

A SYSTEMATIC REVIEW OF FEAR OF FALLING
MEASURES AND INTERVENTIONS

A DISSERTATION

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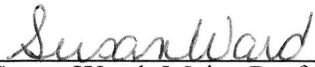
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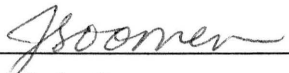
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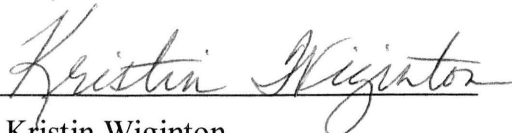


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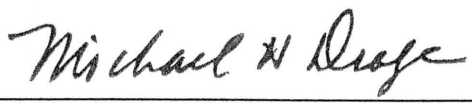


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A SYSTEMATIC REVIEW OF FEAR OF FALLING MEASURES AND INTERVENTIONS

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ABSTRACT

Fear of falling has become more than just a risk factor for falling, it has become a syndrome. More than 30% of all adults over the age of 65 are afraid of falling even if they have not experienced a fall. The systematic review revealed that while there are many measures of fear of falling being tested, none of them have been tested sufficiently without augmentation. More research needs to be done to find valid and reliable instruments that would allow researchers to measure the successfulness of their interventions. As of this review, there is only one intervention that has been done with a random sample and a control group. Additional research needs to be developed to reduce fear of falling, as the costs of medical care are rising with the number of baby-boomers who are aging.

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CHAPTER I

INTRODUCTION

In June of 2001, Guinness editors recognized Farris-Luse, at 115 years of age, as the oldest person in the world. Farris-Luse lived alone and cared for herself until she broke her hip in 1991, due to a fall in her house (Prichard, 2002). Moving into a long-term care facility, The Laurels of Coldwater after her fall, must have been difficult as she was described as a “sharp and fiercely independent woman” (*World's oldest person dies*, 2002). Farris-Luse may be the most famous example of an older person losing her independence due to a fall.

Falls are the number one cause of accidental death in the 65+ population, and the primary cause of hospital admittance, as well as long-term care admittance in this age group (Fuller, 2000). Forty percent of the elderly who fall are admitted to a long-term care facility, with half of those admittances resulting in death within a year (Fuller, 2000; E. W. Peterson, 2001). Falls are considered a dangerous and common problem among the elderly, beginning a spiraling downhill course of bone fractures, loss of independent functioning, depression, and ultimately, death (E. W. Peterson, 2001). In fact, falls are the sixth leading cause of death in the elderly population (Steinweg, 1997).

Falls among the elderly are becoming common, and present major public health concerns, with numerous challenges to health professionals. Costs due to falls are estimated to be between 7 to 10 billion dollars annually (Gregg, 2000), resulting in

10,000 deaths each year (Lipsitz, 1996). With the elderly population growing from 13 % of the U.S. population, in 2000, to 25 % by the year 2040 (*Census 2000*, 2001), a decrease in the number of falls would result in a decrease of medical costs for individuals, insurance programs and Medicare.

Reported contributing factors, recognize that the causes of falls tend to be multifactorial. These factors are classified as both intrinsic and extrinsic, with intrinsic factors defined as characteristics that are inherent to each individual and result from changes related to aging, disease, or medication. Extrinsic factors include environmental hazards, such as uneven flooring, as well as, activity-related factors (Steinweg, 1997). Anxiety, depression, and fear of falling are all psychological disorders that have been identified either together or in isolation to contribute to falls among the elderly.

For an elderly person, the psychological and social consequences of falling can be demoralizing to them. Fear, anxiety, and depression are examples of psychological effects that can impact, or be triggered from the direct or vicarious experience of falling (Campbell, Robertson, Gardner, Norton, & Buchner, 1999). Fear of falling is defined as “a lasting concern about falling that leads to an individual avoiding activities that he or she remains capable of performing (Tinetti & Powell, 1993).

Fear of falling, which effects 25-45% of community-dwelling older adults, causes elderly individuals to “experience a loss of confidence” and reluctance to “participate in rehabilitative efforts” (Campbell et al., 1999), ¶ 5). Elders who experience fear of falling restrict their social interaction, their outdoor activities and their activities of daily living, which increases their risk for falling (Steinweg, 1997). Risk for falling increases when

fear restricts activity to the point of causing deconditioning and associated muscle weakness (Tennstedt, Howland, Lachman, Peterson, Kasten, & Jette, 1998).

There are numerous studies recently published concerning fear of falling in the elderly (E. W. Peterson, 2001; E. W. Peterson & Murphy, 2002). Many of these studies relate to assessments of fear of falling. Since fear of falling is a recent discovered risk factor for falling, many of the studies test the reliability and validity of assessment tools for fear of falling. While there are many studies concerning fear of falling assessments, there is a paucity of research about interventions. There has been no systematic review conducted to summarize the findings and determine the best approach for diagnosing, prevention and/or treatment.

RESEARCH QUESTIONS

1. Which measure is most reliable and valid for diagnosing fear of falling in the elderly?
2. Which interventions reduce fear of falling in the elderly?

PURPOSE OF THE STUDY

The purpose of the study is to identify studies that have discovered methods to diagnose fear of falling and studies that have applied preventative strategies or interventions to community dwelling elderly to reduce fear of falling. A systematic review will locate all pertinent literature and condense it in a manner that will make it straight forward for comparing measures and interventions.

DEFINITION OF TERMS

Elderly, Senior or Older Adult – are people over the age of 65

Community Dwelling Elderly – People over the age of 65 who live in the community and who are not living in assisted living or long-term care facilities for more than three months.

Long-term Care Residents – People over the age of 65 who live permanently, longer than 90 days, in a nursing home or assisted living facility.

Falls – “inadvertently coming to rest on the ground or other lower level with or without loss of consciousness and other than as a consequence of sudden onset of paralysis, epileptic seizure, excess alcohol intake, or overwhelming external force” (Close, 1999).

Fear of falling – “a lasting concern about falling that leads to an individual avoiding activities that he or she remains capable of performing (Tinetti & Powell, 1993).

LIMITATIONS OF THE STUDY

1. Study may not be generalized to the older population of men, as the majority of the older population is comprised mostly of women.
2. Study will not be generalizable to any population with an age less than 65.
3. This study may not be generalizable to other cohorts of people over the age of 65.
4. There is a paucity of research on studies that restrict their interventions to the reduction of fear of falling.

5. Each researcher changed the fear of falling measure to accommodate their research, making comparisons between studies difficult.

DELIMITATIONS OF THE STUDY

1. The years of articles used in the research will be limited to 1994-2002, due to the change in cohort of older adults becoming 65.
2. Articles will be excluded if they exclusively deal with other causes of falling other than fear of falling.
3. Articles will be excluded if they dealt with residents of long-term care facilities, as only community-dwelling elderly will be included.

CHAPTER II

REVIEW OF LITERATURE

Falls are the number one cause of accidental death in the 65+ population, and the primary cause of hospital admittance, along with long-term care admittance (Fuller, 2000). 40% of the elderly who fall are admitted to a long-term care facility, with half of those admittances resulting in death within a year (Fuller, 2000). Falls are considered a dangerous and common problem among the elderly, beginning a spiraling downhill course of bone fractures, loss of independent functioning, depression, and ultimately, death. In fact, falls are the sixth leading cause of death in the elderly population (Steinweg, 1997). Costs due to falls are estimated to be in the billions, resulting in 10,000 deaths each year (Lipsitz, 1996). With the elderly population growing from 13 percent of the U.S. population, in 2000, to 25 percent by the year 2040 (*Census 2000*, 2001), a decrease in the number of falls would result in a decrease of medical costs for insurance programs and Medicare.

In most research publications, “elderly people” are defined as those aged 65 and over. The literature describes community studies and studies of institutionalized elderly people, with most of the falls discussed occurring both inside and outside the home. Many articles do not define falls and, those that do, rarely define them in the same way. For the purpose of this paper, the following definition of a fall will be used: “inadvertently coming to rest on the ground or other lower level with or without loss of

consciousness and other than as a consequence of sudden onset of paralysis, epileptic seizure, excess alcohol intake, or overwhelming external force” (Close, 1999).

Contributing Factors

Many reported contributing factors, recognize that the causes of falls tend to be multi-factorial. These factors are classified as both intrinsic and extrinsic, with intrinsic factors defined as characteristics that are inherent to each individual and result from changes related to aging, disease, or medication. Extrinsic factors include environmental hazards, such as uneven flooring, as well as, activity-related factors (Steinweg, 1997). Anxiety, depression, and FOF are all psychological disorders that have been identified either together or in isolation to contribute to falls among the elderly. Fuller (2000) recognized that, on average, about 33 percent of seniors living in the community fall each year and 60 percent of institutionalized elders fall each year. Falls among the elderly are becoming common, and present major public health concerns, with numerous challenges to health professionals. An appreciation of all contributing factors is necessary to ensure effective assessments of elder individuals. The goal of fall prevention is to reduce the moral or physical injury that results for aging community-dwellers (Fuller, 2000).

Intrinsic Risk Factors

Although falls are common in the elderly, the incidence usually increases with age. As men and women age, they generally have more of a potential of falling, especially those 85 and older, regardless of race or ethnicity (Fuller, 2000). Intrinsic or disease-related predisposing risk factors include general aging, Parkinson’s disease,

postural instability, increased sway, and an increased risk of dehydration. General aging, which usually is associated with neuromuscular changes, is sometimes difficult to distinguish from disease.

The most common intrinsic factors for falls in the elderly are gait and balance disorders causing instability (Smith, Wallston, & Smith, 1995). The factors which can predict imbalance in older adults are many forms of ill-health, such as musculoskeletal, cardiovascular, neurological, visual, vestibular, proprioceptive, cognitive and psychological impairment or disorder and the use of psychotropic medication (Yardley, 1998). With increasing age, more falls are associated with loss of balance than with tripping (Yardley, 1998).

Factors for falling other than imbalance include: 1) cognitive impairments caused by dementia and delirium; 2) neurological conditions such as Parkinson's disease and stroke; 3) any cardiovascular condition that results in reduced cerebral perfusion or oxygenation; 4) acute illness or exacerbation of chronic illness, such as diabetes; and 5) musculoskeletal conditions such as arthritis, injury, deformity and tendonitis. Weak ankle dorsiflexion is a significant risk factor for falls, along with foot disorders. Foot problems, such as calluses, bunions or deformity, and poorly fitting or slippery shoes, may frequently cause falls among elderly individuals (Lipsitz, Jonsson, Kelley, & Koestner, 1991; Lipsitz, 1996; Steinweg, 1997).

Poor vision is another contributing risk factor for falls in the elderly that has been emphasized in research. When elderly individuals develop disorders of the eye, such as, cataracts or glaucoma, these conditions have a tendency to affect the safety and

ambulation of the elderly, regardless if they are institutionalized or living in the community (Steinweg, 1997). The older adult's ability to negotiate the environment changes because many vision disorders can cause problems with depth perception and peripheral vision (Steinweg, 1997). Sensory impairments, including deficits in vision (both contrast sensitivity and acuity), vestibular function, and proprioception, severely limit an older person's abilities (Lipsitz, 1996; Steinweg, 1997). These kinds of limitations tend to make persons more prone to unnecessary accidents, and increased falling. The bone loss that occurs in older adults only increases the risk of falling (Barber, 1998).

Bone density loss for aging adults, especially women, results in the development of osteoporosis. Osteoporosis is caused by many factors, such as "hormonal changes, calcium and vitamin D deficiency, and a decrease in physical activity," which lead to a lack of strength and causes poor muscle tone with limited flexibility (Barber, 1998, Para. 4). If an elderly person with osteoporosis does not exercise, he/she is at a much greater risk of falling with a terminal fracture. Lack of exercise exposes the low-density bones to fracture, due to the lack of protection strong muscles provide. Rawsky & Digby (2000) reported that women are at a higher risk for hip fractures after a serious fall when compared to men. However, in both women and men, age-related physiological factors and diseases could increase the risk for falls. Rawsky & Digby (2000) reported that, with severe injury, age and a previous history of falls were the most consistently reported causes (Rawsky & Digby, 2000). Further research is needed to understand the

relationship of exercise and low levels of activity when reducing falls (Rawsky & Digby, 2000).

In assessment, “a therapeutic approach to a patient with falls is to treat any contributory condition and develop a care plan to prevent future falls” (Lipsitz, 1996). Identifying elderly individuals who are at risk for falling can be partially accomplished through screenings. Ideally, a screening should be quick to perform, inexpensive, transportable, and reliable. Commonly used tests for screening elderly individuals include The Get Up and Go Test (Tibbitts, 1996) Clinical Tests of Sensory Interaction on Balance (CTSIB), Fast Evaluation of Mobility, Balance and Fear (FEMBAF) (Di Fabio, 1997), and the St. Thomas Risk Assessment tool in Elderly (Fuller, 2000; Oliver, Britton, Seed, & Hopper, 1997; Thomas & Brennan, 2000). Many of these tools have proven effective in recognizing people who are at high risk for falls and for identifying people who need some preventative skills to reduce the number of falls, but more “fall-intervention assessments and intervention protocols” are needed (Rawsky & Digby, 2000)

Another common modifiable risk factor is the association between medication use and an increase in the fall rate among the older population (Lipsitz, 1996; Rawsky & Digby, 2000). Specific medications, such as psychotropic or cardiovascular medications, recent changes in medication, and the number of prescribed medications taken are associated with increased falling (Steinweg, 1997). Lachs & Boyer (1999) documented that the risk of falling increases when using four or more medications per person. Drugs such as sedatives, anti-depressants, and anti-psychotic drugs can contribute to falls.

These drugs can affect mental alertness, cause balance and gait to deteriorate, and cause drops in systolic blood pressure. Each of these can affect the ability of individuals to react and increases their potential to fall, even while just standing (Barber, 1998). Koski, Luukinen, Laippola, & Kivela (1996) developed a multivariate model that included physiological factors, and the use of some medications as key risk factors for falls among home-dwelling elderly people (Koski, Luukinen, Laippala, & Kivela, 1996). Their conclusions were that “lower-extremity muscle weakness, peripheral neuropathy, low pulmonary capacity, difficulties in gait and the use of long-acting benzodiazepines and cardiovascular medications” were the most important risk factors for injurious falls (Koski et al., 1996). Alcohol and other substance abuse problems can be very difficult to detect in older persons. Medications, taken to treat medical conditions with even relatively small amounts of alcohol, can have a great influence on motor function, balance, and judgment in elderly persons (Lipsitz, 1996). Unfortunately, the association between medications and falls has been difficult to demonstrate, due to problems that occur when attempting to distinguish between the impact of the medications and the effects of the underlying disease (Koski et al., 1996)

Extrinsic Risk Factors

As mentioned previously, extrinsic risk factors also play a major role in precipitous falls. When considering environmental factors, it is important to look at “the environment as a whole” (Rawsky & Digby, 2000). As individuals age, “their physiologic adaptive ability declines, thus making environmental challenges more significant” (Rawsky & Digby, 2000). A study conducted on community-dwelling

elderly, 65+ years of age, found that between one-third to one-half of them fell at least once every year, and these falls were primarily due to environmental hazards (Donald & Bulpitt, 1999). Indoor hazards include: 1) objects on the floor (Tibbitts, 1996)); 2) uneven surfaces (Fuller, 2000); 3) poor lighting (Fuller, 2000; Rawsky & Digby, 2000; Steinweg, 1997; Tibbitts, 1996); 4) loose rugs (Steinweg, 1997); 5) lack of grab bars (especially in the restroom) (Rawsky & Digby, 2000; Steinweg, 1997); and 6) unsteady furniture (Tibbitts, 1996) Hazards, such as stairs and sidewalks, cause 10% of falls. Falls due to stairs usually occur on the last step (Steinweg, 1997). Implementation of home hazard assessments and interventions has demonstrated to be effective in reducing falls among the elderly. A multidisciplinary approach involving many aging services offer assessments for safety and environmental hazards by having physical or occupational therapists, community nurses, and/or social service workers go into the homes of the elderly (King & Tinetti, 1996).

Approaches that included intrinsic, activity, and environmental factors best explains the multi-factorial etiology of most falls “considering biologic as well as psychosocial perspectives” (Rawsky & Digby, 2000). Interventions that have proven to reduce falls include multi-factorial and exercise interventions (particularly those with a balance component), and those that prescribe individually designed exercises for the individual (Rawsky & Digby, 2000). Hornbrook, Stevens, & Wingfield (1993) suggested that the bio-behavioral-environmental model would assist in designing intervention strategies that are multifaceted and overlapping when application of fall etiology is being incorporated to reduce falls, also (Hornbrook, Stevens, & Wingfield, 1993). The

National Health and Medical Research Council ((NHMRC), 1993) reinforced this position by recommending a multidisciplinary approaches for repeated fallers.

Lipsitz (1996) designed a study using 301 community-dwelling participants mostly of whom were 70 years or older. These participants had a reduction of falls by 30%, over a one year period, because the study incorporated a multidimensional assessment and individual intervention approaches, specifically designed for reducing falls (Lipsitz, 1996). A cognitive-behavioral model that was developed targeted the lack of physical activity among older adults in the reduction of falls examining the relationship “between control beliefs and ageing-related decrements” (Lachman, Howland, Tennstedt, Jette, Assmann, & Peterson, 1998). Lachman & Jette (1997) designed behavioral strategies to raise elder’s confidence levels, ultimately giving them the control and belief to make a difference in their own lives (Lachman & Jette, 1997).

Psychological and Social Risk Factors

For an elderly person, the psychological and social consequences of falling can be demoralizing to them. Fear, anxiety, and depression are examples of psychological effects that can impact, or be triggered from the direct or vicarious experience of falling (Campbell et al., 1999). Anxiety has three distinguishable elements, 1) behavioral or motor response, which can cause “freezing” or tenseness in movement, including escape or avoidance, 2) heightened arousal by activating the “flight or fight” response, and 3) the conscious awareness of fear and anxiety-provoking thoughts (Yardley, 1998). All of these components may be present with fear and anxiety or have the absence of one or

more. By avoiding situations that cause fear it does not allow the body to adjust to the situation with repeated exposure.

For example, if a person becomes fearful of falling when crossing the street because of poor vision, the person may lose their balance. If that person were to continue to cross the street at other times, they may become more equipped to meet the challenge as their body adjusts. However, with avoidance the body does not have an opportunity to adjust. Avoidance can cause a vicious cycle of possible causal relationships between anxiety about falling (fear of falling) and disequilibrium (Yardley, 1998).

FOF causes elderly individuals to “experience a loss of confidence” and reluctance to “participate in rehabilitative efforts” (Campbell & Townsend, 2002, ¶5). Elders who experience FOF restrict their social interaction, which increases their risk for falling (Steinweg, 1997). Risk for falling increases when fear restricts activity to the point of causing deconditioning and associated muscle weakness (Tennstedt et al., 1998).

Falling or experiencing vicarious falls, can cause FOF. This fear may decrease participation in activities of daily living, (ADLs) increasing the potential of their becoming institutionalized (Campbell & Townsend, 2002). The patient or caregiver, who is over protective, may restrict activities, not realizing the potential of creating social isolation and dependency. This social isolation can generate depression in the elderly individual (Steinweg, 1997). Researchers agree that depression, fear, and anxiety are contributing factors for falling among the community-dwelling elderly population, as promotes an avoidance of essential activities.

Fear of Falling as a Risk Factor

“Post Fall Syndrome” and “ptophobia” are some of the terms used to identify FOF since the late 1980’s (Legters, 2002). FOF has been listed as a risk factor for falls since 1988 (Tinetti, Speechley, & Ginter, 1988). FOF affects 25-40% of older adults and it is not necessary for a person to fall to experience FOF, as vicarious experience is enough (Edelberg, 2001). In a study that assessed falls and the elderly, FOF was ranked first in a list of fears that included fear of being robbed, forgetting an important appointment, losing a cherished item or experiencing financial difficulties (Tennstedt et al., 1998).

In initial studies on FOF, this factor was not considered a risk for falls. Instead, it was considered a consequence of previous falls or knowing someone who had fallen (Campbell et al., 1999). Considering FOF as a consequence may have resulted from a focus on extrinsic causes rather than intrinsic causes of falls. Thus, FOF, which is an intrinsic cause, may not have been considered a risk. The study by Tinetti (1994) finally identified FOF as a risk factor of its own (Tinetti, Mendes de Leon, Doucette, & Baker, 1994).

Niino, Tsuzuku, Ando, & Shimokata (2000) report that 30% of middle-aged people and 60% of people over the age of 65, reported that they were fearful of falling (Niino, Tsuzuku, Ando, & Shimokata, 2000). Fear of falling (FOF) can result in a reduction in activities of daily living, social support systems and ventures outside the household. FOF increases self-restriction of activities and greater fear of institutionalization, which leads to dependence, depression, increased immobility, and

subsequent functional deficits, as well as an increased risk of falling (Chandler, Duncan, Sanders, & Studenski, 1996; Fessel & Nevitt, 1997; Fuller, 2000; Kressig, Wolf, Sattin, O'Grady, Greenspan, Curns et al., 2001).

FOF causes elderly individuals to “experience a loss of confidence” and reluctance to “participate in rehabilitative efforts” (Campbell et al., 1999), ¶ 5). Older peoples’ loss of confidence is associated with activity restriction, social isolation and depression (Edelberg, 2001). Elders who experience FOF restrict their social interaction, which increases their risk for falling (Steinweg, 1997). Risk for falling also increases when fear restricts activity to the point of causing deconditioning and associated muscle weakness, which inhibits older people from engaging in rehabilitative efforts. (Tennstedt et al., 1998).

Vellas, Wayne, Romera, Baumgartner, & Garry (1997) studied 405 aged individuals and found that 219 of participants had at least one fall during the two-year study. The study results indicated that approximately one-third of the participants aged 75 or over, unnecessarily restricted their activities due to FOF. These researchers identified that individuals were aware of the complications from a fall, from either direct or vicarious experience, which resulted in a FOF (Vellas, Wayne, Romero, Baumgartner, & Garry, 1997).

Howland (1998) suggested “fear of falling affects those who never fall as well as those who do”(Howland, Lachman, Peterson, Cote, Kasten, & Jette, 1998). Anxiety and fear can profoundly influence motor performance, resulting in a timid gait (Howland et al., 1998). Together, the restriction of motor activities, limited social support, and timid

gate, increase the older person's risk of falling. As mentioned previously, FOF constrains people to remain in their homes, which results in social isolation and depression (Edelberg, 2001). Older people do not often talk about their fears of falling with friends or family because they see falls as an event that leads to admission to a long-term care facility. Not discussing fears of falling can further compound social isolation and depression, as FOF is cyclical. With increased social isolation there is an increase in depression which leads to increases in fear (Rawsky & Digby, 2000).

Activity Restriction

Initially, there does seem to be a protective factor in fear and reduction of activities, since isolation does prevent falls. Unfortunately, though isolation can have a pathological turn and negate its survival value (Aizen, 2001). The survival value of FOF becomes more pathological because, as people restrict their activities, they have reduced muscle mass, reduced flexibility and a reduction in self-efficacy concerning falling (Lachman et al., 1998). FOF has become as much of a risk factor for falls as gait changes, decreased stride length, and speed (Maki, 1997). In fact, these risk factors may be the result of adaptations related to the FOF (Maki, 1997). FOF is as much of a risk factor for falling as the comorbid conditions mentioned previously (Aizen, 2001).

Depression and Fear of Falling

Depression is very common among the elderly who fear falling. The depression may be a result in their lack of activity, reduced social support, loneliness and FOF. There has been no research that has tried to specify the reasons behind the depression for

people who fear falling. But in three research studies, an average of 26% of those with fear reported clinical depression (Chandler et al., 1996; Fessel & Nevitt, 1997; Kressig et al., 2001). Slightly over one in four of the 40% of older adults who experience FOF also experience clinical depression, which means that women are overwhelmingly likely to be at risk for the combination of FOF and depression..

Women and Fear of Falling

As women are the majority of older adults aged 70+ they are the focus of most studies, FOF is high on their list of concerns. In fact, in a study by Salkeld, Cameron, Cumming, Easter, Seymour, Kurrle, & Quine (2000), older women who had exceeded the average life expectancy of 74, found their quality of life profoundly threatened by falls and hip fractures(Salkeld, Cameron, Cumming, Easter, Seymour, Kurrle et al., 2000). “Older women place a very high marginal value on their health. Any loss of ability to live independently in the community has a considerable detrimental effect on their quality of life” (Westerhof, 2001). The importance of assessing FOF is evident in the results of the Salkeld study. Of the 194 participants, 80% reported “they would rather be dead than experience loss of independence and quality of life that results from a bad hip fracture and subsequent admission to a nursing home” (Salkeld et al., 2000). *Quality* of life is more important to older adults than *quantity* of life. The importance of quality of life for older women suggests that they may experience greater FOF because of the possible loss of independence and subsequent quality of life.

Research concerning falling on the basis of activity restriction have found correlates between activities of daily living and FOF (Nourhashemi, Andrieu, Gillette-Guyonnet, Vellas, Albareda, & Grandjean, 2001; Vellas et al., 1997). Strategies for reducing risks for falling, have included exercise programs, (Chorek, Grogan, & Hudson, 1998; Edelberg, 2001; Feder, Cryer, Donovan, & Carter, 2000; Kerschan-Schindl, Uher, Grampp, Kaider, Ghanem, Fialka-Moser et al., 2001; Khan, Liu-Ambrose, Donaldson, & McKay, 2001), geriatric risk assessments, (*Feder et al., 2000; Fuller, 2000; Gardner, Buchner, Robertson, & Campbell, 2001; Harro & Strasburg, 2000; Yearly evaluation is key to falls prevention, new guidelines say, 2001*); environmental changes (Harro & Strasburg, 2000; Hawg, 1999; Huffman, 1999; Hwag, 1999; *Yearly evaluation is key to falls prevention, new guidelines say, 2001*); and consulting services (Hogan, MacDonald, Betts, Bricker, Ebly, Delarue et al., 2001; Khan et al., 2001). Interventions designed exclusively to reduce FOF as a risk factor have been few and only one study was a randomized sample with a control group (McAuley, Mihalko, & Rosengren, 1997).

Assessments of Fear of Falling

Recently there has been an increase in FOF measures due to the recent awareness of FOF as a risk factor (Powell & Myers, 1995). FOF can be scored on both a fall self-efficacy scaled test and a FOF scaled test (Rigler, 1996). The first FOF measures were simple measures with either a positive or negative response, “yes, I am afraid of falling” or “no, I am not afraid of falling” (Lachman et al., 1998; McAuley et al., 1997; Myers, Powell, Maki, Holliday, Brawley, & Sherk, 1996). There was criticism of this simple question because it lacked variability in degrees of fear (Howland, Peterson, Levin, Fried,

Pordon, & Bak, 1993; Lawrence, Tennstedt, Kasten, Shih, Howland, & Jette, 1998).

New assessments came out with Likert scored answers indicating some degree of fear, for instance “very afraid,” or “somewhat afraid” (Cumming, Salkeld, Thomas, & Szonyi, 2000; Lawrence et al., 1998; Tinetti et al., 1994). The simple question to screen for FOF is still being used for both community-dwelling adults and adults in a long-term care facility, while more extensive measures are being developed and used (Myers et al., 1996; Powell & Myers, 1995).

On the falls self-efficacy tests, the questions refer to the persons’ confidence in their ability to perform indoor and outdoor activities without falling. The scoring is on a Likert scale, from little or no confidence in doing the activity, to being very confident (Cameron, Stafford, Cumming, Birks, Kurrle, Lockwood et al., 2000). The first measure to be developed to measure self-efficacy in avoidance of falls was Tinetti’s Falls Efficacy Scale.

Falls Efficacy Scale (FES)

The Fall Efficacy Scale (FES) developed by Tinetti in 1994, is a ten question questionnaire to determine if FOF is hindering activities that are related to self-efficacy (Tinetti, Richman, & Powell, 1990). Older adults are asked global questions that relate to the confidence level an individual has about performing tasks. All of the questions start with the phrase, “How confident are you that you can . . .” and ends with the phrase, “without falling” (Tinetti et al., 1990). In between these two phrases are ten tasks, “get out of bed, take a shower, reach into cabinets, prepare meals, walk around the house, light

housekeeping, get dressed and undressed, answer the door or telephone, get in and out of a chair and simple shopping” (Tinetti et al., 1990). Participants answer the questions with a 10 point Likert scale with a score of 0-10 with 0 being no confidence (Tinetti & Powell, 1993). The total score is 0-100 and the higher the FES the higher the person’s feelings of confidence in performing household tasks without FOF. The internal consistency for the FES is $\alpha = .92$ (McAuley et al., 1997) and the test-retest reliability of $r = .71$ (Cumming et al., 2000) (See Table 1).

Activities-Specific Balance Scale (ABC)

Another scale developed by Canadian researchers, Powell and Myers, is the Activities-Specific Balance scale (ABC). This scale measures a persons confidence in doing more specific tasks like, sweeping the floor, going up and down stairs and picking a slipper off the floor (Powell & Myers, 1995). It is a 16 item questionnaire that asks older adults to rate their balance confidence on a visual analog scale (0-100). The questions start with “How confident are you that you will not lose your balance or become unsteady while . . .?” Zero represents no confidence and 100 represents complete confidence. The questions are far more specific than the FES measure (Myers et al., 1996; Powell & Myers, 1995). Powell & Myers (1995) reported that the difference between the two measures is that the ABC scale detects more subtle levels of fear (Powell & Myers, 1995). ABC scores ranged from 36% to 95% reporting confidence in completing activities, the FES scores range was only 90%-98% among high mobility individuals. Low mobility scores ranged from 44%-84% on the FES and 5%-84% on the ABC (Powell & Myers, 1995). The ABC, according to Brown University, shows more

specificity in showing discrete amounts of fear ("New scale focuses on he specific fears elders have concerning falls.," 1995).

Mobility Efficacy Scale (MES)

The Mobility Efficacy Scale (MES) was developed by Lusardi and Smith to contain more challenging activities than the activities of daily living (Lusardi & Smith, 1997). Since older adults are better content experts about older adult issues, 31 older adults between the ages of 69-92 which were comprised of men and women, generated a list of challenging activities for the measure. Three groups generated lists of activities and the lists were compared to each other. Items that were similar on each of the lists were considered representative of the older population. A total of 20 activities were the result. The new questions generated from the items asked participants to respond to each item starting with "How concerned (about your ability) are you that you might fall when you are. . ." (Lusardi & Smith, 1997).

Similar to the FES measure, the MES uses a 4 point Likert scale with the points labeled 1) "not at all concerned," 2) "a little concerned," 3) "fairly concerned," and 4) "very concerned" (Lusardi & Smith, 1997). Items that were added to the FES for the MES were: "walking down a grassy hill," "carrying a bag of groceries," "carrying a laundry basket," "walking down 3 snowy steps," "using a stool," "step out of the bathtub," and "getting out of the backseat" (Lusardi & Smith, 1997). These activities were considered by the researcher and the groups of older adults as more challenging than the activities of daily living.

Survey of Activities and Fear of Falling in the Elderly (SAFE)

The Survey of Activities and FOF in the Elderly, (SAFE), examine the negative consequences of FOF on activity restriction or subsequent poor quality of life. The SAFE examines activities of daily living, instrumental activities of daily living, mobility tasks and social activities (Lachman et al., 1998). Lachman et al. included exercise activities and social activities with hopes of alerting practitioners to early signs of FOF.

For each of the eleven activities these questions are asked:

1. Do you currently do it?
2. If you do the activity, how worried are you that you might fall?
3. If you do not do the activity, do you not do it because you are worried that you might fall?
4. If you do not do the activity because of worry, are there other reasons that you do not do it?
5. For those not worried, what are the reasons that you do not do the activity?
6. Compared to 5 years ago, would you say that you do it more/ the same/ less than you used to(Lachman et al., 1998)?

A 5 point response system is used for each of the questions (0-4), with the lower score indicating fear and activity restriction. When compared with the FES the SAFE scored $r = -.76$ (Lachman et al., 1998), suggesting that it is dissimilar to the FES and that further research might compare it with the ABC (Legters, 2002).

Perceived Control Over Falling and Perceived Ability to Manage Falls and Falling

Lawrence et al. further refined the concept of fall self-efficacy with the development of two measures, the Perceived Control over Falling and Perceived Ability to Manage Falls and Falling. Perceived Control over Falling is a four item scale that concerns control over the environment and the participant's ability and mobility to prevent falls. A five-point Likert scale is used for each question with a range from "strongly disagree" to "strongly agree" (Lawrence et al., 1998).

Perceived Ability to Manage Falls and Falling is a five-item scale that appraises people's beliefs about managing falls, like protecting themselves when they fall. A four-point Likert scale is used with answers ranging from "not at all sure," to "very sure" (Lawrence et al., 1998). These researchers showed that people with higher perceived levels of fall management have a lower level of FOF (Lawrence et al., 1998) (See TABLE 1).

TABLE 1 *Assessment Tools*

<i>Name of Assessment Tool</i>	<i>Researcher or Developer</i>	<i>Method of Testing</i>	<i>Range</i>	<i>Validity</i>	<i>Test retest reliability</i>	<i>Correlation with the FES</i>
One Question Fear of Falling Scale (1QFOF)		Single Item 1-5 Likert Scale	1-5			
Falls Efficacy Scale (FES)	Tinnetti, et al. 1990	Questionnaire 10 item with 10-point Likert	10-100	$\alpha = .92$	$r = .71$	
Modified Falls Efficacy Scale (MFES)	Tennstedt, et al. 1997	Questionnaire 12 items with 4 point rating scale	4-48			
Activity Balance Scale (ABC)	Powell 1995			$\alpha = .90$		$r = .92^{**}$
Survey of Activities and Fear of Falling in the Elderly (SAFE)	Lachman et al. 1998	Questionnaire 11 activities with 6 questions	6-66	N/A		$r = -.76$
Mobility Efficacy Scale (MES)	Lusardi & Smith	Questionnaire		$\alpha = .90$		$r = .98^{**}$
Perceived Control over	Lawrence 1998	Questionnaire 4 item and 4pt Likert Scale	4-16	$\alpha = .76 - .84$		N/A

<i>Name of Assessment Tool</i>	<i>Researcher or Developer</i>	<i>Method of Testing</i>	<i>Range</i>	<i>Validity</i>	<i>Test retest reliability</i>	<i>Correlation with the FES</i>
Falling (PCF)				$\alpha = .71$		
Perceived Ability to Manage Falls (PAMF)	Lawrence 1998	Questionnaire 5 item with a 4pt Likert Scale	0-20			
Perceived Physical Ability (PPA)	Ryckman, et al. 1982	Questionnaire 10 item scale with a 6-point Likert Scale	6-60	$\alpha = .90$		
Berg Balance Scale (BBS)	Berg, et al. 1992	Physical Abilities 14 items with a 0-4 metric scale	0-56	$\alpha = .90$		
Geriatric Depression Scale (GDS)		Questionnaire		$\alpha = .90$		
Functional Reach Test (FRT)		Physical test of reach in inches		$\alpha = .90$		
Gait Efficacy Scale	McAuley, et al. 1997	Questionnaire 10 point Likert	10-100	$\alpha = .91$		$r = -.57$

****p ≤ .001**

One-Question Fear of Falling Measure (1QFOF)

Other variations on fear measures are a one-question FOF (1QFOF) scale that asks older adults “Are you afraid of falling? Yes or no (Cameron et al., 2000).. Another

measures the level of fear from “none, some fear” to “very fearful” (Fessel & Nevitt, 1997). Fessel also used a question relating to activity “Does your fear of falling interfere with any activities? Yes or no” (Fessel & Nevitt, 1997).

Howland’s Fear of Falling Measure

Howland developed a simple instrument by using three questions with the first answers ranging from 1 = very afraid to 4 =not at all afraid and the last two questions are yes and no answers. The three questions are “How afraid are you that you will fall and hurt yourself in the next year?” “Are there things you don’t do because you are worried that you might fall?” and “Are there things you have stopped doing because you are afraid of falling” (Howland et al., 1998). Evaluation of the answers put the respondents in three groups, not afraid of falling, afraid of falling, but does not curtail activities and afraid of falling and curtails activities (Howland et al., 1998).

Modified Versions of FES & ABC

There are modified versions of the FES for brevity and language, such as the Swedish version of the FES. Most of the reliability and validity studies compare measures with the FES or the ABC. However, both the FES and the ABC are often compared with the Functional Reach test, life satisfaction, Geriatric Depression Scale, quality of life or other similar measures to determine if FOF is interfering with their perception of their life as a whole, despite possible curtailment of activities.

Comparisons of Fear of Falling Measure with Other Measures

All of the FOF measures has been studied in tandem with other measures concerning older adults. Some of the measures that have been studied with FOF are the Geriatric Depression Scale, the ADL's questionnaire, Functional Reach Test, and Gait performance measures. The purpose of exploring these relationships has been to find relationships between FOF and other geriatric problems. The researchers have been intent on knowing the quickest easiest methods of evaluation of FOF to facilitate geriatric assessments (Harro & Strasburg, 2000). Researchers in attempting to find means to assess community dwelling elderly for FOF have done so with the hope to continue to search for interventions that will reduce FOF and the development of subsequent associated problems for older adults.

Geriatric Depression Scale

The Geriatric Depression scale is a 30-item questionnaire where a higher score indicates a higher level of depression. A score of 11 is the cutoff for clinical depression (Yesavage, Brink, & Rose, 1983). A short form of the Geriatric Depression scale, it has a cut score of 7 to distinguish participants with the presence of depressive symptoms (Sheikh & Yesavage, 1986). Both of these scales have been used by researchers to show depression in elderly with FOF.

Berg Balance Scale (BBS)

The Berg Balance Scale (BBS) is a 14 different items designed to challenge balance, scored on a 0-4 metric (scale range 0-56 assessing subjects' abilities to carry out

activities such as standing from a sitting position, turning to look behind, standing with eyes closed and standing on one foot. The BBS takes 15-20 minutes to administer the test and may not be effective in evaluating active, independent elderly persons, as it does not measure a person's ability to stand on uneven surfaces (Nakamura, Holm, & Wilson, 1998). This scale has been able to predict the occurrence of falls in the elderly. The internal consistency for the Berg Balance Scale was ($\alpha = .90$) (McAuley et al., 1997).

Functional Reach Test

Measures the maximum distance one can reach forward while maintaining a fixed base of support standing (Duncan, Weiner, Chandler, & Studenski, 1990). It can be performed easily with community dwelling elderly, but older adults with dementia or the inability to stand on their own would not be able to take this test. There is some concern that residents of long-term care facilities may not be able to take the FR test (Nakamura et al., 1998). The FR test has a interrater reliability of $r = .95$, concurrent validity of $r = .71$ and incorporates concepts of other reliable and valid scales such as the BBS which helps the FR's content validity.

Interventions for Fear of Falling

There is a paucity of research regarding interventions to reduce FOF. Although interventions undertaken to reduce falling have ranged from increased self-efficacy, exercise activities, group support, strength training, balance training strategies (Chorek et al., 1998; Edelberg, 2001; Feder et al., 2000; Kerschman-Schindl et al., 2001; Khan et al., 2001) Other studies have tried to reduce falling and FOF with geriatric risk assessments,

(Feder et al., 2000; Fuller, 2000; Gardner et al., 2001; Harro & Strasburg, 2000; Yearly evaluation is key to falls prevention, new guidelines say, 2001); environmental changes (Harro & Strasburg, 2000; Hogan et al., 2001; Huffman, 1999; Hwag, 1999; Kannus & Khan, 2001; Salkeld et al., 2000); and consulting services (Hogan et al., 2001; Kannus & Khan, 2001). Many of these studies included FOF as one of the characteristics of risk, however, there are very few studies concerned with reducing FOF in order to reduce the risk of falling and only one study that has used randomized sampling and a control group (Legters, 2002).

Exercise and Fear of Falling

In a study with Bruce, Devine and Prince (Bruce, Devine, & Prince, 2002), a cross-sectional analysis was done on the baseline data from a longitudinal study. This study was to determine the relationship between FOF and recreational physical activity. There were 1500 older ambulatory women ages 70-85 randomly selected from an electoral role in Perth, Australia (Bruce et al., 2002). A self-reported questionnaire measured activity levels, FOF, cognitive and physical function. The results of this study indicated that FOF is a psychological barrier and may need to be overcome in order to increase activity levels of older women.

Howland's study (Howland et al., 1998) found a similar result when comparing FOF with social activity curtailment. Howland et al. found that FOF was a stronger predictor of social activity restriction than having a history of falls.

Tai Chi and its relationship to FOF has also been studied (Kessenich, 1998; Lee, 2000; Wolf, Barnhart, Kutner, McNeely, Coogler, & Xu, 1996; Zwick, Rochelle, Choksi, &

Domowicz, 2000). There has been a strong correlation between learning and practicing Tai Chi and the reduction of falls and a possibility of reducing of FOF (Kessenich, 1998; Lee, 2000; Wolf et al., 1996; Zwick et al., 2000)

Self-Efficacy and Fear of Falling

Self-Efficacy relating to falling and FOF has been an interest in several studies (Allegrante, MacKenzie, Robbins, & Cornell, 1991; Cameron et al., 2000; E. Peterson, Howland, Kielhofner, Lachman, Lassmann, & Jette, 1999; "Self-efficacy and balance correlates of fear of falling in the elderly,," 1997; Tinetti & Powell, 1993). Tinetti developed a Falling Self-Efficacy scale (FES) to determine the impact of FOF on their confidence to perform every day tasks (Tinetti & Powell, 1993). People with lowered self-efficacy do not feel that they have control over their ability to do a task due to FOF. A number of studies have suggested that by increasing an individual's confidence in their ability to do the tasks without falling and ability to control their falls, they would be less fearful and have fewer falls (Tinetti & Powell, 1993).

Activities of Daily Living and Fear of Falling

Activities of daily living, like taking a bath or getting dressed, can be affected by FOF. Cumming, Salkeld, Thomas and Szonyi's study (Cumming et al., 2000), assessed 528 participants from Sydney, Australia with a mean age of 77 years, for fall self-efficacy with Tinetti's falls Efficacy Scale (FES)(Tinetti et al., 1990) and their ability to perform ten activities of daily living. The activities were bathing, grooming, dressing, eating, transferring from a bed to a chair, using a toilet, walking across a room, walking half a

mile, doing heavy housework, and walking up and down stairs to the first floor. These were scored 0 (no problems with ADLs) to 10 (major problems with ADLs).

The results of this study indicated that a lower score on the FES (≤ 75 , $n = 307$) resulted in a higher score in ADLs (which also showed an increase risk for falling). FOF affected previous fallers as well as non-fallers (Cumming et al., 2000).

Of all the prevention strategies, only a few referenced any particular health theory or model used to design the program. Some of the prevention programs had some inferred theory as their basis for intervention and prevention. For example, when programs referred to the increase in compliance among people who had fallen in the previous year, the Health Belief Model was inferred, as participants were concerned about the susceptibility and severity of falling as it related to them personally (Huff & Klein, 1999). The Social Cognitive Theory (SCT) seemed to have the most significance in programs designed for FOF. SCT was used in two prevention programs related to FOF (Lachman et al., 1998; Lachman & Jette, 1997; Tennstedt et al., 1998). Lachman is one of the writers on the Tennstedt et al. (1998) article, so it is possible that Lachman contributed to the development of that intervention. In both of these programs, cognitive behavioral strategies were incorporated to promote self-efficacy, (Huff & Klein, 1999) in a person's ability to exercise, encourage a belief that their efforts will make a difference (outcome expectations), and persuade older persons towards adaptive responses to obstacles (attributions) (Huff & Klein, 1999; Lachman & Jette, 1997).

Systematic Review and Fear of Falling

There have been multiple studies relating to FOF, however there has been no systematic review of these studies, to date. There have been some reviews of the existing literature, (Legters, 2002), however it was not a systematic review and some studies were not used in Legters review. A systematic review will be completed on FOF measures and interventions to give a thorough examination of the present literature.

CHAPTER III

METHODOLOGY

Systematic Review

In medical, psychological, sociological and health related studies, there is often an exorbitant amount of research studies over one particular topic (Moher & Schachter, 2002). Practitioners do not have the time to review all of the published literature to find a relevant intervention or measure. A published systematic review gives the reader a “synthesis of the results of several primary studies by using procedures that limit bias and random error” (Delgado-Rodriguez., 2001). A systematic review searches all relevant research studies and use explicit criteria in the selection of investigations for review. Unlike a meta-analysis a systematic review does not require that the dependent variables be similar for comparison. Quantitative systematic reviews are synamymys with meta-analysis and the difference between them and a systematic review is that meta-analysis and quantitative systematic reviews use statistical pooling to summarize the results of the investigations (Delgado-Rodriguez., 2001).

A systematic review was chosen for FOF because of the lack of combinability of the investigations with interventions and measurements for FOF (Egger & Smith, 1996). In meta-analysis It is important that the treatment or intervention be similar, for instance Egger states, “Data from patients in trials evaluating the *same or a similar drug*” (Egger & Smith, 1996). Egger also states that, “Meta-analysis is a statistical procedure that

integrates the results of several independent studies considered to be ‘combinable’ (Egger, Smith, & Phillips, 1997). Using a systematic review with or without the addition of meta-analysis can result in the quantitative synthesis of results (Glass, 1994).

A systematic review “denotes any type of review that has been prepared using strategies to avoid bias. Systematic reviews may or may not include a meta-analysis (Egger & Smith, 2000). A systematic review is a method that helps the researcher to explain gaps and identify gaps in knowledge about a particular problem. The common logic for doing a systematic review is to formulate the question, search the literature, code the information, analyze it and write a report (Glass, 1994).

Search of the Literature

Meta-analysis and systematic reviews require a thorough systematic search of all published and unpublished studies related to a particular topic (Glass, 1994). Identification of search terms was developed to assist in locating articles of interest (see Appendix A). The following terms were used to search library databases for articles and books: “fear of falling,” and elderly or older adult and (falls, falling or fall). The term “efficacy” was added to the search list because many articles dealt with fear of falling and efficacy. Each database was searched for keywords in the title, as well as the body of the text.

Electronic databases in medicine, nursing, education, psychology, sociology, healthcare, health education and health policy were examined. Government publications and reports from the Center for Disease Control and Prevention, Public Health Services, American Association of Retired Persons, Administration on Aging, and Department of

Health and Human Services and National Institute on Aging were searched for relevant material (see APPENDIX A). A request for information on fear of falling was made to, the Southwestern Medical University in Dallas and University of Maryland in Baltimore. No responses from the two research groups were received.

After completing the search for articles, the articles were culled for articles that only dealt with fear of falling measures and primary intervention strategies. Articles that researched falling and the elderly with fear only used as a secondary risk, were not included in the study. Articles that met the criteria of date, 1994-2002; focus on fear of falling and community-dwelling elderly were reviewed and coded for the independent and dependent variables.

Coding of the Information

According to Rosenthal (2001), the first step of data analysis are to define the independent and dependent variables of interest (Rosenthal, 2001). In this study the independent variables will be location of study, percentage of each gender, age, mean age and standard deviation, percentage of White participants, number of participants, number of participants in the control group, type of intervention, methodological characteristics, type of design, group assignment method, test reported for each of the assessments and results for each variable reported (see Appendix B). The coding sheet was developed by reviewing other coding sheets from Alfred (2001) and Snyder (1996) and consultation from an independent statistician, Dr. Linda Hynan of Southwestern Medical University in Dallas (Alfred, 2001; Snyder, 1996). The Code Book details each of the variables on the coding sheet (See Appendix C). The dependent variable will be the effect size for each

study, clustering of effect sizes and an overall effect size. For each dependent variable there will be an effect size reported from the analysis of DSTAT program for meta-analysis.

Data Analysis and Interpretation

Results from each of the articles were accumulated on the coding forms. When possible the reliability and validity of the instruments used in the research were recorded. Using SPSS the means and standard deviation of the measures and demographics were found.

Writing of the Report

In Chapter 4 the results of the systematic review have been written with tables and explanations.

CHAPTER IV

A literature search was performed using the PubMed, Eric, Ebsco, Academic Search Premier, Medline, PsycInfo, Psychological Database, Sociological Database, Dissertations and Health Source /Nursing Academic Edition databases. When using the words “fall, falls and falling,” “fear of falling” and “efficacy” 328 articles were found. Out of the 328 articles, 108 related to “fear of falling.” Out of the 108 articles related to FOF 33 were chosen because they were reflective of fear of falling measurement assessment and the others related to other than community-dwelling elderly (Refer to TABLE 2). Of the 33 articles which dealt with community-dwelling elderly, fear of falling measures only 5 were studies with interventions. However, each of the five studies used different interventions and measures for the outcome of those interventions making it impossible to combine the results in a meta-analysis. Because of the lack of combinability, the five studies have been summarized (See Figure 1).

The 28 articles which dealt with fear of falling measures were compared to each other and to give an overall picture of what is available to the practitioner. Tables were created to show these comparisons (See TABLE 1 and TABLE 2 for a list of all of the articles used in this study).

Figure 1 *Review Process – Flow Chart*

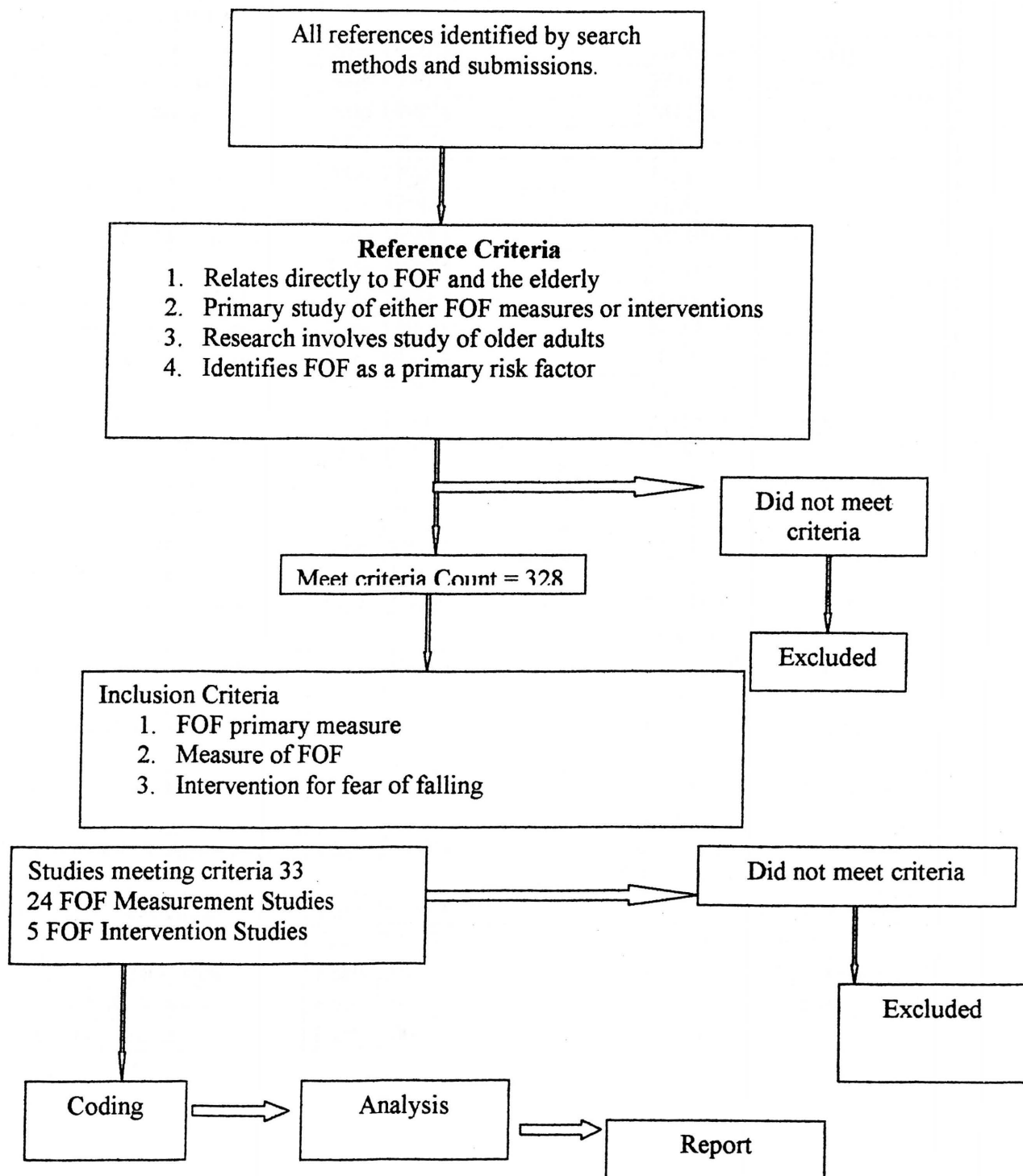


TABLE 2 *Articles Found for Fear of Falling Measures*

RESEACHER-DEVELOPER	DATE	METHOD
Arfken & Associates	Mid 1990's	GDS, FOFS, Frailty
Burker & Associates	Mid 1990's	FOFS, Dizziness
Hill & Associates	Mid 1990's	MFES
Powell & Myers	Mid 1990's	ABC & FES
Tinetti & Associates	Mid 1990's	FES
Hellstrom & Lindmark	Late 1990's	FESS
Campbell & Associates	Late 1990's	MFES/Exercise
Fessel & Nevitt	Late 1990's	GDSS, FOFS
Howland & Associates	Late 1990's	HFOFS, History of falls
Lachman & Associates	Late 1990's	SAFE, FES & FOFS
Lawrence & Associates	Late 1990's	HFODS, PCOF & FAMFF
Lusardi & Smith	Late 1990's	MFES, MES
Maki	Late 1990's	FOFS, Gait Performance
McAuley & Associates	Late 1990's	BBS, 1QFOF, FES & GET
Tennstedt & Associates	Late 1990's	"Matter of Balance" MFES
Vellas & Associates	Late 1990's	1 Q FOF, History of falls
Yardley and Smith	Late 1990's	1QFOF, SAFFE
Bruce & Associates	Early 2000's	FOF, Activity Level
Cameron & Associates	Early 2000's	Hip Protectors, MFES, 1QFOF & MFES
Cumming & Associates	Early 2000's	FES, 1QFOF, History of falls
Drozdzick & Edelstein	Early 2000's	FES, 1QFOF, FOFS, GDS & Coping
Gentleman & Malozemoff	Early 2000's	Altered FES, LSI, Group work
Ingemarsson & Associates	Early 2000's	FES, 1QFOF, FR, Inpatients
Kressig & Associates	Early 2000's	FES, ABC, CES-D & FR
Riley	Early 2000's	Graded Exposure
Salkeld & Associates	Early 2000's	Time trade off, 3senarios
Tennstedt & Associates	Early 2000's	MFES, Affect, Pyscosocial
Yardley & Smith	Early 2000's	1QFOF, SAFFE

DEMOGRAPHICS OF THE STUDIES (FOF MEASURES)

Research studies were all completed, 100%, in urban areas. Participants from all of the studies totaled 8492 with 66% or 5605 women and 34% or 3396 men. The mean age of the 8492 participants was 71.6 years and 81% of the participants were White/Caucasian with 8 studies not reporting ethnicity (See Table 3).

TABLE 3 *Demographics*

<i>Author Name & Yr.</i>	<i># Participants</i>	<i># Control</i>	<i>% Male</i>	<i>% Female</i>	<i>Mean Age</i>	<i>SD Age</i>	<i>% White/ Caucasian</i>	<i>% Urban</i>
Arfken 1994	890	0	33%	67%	78		93%	100%
Bruce 2002	1500	0	0%	100%	75.2	2.7	N/R	100%
Burker	60	66	40%	60%	76	7.4	93%	100%
Campbell 1999	233	110	0%	100%	85		N/R	100%
Cameron 2000	144	75	0%	100%	85		N/R	100%
Cumming 2000	528	0	52%	53%	77		N/R	100%
Drozdzick 2001	34	0	15%	85%	74.4	8.88	100%	100%
Fessel 1997	570	0	24.2%	75.8%	64.9		82.5%	100%
Gentleman 2001	6	0	33%	67%	70		100%	100%
Hellstrom 1999	30	0	66%	33%	65	11	N/R	100%
Hill 1996	179	111	19%	81%	74		N/R	100%
Howland 1998	266	0	23%	77%	76.3	7.9	97%	100%
Ingemarsson 2000	55	0	15%	85%	82.3		N/R	100%

<i>Author Name & Yr.</i>	<i># Participants</i>	<i># Control</i>	<i>% Male</i>	<i>% Female</i>	<i>Mean Age</i>	<i>SD Age</i>	<i>% White/ Caucasian</i>	<i>% Urban</i>
Kressig 2001	287	0	6%	94%	81	6.2	81%	100%
Lachman 1998	270	0	78%	22%	76.16	7.91	97%	100%
Lawrence 1998	392	0	10.5%	89.5%	77.43	7.65	90.3%	100%
Lusardi & Smith	100	0	8%	92%	76.12	6.75	91%	100%
Maki 1997	75	0	28%	72%	82	6.0	N/R	100%
McAuley 1997	58	0	22%	78%	70.97	6.25	N/R	100%
Powell 1995	60	0	28%	72%	85		N/R	100%
Riley 2000	1	0	100%	0%	33		N/R	100%
Salkeld 2000	194	76	0%	100%	83		N/R	100%
Tennstedt 1998	434	218	7.3%	92.7%	77.8	8.0	88%	100%
Tennstedt 2001	434	218	7.3%	92.7%	77.6	8.0	88%	100%
Tinnetti 1994	1103	0	27%	73%	79.6		84%	100%
Vellas 1997	219	0	41%	59%	74	6.7	96%	100%
Yardley 1998	75	0	25%	75%	71		N/R	N/R
Yardley 2002	224	0	47%	53%	80.7	4.25	N/R	100%
Total 28 Studies	8663	874	M= 30%	M= 70%	M= 71.6		M = 81%	100%

RESULTS OF FEAR OF FALLING MEASURES

Fear of Falling and Activity Levels

Fear of falling as measured by the FES, FESS, SAFE, SAFEE, FOF and the ABC scale. These measures of fear of falling were compared with history of falls, activities, ADLs, Depression, Functional Reach Test, age and gender as well as gait performance scales. Bruce, Cumming, Fessel and Chandler (Bruce et al., 2002; Chandler et al., 1996; Cumming et al., 2000; Fessel & Nevitt, 1997) compared fear of falling with history, activities and ADLs. Bruce found that of people who were not fearful, 27% were active and 45.2% were inactive. Cumming observed that of the people who were fearful, 40% were active and 62% were inactive (Bruce et al., 2002; Cumming et al., 2000).

Finding the mean of Bruce and Cumming's results indicates that of those with fear 34% were active and 54% were inactive. People with fear are less active (See TABLE 4).

Cumming discovered that experience with falls increases the fearfulness of people. Of those with 2 or more falls in the last year 47% were fearful, those with 1 fall in the last year 28% were fearful and those without falls in the prior year only 24% were fearful. Cumming also revealed that those with an ADL score of 2.2, 69% were afraid of falling (Cumming et al., 2000). Finding the mean of the mean for the combined studies that compared experience or history of falls with fear of falling suggests that 55% of people with a history of two or more falls are fearful. Of those with a history of one fall, 22% experience fear. Those who have never fallen only 23% experience fear. Chandler

found that of those the researcher studied 51% who had any experience with falls were fearful (See TABLE 4).

TABLE 4 *Experience/Fear/Activity Level*

<i>Author & Date</i>	<i>Experience w/Falls / % fearful</i>	<i>Active + Fear</i>	<i>ADL Score/% fearful</i>
Bruce 2002		27%	
Active			
In Active		45.2	
Cummings 2000			2.2/69%
Active		40%	
In Active		62%	
2+ Falls	47%		
1 Fall	28%		
No Falls	24%		
Fessel 1997	2+/63%		
	1/15%		
	0/22%		
Chandler 1996		51%	
Mean			
Active		34%	
In Active		54%	
2+ Falls	55%		
1 Fall	22%		
No Falls	23%		

Fear of Falling and Depression

Higher levels of depression were observed with people who had fear of falling. Fessel discovered that participants with a score of 7 or more on the Geriatric Depression scale, 24% with fear of falling and 6.7% without fear (Fessel & Nevitt, 1997). Kressig observed that 32% of those with fear had a score of 7+ on the GDS, showing clinical depression. Those participants not experiencing fear 18% had clinical depression ((Kressig et al., 2001).

Of those who scored as fearful 24% also scored 7 or more on the depression scale giving a positive measure of clinical depression. Of those who scored with no fear of falling only 12% scored 7 or more on the depression scale for a positive diagnosis for clinical depression (See TABLE 5).

Functional Reach Test and Fear of Falling

The Functional Reach Test was very predictive of fear of falling. Kressig showed that the mean FR score for those who were fearful was 10.34 and the mean FR score for those who were not fearful was 11.85, $p < .0001$ (Kressig et al., 2001). Chandler discovered that history of falls reduced the FR mean score in those who also experienced fear of falling. Those with fear and without fall history scored, $M = 8.9$ (SD, 3.3). Participants with fear and with history, $M = 8.9$ (SD, 3.3). Subjects without fear and without history of falls scored $M = 10.4$ (SD, 2.6). Older adults who were without fear and with a history of falls scored $M = 9.5$ (SD, 3.1), $p = .498$ (Chandler et al., 1996).

When finding the mean of the mean for the three studies the results are that those with fear score a mean of 9.41 inches compared to those without fear who score 10.58

inches. According to Nakamura, the test-retest reliability score is $r = .69$ (Nakamura et al., 1998) (See TABLE 5).

TABLE 5 *Depression/fear & Fear/FR Test*

<i>Author & Date</i>	<i>Depression Score 7+ %</i>	<i>Functional Reach Test (FR)</i>	
		<i>Inches</i>	
		Mean Reach Score	SD Reach Score
Fessel 1997			
W/Fear	24%		
WO/Fear	6.7		
Kressig 2001			
W/Fear	32%	10.34	2.89**
WO/Fear	18%	11.85	3.07**
Chandler 1996			
W/Fear/W/History	22%	8.9	3.3**
W/Fear/WO/History	16%	9.0	3.3**
WO/Fear/W/History		9.5	3.1**
WO/Fear/WO/History		10.4	2.6
Mean			
W/Fear	26%	9.41 in.	
Mean			
WO/Fear	12%	10.58 in	

** $p < .001$

Fear of Falling Comparing Age and Gender

Arfken found that a higher percentage of older female participants were afraid than younger female and male participants. The percent fearful of women aged 66-70 was 21%, aged 71-75 was 37%, aged 76-80 was 40% and of the women over the age of 81 46% were fearful (Arfken, Lach, Birge, & Miller, 1994). Cummings found a similar

increase of participants with fear in the higher age groups. Of women participants between the ages of 71-75, 18% were fearful, of those between the ages of 76-80, 28% were fearful, and of women over the age of 81, 50% were fearful (Cumming et al., 2000). Kressig found even higher levels of fear with an increase of age. 41% of those between the ages of 71-75 were fearful, 41% of those between the ages of 76-80 were fearful and 59% of those over the age of 81 were fearful (Kressig et al., 2001)

When comparing the percentage of fearful adults with age and gender the combined results were that as women age they become more fearful. Women who are between the ages of 66-70 only 21% are fearful. Women who are between the ages of 71-75 32% are fearful. Female participants between the ages of 76-80 36% are fearful. And, women over the age of 81 52% are fearful. Only one research project studied men's fear as they aged (See TABLE 6).

Gait Disturbances and Fear of Falling

The scores on Gait Performance showed a decrease in speed and length of stride with people who had experienced a fall and were fearful. Of those with a history of falls, the gait performance score was $M = 14.4$ (SD, 1.6) for the fearless and $M = 13.2$ (SD, 2.1) for the fearful. For those without a history of falls, the gait performance score was $M = 13.8$ (SD, 1.8) for the fearful and $M = 14.1$ (SD, 1.7) for the fearless (Maki, 1997) (See TABLE 6).

TABLE 6 *Percent Fearful Stratified by Age and Gender*

<i>Author & Date</i>	% <i>Fearful Women 66-70 yrs</i>	% <i>Fearful Women 71-75 yrs</i>	% <i>Fearful Women 76-80 yrs</i>	% <i>Fearful Women 81+ yrs.</i>	% <i>Fearful Men 66-70 yrs</i>	% <i>Fearful Men 71-75 yrs</i>	% <i>Fearful Men 76-80 yrs</i>	% <i>Fearful Men 81+ yrs</i>
Arfken 1994	21%	37%	40%	46%	13%	15%	14%	21%
Cummings 2000		18%	28%	50%				
Kressig 2001		41%	41%	59%				
Mean	21%	32%	36%	52%	13%	15%	14%	21%

TABLE 7 *Fear/Gait Performance/History of Falls*

<i>Author & Date</i>		<i>Gait Performance Score / Fallers</i>	<i>SD</i>	<i>Gait Performance Score / Non-Fallers</i>	<i>SD</i>
Maki 1997	Fearful	13.2	2.1	13.8	1.8
	Fearless	14.4	1.6	14.1	1.7

RESULTS FOR FEAR OF FALLING INTERVENTIONS

Demographics Of The Studies For Fear Of Falling Interventions

In Burkner's study there were 66 in the control group and 60 in the group in treatment and 40% were male and 60% were female. The mean age of both groups was 76 years with 93% Caucasian (Burkner, Wong, Sloane, Mattingly, Preisser, & Mitchell, 1995). In Cameron's research, there were 144 women participants in the experimental

group and 75 women in the control group. The mean age of both groups was 85 with the ethnicity not reported.

Tennstedt's study had 216 participants in the experimental group and 218 in the control group. The groups were comprised with 7% males and 93% females with a mean age of 77.8 years. No ethnicity was reported for this study (Tennstedt et al., 1998)

Hip Pad Protector Research

Cameron compared women over the age of 70 who were given hip protectors (N = 144) to a control group (N = 75) who did not have hip protectors (Cameron et al., 2000). In Cameron's study he compared a yes/no question about falling, the Tinetti Fear of Falling Measurement and the Modified FES for the experimental group and the control group. Cameron and his associates found that there was a significant reduction of fear of falling for the group with hip protectors for each fear of falling measure compared with the control group at baseline and follow-up (Cameron et al., 2000).

The baseline percentages for fear of falling with the hip protector group were 56% fearful with the one question test, 49% for the FES and 38% for the modified FES. The baseline percentages for fear of falling in the control group were 57% of the one question test, 47% with the FES and 41% with the modified FES.

Exercise and Fear of Falling

In a study with Bruce, Devine and Prince (Bruce et al., 2002), a cross-sectional analysis was done on the baseline data from a longitudinal study. This study was to determine the relationship between FOF and recreational physical activity. There were 1500 older ambulatory women ages 70-85 randomly selected from an electoral role in

Perth, Australia (Bruce et al., 2002). A self-reported questionnaire measured activity levels, FOF, cognitive and physical function. The results of this study indicated that FOF is a psychological barrier and may need to be overcome in order to increase activity levels of older women.

Dizziness and Fear of Falling

Burker and associates (Burker et al., 1995) asked each of the 120 participants with a mean age of 76.5 years to answer questions regarding their history of falls, ADLs and the dizziness they felt accompanied their fear of falling. The study had 60 participants who were being treated for dizziness and 60 who were not dizzy.

The results of this study showed that on a 5 point Likert ADL questionnaire the dizzy elderly scored higher on the number of tasks that require assistance with the dizzy elderly ($M = 6.9$, $SD 2.7$) and the non-dizzy elderly ($M = 5.3$, $SD 1.0$) (Burker et al., 1995). With the non-dizzy elderly they experienced fewer falls ($M = .09$, $SD .4$) than the dizzy elderly ($M = 1.5$, $SD 2.1$). Fear of falling was also significantly higher in the dizzy elderly ($M = 7.6$, $SD 4$) than the non-dizzy elderly ($M = 4.2$, $SD 1.4$) (Burker et al., 1995).

There were two research case studies that examined fear of falling as a phobia and suggested sensitivity training. Bhala and associates coined the term Ptophobia to diagnose older adults who were afraid of falling as early as 1988 (Bhala, O'Donnell, & Thoppil, 1982). Riley in 2000, used graded exposed for his sensitivity training for a gentleman 33 years old and was able to reduce his fear in only six months (Riley, 2000).

"Matter of Balance" 1998

Tennstedt et al. (1998) program was designed to reduce FOF among community-dwelling elderly who had a preexisting FOF. Tennstedt et al. (1998) strategy was to restructure misconceptions about falling, set realistic goals for increasing activities, alter the environment, and promote an increase in strength and balance (Tennstedt et al., 1998). Tennstedt et al. (1998) projected that, due to the researcher's intervention, participants would increase their activities, increase their self-efficacy regarding falling, which would ultimately decrease their FOF. The intervention was comprised of 434 adults, aged 60 or older, with 216 randomly assigned to the intervention group and 218 randomly assigned to the attention control group. The intervention group used a cognitive restructuring approach to change attitudes about activity restrictions related to FOF. Cognitive restructuring was accomplished by reinforcing information about fall risk, skills training in fall prevention, and providing an action plan for when a fall occurs. The costs and benefits of exercise and improved strength and balance were emphasized in six sessions, with the use of videotape, lecture, group discussion, mutual problem solving, role playing, exercise training, home assignments and behavioral contracting. Thirty minutes of each of the six sessions was devoted to strength training exercises. These intervention sessions were conducted at 20 sites at elderly housing complexes (Tennstedt et al., 1998).

The results of the intervention by Tennstedt et al. (1998) were measured by number of falls, fall efficacy, and the ability to manage falls. Measurements were taken at 6 weeks, 6 months and 12 months. The results indicated no significant difference

between the intervention and the control group for number of falls, which could be due to the increased activity level of the intervention group. Falls efficacy and the ability to manage falls by the intervention group remained consistently above the control group. Since the extent of injuries due to falls was not reported, it is possible that the sustained cognitive outcomes contributed to less injurious falls, while the number of falls remained the same.

Characteristics of Older Adults who Would Benefit from Interventions 2001

Using the baseline and 12 month follow-up of the 1998 research, Tennstedt, et al. (2001) showed who were more likely to benefit from the intervention, so that people with greatest need might be targeted in the future (Tennstedt, Lawrence, & Kasten, 2001). As in the previous study, two items were added to the FES, carrying bundles and exercising. Other measures were taken in the previous study that were not reported. Included in the previous study were the measures of social behavior, emotional stability and affect (positive and negative)(Tennstedt et al., 2001). The baseline and 12 month follow up scores were compared with the FOF scores and number of falls by using a cluster analysis of the data.. Tennstedt, et al. was attempting to find out what attitudinal changes occurred in the participants who benefited from the intervention.

Participants who benefited the most from the intervention were those who had the most FOF, those whose participation was not hindered do to dysfunction and those who perceived their ability to manage falls. People with more dysfunction, lower perceived ability to control their falling and restricted outside mobility benefited the least from the intervention. Participants that did not benefit from the intervention are the people at

highest risk for falls. New interventions need to be sought that would address this population of older adults.

CHAPTER V

SUMMARY

Fear of falling has become an important risk factor to be able to diagnose, and reduce in order to prevent a fall itself or the resulting poor quality of life from the restriction of activity due to fear. Several measure of fear of falling, such as the Falls Self-Efficacy Scale, The Activities Balance Scale and the SAFE scale show promise in detecting FOF, however little research duplicates the original study. Many of the measures have been adjusted for the researchers study and have been tested and compared with depression, Functional Reach, activities level and/or Activities of Daily Living.

The results of the studies have shown that from 40%-60% of adults over the age of 65 experience some level of FOF. The percentage of women who have fear of falling increases from 21%, for those women below the age of 70 years old, to 52% of women 81+ years old. There is also an increase in the percentage of men who have fear of falling, but it is a smaller percentage than women, through all of the age groups. The range for fearful men is 13% below the age of 70 to 21% who are 81+ years old.

Depression increases with history of falls and fear of falling. The people who have fear of falling are not as flexible as people who do not fear falling, gait performance is reduced with people who have fear of falling and people become more inactive.

Graded exposure to reduce fear of falling has been tried twice since 1988, at least that is the number of reported and published articles regarding fear of falling as a phobia. There have been no studies done with both an experimental and a control group for graded exposure. There has been only one research project that utilized random sampling with a control group (Legters, 2002). Tennstedt, et al.'s research showed that a reduction of FOF can occur with a program of instruction on self-efficacy and exercise (Tennstedt et al., 1998). Tennstedt, et al. also demonstrated the characteristics of a older adult who would be most likely to benefit from an intervention to reduce FOF.

DISCUSSION

While the number of elderly is climbing at an exceptional pace, especially women over the age of 80 (*Census 2000*, 2001), there have been very few research studies to increase their quality of life and life satisfaction by reducing fear of falling, or the number of subsequent falls and the cost of each fall to the person and the nation. Fear of falling has become an extremely important concern for both the older adult and the medical community ((Gregg, 2000; E. W. Peterson, 2001; Tinetti, Williams, & Gill, 2000). Costs due to falls are estimated to be between 7 to 10 billion dollars annually (Gregg, 2000), resulting in 10,000 deaths each year (Lipsitz, 1996). The cost of fear of falling is a reduction of muscle strength and flexibility, social isolation, depression and loss of independence which ultimately results in an actual fall (Gregg, 2000; Lipsitz, 1996; E. W. Peterson & Murphy, 2002). Women fear a loss of independence above all fears as explained by Salkeld (Salkeld et al., 2000)

Research Question One

Which measure is most reliable and valid for diagnosing fear of falling in the elderly?

While the Falls Efficacy Scale (FES) has been around the longest and has shown the most reliability and validity in measuring fear of falling, subsequent research has, however, altered the original version of the scale. Researchers have also altered the Activities-Specific Balance Scale (ABC) Balance and the Survey of Activities and Fear of Falling in the Elderly (SAFE). Because of the alteration of the existing measures and the multiple creation of new measures that try to contribute to a wider range of specificity, there have not been reproductions of the studies to validate the reliability or validity of the instruments. Only the FES measure has sufficient research to consider it both valid and reliable, however this instrument can be very time consuming because it is an interview measure not a self-report measure (Legters, 2002).

Research Question Two

Which interventions reduce fear of falling in the elderly?

Tennstedt's "Matter of Balance" showed some very promising results. This cognitive-behavioral approach did reduce fear of falling in those adults who attended the sessions. However, the participants who dropped out of the study were the adults who needed the intervention the most. The authors felt an intervention needed to be designed that would address adults who have a higher level of dysfunction and have restricted themselves to their homes (Tennstedt et al., 2001).

Hip protectors with cognitive and behavioral training seemed the most promising. Adults who used the hip protectors lowered their level of fear (Cameron et al., 2000). This intervention might be a good intervention to use prior to "A Matter of Balance," as it would give adults with higher dysfunction the confidence to leave home to attend the sessions offered by Tennstedt's group. However, more sessions might need to be conducted over a longer period to jog participant's memories concerning the use of the pads.

Another possibility for future research is treating the fear as a phobia and using graded exposure to counteract the fear of falling. There have been two one-case studies showing some promising results, but there has not been a randomized sample control group research to examine this possibility (Bhala et al., 1982; Riley, 2000). Having an older adult exposed to their fear of activity and falling with no adverse consequences may reduce the person's fear. Combining graded exposure with exercise using a hip protector might have good results. The older adult would have developed some fall self-efficacy because of the hip protector and be able to slowly engage in activities first inside the home and gradually moving to outside activities.

By increasing their activities the result should be an increase in self-esteem, strength and self efficacy. People who engage in activities are less likely to be depressed (Chandler et al., 1996; Kressig et al., 2001), so the cycle of inactivity, fear and depression could be stopped. The results of reducing fear should be a reduction in the number and severity of falls.

However, all of the researchers have found that a reduction of fear and an increase in activities does not result in a fewer number of falls. As older adults become more active they tend to report more falls (Campbell et al., 1999). The severity of falls has not been considered in any of the studies, however. The report from the adult has always been in the crude number of falls experienced in the past. New research needs to be conducted to also find the severity of each fall experienced after an intervention.

Limitations

There are several limitations to this study. One is that there is a paucity of research for interventions on FOF using randomized control group samples. Another limitation is that the researchers altered or created new measure of FOF making it impossible to do a meta-analysis, which would be helpful to practitioners. There also may be unpublished studies that considered fear of falling and an intervention to reduce it, but the researcher was unable to locate any of those articles. And it may be that some published studies were overlooked in the literature search, due to the limitation of words used to search.

Further Research

Further research needs to be done to replicate the studies that created some of the instruments to measure FOF. With more duplication the validity and reliability could be measured and a standard measurement could be found for FOF. With the new measure it would be more efficient to measure the results of interventions to reduce FOF.

Since FOF is not only a risk factor for falling, but also a debilitating syndrome in itself there should be more research developed that would address interventions to reduce FOF. While there are over 250 interventions published to reduce falls, but not only 5 studies were found that dealt with reducing fear of falling and only one of those used randomized sampling with a control group. More research needs to be done that would find an existing measure that is both valid and reliable and an intervention that reduce FOF.

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APPENDIX A
DATABASES AND SEARCH TERMS

APPENDIX A

DATABASES AND SEARCH TERMS

The following electronic databases were search for the years 1994 – 2002. Search terms for each database are noted. Some terms were combined to refine the search process.

Academic Search Premier

Older adult, elderly, senior

Fall, falls, falling

Fear of falling

Fear of falling measures

Administration on Aging

Fall, falls or falling

Fear of falling

Prevention, intervention

American Association of Retired Persons

Fall, falls, falling

Fear

Programs, prevention

Center for Disease Control and Prevention Site search

Elderly, older adult, senior

Fall, falls, falling

Fear, fear of falling

Fear of falling interventions

Department of Health and Human Services

Elderly, older adult, senior

Fall, falls, falling

Fear, fear of falling

Dissertation Abstracts

Fear of falling

Older adult, elderly

Self-efficacy, efficacy

EBSCO

Fear of falling

Fear of falling interventions

Fear of falling measures

Fear of falling prevention

Older adult, elderly

Self-efficacy, efficacy

ERIC

Fall, falls, falling

Fear of falling

Older adult, elderly, senior adult

Self-efficacy, efficacy

Fear of falling interventions

Fear of falling measures

Fear of falling prevention

MEDLINE

Fall, falls, falling

Fear of falling

Older adult, elderly, senior adult

Self-efficacy, efficacy

Fear of falling interventions

Fear of falling measures

Fear of falling prevention

PSYCHFIRST

Fall, falls, falling

Fear of falling

Older adult, elderly, senior adult

Self-efficacy, efficacy

Fear of falling interventions

Fear of falling measures

Fear of falling prevention

PSYCHLIT

Fall, falls, falling

Fear of falling

Older adult, elderly, senior adult

Self-efficacy, efficacy

Fear of falling interventions

Fear of falling measures

Fear of falling prevention

PUBMED

Fear of falling interventions

Fear of falling prevention

Older adult, elderly, senior

SOCIOFILE

Fall, falls, falling

Fear of falling

Fall efficacy

Fear of falling measures

Older adult, elderly, senior adult

Self-efficacy, efficacy