-specific Balance Confidence Scale (ABC), Falls Efficacy Scale-International (FES-I), and Safe At Home assessments, along with fall risks, modifiable risk factor education, and individualized community resources.

Results: Wilcoxon Signed Rank Test demonstrated statistical significance at the $p \leq 0.05$ level, indicating positive OT intervention impact on behaviors, confidence, and self-efficacy on falls prevention. Spearman's Rank-Order (RHO) Coefficient Test revealed moderate statistical significance for marital status on behaviors and prior number of falls history on self-efficacy. All of the participants had one or more areas of psychological scale improvements and over 74% implemented home safety modification recommendations.

Conclusions: Falls prevention is multifactorial and OT is a necessary service in the development of a truly comprehensive conceptual program model. Those without prior or recurrent falls may temporarily decline in one or more psychological factors when perceived risk is changed to actual risk as a result of OT falls prevention education.

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CERTIFICATION OF AUTHORSHIP

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Title of Submission: Person-Environment Interactions: The Psychological Implications of Behavior, Confidence, and Self-Efficacy in Falls Management_____

Certification of Authorship: I hereby certify that I am the author of this document and that any assistance I received in its preparation is fully acknowledged and disclosed in the document. I have also cited all sources from which I obtained data, ideas, or words that are copied directly or paraphrased in the document. Sources are properly credited according to accepted standards for professional publications. I also certify that this paper was prepared by me for this purpose.

Student's Signature: Lisa S Roberson OTR/L, MPA

Date of Submission: 5-15-19

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Introduction

Falls in older adults are at an all-time high and only projected to escalate (CDC, 2018). The World Health Organization (WHO) defines a fall as an incident in which a person is unintentionally reposed on the ground, floor, or a lower level (i.e. chair, toilet, bed, or stair) (Alshammari et al., 2018). There is often a significant impact on individual physical, mental, and emotional health with resultant immobility, dependence, disability, chronic pain, anxiety and fear (Fabre, Ellis, Kosma, & Wood, 2010). The mortality rates of adults aged 65 and older from falls have increased 30% from 2007 to 2016. By the year 2030, it is predicted that 7 older adults will die every hour if fall rates continue to rise 3% each year (Burns, & Karara, 2018). The economic burden on our health care system and society as a whole is substantial (WHO, 2018). There are large universities, governmental agencies, for-profit, and non-profit organizations creating a variety of different educational programs and tools to help reduce and prevent falls (Lusardi et al., 2017).

Economic Impact

Falls are the primary cause of older adult injury, hospital visits, and death due to injury (CDC, 2018; Bergen, 2018; Shankar, Taylor, Rizzo, & Liu, 2017). The most common injuries of adults aged 65 and older from falls are head injuries and hip fractures (NCOA, 2017). Fatal falls are greatest in adults aged 65 and older (WHO, 2018). In the United States annually, 2.8 million older adults fall and go to an emergency room (Centers for Disease Control and Prevention, 2016). Globally, the number of falls annually requiring medical attention is an astonishing 37.3 million (WHO, 2018). Medicare recipients with non-fatal falls have an estimated annual direct medical cost of over $31 billion as of 2015 (Burns, Stevens, & Lee, 2016; Elliott, & Leland, 2018; Shankar,

Taylor, Rizzo, & Liu, 2017). The costs are comprised of emergency room visits, hospitalizations, and outpatient services, which equate to 6% of Medicare spending (Burns, Stevens, & Lee, 2016). The annual costs rise to $50 billion once private pay and Medicaid spending are factored (Florence, Bergen, Atherly, Burns, & Stevens, 2018). It is projected by the year 2020 Medicare's yearly expenditure will be in excess of $67.7 billion (NCOA, 2017).

Fifty percent of residents taken to the emergency room, due to a fall-related injury, and admitted to the hospital are estimated to have a one-year survival rate (Shea, Ward, Welch, Keily, Goldstein, & Bean, 2018). The mortality is often due to complications from the fall. The recurrence of falls within a six-month time frame post-acute care discharge ranges from 14% to 48%. One might expect based on the amount of financial resources utilized and time spent in the healthcare system on falls that these statistics would produce a more positive impact on fall reduction rates. There are other factors contributing to the number of falls that need consideration.

Risk Factors

There are intrinsic (patient centered) factors and extrinsic (environmental) factors that increase an individual's expectancy of falling (Pati et al., 2017). Common risk factors for falls include leg weakness, impaired mobility skills, medication side effects, impaired cognition, impaired vision, foot pain, alcohol and substance abuse, improper footwear, physical inactivity, Vitamin D deficiency, and environmental hazards in the home and community (Bloch et al., 2010; Deandrea et al., 2010). The National Council on Aging's (NCOA) Stopping Elderly Accidents, Deaths & Injuries (STEADI) program has identified modifiable risk factors (Centers for Disease Control and Prevention, n.d.). They include decreased muscle strength, impaired gait and decreased balance, medication misuse, vision impairment, and trip hazards in the home. Evidence also reveals that older adults are unaware of fall prevention strategies (Shankar, Taylor, Rizzo, &

Liu, 2017). Concerningly, the NCOA does not list the lack of knowledge of falls as a modifiable risk factor for falls (Bergen, 2018).

Psychological Impact

According to the American Psychological Association, psychology is the scientific study of the mind and behavior (Nordqvist, 2018). A number of older adults believe that falling is a natural part of aging (Shankar, Taylor, Rizzo, & Liu, 2017). This may explain some of the influence on behaviors in older adult person-environment interactions - ability or inability as a direct result of an interaction between a person and his/her environment (Francescutti, Gongolo, Simoncello, & Frattura, 2011). However, falls are not a natural part of aging and a large portion of falls are preventable (National Council on Aging, n.d.). Previous qualitative studies of falls and fall prevention in older adults found personal risk and personal relevance to be severely diminished. Interviews conducted in the emergency room immediately post-fall revealed older adults aged 65 and older place blame on the environment, self, medical conditions, or accident (Shankar, Taylor, Rizzo, & Liu, 2017). Risk, whether real or perceived, is limited because many older adults tend to have the inability to relate falls to multifactorial issues. Typical heavily utilized fall prevention strategies include paying close attention or being careful (Shankar, Taylor, Rizzo, & Liu, 2017).

Fear alone can increase the risk of falls and often results in limited physical activity. Physical inactivity can cause an increase in weakness, in turn making the risk of falling even greater (Tarrant County Public Health, 2017). Adults with recurrent falls often experience limited independence with their daily activities due to the fear of falling (Chase, Mann, Wasek, & Arbesman, 2012). Moreover, the fear of falling often leads to social isolation (Shankar, Taylor, Rizzo, & Liu, 2017). Only fifteen percent of older adults with a high fear or perception of risk,

specifically with significant injury, initiate discussions with healthcare practitioners about fall prevention (Lee et al., 2013).

Environmental Impact

Most falls occur in the home and approximately 80% are without injury. The majority of falls occur during routine activities (Kurtkoti, 2014). Older adults are using assistive technology without proper training due to the availability for purchase in a variety of stores and online websites (Kurtkoti, 2014). Businesses entice older adults to use their service by offering free home safety assessments. It is highly probable that many do so with improper training, lack of experience or limited knowledge in the progression of medical conditions. The dynamic person-environment interactions are rarely, if ever, utilized in the determination of appropriate modifications. Older adults typically do not report falls to their physician or family (Lorig, Holman, Sobel, Laurent, Gonzalez, & Minor, 2012). This compounded with the lack of awareness of available resources, poor health literacy, and difficulty navigating the health care system further adds to what is now considered a falls epidemic (Gallo, Stelmach, Frigeri, & Ahn, 2018).

Community Impact

The majority of older adult falls occur at home (73%) (Alshammari et al., 2018). The typical need for a home visit is “lift assist” when 911 services are called (Jaslow, 2005). This is where the resident has no identifiable fall related injury or verbalization of injury. There is a lack of or non-existent standardized processes or procedures established by the National Association of Emergency Medical Technicians (NAEMT), the state, or local jurisdictions related to how these calls should be handled (Jaslow, 2005). The assessment or questions asked by the EMS providers are unchecked, unregulated, and sometimes prejudiced (Jaslow, 2005). This can lead to unsubstantiated bias that the call is a waste of time compared to other emergencies (Jaslow, 2005).

These calls are referred to as “utility calls” and EMS service providers have inadequate resources to provide older residents to help prevent future falls (personal interview, April 19, 2018). It is an occupational therapist’s ethical responsibility to meet the diverse needs of individuals served in the community in context using a cultural perspective (AOTA, 2015). A Hurst, Texas EMS worker, Louis Flores, stated, “multiple interventions by 911 EMS personnel can result in a referral to adult protective services (APS)” (personal interview, Oct 17, 2018). Occupational therapy intervention could play a role in the reduction of 911 calls and APS involvement for residents and caregivers whose goals are to age in place. The concept of aging in place is proving an older adult his/her choice of residence, while having the necessary things needed for daily living, to maintain a quality of life (AgeInPlace, 2019). This is intended to be for as long as they can, with or without additional supportive services.

The medical community could make a significant impact given the advantages of time, directly following an actual fall, through interventions on-site during a lift assist response. Moreover, emergency room physicians, nurses, or case managers could engage the patients on education of fall prevention strategies. Time constraints and other factors limit or exclude fall-prevention interventions effectively being employed in these rather ideal situations and settings (Shankar, Taylor, Rizzo, & Liu, 2017). This challenge may also exist in home health, skilled nursing facilities, and inpatient rehabilitation service lines.

Intervention Impact

The American Occupational Therapy Association (AOTA) recommends two specific interventions for fall prevention. They include home safety assessment with home modifications and exercise (AOTA, 2010). Fall risks are significantly decreased and more cost effective when adaptations and modifications are identified by an occupational therapist (AOTA, 2010). Home

safety assessments and modification recommendations as an occupational therapy treatment intervention have been found effective in reducing fall risks, falls, and falls with injury (Chase, Mann, Waske, Arbesman, 2012; Kurtkoti, 2014; Stark, Keglovits, Arbesman, & Liberman, 2017). Few older adults have knowledge or access to home safety assessments. This can occur even when hospitalized, placed in a facility, or receiving home health services. Those that have the knowledge and access may not advocate for the service, may not be offered by the healthcare provider, or simply decline the assessment. One study found 20% of the participants did not adhere to the occupational therapist's recommended modifications for fall prevention (Chase, Mann, Wasek, & Arbesman, 2012). Another study found that only 50% of the home recommendations made by an occupational therapist were implemented at the 12-month follow-up (Cumming, Thomas, Szonyi, Salkeld, & O'Neill, 2015). Home safety may be considered fire and security as opposed to fall preventions. Ensuring that the elder understands what is meant by a home safety assessment, including fall assessments, may prove more beneficial.

Evidence-based falls prevention programs that have proven most successful for older adults include A Matter of Balance (AMOB), Otago Exercise Program, Stepping On, and Tai Chi: Moving for Better Balance (National Council On Aging, 2017). These programs focus on different aspects of fall prevention. AMOB provides exercises and encourages increased physical activity. The primary goal however is to reduce the fear of falling. Otago provides adults aged 80 and older an individualized strength and balance program designed by a physical therapist. The Stepping On program provides strategies to increase self-confidence and reduce falls. Tai Chi is a program that provides balance and gait training through the use of controlled movements. However, none of these programs employs a truly comprehensive intervention to falls prevention and reduction. AMOB is by far the closest. It utilizes group format instruction that is engaging and dynamic. The

element of comprehensiveness can be lost however, in that participants typically do not attend all eight sessions provided. As a result, participants may miss key information. Handouts on fall prevention strategies are not provided. In addition, the selected format for learning does not take into account those with a primary visual learning style. The individualized aspect of intervention may be lost. The participants gain knowledge yet true generalization of understanding and applications to fall prevention are unable to be verified. The person-environment interaction is also unrecognized as an important part in the dynamics of occupational performance as it relates to falls.

Problem Statement

Literature overwhelmingly supports the use of exercise and physical activity to improve balance, strength, endurance and flexibility for falls prevention (AOTA, 2010; Gallo, Stelmach, Frigeri, & Ahn, 2018; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Strong evidence also supports medication review and management, health and safety education, and home modifications as a holistic approach to falls prevention. Current research demonstrates that individual interventions reduce the risk of falls yet do not statistically actually reduce the number of falls (Gallo, Stelmach, Frigeri, & Ahn, 2018). Providing additional support and resources were selected as a much needed addition to the current practice. The decision was made that this could be accomplished through the implementation of a Falls Management Solutions Program. As a result, the author has worked collaboratively with Emergency Medical Services (EMS) and community partners to design and implement a community program entitled "Fall Management Solutions Program." This program was designed to bridge the gap between home to hospital. The focus was educating EMS and community partners on the common occupational therapy

intervention of home safety assessments, recommendations and their implementation, and individualized supportive resources.

The problem this Capstone project addressed was the limited psychological considerations of awareness of behaviors, confidence, and self-efficacy as they relate to falls prevention. These psychological factors have not been previously studied in a single study. The research question was: Does increasing awareness through education, being mindful of the psychological considerations, improve adherence to home modifications with patient-environment interactions for the purpose of falls prevention?

Purpose Statement

Therefore, the purpose of this Capstone project was to determine the relationship or significance of psychological considerations as they relate to falls prevention. It was also to increase older adults understanding of the multifactorial problems of fall risks, behavioral prevention strategies, and how fear can increase fall risk. Lastly, the study considered if providing available community resources and increasing utilization of home modifications, reduced both risks of falls and the number of falls in older adults aged 65 and older. The intended benefit of the program was to improve the community's overall health by managing falls in older adults, people with disabilities, and minorities that have limited education and access to health care and other helpful resources (Wells, 2016). It was achieved through enhancing collaborative community partnerships to provide supportive assistance to those requiring lift assist. The supportive assistance was provided in the form of an individualized home safety assessment performed by an occupational therapist with modification recommendations, education, resources and referrals for necessary interventions. The program benefits were intended to provide a reduction in the number of falls and recurrent falls with resultant hospitalizations, hospital re-admissions, and the

identification of the right help at the right time. An additional anticipated benefit was assistance in the diminution with utilization of unnecessary services and associated costs.

Project Objectives

The project objectives were to: 1) obtain individual psychological (behaviors, confidence, self-efficacy) fall risks to better understand these intrinsic risk factors influence of extrinsic risk factor modification; 2) to provide individualized falls risk prevention, behavioral strategies, and home modification education to positively influence the psychological (behaviors, confidence, self-efficacy) and person-environment interactions in the home and community for the purpose of reducing falls; and 3) to provide resources and supportive education to older adults to enhance their advocacy and navigation skills with available community resources to reduce falls. The evidence of behavior and home modification utilization, enhanced self-monitoring, and self-reflection throughout person-environment interactions in the home and community will be explored as a result of this program.

Theory

There are three theoretical frameworks that best encompass the symbiotic person-environment relationship and how to effectively promote more positive behavior changes in individuals. Occupational therapists are knowledgeable and have the unique ability to apply these theories in successful fall prevention program or treatment interventions. The three theories are Social Cognitive Theory (SCT), Transtheoretical Model (TTM), and Press-Competency or Person-Environment Fit Model.

The SCT best describes the dynamic interaction between person-environmental factors and of human behavior and how each influences the other (NIH, 2005). The strategies used in SCT can

positively impact fall prevention. This can occur through behavior changes based on self-efficacy, goals, and outcome expectancies. The promotion of rewards is one strategy. For the purpose of this program, the reward would be fall and injury prevention. The strategies were provided and encouragement given for change to be accomplished in small steps, while ensuring specificity on what changes are desired. Additional change strategies include the utilization of various ways to instigate behavioral change through environmental modifications, personal attitudes, and by clearing up any misconceptions. Modeling and mastery of positive behaviors and skills training is also beneficial (NIH, 2005). All of these techniques are utilized in the Falls Management Solutions Program for the purpose of reducing and preventing falls.

Prochaska and DiClemente's Stages of Change (Transtheoretical) Model (TTM) provides an understanding of stages of health behavior changes in individuals (NIH, 2005). The TTM focuses on decision-making abilities that influence behavior as opposed to the social or biological influences (Lenio, n.d.). Awareness and understanding of this model and its stages can better prepare and enhance the effectiveness of health care professionals, lay people in health care, and community-based education programs. Patients are often provided information during a time or in a way that does not directly influence changes in healthy lifestyle choices and behaviors. These "non-compliant" individuals may simply not understand the information in relation to condition, risk, benefits, measurements and dosages, or cost involved in prevention – such as nutrition, physical activity, and other important healthy behaviors. Moreover, many of them may have poor health literacy, lack of resources, and possible financial constraints to make the best decisions related to their health and care (Cutilli, 2005).

In the Transtheoretical Model, informational needs and interventions utilized in the falls program are determined based on the stage that an individual is in at the time. The stages include

precontemplation, contemplation, preparation, action, and maintenance. They range from increasing awareness to assistance in coping with life events in new positive ways to avoid relapses. This model is circular in nature, allowing entrance in the processes at any stage, and as one reaches the maintenance stage in one area of their life they can still be in the precontemplation stage for another (NIH, 2005). The technique utilized in providing education helps those in the precontemplation phase to have increased awareness. This awareness is necessary to move toward contemplation and so on. Largely, this model allows an occupational therapist to enhance interactions and alter how intervention strategies are presented based on a client's readiness for change (Stark et al., 2015)

The program also incorporates the Lawton and Nahemow's Press-Competence Model or Person-Environment Fit Model (Maus, & Satariano, 2017). This model falls under the umbrella of the ecological model, which encompasses the biologic, behavioral, social, and health sciences. Emphasis is on the component of *context* – social and physical environments. According to the ecological model, pathology (disease and injury) can cause impairments (musculoskeletal dysfunction) that lead to functional limitations (restrictions in walking) and can cause disability (difficulty with ADL's/IADL's). The Press-Competence model states that disability only occurs when the environmental demands exceed the person's ability to meet the demands.

Significance

The significance of this study is multifold. Research is plentiful on the use of assessments and single interventions for the reduction of falls (Fabre, Ellis, Kosma, & Wood, 2010; Gallo, Stelmach, Frigeri, & Ahn, 2018; Lusardi et al., 2017). However, the psychological implications (behaviors, confidence, and self-efficacy) have not been thoroughly studied in combination with the standard occupational therapy intervention of home safety assessment with modifications.

Occupational therapy home safety assessments are typically provided in the natural home environment often through the use of home health services (Mackenzie, Byles, Higginbotham, 2000). Nurses and physical therapists are providing many of the home safety assessments and making recommended modifications often times due to visit constraints, limited staffing, and other factors in order to follow the OASIS-C2 Guidance Manual (CMS, 2018). However, occupational therapy is, considered by many, the only profession uniquely trained to consider the dynamic interaction of person, environment, and occupation (AOTA, 2010; Polatajko, Mandich, & Martini, 2000). It is this skill set hypothesized to be critical in effective reduction and prevention of older adult falls in the home and community.

This study can raise awareness and support of occupational therapy as a profession within the medical and community centered realm of fall prevention. Occupational therapy's unique training and belief of the highly individualistic person-environment interaction, along with the psychological implications, should be considered best practice in the efforts to significantly reduce falls (Polatajko, Mandich, & Martini, 2000). This includes the emergency room, acute care, long-term acute care, inpatient rehabilitation, home health and outpatient service lines. Moreover, utilizing a person-environment interactions and psychological implications approach can be used in other aspects of healthcare such as chronic disease self-management. The concepts can be used interdisciplinary for the most effective long-term behavior changes for functional outcomes.

Summary

Medical and community model fall prevention practices are not universally utilized (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). A comprehensive, long-term solution to falls management clinical practice guideline, similar to those already available for other conditions such as stroke and spinal cord injury, is necessary to reduce the debilitating and

financial detrimental impact on individuals aged 65 and older in the U.S. Some important aspects of falls prevention guideline development are the inclusion of psychological implications on falls management and the necessity of occupational therapy services.

Section II: Review of the Literature

Most home related falls are preventable (Abdelrahman et al., 2018). However, falls in older adults are considered a major public health problem (Chase, Mann, Wasek, & Arbesman, 2012: Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). By 2030, older adults in the United States are projected to represent 20% of the total population (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Reports convey there are approximately 2.8 million adults aged 65 and older that visit the emergency room (ER) due to a fall each year (Elliott, & Leland, 2018). In 2016, 2.5 million older adults sustained fall related injuries that were non-fatal (Alshammari et al., 2018; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018; Shankar, Taylor, Rizzo, & Liu, 2017). Falling is the leading cause of injury, death (27,000 annually), and need for institutionalization of adults aged 65 and older (Alshammari et al., 2018; Chase, Mann, Wasek, & Arbesmann, 2012; Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011; Shankar, Taylor, Rizzo, & Liu, 2017). Each year, between 33-40% of community-dwelling older adults sustain a fall (Anemaet, & Moffa-Trotter, 1999; Letts et al., 2009; Shea, Ward, Welch, Kiely, Goldstein, & Bean 2018). This number increases for those with low visual acuity (Fong et al., 2014). It doubles (60%) for older adults with impaired cognition (Ansai et al., 2017). In a recent geriatric study, 52.1% elders reported falling once, 21.3% reported falling twice, and 24.1% reported falling 3 or more times and only one third sought medical care (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018). The risk of falling within a year increases by 75% once an older adult falls and repeated falls occur to approximately 50% (Fabre, Ellis, Kosma, & Wood, 2010; Shaw, Bastawrous, Burns, & McKay, 2016).

Statistical Relevance

Falls (70%) are mostly unwitnessed and up to 73% of them occur at home (Alshammari et al., 2018; Pati et al., 2017). The remainder of falls occur in the community and up to 10% occur in skilled nursing facilities (Armstrong, & Hubbard, 2016). The literature suggests that those with the highest risk of falling are Caucasian, female (80%), over 65, lower education level, and lower income (Alshammari et al., 2018; Fabre, Ellis, Kosma, & Wood, 2010; Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018; Bloch, Thibaud, Duque, Breque, Rigaud, & Kemoun, 2010). Women (30.3%) are more probable, compared to men (26.5%), to communicate a fall occurrence (Alshammari et al., 2018).

The emergency 911 system is often utilized following a fall for lift assist (21%) or transportation to the emergency room (29%) (Shaw, Bastawrous, Burns, & McKay, 2016). It is surprising that with the abundant use of the ER that there is still such limited fall prevention information provided to a patient from the hospital in the discharge paperwork. This is even more concerning with the increasing shift of patient self-management from hospital to the home and community (Shaw, Bastawrous, Burns, & McKay, 2016).

The most common fall-related injuries among older adults are hip fractures, wrist fractures, and spinal fractures (Armstrong, & Hubbard, 2016). The emergency department provides reassurance that trauma was avoided, however, there is a lack of concern for other medical or environmental issues that contributed to the fall (Bloch, Thibaud, Duque, Breque, Rigaud, & Kemoun, 2010). This is a huge oversight due to major falls being a mandated post-acute care quality indicator (Elliott, & Leland, 2018). A targeted intervention for fall prevention after a sustained fall is needed (Shankar, Taylor, Rizzo, & Liu, 2017).

Negative Impact of Falls

The result of a fall can lead to loss of independence due to changes in performance of activities of daily living (ADL) (Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). Falls can be life changing considering one study found falls were more prevalent in robust older adults, as opposed to frail older adults (Lord, Menz, & Sherrington, 2006). The findings concluded frail older adults took fewer risks and avoided more hazards. In addition, many experience increased anxiety and decreased self-confidence with a resultant decrease in activity (Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011). The decrease in activity perpetuates the problem by compromising strength and endurance, leading ultimately to decreasing social and leisure activities, particularly in older adults with more than one fall in a 3-year time frame (Chase, Mann, Wasek, & Arbesmann, 2012). The risk factor for falls doubles when an individual requires assistance with one activity of daily living (ADL) or instrumental activity of daily living (IADL) (Bloch, Thibaud, Duque, Breque, Rigaud, & Kemoun, 2010; Fabre, Ellis, Kosma, & Wood, 2010). This can further promote loss of autonomy. There are estimated to be 4.5 million older adults that require assistance with ADL's yet do not receive assistance (Armstrong, & Hubbard, 2016). Stark and colleagues determined that in the United States alone, 12 million out of 57.6 million people with disabilities report difficulty with ADL's (2015).

WHO Cares

Participation in daily activities can be positively impacted by an individual's perception of health and well-being or negatively impacted by the fear of falling (Law, 2002). The World Health Organization (WHO) provides a description of the International Classification of Functioning, Disability and Health as "the *participation* in daily activities as an interaction between people's abilities and the contexts in which they live" (Stark, Somerville, & Morris, 2010, p. 580). The

WHO defines *participation* as "the person's involvement in a life situation" which involves engagement of the body, mind, and soul (Haak, Fange, Horstmann, & Iwarsson, 2008, p. 77). A complex relationship exists between the person, environment, and participation in occupation (Law, 2002; Fange, & Iwarsson, 2007). It is not always apparent to older adults that there is a connection between person, environment, and occupation (Oakes, 2015). Occupational therapy plays a vital role in raising awareness, exploring the value, and facilitating the understanding of this connection and its effect of a person's everyday life. The joyful experiences while participating in occupations are often influenced by what, where, and with whom the activity is performed (Law, 2002).

Quality of life (QOL) and lived experiences can be directly determined by someone's participation in activities (Law, 2002). QOL is defined as "a subjective concept with multiple dimensions comprising physical, social, and environmental conditions" (Perez-Ros, Martinez-Arnau, Tarazona-Santabalbina, 2018, p. 1). One study identified that QOL was a larger predictor of the number of falls that a person has as opposed to their comorbidities (9). It was determined that the higher the QOL the fewer the falls. QOL determinants are largely modifiable, including physical activity (Perez-Ros, Martinez-Arnau, Tarazona-Santabalbina, 2018). Home modifications have proven beneficial in improving QOL (Stark, Keglovits, Arbesman, & Lieberman, 2017). Fall prone older adults are unable to adapt to environments that change as well as healthy older adults can (Allison, Kiemel, & Jeka, 2018). This is one reason why providing environmental supports to safely age in place at home is preferred over institutionalization.

Psychological Considerations

There is sparse research that discusses the psychological implications beyond fear and anxiety that impact participation and increased risk of falling. One study suggested that an

increased focus on psychosocial factors could prove advantageous to fall prevention (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Falls have been linked to physical disabilities, as well as long-lasting psychological effects (Abdelrahman et al., 2018). Older adults (73%) that fall experience post fall anxiety within one year from the incident. This reduces to only 50% beyond one year (Fabre, Ellis, Kosma, & Wood, 2010). The anxiety can be accompanied by fear that functionally impairs someone to the point that he/she becomes unable to remain independent (Fabre, Ellis, Kosma, & Wood, 2010; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018).

Psychological implications are recognized as a contributing factor in falls and fall prevention (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Self-efficacy and confidence are powerfully related to physical performance (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Loss of confidence and social isolation are often the result of falls (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018; Shankar, Taylor, Rizzo, & Liu, 2017). AMOB is an evidence-based program that aims to reduce the fear of falling in adults aged 60 and older. The impact of psychological implications on falls is relatively new and in need of further research to substantiate the potential effects.

Risk Factors

Much of the medical and rehabilitation literature on falls point out that there are intrinsic and extrinsic risk factors (Allison, Kiemel, & Jeka, 2018; Alshammari et al., 2018; Anemaet, & Moffa-Trotter, 1999; Armstrong, & Hubbard, 2016; Fabre, Ellis, Kosma, & Wood, 2010; Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Intrinsic risk factors can be categorized as either medical or personal. Medical intrinsic risk factors are considered to be medical diagnoses, gait and balance disturbances,

medications, cognition impairments, and generalized age-related changes (Armstrong, & Hubbard, 2016). Personal intrinsic risk factors are distinctive to each individual and include age, activity level, bone strength, gender, smoking, alcohol use, nutrition, heredity, habits and diet, vision, pain, incontinence, range of motion, muscle strength, postural hypotension, footwear, flexibility, vitamin D intake, and calcium intake or absorption (Alshammari et al., 2018; Anemaet, & Moffa-Trotter, 1999; AOTA, 2010; Armstrong, & Hubbard, 2016; Bloch, Thibaud, Duque, Breque, Rigaud, & Kemoun, 2010; Burke-Doe, Hudson, Werth, & Riordan, 2008; Elliott, & Leland, 2018; Fabre, Ellis, Kosma, & Wood, 2010; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018; Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011; Shankar, Taylor, Rizzo, & Liu, 2017).

The most prevalent medical diagnoses for fall risks include cerebral vascular accident, arthritis, hypertension, asthma, cancer, diabetes mellitus, cardiovascular disease, and visual deficits (Abdelrahman et al., 2018; Fabre, Ellis, Kosma, & Wood, 2010; Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018; Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). Many intrinsic risk factors are considered non-modifiable. However, there are some modifiable intrinsic risk factors such as acute illness, incontinence, history of falls, gait or mobility impairments, and visual or sensory deficits (Fabre, Ellis, Kosma, & Wood, 2010). Stamm et al. found that 44.6% of those that fell reported chronic disease, 46.7% were prescribed one or more medication, and 42.4% used glasses (Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). Another study found that 75% of those who reported a fall had three or more chronic conditions (Alshammari et al., 2018). Physical performance tests cannot predict if an injury will occur with a fall even though it can predict the risk of falling (Shea, Ward, Welch, Kiely, Goldstein, & Bean, 2018). However, one research study found serious falls were related to extrinsic environmental factors more than health problems (Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016).

Extrinsic risk factors are mostly environmental but can become a financial factor due to the inability to pay for needed repairs or modifications (Alshammari et al., 2018; Anemaet, & Moffa-Trotter, 1999; Fabre, Ellis, Kosma, & Wood, 2010; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018; Stark, Somerville, Keglovits, Smason, & Bigham, 2015). In fact, lack of transportation and caregiver roles are also noteworthy to mention as they impact access and timely ability to implement environmental modifications. Much of the literature relates falls to environmental factors (Anemaet, & Moffa-Trotter, 1999; Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). In fact, according to Stamm et al., 53% of older adults fell due an insufficient home environment (Stamm, Leite, Hildebrandt, Kirchner, & Menezes, 2016). Another study reported that 50% of the falls were related to environmental factors (Anemaet, & Moffa-Trotter, 1999). One study found a strong association between environmental hazards and fall occurrences (Alshammari et al., 2018). There are several modifiable extrinsic risk factors such as medications and their side effects, home hazards, and footwear (Fabre, Ellis, Kosma, & Wood, 2010). Older adults without any risk factors have an 8% fall risk. This risk of falling increases to 78% if an individual has four or more risk factors (Fabre, Ellis, Kosma, & Wood, 2010).

Home Environment

Several studies reported between 60%-73% of falls occurring in the home (Alshammari et al., 2018; Anemaet, & Moffa-Trotter, 1999; Armstrong, & Hubbard, 2016; Fabre, Ellis, Kosma, & Wood, 2010; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). The ability or disability of a person is determined by the demands of the environment more than other factors such as environmental supports and interventions used to compensate for functional loss (Stark, Somerville, & Morris, 2010). A study by Anemaet and Moffa-Trotter found that at least one hazard was identified in 80% of the homes assessed and a separate study also reported 39% of the

homes were identified to have five or more hazards (1999; Fabre, Ellis, Kosma, & Wood, 2010). Overwhelmingly, 97% of these same home owners self-reported having fairly or very safe homes (Anemaet, & Moffa-Trotter, 1999).

A person's level of dependence or need for reliance on another can be decreased with a proper home environment (Anemaet, & Moffa-Trotter, 1999). A major predictor of recurrent falls is the home environment, yet most assessments and interventions view the person, environment, or task separately, failing to factor in the symbiotic relationship (Anemaet, & Moffa-Trotter, 1999; Stark, Somerville, & Morris, 2010). This may in large part be due to a shortage of sound measurement tools that consider the contextual (person-environment) fit (Stark, Somerville, & Morris, 2010). There are often discrepancies between the physical environment and the older adult's physical capabilities that can create unnecessary barriers that impede occupational performance that results in falls (Stark, Keglovits, Arbesman, & Lieberman, 2017).

Environmental Interactions

Kurtkoti studied falls and home modifications and found that most falls occurred on a level surface (44%), followed by stairs/height (16%), and then the bathroom (4%) (2014). It was also discovered that 75% of the falls were during ADL's. Moreover, 44% of those individuals were found to have one or more environmental hazards (Kurtkoti, 2014). The most commonly reported environmental hazards include: poor stairway design or disrepair, loose carpets, loose rugs, inadequate lighting, clutter, slippery floors, electrical cords in the walkway, uneven surfaces, non-sturdy furniture, pet-related objects, opening doors, walking, lack of non-skid surfaces in bathtubs, unclearly or unmarked light switches, bedroom furniture, low toilet seats, and bathroom (Abdelrahman et al., 2018; Alshammari et al., 2018; Anemaet, & Moffa-Trotter, 1999; AOTA, 2010; Fabre, Ellis, Kosma, & Wood, 2010; Kurtkoti, 2014; Lord, Menz, & Sherrington, 2006;

Mackenzie, Byles, & Higginbotham, 2000; Pati et al., 2000; Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011; Sommerville, Smallfield, Stark, Seibert, Arbesman, & Lieberman, 2016). The most commonly reported home modifications in the literature included bath benches, grab bars, repairing stairways, improving lighting, repairing floor surfaces, replacing round door knobs with levers, entry ramps, railings, raised toilet seats, marked dials, hardwood floors, adjustable window coverings, and removal of clutter (Mackenzie, Byles, & Higginbotham, 2000).

In 2018, Elliott and Leland conducted a systematic review of 50 published research study articles. The studies analyzed and compared single, multicomponent, multifactorial, and population-based fall interventions. Mixed evidence was found in use of single-component interventions of exercise, guided imagery or relaxation, occupational therapy home and functional assessments, and fall prevention education (Elliott, & Leland, 2018). The combination of exercise and education demonstrated significant improvement in fall-related outcomes. Other multifactorial outcomes were mixed. However, the interventions that proved most positive included home assessment, modification, or removal of hazards. The community-based fall groups revealed moderate evidence on falls reduction that typically comprised of the evidence-based programs A Matter of Balance (AMOB) and Stepping On (AOTA, 2010; Elliott, & Leland, 2018).

Home safety and education alone by an occupational therapist had insufficient evidence of successful outcomes (Elliott, & Leland, 2018). Research on occupational therapy effectiveness on fall reduction is limited. More studies are needed to support the role of occupational therapy and provide successful evidence-based multifactorial interventions. The recommended interventions provided by an occupational therapist include an individualized fall risk assessment, fall prevention education, home safety assessment, exercises, education, fall recovery, and home modification recommendations (Elliott, & Leland, 2018). Gallo and colleagues found that

although home exercise programs reduce the risk of falls they do not reduce the actual number of falls of an older adult (2018). This further supports the use of a multifactorial approach to fall prevention.

Healthy People 2020 had a goal of lowering the number of people with disabilities who encounter environmental barriers to participation in the home (Stark, Somerville, Keglovits, Smason, & Bigham, 2015). Healthy People 2030's vision includes creating physical environments and promoting healthy behaviors, the focus of this study. In fact, AOTA's Vision 2025 and Healthy People 2030's mission statement both contain the words "health and well-being", of which reducing falls can factor in to achieve these goals (AOTA, 2018; Healthy People, 2019). The foundational principle that this study primarily addresses is "the healthy physical, social, and economic environments strengthen the potential to achieve health and well-being" (U.S. Department of Health & Human Services, 2017).

Those individuals that fall repeatedly typically have the highest modifiable risk factor - home hazards (Letts et al., 2009). Home modifications can provide many benefits such as improved ADL performance, reduced the rate of falls, delayed progression of functional decline, and improve caregiver confidence (Stark, Somerville, Keglovits, Smason, & Bigham, 2015). Lawton's ecological model, the harmony of a person and his/her environment from an aging perspective, suggests accessibility is the key to participation (Wahl, Iwarsson, & Oswald, 2012). Furthermore, home safety is the result of the symbiotic relationship between the functional capacity (person), the physical environment (environment), and the occupation (activity) (Fange, & Iwarsson, 2007). An example of this symbiotic relationship are the postural changes demanded in interactions during ADL's utilizing the physical environment that constitute most fall occurrences (Pati et al., 2017).

Effective Approaches

Falls are multifactorial in nature for older adults and therefore require a holistic approach including interdisciplinary comprehensive identification, assessments, and interventions (Anemaet, & Moffa-Trotter, 1999; Armstrong, & Hubbard, 2016; Bloch, Thibaud, Duque, Breque, Rigaud, & Kemoun, 2010; Elliott, & Leland, 2018; Law, 2002; Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011; Shankar, Taylor, Rizzo, & Liu, 2017). However, the 2011 fall prevention published guidelines (American Geriatrics Society and British Geriatric Society) that support interdisciplinary intervention are not universally implemented (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). It is of concern that the cost of falls in 2015 for fatal and non-fatal falls reached $50 billion and is projected to reach $67 billion by 2020 (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018; Shankar, Taylor, Rizzo, & Liu, 2017). This is despite widely implemented fall prevention guidelines. A 2017 study confirmed what many healthcare providers experience, in that patients often deny personal relevance, curtail personal risk, claim ignorance of risk factors, or solely compensate by increasing their attentiveness or awareness (Shankar, Taylor, Rizzo, & Liu).

Critical factors in fall prevention include interdisciplinary communication and teamwork (O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Otherwise, lack of knowledge, time constraints, and lack of consideration or misunderstanding of each other's role in fall prevention assessment and interventions can occur. The most effective interventions exist when the patient either has been or is provided an understanding of his/her fall risk along with being open to the information and willingness to actively participate in the plan of care (Shankar, Taylor, Rizzo, & Liu, 2017). Burke-Doe and colleagues found a positive correlation of increased confidence in

performing ADL's with the provision of fall risk factor education to patients with osteoporosis (2008). Increased patient confidence was an outcome of positive changes in fall risk behaviors.

Benefits of Occupational Therapy

Occupational therapy services in general provide a customized approach that considers the dynamic relationship of person, environment, and activity. This approach in combination with the understanding of how an individual's readiness for change (TTM) allows for more dynamic interactions. Specifically, long-term change is made possible due to an enhanced awareness and understanding of fall risk factors and the psychological implications related to behaviors, confidence, and self-efficacy by the clinician as well as the participant (Fange, & Iwarsson, 2007; Stark, Somerville, Keglovits, Smason, & Bigham, 2015). OTs affirm that maintaining independence with ADL's and IADL's improves both the physical and psychological components of an individual's life (Chase, Mann, Wasek, & Arbesman, 2012). Much of the literature suggest that the most effective intervention for reducing falls among community-dwelling older adults consist of home assessment with modifications, education to reduce home hazards and increase fall risk knowledge, use of assistive technology, medication management, vision management, and exercise (AOTA, 2010; Barstow, Bennett, & Vogtle, 2011; Chase, Mann, Wasek, & Arbesman, 2012; Lord, Menz, & Sherrington, 2006, Mackenzie, Byles, & Higginsbotham, 2000; Pighills, Torgerson, Sheldon, Drummond, & Blend, 2011; Stark, Somerville, Keglovits, Smason, & Bigham, 2015). Studies also suggest that home assessments with modifications are most effective when performed by an occupational therapist (AOTA, 2010; Pighills, Torgerson, Sheldon, Drummond, & Blend 2011; Stark, Keglovits, Arbesman, & Lieberman, 2017). This may be in large part due to findings of one study by Cumming and colleagues that home modifications utilized as a single component intervention are not effective in significantly reducing falls (2015).

Conversely, an earlier study by Mackenzie and colleagues found that addressing home hazards alone made a significant impact on the reduction of falls in older adults (2000). It is important to note the study also adopted and applied the concept of person, environment, and activity interactions. This person-environment fit model may have impacted the intervention strategies, which led to overall fall reduction intervention effectiveness (Mackenzie, Byles, & Higginbotham, 2000).

Behavior and Home Modifications

Research studies provide an understanding that behavior changes are also important in fall prevention. Behavioral changes can be influenced by people's perception of risk factors, home safety and what is meaningful to them, and the anxiety or fear that is often impactful (Cumming, Thomas, Szonyi, Salkeld, & O'Neill, 2015; Lord, Menz, & Sherrington, 2006; Oakes, 2015). This is supported with fall reductions occurring inside the home and also generalized to outside of the home after an occupational therapy intervention with behavior modification (Shaw, Bastawrous, Burns, & McKay, 2016). The concern is that an evidence-based approach to home safety assessments with modifications and the psychological implications may not be well understood or used consistently by occupational therapists. One study reported only 50% of home modifications were in place at a year follow-up (Cumming, Thomas, Szonyi, Salkeld, & O'Neill, 2015). Stark and colleagues reported that only 70% of the homeowners completed 50% of the modifications with a resultant 31% decrease in falls (2017). They also found that 75.7% of the participants that made only one modification still demonstrated a decrease in falls. Kurtkoti reported out of a total of 50 homes, 80% of the fall study participants incorporated the recommended home modifications (2014). Most of the modifications took place in the bathroom (24%), living room (21%), stairs (20%), kitchen (19%), and bedroom (16%).

Summary

It is therefore recommended that the psychological implications related to falls be further explored and incorporated into occupational therapy interventions in order to increase compliance with home modifications for the purpose of reducing falls. There are evidence-based community fall prevention programs that have demonstrated 30%-55% reduction in falls. However, the American Occupational Therapy Association (AOTA) recommends that physical therapy (balance, strength, and gait training), occupational therapy (home safety assessments with modifications, energy conservation strategies, education on risk factors, occupational performance in context of the person and environment, and behavior modification), durable medical equipment, and vitamin D supplements also be incorporated for the most effective multifactorial falls management program for older adults (AOTA, 2010).

Section III: Methods

Study Design

This 30-day study utilized a quantitative method, pre-experimental design. The quantitative method was chosen based on the type of pre and post-test questionnaires used. The study is considered pre-experimental due to the one-group pretest-posttest design (Creswell, 2014). This design was chosen to test the impact of performing the occupational therapy intervention of fall prevention education and home safety assessments with recommended modifications. Additional consideration and focus included the incorporation of psychological implications (behaviors, confidence, self-efficacy) as they contribute to choices that can predict either an increase or decrease in falls. This study was part of a pilot falls prevention referral program that identifies nutritional, supportive living, support groups, financial, and legal service needs in addition to providing falls education and home assessments. The Fall Management Solutions Program was created in 2018 by the primary investigator in an effort to provide a solution to an identified need of decreasing elder in home falls in the local community. The need was identified during a requested meeting of the primary investigator with the Bedford, Texas Fire Political Action Committee (PAC). The need was vocalized again during the first meeting of the Bedford Senior Task Force where representatives from the Bedford Fire/EMS and Roy Turner, City Councilman and liaison to the Bedford Senior Activity Center, were present.

The national organization AMBUCS is in support of the program. The local Mid Cities chapter of AMBUCS, of which the primary investigator holds the position of President, has graciously agreed to support this pilot program. The National AMBUCS mission is to inspire mobility and independence and this program is believed to align with that mission, along with

other community services. This study received approval from the Eastern Kentucky University institutional review board on January 15, 2019, prior to conducting the study and collecting data.

Population and Setting

A convenience sample of 21 English speaking older adults that have had a previous fall and self referred to the Falls Management Solutions Program were selected. The recruitment occurred from 1) local EMS providers that had responded to 911 lift assist calls, 2) healthcare providers that had come into contact with an older adult aged 65 and older through the emergency room, 3) home health care service workers, 4) local senior adult church ministries, and 5) senior living professionals. Older adults that have fallen are at a higher risk of recurrent falls and may be more responsive to interventions than well, active adults that had not experienced a recent fall (CDC, n.d.; Calhoun et al., 2011). All 21 participants were interviewed and the interventions provided in their homes. The participants were screened using the validated Six-item Cognitive Impairment Test (6CIT). Those scoring in the normal (0-7) to mild cognitive impairment (8-9) range were included. Non-English speaking adults aged 65 and older that live in skilled nursing facilities, individuals under 65 years of age, those that score a 10 or higher on the 6CIT indicating significant cognitive impairment, and those referred that had never experienced a fall were excluded.

Study Protocol

Once the referral for the Falls Management Solutions Program had been received, the principal investigator contacted the participant via phone to introduce the program and arrange a mutually convenient time for the initial home visit. The home visit took approximately 90-120 minutes in which the informed consent form was read and signed by the participant first. Next, the Six Item Cognitive Impairment Test (6CIT) was completed in order to determine inclusion or exclusion from the study. If the score on the 6CIT was 0-9, a demographic and healthcare

utilization form was then completed, followed by additional data collected utilizing the Falls Behavioural (FaB) Scale for the Older Person, The Activities-specific Balance Confidence (ABC) Scale, and the Falls Efficacy Scale - International, (Appendix A). A home safety assessment with applicable recommended modifications was also performed through the use of the Rebuilding Together Safe At Home Checklist. The results of the three scales were shared with the participant.

Each participant received education by the OT during the initial visit about extrinsic and intrinsic fall risks, fall risk behaviors, how to reduce fall risks, and how to improve self-efficacy. The Stopping Elderly Accidents, Deaths & Injuries (STEADI) materials used for education were found on the Centers for Disease Control and Prevention (CDC) website at https://www.cdc.gov/steadi/patient.html. The National Institute of Health education materials utilized were entitled “What YOU Can do to Prevent Falls”, “Chair Rise Exercise”, “Postural Hypotension: What is It & How to Manage It”, “Stay Independent: Prevent Falls” fact sheet, and “Older Adult Falls: A Growing Danger” (2017). The results and recommendations from the home safety assessment and recommended modifications were shared with the participant and provided in writing, along with resources to obtain products and/or services from the local community for little or no cost by day seven.

Phone contact occurred approximately one week from the initial home visit to reinforce reading the information provided. The OT also encouraged participants to practice lifestyle behaviors that are known to reduce falls. Inquiry about progress on any home modifications was made and continued support and assistance was provided. Phone contact occurred again approximately three weeks post initial home visit. The OT continued the same support provided at week one interval. If the participants were not able to answer the call, a detailed voice message

reminding them to review the reading material, recommended home modifications, and any additional pertinent follow-up needed depending on the individual participant. For example, the participant was informed about calling or applying online for community resources for grab bars, transportation, wheelchair ramp, meals, or other identified needs.

The final home visit was arranged during the last call approximately four weeks from the initial visit. Additional question and answer time was provided to elicit any new areas of concern or additional resources needed now that education designed to enhance awareness had been implemented. At four weeks the three scales completed at the initial visit (FaB, ABC, FES-I) were completed again. The OT followed-up to determine if all of the recommended home modifications were implemented. Each participant was provided "A Guide for Older People: Talking With Your Doctor" published by the National Institute on Health: National Institute on Aging. It was retrieved free of charge by ordering or downloading the materials on the website https://order.nia.nih.gov/publication/talking-with-your-doctor-a-guide-for-older-people. Study participants were encouraged to develop or continue a participatory relationship with their physicians to manage falls and other chronic health conditions and obtain regular physical activity. Each was also provided the information for location and how to register for a free upcoming AMOB class in their local community.

Study Instruments

The study instruments included the 6-Item Cognitive Impairment Test, The Falls Behavioural (FaB) Scale for the Older Person, The Activities-specific Balance Confidence (ABC) Scale, the Falls Efficacy Scale-International (FES-I), and the Safe At Home Checklist. The 6CIT was selected as a screening tool because of its quickness and ease of use to test cognition. The 6CIT correlates well with the Mini-Mental Status Exam (MMSE) yet has higher sensitivity in milder dementia (Brooke, &

Bullock, 1999). Participants needed to a score of 0-9 to participate in the study. The reason for the cognitive screening test is that this program and its interventions are most effective when a person has not lost the ability for new learning, self-regulation, and self-monitoring for the purpose of changing behaviors for falls prevention. There are benefits to modifying the environment to increase safety and reduce fall in people with dementia. However, this study was concerned with the psychological considerations of thinking and behaving so those with higher cognitive scores, indicating more impairment, were not included in this study. This study was limited to how occupational therapy interventions lead to changes in behaviors, confidence, self-efficacy, and impact on the person-environment interactions of normal to mild cognitively impaired individuals.

The Falls Behavioural (FaB) Scale for the Older Person was chosen due to the population of this study scale's ability to identify the awareness and practice of fall behaviors (Clemson, Cumming, & Heard, 2003). There are 30 statements on the FaB. The respondent selects an answer of Never (1), Sometimes (2), Often (3), and Always (4). There is recoding required on questions number 7, 8, 9, 10, 19, and 23 in which Never (4), Sometimes (3), Often (2), and Always (1) points are reversed. Higher scores equate to higher perceptions of safe behaviors. The total FaB mean scores are recommended as opposed to the total FaB summed score. The FaB scale has established reliability and validity. It has application to a pre and posttest falls prevention interventions, which is how it is utilized in this study. A person's awareness is key to self-monitoring and self-regulation for the purpose of implementing successful changes in the home and community for the prevention of falls. Patterns, actions, and habits play a collective role in fall prevention and have context with situational and environmental stimuli (Clemson, Cumming, & Heard, 2003). The FaB takes five to ten minutes to complete. It also indirectly provides participant awareness of fall prevention behaviors by completing the tool.

The Activities-specific Balance Confidence (ABC) Scale was chosen due to measurement of participant subjective ability to rate his/her confidence level of balance during ambulatory activities (Moiz et al., 2017). The questionnaire was designed for use with adults aged 65 and older, which is the same age group that this study examined. It has established cross-cultural adaptation, validity, and reliability for older adults (Moiz et al., 2017). The ABC can predict future falls in community-dwelling adults based on their respective scores (Cleary, & Kornyakov, 2017). An older adult's confidence in his/her balance is a falls risk predictor and confidence is a critical element of the psychological implications of the person-environment interactions as it relates to falls. There are 16 questions for the participant to score with a percentage from no confidence (0%) to completely confident (100%). The percentage of self-confidence is determined by adding the 16 individual percentages divided by the number of questions (16). Conversely, the percentage of impairment can be determined by subtracting the percentage of self-confidence from 100% (Powell, & Myers, 1995). Increased fall risk is indicated on the ABC if participants score 67 or higher (Moiz et al., 2017). This scale is also able to provide a percentage of impairment, which can be useful for documentation purposes to demonstrate objective improvements.

The Falls Efficacy Scale – International (FES-I) was selected due to the importance of the role fear of falling has in the risk of falls (Greenberg, 2011). There may be a connection with fear of falling and implementing or not implementing home modifications and behavioral changes. It also has an excellent internal validity and test-retest reliability. This scale was used pre and posttest. The FES-I targeted older adults with a history of falling. FES-I has psychometric properties that take into account social activities and routine activities of daily living (Greenberg, 2011). The FES-I has 16 questions with the answer selection of Not at all Concerned (1), Somewhat Concerned (2), Fairly Concerned (3),

and Very Concerned (4). The total possible points are 64. The lower the point score on the FES-I, the less fearful the participant is related to falling.

The Safe at Home Checklist was utilized as the home safety assessment. It was developed in a collaborative effort between Rebuilding and Area Agencies on Aging, AARP, National Association of Home Builders, National Council on Aging, and the American Occupational Therapy Association (Rebuilding Together, n.d.). There are 12 areas of the home that are assessed: 1) exterior entrances and exits; 2) interior doors, stairs, halls; 3) bathroom; 4) kitchen; 5) living, dining, bedroom; 6) laundry; 7) basement; 8) telephone and door; 9) storage space; 10) windows; 11) electric outlets and controls; and 12) heat, light, ventilation, smoke, carbon monoxide, and water temperature control. Basements are not prevalent in Texas so this will likely not be applicable for all of the homes assessed. The primary investigator had the discretion to replace the basement with a garage or shed depending on the participant frequency of use. This assessment was not numerical like the FaB, ABC, and the FES-I. The number of recommendations identified on the initial visit were compared to how many were implemented by percentage on the 30-day final visit.

Data Analysis

A within-subject design with a pre and posttest was utilized. The data was analyzed using the nonparametric, inferential test of paired or matched data known as the Wilcoxon Signed Rank Test. This method was chosen due to the interval data specific measurement scale (Likert) and small sample size with a need for sensitivity to changes (Sullivan, 2017). Each of the 21 subjects had a pre and posttest comparison analysis of the number of home safety modification recommendations from the initial home visit, and the number of those recommendations completed on the last home visit, were analyzed comparatively to each individual and then collectively by percentage. This was followed by a combined analysis of overall pre and posttest comparisons

utilizing the FaB, confidence utilizing the ABC, and self-efficacy utilizing the FES-I for individual behavior, confidence, and self-efficacy scores.

The Wilcoxon Signed Rank Test analysis instrument was utilized as a non-parametric test of matched or paired data because of the study design and its sensitivity to changes given such a small sample size. The sample size was too small to guarantee that the sample size would be normally distributed. The Spearman's Ranked-Order (RHO) Coefficient Test was chosen to determine the direction, strength, and relationship of age, gender, cognition, marital status, type of residence, use of mobility aid, caregiver role, level of education, income, and historical number of falls to changes in behavior, confidence, and self-efficacy. Statistical relevance was also determined on various factors such as illness, the 6CIT score respective to improvements in each area, physical ability, home safety modifications implemented, and overall improvements in behaviors, confidence, and self-efficacy. This was accomplished with Microsoft Excel software using pivot table functions. Lastly, home safety modifications implemented were hand calculated to determine the percentage completed within the 30-day study timeframe.

Outcome Measures

Descriptive statistical analysis was used to determine statistical significance of characteristics of the group such as age to each of the pre and posttest measures (Taylor, 2017). These scores were analyzed to find the correlation of each area and to determine the significance in the implementation of home modifications, safer behavioral choices, increased confidence, and decreased fear to determine statistical significance of $p \leq 0.05$. Each scale utilized to measure pre and posttest behaviors, confidence, and self-efficacy. It was predicted that the largest improvements in the areas of behaviors, confidence, and self-efficacy would likewise have the greater compliance with home modifications. Statistical significance was sought to also identify

the role of age ranges, socio-economic status, number of previous falls, and 6CIT scores and their predictive or correlation relationship. The subjects were categorized into different areas to look for statistical relationships with pre and posttests. Gender was not heavily factored in to this particular study based on relevance due to such a small sample size of men (3) as opposed to women (18).

There were possible internal validity threats in the convenience sampling selection due to the small sample size. There was also a risk of participants becoming unavailable at the intended interval of visits or being overwhelmed at the amount of visits or illness during flu season when the study occurred. This may have caused them to drop out and then their outcomes would have been unknown. Fortunately, all participants that consented to the study completed the pre and posttests. However, there were times due to illness or vacation that the phone calls were delayed. Several of the participants were unavailable to answer the phone and communication occurred through voice message left by the occupational therapist. The possible external validity threats included the time frame interaction, history, and intervention. New habits on average take longer than 30 days and the changes may have been temporarily distorted or not long enough to produce change. The participants may have had exposure in the past to events that may contribute to current perspectives, such as witnessing or having experienced a traumatic fall with injury. The interventions were more psychological and reflective in nature, which may be quite different to the physical activity expectation that many participants may have had when initially volunteering for the study.

Ethical Considerations

The IRB application was submitted on November 27, 2018. The referrals were obtained once IRB approval was received on January 15, 2019. The participants had the right to privacy, which means protection of their medical and other information with their anonymity preserved

(Smith, & Quelch, 1992). Voluntary participation was reviewed in detail with the participant using a formal letter. The letter was read and a copy left for the participant to refer back. It included information on the purpose of the study, the ability to withdraw from the study without penalty, and contact information for the primary investigator to answer questions or concerns at any time during the study. Consideration also was given to possibly exposing participants to mental stress. Since a fall can be the cause of feelings such as fear and anxiety participating in a study could cause additional stress (Fabre, Ellis, Kosma, & Wood, 2010; O'Rourke, Upchurch, Bain, Tirey, Vrchota, & Watson, 2018). Additional stress could be due to the amount of questions, visits, and educational information that will be provided in a relatively short period of time (30 days). Falls could also create a severe financial burden. Home modifications can be costly as well, further contributing to the burden. Resources were shared that could offset the cost of modifications in order to reduce the negative impact financially. The outcomes of the study were shared with the participants at the project completion. The study complies with the guiding principles for ethical research as defined by the National Institute of Health (NIH, 2016).

Timeline of Project Procedures

The program began in March of 2017 after meeting with the Bedford Fire Political Action Committee (PAC). The fire fighters present during the meeting shared how problematic falls requiring lift assist were taking time away from meeting other emergency needs in the community. The timeline (Figure 1) below depicts the steps taken since initiation of the study. The IRB application was submitted on November 27, 2018. The referrals were obtained once IRB approval was received on January 15, 2019.The program brochures had been distributed three months prior to the Hurst, Euless, and Bedford EMS Chiefs. A variety of local churches with active senior adult ministries, senior living and independent living marketing directors, outpatient physical therapy

clinics, home health and private duty agencies were provided brochures and flyers with information about the program once IRB approval was received.

Twenty-one initial home visits with completion of informed consent followed by the administering of pre-test measures occurred between the dates of January 23, 2019 and February 24, 2019. The participants were given the STEADI educational material and home modification recommendations (independent variables) at the end of the first visit. The administration of post-test measures and home safety modification recommendations were completed approximately 30 days following the initial visit. The last piece of posttest data was collected on March 24, 2019. The comparison of pre-test and post-test measures using Wilcoxon Signed Rank Testing and Spearman's RHO to determine statistical significance were concluded on April 30, 2019. The final CAPSTONE paper was submitted and presentation provided May 1, 2019 as determined by the Occupational Therapy department at Eastern Kentucky University.

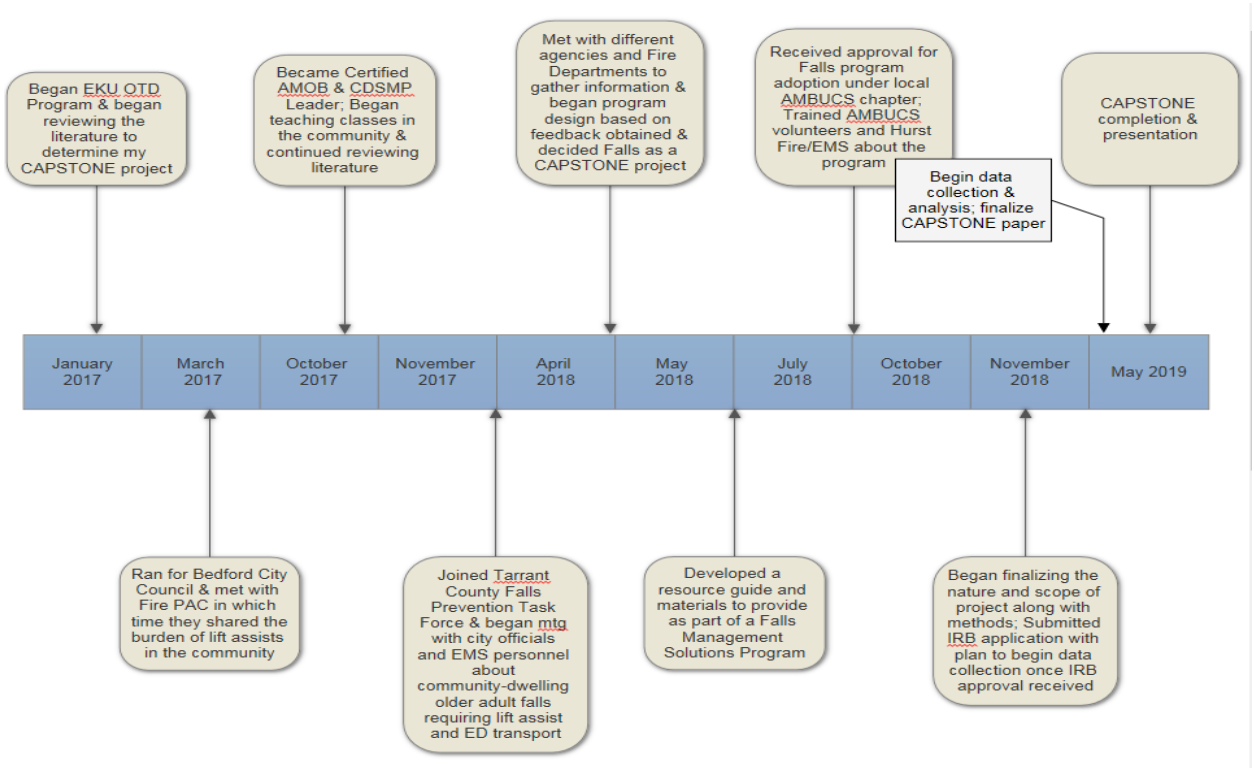

Figure 1. Timeline of Project Procedures

Section IV: Results and Discussion

All 21 participants had a common goal of learning to reduce their risk of falling and increase their safety as a reason for volunteering for the study. One occupational therapist provided all communication, education, assessments, resources and home modification recommendations. Each of the 21 volunteer participants involved in the Fall Prevention Research Study completed all of the questions on both pre and posttest home assessment visits, including all pre and posttest surveys. All received two accountability and educational phone calls, one at the end of week one and one at the beginning of week three. Some were available to discuss the personalized education as determined by the occupational therapist as a result of the initial home assessment modification recommendations. All participants were provided a combination of previously identified resources, follow-up with the understanding and answering of any questions from the STEADI fall prevention material provided, and how his/her progress was with the goals established on the initial visit. Others that were not available by phone were left a detailed message on an answering machine. The OT provided specific reminders of the individualized home assessment modification recommendations, resources, and encouragement to review the STEADI educational material. Participants were also asked to return the call as needed prior to the next call or final home visit.

It is important to note that on the final home visit, the home modification recommendations were reviewed with each participant first with encouragement and praise for those items implemented within the 30 days of the study, as well as things not yet completed or rejected utilizing the Stages of Change approach. The posttest survey questionnaires were then completed directly following with the results of pre and posttest changes, reassurance provided of favorable and any less favorable change, and possible reasons for those changes. Every participant was congratulated on taking an active role in reducing his/her risk of falling by improving in one or more psychological

implications to falls. Lastly, participants were provided the booklet "A Guide for Older People: Talking With Your Doctor" (National Institute on Aging, 2016).

Statistical Analysis: Demographic Data

Participant ages ranged from 65 to 82 with a mean age of 73.5 years old. Yearly income for the participants was reportedly $0 to $30,000 (9), $31,000 to $60,000 (8), $61,000-$90,000 (2), and $91,000 to $120,00 (1). One participant chose not to answer. On the cognition assessment (6CIT), 20 scored in the 0-7 (normal range) and one scored in the 8-9 range (mild impairment). The majority of participants did not utilize walking aids such as a rollator, rolling walker, or cane for mobility (12), some utilized one or more types of walking aids (8), and the primary mode of location for one participant was a powered wheelchair. The living situation of the participants were low-income housing apartments (12), assisted living facility (1), single story home (6), and a two-story townhome (1). Of the 21 participants, eleven lived alone and ten were married and lived with their spouse.

All of the participants in this study had a history of one or more falls. Fifteen of the participants had one previous fall, four participants had two previous falls, one participant had three previous falls, and one participant had five or more falls. Two of the participants had previously completed AMOB. The average number of falls reported by the participants at the initial visit was 1.5. One of the participants receiving physical therapy for balance impairment fell twice at home prior to receiving a rollator at the end of week one. The OT had to first confirm with the treating PT, as a professional courtesy, to determine the appropriateness and safety of the rollator. The PT was also informed the client was not using the rolling walker in the home. The client did not report additional falls after obtaining the rollator during the remainder of the study period.

Nearly all of the participants were born in the United States. Three immigrated to the United States from Pakistan. The participants identified his/her religious affiliations as Christian (Baptist, Methodist, and Catholic), Jewish, Muslim, and Buddhist. The culturally identified makeup of the participants included Caucasian (16), African American (1), Islamic (3), and Hispanic (1). The participants were a majority of women (85.71%) versus a minority of men (14.29%). The highest level of education for the participants included high school (7), some college (6), Associate's degree (1), Bachelor's degree (2), and Master's degree (5).

There were unique client factor findings from many of the participants: One of the participants was married to a spouse with dementia and was considered his caregiver, one participant had a diagnosis of dementia and his spouse was considered his caregiver, one participant was the caregiver for a spouse who has right hemiparesis from a stroke in 2010, one participant was a recent widow, two participants were married and were not caregivers to their spouses, two married couples were both participants and reportedly in good health, and the remaining participants lived alone. In addition, five participants became ill or unwell during the course of the study and two were receiving outpatient physical therapy. One participant experienced a transient ischemic attack (TIA) one day following the initial visit.

Statistical Analysis – Client Factors

Cognition scores and number of falls were examined in relation to behaviors, confidence, and self-efficacy. The 6CIT's interpretation of cognition scores state that 0-7 is normal and 8-9 is mildly impaired. Ten participants scoring a 0 revealed slightly greater improvements in behaviors (average of 9.90) compared to the eleven participants that scored 2-8 (average of 8.1). Likewise, clients with a score of 0 demonstrated slightly greater improvements in confidence (average of 82.82) compared to those scoring between 2-8 (average of 80.50). Furthermore, those with scores

of 2-8 demonstrated significantly lower improvements in self-efficacy (average of 3.82) compared to their counterparts that scored a 0 (average of 6.8).

Behaviors were found to be similar between frequent fallers (9.16) and infrequent fallers (9.0). There were 12 participants that fell that did not use a walking aid and 8 participants that fell that did use a walking aid (see Figure 2). The study revealed that five participants (28.57%) that had experienced two or more falls prior to the study made statistically significant improvements (average of 169.5) in the area of confidence compared to those that had experienced only one fall, making only a moderate improvement (average of 46). However, those with two or more falls had less self-efficacy (average of 1) than his/her counterpart (average of 6.9).

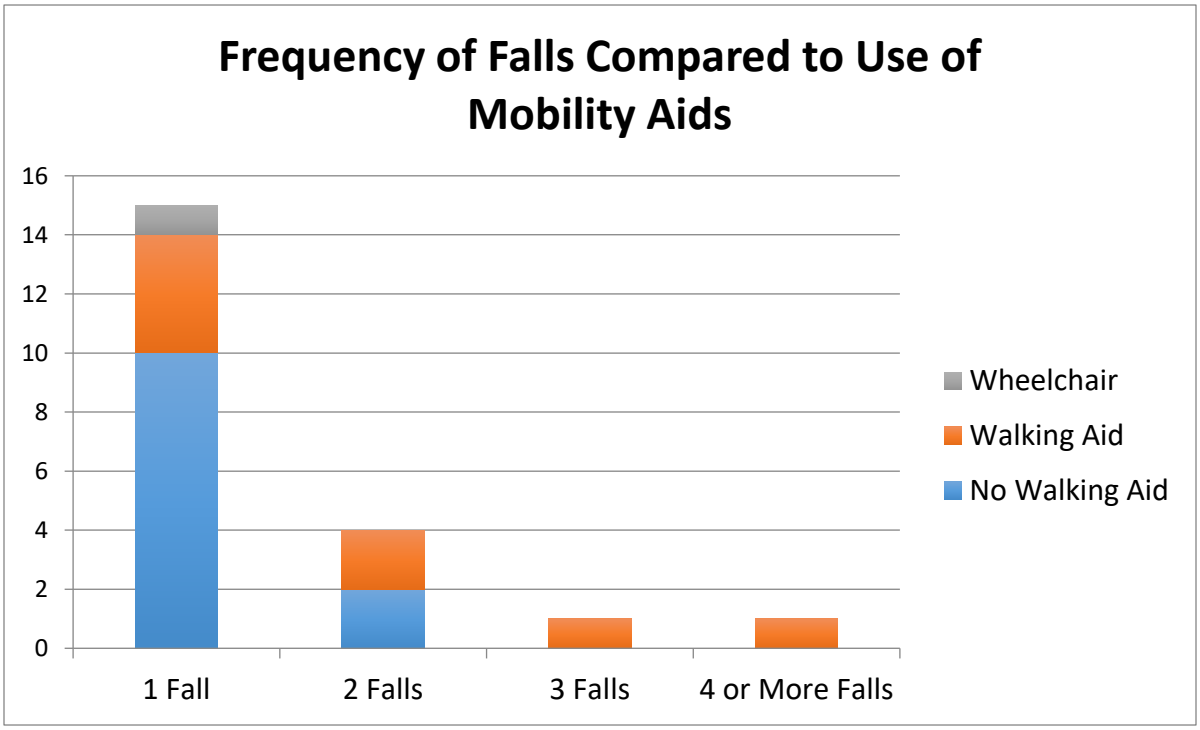

Figure 2. Frequency of falls compared to use of mobility aids

Statistical Analysis - Psychological Factors

Each participant improved in one or more areas of behaviors, confidence, and self-efficacy as demonstrated in Figure 3. Nineteen percent of clients improved in 1 area, 52% of clients improved in two areas, and 29% improved in all three psychological factors.

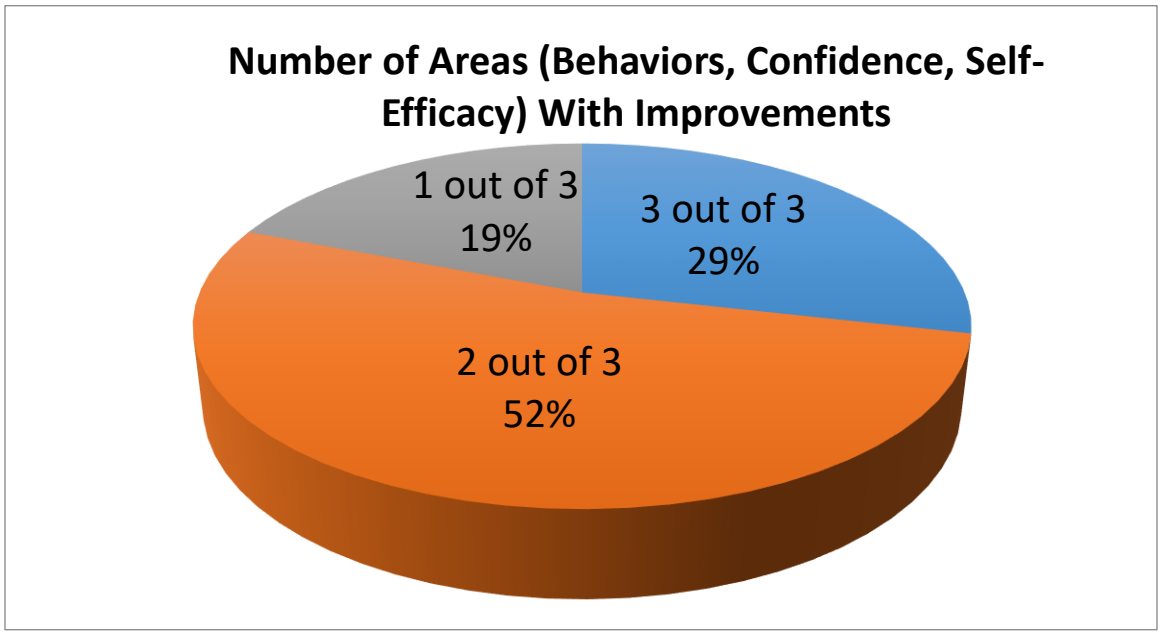

Figure 3. Number of areas with improvements

The Wilcoxon Signed Rank Test was used for each individual participant pre and posttest scores in the area of behaviors, confidence, and self-efficacy. Each of the three measured psychological outcomes provided sufficient evidence using critical factor at the $p \leq .05$ level, suggesting that occupational therapy interventions improved behaviors (Table 1), confidence (Table 2), and self-efficacy (Table 3) in relation to fall prevention. The null hypothesis was rejected each time, supporting that occupational therapy intervention of incorporating the psychological implications of behaviors, confidence, and self-efficacy as interventions, into education and home safety assessments, is indeed relevant.

Table 1. Statistical Analysis of Behaviors Using Wilcoxon Signed Rank Test

Partici-pant #	Pre Behavior	Post Behavior	Difference	Absolute Value	Rank	Signed Rank
1	72	72	-	-	-	-
2	87	84	(3)	3	4.0	(4.0)
3	108	107	(1)	1	1.5	(1.5)
4	67	82	15	15	17.0	17.0
5	70	80	10	10	13.0	13.0
6	91	99	8	8	9.5	9.5
7	49	63	14	14	15.5	15.5
8	79	88	9	9	11.0	11.0
9	60	70	10	10	13.0	13.0
10	96	134	38	38	20.0	20.0
11	89	84	(5)	5	5.5	-5.5
12	85	92	7	7	7.5	7.5
13	89	94	5	5	5.5	5.5
14	81	102	21	21	19.0	19.0
15	84	104	20	20	18.0	18.0
16	87	88	1	1	1.5	1.5
17	89	99	10	10	13.0	13.0
18	65	79	14	14	15.5	15.5
19	81	89	8	8	9.5	9.5

20	77	84	7	7	7.5	7.5
21	90	92	2	2	3.0	3.0
Average	80.76	89.90				
Standard Deviation	13.35	15.17				
N = 20 T- =11 (stat) T+ = 199 Critical Factor = 52 (crit) Wstat<Wcrit = Reject Null Hypothesis						

Table 2. Statistical Analysis of Confidence Using Wilcoxon Signed Rank Test

Participant #	Pre Confidence	Post Confidence	Difference	Absolute Value	Rank	Signed Rank
1	885	1265	380	380	16.5	16.5
2	1470	1466	-4	-4	1	-1
3	680	1060	380	380	16.5	16.5
4	910	910	-	-	-	-
5	820	1060	240	240	13	13
6	750	1017	267	267	15	15
7	1270	1320	50	50	6.5	6.5
8	1429	1300	-129	129	9	-9
9	1458	1480	22	22	5	5
10	1360	1130	-230	230	12	-12
11	240	495	255	255	14	14
12	1280	1330	50	50	6.5	6.5

13	1475	1290	-185	185	11	-11
14	1050	1110	60	60	7	7
15	1115	1600	485	485	18	18
16	470	490	20	20	3.5	3.5
17	1410	1540	130	130	10	10
18	1600	1600	-	-	-	-
19	1580	1565	-15	15	2	-2
20	1310	1230	-80	80	8	-8
21	1070	1090	20	20	3.5	3.5
Average	1,125	1,207				
Standard Deviation	368	305				
N=19 T- = 43 (stat) T+ 135 Critical Stat = 46 (crit) Wstat<Wcrit = Reject Null Hypothesis						

Table 3. Statistical Analysis of Self-Efficacy Using Wilcoxon Signed Rank Test

Participant #	Pre Self-Efficacy	Post Self-Efficacy	Difference	Absolute Value	Rank	Signed Rank
1	35	34	1	1	2	2
2	26	22	4	4	8	8
3	46	30	16	16	17	17
4	35	33	2	2	5.5	5.5
5	39	40	-1	1	2	-2

6	34	25	9	9	14.5	14.5
7	24	26	-2	2	5.5	-5.5
8	26	34	-8	8	12	-12
9	19	19	-	-	-	-
10	27	19	8	8	12	12
11	44	32	12	12	16	16
12	31	26	5	5	9.5	9.5
13	27	28	-1	1	2	-2
14	28	37	-9	9	14.5	-14.5
15	38	16	22	22	18	18
16	54	31	23	23	19	19
17	35	30	5	5	9.5	9.5
18	16	16	-	-	-	-
19	18	16	2	2	5.5	5.5
20	26	28	-2	2	5.5	-5.5
21	31	23	8	8	12	12
Average	31	27				
Standard Deviation	9.24	6.91				
N = 19 T- = 41.5 (stat) T+ = 148.5 Critical Stat= 46 (crit) Wstat<Wcrit = Reject Null Hypothesis						

Seventeen (81%) of the twenty-one participants improved in behavior. The four that did not improve or had slightly decreased scores on the FaB had some commonalities. Three (75%) of the

four scored more than zero on the 6CIT and none of the participants had implemented all of the home safety modification recommendations. Participants who improved in confidence and self-efficacy made the most improvements overall. Fourteen (67%) of the twenty-one participants improved in confidence. Four (57.14%) of the seven that did not improve in confidence became ill or had a TIA during the study. Fifteen (71%) of the participants improved in self-efficacy, including the five participants that became ill during the study.

Statistical Analysis – Client & Psychological Factors

The Spearman's Rank-Order (RHO) Coefficient Test was used to measure the strength, direction, and relationship (r_s) between two variables. There were no statistical significances between the variables of age, gender, 6CIT scores, type of home, caregiver role, level of education, use of mobility aid, and income to behaviors, confidence, self-efficacy. There were very weak and weak statistical significances in marital status to confidence and self-efficacy. Marital status and behaviors had a moderate statistical relationship (r_s): -0.49. Likewise, history of prior falls had very weak and weak statistical significance in both behaviors and self-efficacy respectively and there was a moderate statistical significance to confidence Table 4. Married (did not live alone) participants had a higher mean score improvement in behavior (14.55) compared to single, divorced, or widowed (lived alone) participants (4.91). Age was also compared to results on the 6CIT, use of assistive devices, and number of previous falls using Microsoft Excel pivot tables, with no findings of statistical significance.

Table 4. Spearman's Rank-Order (RHO) Coefficient Test

Factors	Behaviors	Confidence	Self-Efficacy
Age	(rs): -0.28	(rs): 0.02	(rs): 0.21
Gender	(rs): -0.01	(rs): -0.07	(rs): 0.30
6CIT Score	(rs): 0.06	(rs): 0.06	(rs): -0.09
Marital Status	(rs): -0.49	(rs): 0.10	(r): 0.20
Type of Residence	(rs): -0.23	(rs): 0.22	(rs): 0.13
Use of Mobility Aid	(rs): 0,04	(rs): -0.37	(rs): -0.22
Caregiver Role	(rs): 0.27	(rs): 0.01	(rs): -0.16
Level of Education	(rs): -0.05	(rs): 0.02	(r): 0.17
Income	(rs): 0.16	(rs): -0.20	(rs): -0.30
Number of Falls	(rs): 0.09	(rs): 0.22	(rs): -0.29

Statistical Analysis - Home Modifications & Resources

The relationship between behavior, confidence, and self-efficacy to home modification recommendations implementation were not apparently obvious. Generally, those that implemented 80% of more of the home modification recommendations during the 30-day study time frame demonstrated the highest improvements in behaviors, confidence, and self-efficacy. The study revealed that participants with two or more falls implemented home modification recommendations on average of 77.33%, compared to participants with only one fall having an average of 66.26%. Furthermore, 66.66% of the participants that had an illness (5) or TIA (1) were unable to complete 100% of the home modification recommendations. Fourteen of the twenty-one participants that demonstrated no improvement or increased fear had implemented 66.66% or less

of the home modification recommendations. Interestingly, implemented home modification recommendations for those with a score of 2-8 were completed at an average of 66.09% of the time as opposed to those with a score of zero, with an average of 73.1%.

Environmental hazards were identified in 100% of the homes visited. The percentage of home modifications recommendations implemented were hand calculated and compared to the individual behavior, confidence, and self-efficacy scores of each individual. The number of home modification recommendations ranged from 1 to 10, with an average of 5. There were 101 home modification recommendations in all, with 75 completed. This resulted in a completion rate of 74.26% in a 30-day study time frame. There were 20 modifications (19.80%) accepted by participants, yet unable to be completed within the 30-day time frame. Only 6 of the modifications (5.94%) were rejected by the participants. Participants that implemented 80% or more of the recommendations demonstrated the highest improvements in confidence (average of 162 as opposed to 49) and self-efficacy (average of 12 as opposed to 2.53). See Figure 4.

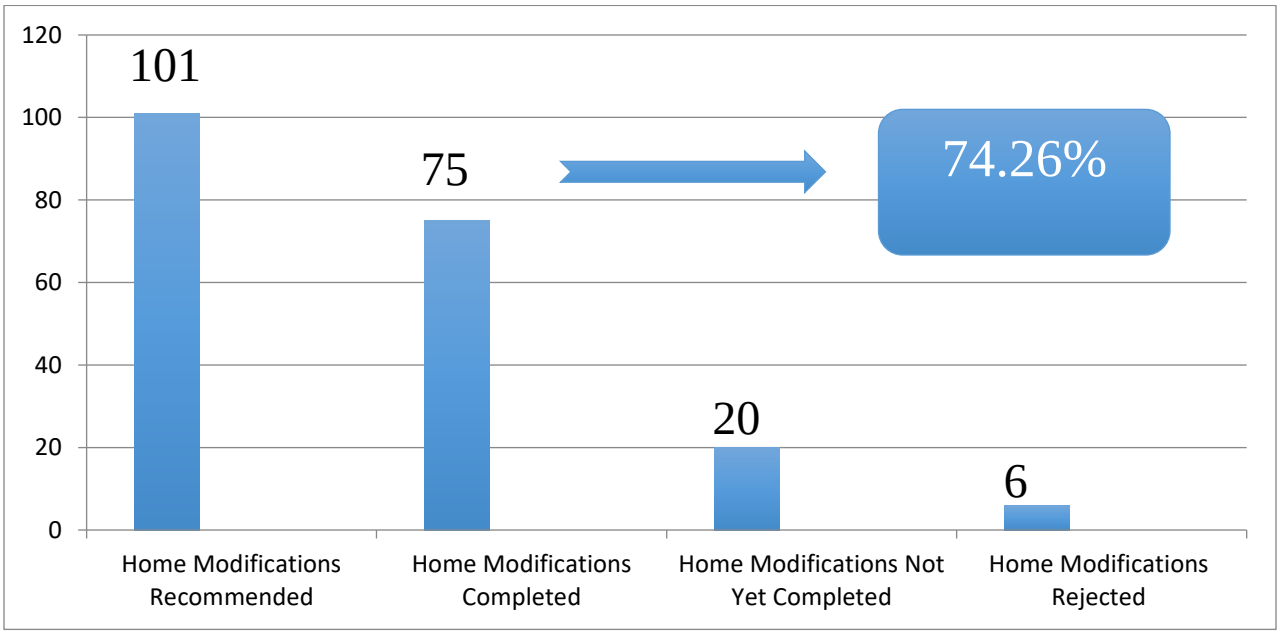

Figure 4. Number of Home Modifications Recommended and the Implementation Results

The most common home modification recommendations were non-skid rug to replace one that was unsafe (17), grab bars at the toilet and/or shower (8), and removal of clutter (i.e. magazines, boxes, shoes, cords) (5), relocation of items/furniture to increase pathway safety, a longer stair rail (1), and a ramp inside the home (1). The occupational therapist provided a rollator (1) and grab bars (2) to participants that were financially unable to afford them. Two participants hired a contractor to install his/her grab bars. Three of the participants had apartment maintenance install a grab bar in the shower. Participants were emailed or had pictures texted of various non-skid backings found on Amazon.com and also available locally.

The resources provided that were most needed, according to participants, were local AMOB classes (90%), the 211 contact information for the Area Agency of Aging and United Way (48%), transportation resources to routine medical appointments (24%), physical activity resource recommendations (19%), meals on wheels (14%), vial of life (14%), a contractor to install grab bars (10%), and the Lighthouse for the Blind (1%). Assistance in locating, contacting, and initiating the referral was found to be more beneficial to greater than half of the participants than simply providing the resource brochure, name and phone number. Clients might not have otherwise received timely services, resulting in a negative impact to both his/her psychological factors and fall risk.

Discussion

The person-environment interaction was critical in providing effective, individualized education and interventions. The OT interventions of fall prevention education and home safety assessments with modifications addressing the psychological implications for behaviors, confidence, and self-efficacy were proven to be statically significant at the P<=.05 level as seen in Tables 1-3. The study outcomes support the previous findings of O'Rourke and colleagues, that

psychosocial factors do impact fall prevention and self-efficacy is powerfully related to physical performance (2018). Home safety assessments are best done by an occupational therapist in the home (AOTA, 2010). How people perceive environments, limitations, and therefore what safety issues they may or may not have are often biased and not an effective way to prevent falls (Shankar, Taylor, Rizzo, & Liu, 2017). It can be helpful to have an outside perspective as many people become immune to their surroundings and fall risks may not be easily identified or realized. The follow-through time and solutions implemented through identified safety concerns and resultant recommendations are also equally important. Two of the participants could be considered hoarders (people that struggle to throw any thing away) due to the amount of excessive clutter in their homes, making it unsafe to maneuver and impossible to use walking aids.

The participants who were caregivers to spouses were less timely in implementing the recommendations. This was due to time constraints identified when caring for another person and transportation issues. The participants that scored between a two and eight on the 6CIT required more direction and assistance for identifying how and where to obtain items. They required additional cues and assistance to initiate necessary phone calls for implementation of the recommendations. For example, the OT called and requested applications for assistance be mailed to the participant. Those with limited income needed additional resources to furnish and install the necessary DME (rollator and grab bar for the shower). The participant with the powered wheelchair that had a spouse with dementia also needed financial assistance for replacing a ramp inside the home and grab bar installation in her home due to the financial constraints with both having significant medical needs.

Client & Community Education Needs

Healthcare practitioners are not routinely or consistently initiating fall prevention education with older adults. The investigator spent approximately six months presenting the Falls Management Solutions Program to local EMS workers, distributing flyers, notifying other health care professionals, presenting to local senior adult Sunday school classes at church, and posting signs in local rehabilitation, chiropractor, primary care physician offices, and senior centers. With all of the education and communication efforts completed by the researcher, only 21 subjects self-referred to take part in the 'Fall Prevention' study. In this study, clients with recurrent falls more readily discussed fall prevention demonstrated an increased perception of risk, particularly of injury. These participants indicated they had not previously received information and follow-up that addresses these perceptions and risk from healthcare providers. This supports the belief that health-care professionals may not be properly equipped with evidence-based fall prevention information (Lee et al., 2013).

Three of the participants that went to the emergency room after falling for evaluation and care supported Bloch and colleague's reported lack of concern for other medical or environmental issues that contributed to the fall (2010). Of those that had experienced falls and sought medical attention, future fall prevention was commonly the caution to 'be careful', 'slow down', or 'be aware of their environment', yet 41.8% reported they were not provided any recommendations (Lee et al., 2013). Participants indicated they were not provided fall prevention information, home safety information, recommendations for therapy or physical activity, or a home health referral. These findings align with Shankar and colleagues conclusion from their research of the need for targeted intervention and education for fall prevention after a sustained fall (2017).

One participant served as a caregiver to her spouse who had a diagnosis of dementia. He had fallen up to three times each day for approximately two weeks with resultant numerous calls to 911 for lift assist. He was admitted for inpatient rehabilitation services, addressing his acute urinary tract infection, balance impairment, and weakness. He was discharged home only to resume falling. The home was not assessed as part of the inpatient program. The spouse also received home health services during the study period. However, the OT conducting this study identified several factors to be unsafe for both participant and spouse as a result of the home safety assessment. The spouse's wheelchair brakes were broken, his recliner did not close properly, they had an inside ramp that was too steep, grab bars were needed in the bathroom for steadying assistance for self-care, and the participant who used powered mobility was suffering from caregiver burn out. All of these items put both her and her spouse at higher risk of falling. They had a need for a new wheelchair with working brakes, a recliner chair that closed properly, grab bars in the bathroom, a new ramp inside the split-level home that was installed too steep approximately ten years prior through Easter Seals, and some support in the home to reduce caregiver burden. The local veterans thrift-store donated a new wheelchair, the home health PT found a slightly used reclining chair that was affordable, the Area Agency on Aging installed a new wheelchair ramp in the hallway and two grab bars in the bathroom, and the United Way began providing 6-8 hours of assistance for a 6 month duration of which both were provided for free through local charitable contributions.

This information is helpful to occupational therapists and other healthcare professionals. It is often the responsibility of a health care professional to provide education and other identified resources. However, it is the clinical judgement of the investigator from having worked in different settings over a 25 year span, that the time in assisting a patient or caregiver is often not sufficiently

provided or is inadvertently neglected within the role of the health professionals providing care. Determining an individual's level of income, living situation and support, or assessing cognition and health literacy may be instrumental in prioritizing how much time and support should be provided to truly impact fall prevention and supportive resource efforts. Keen observation, interview skills, and proper training can help guide health care professionals in identifying those people most at risk. This can be useful to treating clinicians and as well as case managers.

Enhancing Current Interventions

Three of the twenty-one participants were already receiving outpatient physical therapy for balance and other mobility limitations. All three participants expressed gratitude and appreciation for the information and support provided by the OT and said that it was life changing. The person-environment fit model utilized by the OT impacted the intervention strategies, which led to the overall intervention effectiveness as also reported successful in the research conducted by Mackenzie, Byles, & Higginbotham (2000). This study's outcomes further support the work of Cumming and colleagues, Lord and colleagues, and Oakes on the impact of behavioral changes, home safety, and the reduction on anxiety and fear (2015, 2006, 2015).

It was not surprising that the higher incidents of falls occur to those that use walking aids for locomotion. Participant number five desired a rollator, instead of a rolling walker, in order to sit and rest due to decreased activity tolerance. She was initially unaware that she should discuss this with her physical therapist (PT). The OT contacted her PT and discussed her concern. The PT supported her attaining the rollator and was appreciative of the information. The participant's compliance with the use of a mobility aid and her behaviors and confidence improved as a result. This supports Stark and colleagues research findings on the benefit of occupational therapy through effective tailoring of interventions to individuals (2015). O'Rourke and colleagues

findings of the psychological implications of behavior, confidence, and self-efficacy as a beneficial self-reflective and educational approach were further supported by this study (2018).

This study required two visits and two phone calls to each participant by an occupational therapist. This totaled approximately four hours per participant time and six hours per therapist time, including time in travel, calculating results and documentation, and developing a plan of care for educational and resource needs. This service delivery allowed for greater ability in accessing the home environment. A longer time frame may be needed to positively impact long-term improved psychological factors and home safety than what acute care and traditional inpatient rehabilitative services currently provide. The Centers for Medicare and Medicaid Services (CMS) guidelines for home health services should recognize the value in occupational therapy being a stand-alone profession to maximize outcomes. This could further combat the devastation and disability that falls have on older adults and U.S. health care expenditures. It also rare to find occupational therapists working in traditional outpatient physical therapy clinics that typically treat a high preponderance of mobility and balance impairments with goals to improve client mobility and reduce or prevent falls. Providing additional support services from occupational therapy can be helpful in reducing falls in adults aged 65 and older.

Future Research

This study supports occupational therapy having a place in developing a conceptual model of evidence-based fall prevention. The person-environment fit model can further enhance efforts already in place within current medical and rehabilitative services (state Health & Human Services Department, Area Agency on Aging, United Way, Meals on Wheels, Centers for Disease Control and Prevention, and other valuable federal, state, privately funded and non-profit entities) who work with older adults to improve health and wellness and prevent injuries and disability. In a time

when resources are slim, it is necessary to consider both cost as well as outcomes in deciding who is the best to perform fall prevention interventions, albeit that of an interdisciplinary team or one discipline.

The accountability aspect of this study through follow-up phone calls strategically at the end of week one and three should be recognized. The impact of this relationship and support may have been instrumental in the overall outcomes. Perhaps a study that provided accountability touch points for one group and not for another could help us understand this aspect that typically is interwoven into many popular and heavily utilized evidence-based programs. This study was made duplicative and application oriented through the choice of assessments, educational tools, and resources that were strategically chosen. All tools are available on the World Wide Web at no cost. The profession of occupational therapy must have consistency in how fall prevention interventions are provided in order to be invariable no matter who performs the assessment or implements the plan of care. The goal is that every occupational therapist can achieve such success with their respective patient populations in various settings.

Perhaps the most revealing evidence to the researcher is that fall prevention education may temporarily decrease confidence and increase fear. This was indicated by the reductions in participant scores for those with acute illness, new or exacerbated medical conditions, recent fall, and perhaps scoring superficially high in pretest surveys. This can increase risk of injury, hospitalization or re-hospitalization in the older adult population. This outcome supports the research conducted by Shankar and colleagues with ED patients that had fallen and became more fearful and less confident (2017). Healthcare providers must be aware of this phenomena and advocate for the appropriate follow-up for his/her patient such as inpatient rehabilitation, home health services, outpatient services, or community evidenced-based fall prevention programs. This

is very important, yet has become more difficult in a time of bundled payments and other financial penalties for contradictory outcomes.

Limitations

The time frame of which the study was submitted for IRB approval and required to be completed was the biggest limitation of this study. The result was only obtaining 21 as opposed to the initial goal of 30 participants. This study was very broad in it's undertaking and may not have provided the degree of statistical evidence supporting one or more specific client factors or interventions. However, falls are multifactorial in nature and thus looking at more than one item was considered to be more important. Another limitation was the amount of participants that became ill during the study since it was done in the winter months. It would be interesting to see the results from a study done in the spring or summer. Avoiding the flu season and having weather permitting an increase in outdoor activities may have produced different results altogether.

The study was void of additional occupational therapy interventions such as ADL retraining, use of assistive devices, energy conservation, physical activity, or home exercise program. Had those traditional interventions been included the outcomes may have changed in all probability to add further value. All of the materials used are easily obtainable and the study is easily reproducible which are both a limitation and strength. The investigator purposefully made the design and implementation such that all occupational therapy practitioners could achieve successful results in positively impacting the psychological factors that contribute to falls.

This study was 30-day time-bound and may not be generalized into future situations where older adults had more time or had not experienced a fall. Three of the participants were actively receiving outpatient physical therapy (PT). The PT interventions may have contributed to the gains

found in the study. It is imperative to also discuss that the outcomes achieved may also have been impacted by several factors that are often not applicable in real life situations.

The sole focus of the time spent with the participant was on fall prevention strategies, including all of the education and resources provided. The same occupational therapist was used throughout the entire study. The principal investigator has been a practicing occupational therapist for over 24 years, is known to her mentors and peers as a natural born educator, has a passion for falls prevention in older adults from both personal and professional experience, and has taken over 20 hours of continuing education in home modifications. Not all occupational therapists may be able to achieve the same results based on one or all of these factors.

Lastly, the sample size of 21 was small. Although there were diverse backgrounds of the study participants, the same results may not be duplicated in a larger study. Therefore, it is unable to be generalized to all high and low-income elders, those with high and low educational levels, different ethnic backgrounds, or older adults who have not fallen.

The final limitation of this study was that twelve of the participants lived in a newly constructed low-income apartment housing that opened only six months earlier. As a result, many participants had very few belongings or had not completely unpacked. Residences lived in for a longer time frame or single-family homes may have provided a change in the number and type of home safety modifications recommended. It may have also impacted the number of implemented recommendations within the 30-day study time frame. Several of the participants in the apartment complex helped each other with the double-sided tape for the area rugs. It was refreshing to see the support, yet may not be reproduced by those living in single story homes. This did positively contribute to the total percentage of home safety modifications implemented.

Conclusion

Falls are generally not caused by just one issue- they are a multifactorial. Community-dwelling older adults aged 65 and older can benefit from an evidence-based conceptual model fall prevention program to assist them in raising awareness of falls as a problem and their modifiable risk factors. Effective falls management interventions include incorporating the psychological components that influence person-environment fit. Individualized education of identifying behaviors, concerns, and self-efficacy can promote self-reflection and self-monitoring of falls prevention. Older adults can develop greater awareness, gain assertiveness, and empowerment through enhanced understanding of fall risks. These strengths can increase the advocacy and utilization of resources to ultimately make the necessary changes in behaviors to help prevent falls. Shankar and colleagues cite that current geriatric emergency department guidelines recommend a screening of fall risks for all older adults (2017). This also includes fall evaluations and targeted interventions for those with recurrent falls or abnormalities in balance or gait. It is recommended that health-care professionals adopt the routine standard practice of providing fall prevention information to their client including a referral for OT services for falls prevention.

Home safety modifications and reduction of environmental hazards are more effectively, efficiently, and consistently utilized as a result of interventions provided by occupational therapy practitioners. Additional support in the navigation of resources to benefit self-determined needs can provide further confidence and may alleviate anxiety and fear in the long term. More hands-on assistance is needed with individuals faced with financial limitations, caregiver burden, and impaired cognition to implement home safety assessment recommendations.

The reduction of falls ultimately leads to a better quality of life and achieves both the Healthy People 2020 and 2030 goals and AOTA’s Vision 2025. Occupational therapy needs to be

incorporated into any falls management program in order to achieve the highest level of safety and independence for clients. OT's have unique ability to understand the symbiotic relationship of person-environment, psychological implications, the clinical course of health conditions for current and future ADL capacities, all while presenting the information that coincides with a client's readiness for change. Occupational therapy is an integral part of falls management and should be included into all conceptual fall prevention programs, multifactorial fall evaluations, and targeted interventions.

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Appendix A. Study Instruments

Falls Efficacy Scale-International (English) can be retrieved from https://consultgeri.org/try-this/general-assessment/issue-29.pdf

Safe at Home Checklist can be retrieved from https://www.aota.org/~/media/Corporate/Files/Practice/Aging/rebuilding-together/RT-Aging-in-Place-Safe-at-Home-Checklist.pdf

Six Item Cognitive Impairment Test (6CIT) can be retrieved from http://www.wales.nhs.uk/sitesplus/documents/862/foi-286g-13.pdf

The Activities-specific Balance Confidence (ABC) Scale can be retrieved from https://drayerpt.com/content/uploads/2015/10/Balance-Gait-Falls-ABC-Scale.pdf

The Falls Behavioural (FaB) Scale for the Older Person can be retrieved from http://sydney.edu.au/health-sciences/staff/docs/lindy_clemson/FaB_manual_2003.pdf