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Factors Associated with Falls Self-Efficacy in Community Dwelling Older Adults

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The University of Sydney
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Abstract

BACKGROUND: This thesis will include a literature review and journal manuscript to be submitted to the Australasian Journal on Aging. Accidental falls affect 27% of older Australians each year and cost the government $558.5 million. Falls self-efficacy can be used to understand the concern older people have for falling while doing different activities.

AIMS: This paper aims to investigate associations between falls self-efficacy and other health related factors in community-dwelling older adults.

METHODS: A quantitative, cross-sectional study was conducted with 560 older adults in the Sydney North Primary Health Network (SNPHN) through completing an interview style questionnaire that included questions about falls history, the Short Falls-Efficacy Scale-International (FES-I), physical activity, social participation, health service use, comorbidities, and medications. The data was analysed through descriptive and inferential statistics.

RESULTS: Significant factors associated with increased concern for falling as rated by the FES-I were being injured in a past fall, having a walking aid, physical activity, social participation, being hospitalized in the past month, number of comorbidities, and number of medications, though these relationships were all weak ($r<0.300$ and $r>-0.300$). Multiple linear regression found that having or using a walking aid, having a higher number of comorbidities, having panic or anxiety disorders, and being concerned about falling were predictors of FES-I score.

CONCLUSIONS: Having a healthy level of respect for the risk of falls as people age is essential to healthy ageing. Falls self-efficacy is a valid measure of the concern that community-dwelling older adults have about falling, and understanding falls self-efficacy can be used to implement more effective falls prevention strategies.

KEYWORDS: ‘accidental falls’, ‘comorbidity’, ‘exercise’, ‘social participation’, ‘occupational therapy’

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Part 1: Literature Review

The population is ageing, with the number of individuals over the age of 60 growing faster than any other age group (World Health Organisation [WHO], 2008). In Australia, the population of older adults is expected to rise from 14% in 2010 to 23% by 2050 (Australian Commission on Safety and Quality in Health Care, 2009). As the population ages, the number of accidental falls will increase as well, increasing the cost of healthcare for older adults. An accidental fall is defined as "inadvertently coming to rest on the ground, floor, or other lower level" (World Health Organisation [WHO], 2008, p.1). An estimated 40% of injury-related deaths of older adults are caused by accidental falls, thus accidental falls are a major concern for adults over the age of 65 (Australian Commission on Safety and Quality in Health Care, 2009). The number of older individuals who experience at least one fall annually varies between studies, with 30-60% of older adults being reported to experience at least one accidental fall each year (Australian Commission on Safety and Quality in Health Care, 2009; Watson, Clapperton, & Mitchell, 2010). In 2006/2007, the costs of these falls to the Australian government was $558.5 million (Watson et al., 2010). Because of the great cost of falls and the high prevalence of accidental falls among older adults, falls prevention has been a focus of research and a priority of the National Injury Prevention Plan since 2004 (Pointer, Harrison, & Bradley, 2003). Falls influence the independence, self-confidence, and well-being of older adults (defined as adults over the age of 65), and can lead to a decrease in function (American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2010). The purpose of this literature review is to develop a greater understanding of accidental falls, explain the role that fear of falling has in the rate of accidental falls for community-dwelling older adults, and to explore the need for a better understanding of falls self-efficacy.

Search Strategy

Four databases accessed through The University of Sydney library website were searched including CINAHL, MEDLINE, Scopus and OTSeeker. Each database was searched using key search terms that are included in Table 1. Each of the four databases produced similar results. The search was limited to articles that were written or translated into English and articles that were written since 2000. Some articles that focused on the theoretical underpinnings of falls self-efficacy and the Health Belief Model were published prior to 2000 and were included to ensure depth of understanding of relevant information. Articles that focused on older adults who were not living in the community were excluded. Research from

developed countries was prioritised for this review. References from articles found were explored and some were used to enhance the literature review. Additionally, Australian government websites and resources were searched for data about the aging population and the rate of falls in Australia.

Main search terms	Search terms combined with main search term with AND Boolean operator
"accidental falls" AND "community-dwelling"	"fear", "gender", "age", "physical activity", "comorbidities", "hospital*", "social participation", "medications", "injury", "arthritis", "osteoporosis", "asthma", "chronic obstructive pulmonary disease", "angina", "congestive heart failure" OR "heart failure", "heart attack" OR "myocardial infarction", "neurological disease", "stroke" OR "TIA", "peripheral vascular disease", "diabetes mellitus", "gastrointestinal diseases" OR "ulcer" OR "hernia" OR "gastroesophageal reflux", "depression", "anxiety", "visual impairment", "hearing impairment" OR "hearing loss", "degenerative disc disease"
"accidental falls" AND "fear"	"gender", "age", "physical activity", "comorbidities", "hospital*", "social participation", "medications", "injury", "arthritis", "osteoporosis", "asthma", "chronic obstructive pulmonary disease", "angina", "congestive heart failure" OR "heart failure", "heart attack" OR "myocardial infarction", "neurological disease", "stroke" OR "TIA", "peripheral vascular disease", "diabetes mellitus", "gastrointestinal diseases" OR "ulcer" OR "hernia" OR "gastroesophageal reflux", "depression", "anxiety", "visual impairment", "hearing impairment" OR "hearing loss", "degenerative disc disease"
"falls self-efficacy"	"fear" AND "accidental falls", "gender", "age", "physical activity", "comorbidities", "hospital*", "social participation", "medications", "injury"
"falls prevention"	"fear" AND "accidental falls", "falls self-efficacy", "community-dwelling", "physical activity", "social participation"
"Health Belief Model"	"accidental falls", "falls self-efficacy"

Table 1: Search terms used in the literature review search strategy

Risk Factors for Accidental Falls

The main risk factors for accidental falls in older adults can be classified into four main categories: (a) biological risk factors; (b) behavior risk factors; (c) environmental risk factors; and (d) socioeconomic risk factors (Deandrea et al., 2010; World Health Organisation [WHO], 2008). Older age has been found to be a risk factor for falls in multiple studies (Boyd & Stevens, 2009; Clemson, Kendig, Mackenzie, & Browning, 2015; Deandrea et al., 2010; Gassmann, Rupprecht & Freiberger, 2009; Stevens & Sogolow, 2005), as has being female (Deandrea et al., 2010; Gassmann, Rupprecht & Freiberger, 2009; Painter & Elliott, 2009). In a systematic review of 74 studies on accidental falls, a fall within the previous 12 months was associated with an increased risk of falling, as has the use of a walking aid, living alone, having various comorbidities, and increased number of medications (Deandrea et al., 2010). Other studies have found that older adults who do not engage in physical activity are at higher risk of experiencing an accidental fall, as well as recurring falls (Heesch, Byles & Brown, 2008). The risk factors for accidental falls are well known and well discussed in the research, and thus there is also a large range of published research on falls prevention for community-dwelling older adults (Clemson, Mackenzie, Ballinger, Close, & Cumming, 2008; Gillespie et al., 2012; Hughes et al., 2008).

Falls Prevention

The question remains why the falls rate has stayed fairly static despite the high volume of research conducted and presented about effective falls prevention. This leads to the question of what is not being addressed in falls prevention interventions for community-dwelling older adults. A Cochrane Review of falls prevention interventions for older adults living in the community done by Gillespie et al. (2012) looked at 159 randomised control trials and found that multiple-component home-based exercises and multiple-component group exercise significantly reduced the rate of falls, as well as the risk of falling. Tai Chi significantly reduced the risk of falling, but did not significantly reduce the rate of falls. Multifactorial interventions reduced the number of falls, but not the risk of falling in older adults. Gillespie et al. (2012) reviewed seven trials that used cognitive behavioural interventions or education about falls prevention to attempt to reduce the rate of falls or risk of falls and found that there is no evidence for the effectiveness of either type of intervention. A systematic review and meta-analysis of six randomized control trials about the effectiveness of environmental interventions as a single intervention in reducing falls for community-dwelling older adults found that environmental interventions work best at

reducing falls for older adults who were at high risk of falling (Clemson et al., 2008), and when the intervention was conducted by an occupational therapist.

In a qualitative study, Roe et al. (2008) found that older people who reflected on their fall were more likely to face any fear and continue participating in their ADLs, while those who did not were more likely to experience a fear of falling and decrease their daily activities. While these results are not generalizable, they provide insight into the experience that older adults have after a fall and the potential relationship between the falls and their fear of falling. Chen et al. (2016) also found that personal reflection is key in falls prevention, indicating that understanding falls self-efficacy is essential to effective falls prevention strategies. However, Gillespie et al. (2012) found that neither cognitive behavioural interventions or interventions based on education had an effect on the rate of falls or risk of falling.

Factors Associated with a Fear of Falling

In 1982, Bhala, O'Donnell, and Thoppil were the first to define fear of falling as ptophobia, meaning that older individuals have a phobia of standing or walking. Since then, the definition of fear of falling has developed from being a phobia or a syndrome (Murphy & Isaacs, 1982) to an individual's loss of confidence in activities that require balance and postural control (Maki, Holliday, & Topper, 1991; Tinetti, Speechley, & Ginter, 1988). More recently, fear of falling has been defined as a constant concern about falling that leads to avoidance of activity (Tinetti & Powell, 1993). Even stronger language was used by Tidieksaar (2010) who stated that fear of falling was unhealthy. Fear of falling has been associated with several negative consequences (Clemson et al., 2015; Jung, 2008; Scheffer, Schuurmans, van Dijk, van der Hooft, & de Rooij, 2008). Clemson et al. (2015) found that increasing age predicts both fear of falls and experiencing accidental falls, but there are also differences between older adults who have injurious falls and those who have a fear of falling. Some of these differences include gender, cognitive impairment, and reduced social participation being predictors of fear of falling, while the most important predictors of a fall were being depressed and having a slower gait speed.

Age and Gender

Older adults in their 60s and 70s who are healthy are less likely to have a perceived risk of falling than older adults over the age of 80 (Hughes et al., 2008). Older adults over the age of 75 have a higher rate of fear of falling than those older adults who are between 65 and 74 years old (Boyd & Stevens, 2009; Stevens & Sogolow, 2005). Multiple studies have found that women are more afraid of falling than men (Boyd & Stevens, 2009; Painter & Elliott,

2009; Pohl, Ahlgren, Nordin, Lundquist & Lundin-Olsson, 2014; Scheffer et al., 2008; Stevens & Sogolow, 2005). Women are also more likely to decrease activity due to a fear of falling and have a higher perceived falls risk than males (Painter & Elliott, 2009; Hughes et al., 2008; Moreira, Bilton, Dias, Ferriolli & Perracini, 2016).

Falls History

Individuals who have fallen in the past year are four times more likely to have a fear of falling (Fletcher, Guthrie, Berg, & Hirdes, 2010), with a past fall being the main risk factor for having a fear of falls (Scheffer et al., 2008). There has also been research that shows that up to 50% of individuals who have never personally experienced an accidental fall also report a fear of falling (Friedman, Munoz, West, Rubin, & Fried, 2002; Jung, 2008; Murphy, Dubin, & Gill, 2003). Loss of confidence and fear of falling also increase when individuals have more frequent accidental falls or more severe accidental falls (Delbaere, Crombez, van Haastregt, & Vlaeyen, 2009; Roe et al., 2008). An 11-year longitudinal study of 1000 participants found that having a fear of falls and having a history of an injurious fall did not predict each other (Clemson et al., 2015). This is novel evidence and future studies are needed to confirm the complexity of this relationship.

Physical Activity

When older adults are more sedentary, something which is often a consequence of an unhealthy fear of falling, they become frailer and are therefore more likely to be injured if they experience an accidental fall (Gregg, Pereira, & Caspersen, 2000; Murphy, Williams, & Gill, 2002). Older adults who engage in less physical activity are more likely to be afraid of falling, as well as more likely to experience accidental falls (Gregg et al., 2000). Much research has been done regarding the impact of physical activity interventions to prevent falls in older adults. While several types of physical activity have been shown to decrease fear of falling in older adults, including home-based exercises and Tai Chi (Zijlstra et al., 2007), the positive benefits of these interventions have not been found to have lasting effects on decreasing fear of falls once the interventions have ceased (Kumar et al., 2016).

Social Participation

Along with a decrease in physical activity, another factor that has been found to be associated with fear of falling is a decrease in social participation. Individuals who have a fear of falling are more likely to restrict their activities outside the home, with several studies finding that 30% of older adults who report a fear of falling limit their outdoor activities (Fletcher et al., 2010; Guthrie et al., 2012). With activity restriction comes decreased

participation in social activities (Fletcher et al., 2010) and increase in social isolation (Austin, Devine, Dick, Prince, & Bruce, 2007). Clemson et al. (2015) found that decreased social participation was a predictor of fear of falling.

Health Service Use

There is little research to be found regarding the association between fear of falling and how often individuals are admitted to hospital. In a qualitative and quantitative study looking at the fear of falling in hospitalized older adults, Boltz, Resnick, Capezuti & Shuluk, (2013) found an association between fear of falling and decreased functional ability that occurs during hospital admission. While this emerging information is beneficial in exploring the effect of health service use on fear of falling in older adults, the significance of this relationship needs to be further explored.

Comorbidities and Medications

Several researchers have found that due to fear of falling, older adults with multiple comorbidities are more likely to restrict their participation in various activities (Deshpande et al., 2008; Guthrie et al., 2012; Murphy et al., 2002). Older adults with more comorbidities have a higher perceived falls risk and are more likely to experience an accidental fall than those with fewer comorbidities (Lawlor, Patel, & Ebrahim, 2003; Moreira et al., 2016). Older adults with heart disease, hypertension, diabetes, arthritis, osteoporosis, and urinary incontinence have a higher perceived falls risk (ie lower falls self-efficacy) (Moreira et al., 2016). The presence of pain, which is a symptom of many of the comorbidities that older adults exhibit, has been found to be a risk factor for older adults restricting activities due to a fear of falling (Fletcher et al., 2010; Patel et al., 2014).

Most medications have not been shown to have a significant association with falls risk when other factors are studied (Lee, Kwok, Leung, & Woo, 2006; Lawlor et al., 2003), which suggests that the medications older adults use to treat their various comorbidities may not play as great a role in predicting accidental falls or fear of falling as the comorbidities themselves. Older adults who restrict their activities due to a fear of falling are more likely to be taking three or more medications (Guthrie et al., 2012). Specific comorbidities have various associations with falling and fear of falling.

Visual impairment. Vision is key for maintaining balance and avoiding falls due to environmental risk factors (Australian Commission on Safety and Quality in Health Care, 2009), with older adults relying on sensory input from their sight more than proprioception or vestibular input to maintain balance (Choy, Brauer & Nitz, 2003; Coleman et al., 2007; Wang

et al., 2012). A cross-sectional survey of 3654 individuals over 49 years old in the Blue Mountains region of New South Wales determined that visual impairment is strongly associated with two or more falls (Boptom, Cumming, Mitchell & Attebo, 1998). Studies have shown that individuals who have worse vision have a higher fear of falling and that fear of falling levels increase when individuals have visual impairments (Sibley, Voth, Munce, Straus, & Jaglal, 2014; White, Black, Wood & Delbaere, 2015). Self-reported visual impairment was independently associated with fear of falling and activity restriction due to that fear in a longitudinal study of 5003 community-dwelling older adults, while actual visual acuity or contrast sensitivity were not (Donoghue et al., 2013). Activity limitation due to fear of falling affected 40-50% of patients who have eye disease, but only 16% of individuals with normal vision (Wang et al., 2012). Cataracts lead to an increased risk of falls (Ivers, Cumming, Mitchell, Simpson & Peduto, 2003; Schwartz et al., 2005) and older adults who are diagnosed with cataracts are encouraged to have them removed as soon as possible to decrease falls risk (Australian Commission on Safety and Quality in Health Care, 2009).

Arthritis. Individuals who have rheumatoid arthritis (RA) are more at risk of falling than those who do not have RA, most likely due to the pain, deformity, and decreased muscle strength that is associated with RA (Stanmore et al., 2013). A systematic review found that having a history of a previous fall and an increased number of medications were associated with falls in older adults who have RA (Brenton-Rule et al., 2015). More specifically, a study that looked at 2120 older adults with osteoarthritis in their knees found that the symptoms of this disease, specifically knee buckling and knee instability, were significantly associated with a fear of falling (Nguyen et al., 2014).

Osteoporosis. Older adults with osteoporosis have an increased fear of falling (Halvarsson, Franzén & Ståhle, 2014; Resnick et al., 2014). In a large international study of 7,897 women with osteoporosis, having a high fear of falling was also associated with decreased health-related quality of life (Guillemin et al., 2013).

Hearing impairment. A systematic review found that older adults with some level of hearing loss experienced a 69% increase in their risk of falling, which is a significant increase over older adults who do not have hearing loss (Jiam, Li & Agrawal, 2016). Loss of hearing has also been found to be independently associated with increased frailty in older adults, which leads to more falls and increased likelihood of injury when falls occur (Kamil et al., 2015). There has not been significant research done regarding the impact hearing impairment

has on fear of falling in older adults, although one study found no significant association between hearing impairment and decreased health-related quality of life (Lopez et al., 2011).

Congestive heart failure, heart attack, and angina. In a study of 11,113 older adults, 23.3% of participants who had been diagnosed with a heart attack in the past two years had also experienced two or more falls in the past two years. Of 8.9% of participants who had congestive heart failure, they also had experienced two or more falls in the past two years (Lee, Cigolle & Blaum, 2009). Angina and heart failure were found to be associated with recurrent falls, but not first falls (Jansen, Kenny, de Rooij & van der Velde, 2014). There is a lack of research about the association between fear of falling and heart failure, heart attack, or angina in community-dwelling older adults.

Depression. "Depression is an independent risk factor for falls" (Iaboni & Flint, 2013, p. 485). In a study of 488 community dwelling older adults who had had at least one injurious fall or two non-injurious falls in 12 months, Kvelde et al. (2015) found that both depressive symptoms and antidepressant use were significant risk factors for falls. They also found that the risk increased when individuals had depressive symptoms and were using antidepressants. A cohort study (Delbaere, Close, Brodaty, Sachdev & Lord, 2010) found that older adults who had a low physiological risk of falling but a high fear of falls were more likely to experience depressive symptoms, while Moreira et al. (2016) found that individuals with a higher perceived falls risk exhibited more depressive symptoms. Depressive symptoms are also independently associated with activity restriction due to fear of falling (Murphy et al., 2002). It is difficult to determine whether depression itself or antidepressants lead to increased falls. A meta-analysis (Woolcott et al., 2009) found that anti-depressants lead to an increased likelihood of falling (Odds ratio of 1.68 with a 95% CI). A cross-sectional study of 134 fallers and non-fallers found that depression is significantly more common in recurrent fallers (Somadder, Mondal, Kersh & Abdelhafiz, 2007). The authors' suggested that depression in recurrent fallers may be caused by their recurrent falls, and there may be some connection between falling more frequently and depression.

Anxiety. A meta-analysis of studies about anxiety and accidental falls found that older adults who had increased levels of anxiety were 58% more likely to experience an accidental fall (Hallford, Nicholson, Sanders & McCabe, 2017). Much research has found that there is a relationship between having a fear of falling and anxiety (Bosma et al., 2004; Hallford et al.; & Painter et al., 2012), but anxiety and depression are often combined making it difficult to determine if either factor has more of an influence of fear of falling than the other.

Diabetes. Older adults with type two diabetes are at higher risk of falling (Vinik, Vinik, Colberg & Morrison, 2015) and fear of falling is prevalent among older adults with diabetes mellitus (Kelly et al., 2013). Sibley et al. (2014) found that 36.6% of older adults with diabetes had a fear of falling. Research has also shown that having diabetes is associated with higher fear of falling that leads to fear related activity avoidance (Bruce, Hunter, Peters, Davis & Davis, 2015). Vieira, Mendy, Prado, Gasana, and Albatineh (2015) found that diabetes was significantly associated with falls, but also with many of the items that are looked at in the Falls Efficacy Scale-International (FES-I), including attending social events and reaching for something over-head.

Stroke or transient ischaemic attack (TIA). Older adults who have had a stroke or TIA are more likely to experience a fall (Paliwal, Slattum & Ratliff, 2017). Fear of falling is common in older adults after they have experienced a stroke (Schinkel-Ivy, Inness & Mansfield, 2016; Schmid & Rittman, 2007), with up to 88% of older adults who have experienced a fall reporting fear of falling (Watanabe, 2005). Qualitative studies have also identified that stroke survivors often develop a fear of falling if they fall during recovery (Schmid & Rittman, 2009).

Respiratory diseases. Older adults with Chronic Obstructive Pulmonary Disease (COPD) are more likely to experience accidental falls due to decreased balance and inability to maintain posture (Roig, Eng, MacIntyre, Road & Reid, 2011). Hellström, Vahlberg, Urell and Emtner (2009) found that older individuals with COPD were four to five times more likely to experience a fall than individuals who did not have COPD. While their sample size was small (n=80), they provide insight into the psychological impact that COPD has on individuals' fear of falling, with 50% of individuals who had a fear of falling reporting activity avoidance. COPD was found to be a predictor of recurrent falling in community-dwelling older adults in a study of over 159,000 older adults (Paliwal et al., 2017). There is a lack of research on the impact of other respiratory diseases, such as acquired respiratory distress syndrome and emphysema, on accidental falls or a fear of falling.

Neurological diseases. Neurological diseases such as Parkinson disease and multiple sclerosis can have an impact on individuals' fear of falling. Older adults with Parkinson disease often have a higher fear of falling due to symptoms of the disease such as walking difficulties, motor symptoms and fatigue (Jonasson, Ullen, Iwarsson, Lexell & Nilsson, 2015). This may lead to individuals with Parkinson disease to avoid activities due to fear of falling, have lower balance confidence and higher falls catastrophization, along with higher

levels of depression and anxiety (Landers et al., 2017). Matsuda, Shumway-Cook, Ciol, Bombardier and Kartin (2012) found that 62% of individuals with multiple sclerosis were concerned about falling and 67% restricted activities due to their concern, regardless of if they had a history of falling or not. Older adults with multiple sclerosis became more concerned about falling as the disease progressed (van Vliet, Hoang, Lord, Gandevia, Delbaere, 2015).

Other comorbidities. Very little research was located about the association of fear of falling in older adults with upper gastrointestinal disease, degenerative disc disease, or peripheral vascular disease. Older adults with asthma are more likely to experience a fall (Paliwal, Slattum & Ratliff, 2017), but there is little research about the association between asthma and fear of falling. There needs to be more research done to determine both the impact that different comorbidities have on falling in community-dwelling older adults and the association between these comorbidities and fear of falling.

Health Belief Model

When studying falls and perceived risk of falling, as well as fear of falling, researchers often use the International Classification of Functioning, Disability, and Health (ICF) framework (Pohl et al, 2014). While the ICF is a beneficial way of thinking about falls and fear of falling, because self-efficacy is the focus of the current study the Health Belief Model was used as the main theoretical framework. It has been suggested that the Health Belief Model and self-efficacy should be used together to better understand health-related behavior (Rosenstock, Strecher, & Becker, 1988). Understanding the perceived threats and outcome expectations that individuals have regarding falls could lead to more effective interventions directed at changing behaviour (Abraham, & Sheeran, 2005). The Health Belief Model assumes several things, including: (a) that individuals need to be in control of their own health to be healthy (Rosenstock, 1974); (b) Individuals desire good health and are motivated to change their behaviours to attain that desire (Taylor, 2014); (c) health behaviour change is predicted by the Health Belief Model (Nutbeam, Harris, & Wise, 2014); and (d) attitudes and beliefs are the driving factor behind changes in behaviour, but may not be the only factors (Janz & Becker, 1984).

Self-Efficacy

Self-efficacy is an essential component of the Health Belief Model and refers to how individuals perceive their abilities and capacity to complete a specific task or activity (Bandura, 1978). When individuals have higher self-efficacy, they are more likely to change their behavior in relation to to the specific task (Tinetti, Richman, & Powell, 1990), and

therefore they are more successful in achieving that task (Bandura, 1977). As seen in Figure 1, self-efficacy is the outcome of many perceptions about threat, benefits, and barriers that individuals have (Nutbeam, Harris, & Wise, 2014). Self-efficacy is an essential component in healthy ageing (Liu-Ambrose et al., 2006; Mendes de Leon, Seeman, Baker, Richardson, & Tinetti., 1996; Seeman, Unger, McAvay, & Mendes de Leon, 1999).

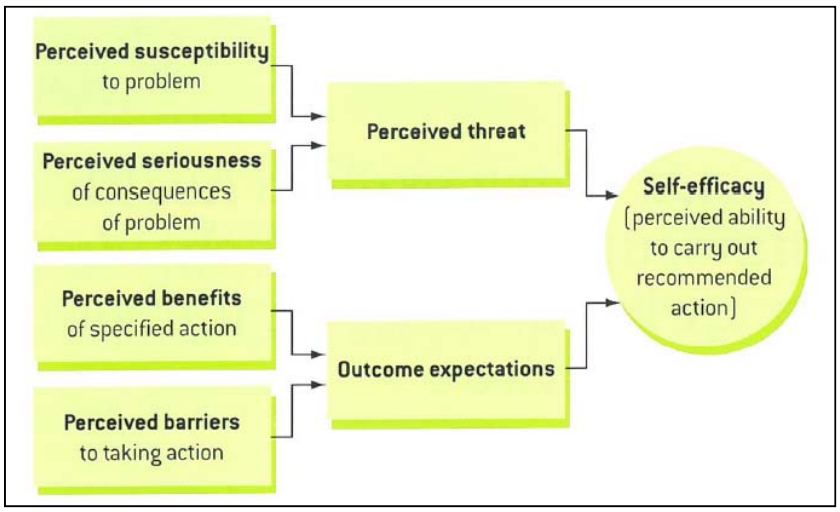

Figure 1: Health Belief Model (Nutbeam et al., 2014)

Falls Self-Efficacy

Falls self-efficacy fits in the Health Belief Model in that previous fallers have a sense of susceptibility to falls and are very aware of the seriousness of consequences of accidental falls, especially if older adults have experienced injury in previous falls. If older adults have a high sense of a threat due to past falls or other factors they are likely to have less falls self-efficacy if they are not convinced they can change their situation. In the early literature about falls self-efficacy, falls self-efficacy was defined as "the degree of confidence a person has in performing common daily activities without falling" (Tinetti, de Leon, Doucette, & Baker, 1994, p.141). Falls self-efficacy came about because researchers were attempting to find more objective way to look at fear or concern about falling (Tinetti et al., 1990). Falls self-efficacy provides more detail about why older adults are concerned about or afraid of falling, by determining what the fear or concern means for that specific individual in various activities, ranging from very basic (getting out of a chair) to more difficult (going up and down stairs) (Greenberg, Sullivan-Marx, Sommers, Chittams, & Cacchione, 2016). When older adults have a higher level of falls self-efficacy, they are less likely to have functional decline due to its buffering effect (Mendes de Leon et al., 1996). Fear of falls and falls self-efficacy are not polar opposites, but are similar in that they are connected to falls and provide clues to how to

decrease the amount of activity restriction older adults have due to their fear or concern about falling.

Health related quality of life has been shown to be independently associated with falls self-efficacy (Davis, Marra, & Liu-Ambrose, 2011), indicating that having high falls self-efficacy is beneficial to older adults in more than just their risk of falls. One major difference is that falls self-efficacy is a positive way of thinking about what is often construed as negative. When older adults can think positively about accidental falls, and focus more on the confidence that they have in doing specific activities, they are more likely to change their behavior, which could lead to decreased falls and better falls prevention. Personal reflection on what they are able to do, rather than what they are unable to do, could be the factor that leads to decreased falls. Personal reflection has been found to lead to more effective falls prevention interventions (Chen et al., 2016).

While there is a definite need for more research to be done on falls self-efficacy, there are several factors that have been shown to be associated with falls self-efficacy. A cohort study of 500 community-dwelling older adults in Eastern Sydney found that one third of participants had a disparity between their perceived risk of falling and their physiological risk of falling and that individuals who had experienced a fall in which they were injured or multiple falls (greater than one fall) were more likely to have a higher falls self-efficacy score on the FES-I (Delbaere et al., 2010). Women have also been found to have lower falls self-efficacy than men (Davis et al., 2011). Due to the lack of information on what is associated with falls self-efficacy, especially in populations of Australian community-dwelling older adults, there is a need for more research to be done. Understanding how various factors are associated with falls self-efficacy will lead to more specific interventions aimed at decreasing fear of falling and accidental falls among the elderly.

References

Abraham, C., & Sheeran, P. (2005). The Health Belief Model. In M. Conner & P. Norman, *Predicting Health Behaviour: Research and Practice with Social Cognition Models* (2nd ed., pp. 28-80). Maidenhead: Open University Press.

American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention. (2010). Guideline for the prevention of falls in older persons. *Journal of the American Geriatrics Society, 49*, 664-672. Retrieved from http://geriatricscareonline.org/ProductAbstract/updated-american-geriatrics-societybritishgeriatrics-society-clinical-practice-guideline-for-prevention-of-falls-in-older-persons-andrecommendations/CL014

Austin, N., Devine, A., Dick, I., Prince, R., & Bruce, D. (2007). Fear of falling in older women: A longitudinal study of incidence, persistence, and predictors. *Journal of the American Geriatrics Society*, *55*(10), 1598-1603. http://dx.doi.org/10.1111/j.1532-5415.2007.01317.x

Australian Commission on Safety and Quality in Health Care. (2009). *Preventing falls and harm from falls in older people: Best practice guidelines for Australian community care.* Retrieved from https://www.safetyandquality.gov.au/wpcontent/uploads/2012/01/Guidelines-COMM.pdf

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215. http://dx.doi.org/10.1037//0033-295x.84.2.191

Bandura, A. (1978). Reflections on self-efficacy. *Advances In Behaviour Research And Therapy, 1*(4), 237-269. http://dx.doi.org/10.1016/0146-6402(78)90012-7

Bhala, R., O'Donnell, J., & Thoppil, E. (1982). Ptophobia. Phobic fear of falling and its clinical management. *Physical Therapy*, *62*(2), 187-190.

Boltz, M., Resnick, B., Capezuti, E., & Shuluk, J. (2013). Activity restriction vs. self-direction: Hospitalised older adults' response to fear of falling. *International Journal Of Older People Nursing*, *9*(1), 44-53. http://dx.doi.org/10.1111/opn.12015

Boptom, R., Cumming, R., Mitchell, P., & Attebo, K. (1998). Visual impairment and falls in older adults: The Blue Mountains eye study. *Journal of The American Geriatrics Society, 46*(1), 58-64. http://dx.doi.org/10.1111/j.1532-5415.1998.tb01014.x

Bosma, H., Sanderman, R., Scaf-Klomp, W., Van Eijk, J., Ormel, J., & Kempen, G. (2004). Demographic, health-related and psychosocial predictors of changes in depressive

symptoms and anxiety in late middle-aged and older persons with fall-related injuries. *Psychology & Health, 19*(1), 103-115. http://dx.doi.org/10.1080/08870440310001594510

Boyd, R., & Stevens, J. (2009). Falls and fear of falling: burden, beliefs and behaviours. *Age and Ageing*, *38*(4), 423-428. http://dx.doi.org/10.1093/ageing/afp053

Brenton-Rule, A., Dalbeth, N., Bassett, S., Menz, H., & Rome, K. (2015). The incidence and risk factors for falls in adults with rheumatoid arthritis: A systematic review. *Seminars In Arthritis And Rheumatism*, *44*(4), 389-398. http://dx.doi.org/10.1016/j.semarthrit.2014.08.001

Bruce, D., Hunter, M., Peters, K., Davis, T., & Davis, W. (2015). Fear of falling is common in patients with type 2 diabetes and is associated with increased risk of falls. *Age And Ageing*, *44*(4), 687-690. http://dx.doi.org/10.1093/ageing/afv024

Chen, S., Huang, S., Lu, L., Wang, M., Liao, J., & Guo, J. (2016). Patterns of perspectives on fall-prevention beliefs by community-dwelling older adults: A Q method investigation. *BMC Geriatrics*, *16*(1). http://dx.doi.org/10.1186/s12877-016-0307-1

Choy, N., Brauer, S., & Nitz, J. (2003). Changes in postural stability in women aged 20 to 80 years. *The Journals of Gerontology Series A: Biological Sciences And Medical Sciences, 58*(6), 525-530. http://dx.doi.org/10.1093/gerona/58.6.m525

Clemson, L., Kendig, H., Mackenzie, L., & Browning, C. (2015). Predictors of injurious falls and fear of falling differ. *Journal of Aging And Health*, *27*(2), 239-256. http://dx.doi.org/10.1177/0898264314546716

Clemson, L., Mackenzie, L., Ballinger, C., Close, J., & Cumming, R. (2008). Environmental interventions to prevent falls in community-dwelling older people. *Journal of Aging and Health, 20*(8), 954-971. http://dx.doi.org/10.1177/0898264308324672

Coleman, A., Cummings, S., Yu, F., Kodjebacheva, G., Ensrud, K., & Gutierrez, P. et al. (2007). Binocular visual-field loss increases the risk of future falls in older white women. *Journal of The American Geriatrics Society, 55*(3), 357-364. http://dx.doi.org/10.1111/j.1532-5415.2007.01094.x

Davis, J., Marra, C., & Liu-Ambrose, T. (2011). Falls-related self-efficacy is independently associated with quality-adjusted life years in older women. *Age and Ageing*, *40*(3), 340-346. http://dx.doi.org/10.1093/ageing/afr019

Deandrea, S., Lucenteforte, E., Bravi, F., Foschi, R., La Vecchia, C., & Negri, E. (2010). Risk factors for falls in community-dwelling older people: A systematic review and meta-analysis. *Epidemiology, 21*(5), 658-668. doi:10.1097/EDE.0b013e3181e89905

Delbaere, K., Close, J., Brodaty, H., Sachdev, P., & Lord, S. (2010). Determinants of disparities between perceived and physiological risk of falling among elderly people: cohort study. *BMJ*, *341*(aug18 4), c4165-c4165. http://dx.doi.org/10.1136/bmj.

Delbaere, K., Crombez, G., van Haastregt, J., & Vlaeyen, J. (2009). Falls and catastrophic thoughts about falls predict mobility restriction in community-dwelling older people: A structural equation modelling approach. *Aging & Mental Health*, *13*(4), 587-592. http://dx.doi.org/10.1080/13607860902774444

Deshpande, N., Metter, E., Lauretani, F., Bandinelli, S., Guralnik, J., & Ferrucci, L. (2008). Activity restriction induced by fear of falling and objective and subjective measures of physical function: A prospective cohort study. *Journal of the American Geriatrics Society*, *56*(4), 615-620. http://dx.doi.org/10.1111/j.1532-5415.2007.01639.x

Donoghue, O., Ryan, H., Duggan, E., Finucane, C., Savva, G., & Cronin, H. et al. (2013). Relationship between fear of falling and mobility varies with visual function among older adults. *Geriatrics & Gerontology International, 14*(4), 827-836. http://dx.doi.org/10.1111/ggi.12174

Fletcher, P., Guthrie, D., Berg, K., & Hirdes, J. (2010). Risk factors for restriction in activity associated with fear of falling among seniors within the community. *Journal Of Patient Safety*, *6*(3), 187-191. http://dx.doi.org/10.1097/pts.0b013e3181f1251c

Friedman, S. M., Munoz, B., West, S. K., Rubin, G. S., & Fried, L. P. (2002). Falls and fear of falling: Which comes first? A longitudinal prediction model suggests strategies for primary and secondary prevention. *Journal of the American Geriatrics Society, 50*, 1329–1335.

Gassmann, K., Rupprecht, R., & Freiberger, E. (2009). Predictors for occasional and recurrent falls in community-dwelling older people. *Zeitschrift Für Gerontologie Und Geriatrie*, *42*(1), 3-10. http://dx.doi.org/10.1007/s00391-008-0506-2

Gillespie, L., Robertson, M., Gillespie, W., Sherrington, C., Gates, S., Clemson, L., & Lamb, S. (2012). Interventions for preventing falls in older people living in the community. *Cochrane Database of Systematic Reviews*. http://dx.doi.org/10.1002/14651858.cd007146.pub3

Greenberg, S., Sullivan-Marx, E., Sommers, M., Chittams, J., & Cacchione, P. (2016). Measuring fear of falling among high-risk, urban, community-dwelling older adults. *Geriatric Nursing*, *37*(6), 489-495. http://dx.doi.org/10.1016/j.gerinurse.2016.08.018

Gregg, E., Pereira, M., & Caspersen, C. (2000). Physical activity, falls, and fractures among older adults: A review of the epidemiologic evidence. *Journal of The American Geriatrics Society*, *48*(8), 883-893. http://dx.doi.org/10.1111/j.1532-5415.2000.tb06884.x

Guillemin, F., Martinez, L., Calvert, M., Cooper, C., Ganiats, T., & Gitlin, M. et al. (2013). Fear of falling, fracture history, and comorbidities are associated with health-related quality of life among European and US women with osteoporosis in a large international study. *Osteoporosis International*, *24*(12), 3001-3010. http://dx.doi.org/10.1007/s00198-013-2408-4

Guthrie, D., Fletcher, P., Berg, K., Williams, E., Boumans, N., & Hirdes, J. (2012). The role of medications in predicting activity restriction due to a fear of falling. *Journal of Aging and Health*, *24*(2), 269-286. http://dx.doi.org/10.1177/0898264311422598

Hallford, D., Nicholson, G., Sanders, K., & McCabe, M. (2016). The association between anxiety and falls: A meta-analysis. *The Journals of Gerontology Series B: Psychological Sciences And Social Sciences, 72*(5), 729-741. http://dx.doi.org/10.1093/geronb/gbv160

Halvarsson, A., Franzén, E., & Ståhle, A. (2014). Balance training with multi-task exercises improves fall-related self-efficacy, gait, balance performance and physical function in older adults with osteoporosis: a randomized controlled trial. *Clinical Rehabilitation*, *29*(4), 365-375. http://dx.doi.org/10.1177/0269215514544983

Heesch, K., Byles, J., & Brown, W. (2008). Prospective association between physical activity and falls in community-dwelling older women. *Journal Of Epidemiology & Community Health*, *62*(5), 421-426. http://dx.doi.org/10.1136/jech.2007.064147

Hellström, K., Vahlberg, B., Urell, C., & Emtner, M. (2009). Fear of falling, fall-related self-efficacy, anxiety and depression in individuals with chronic obstructive pulmonary disease. *Clinical Rehabilitation, 23*(12), 1136-1144. http://dx.doi.org/10.1177/0269215509342329

Hughes, K., van Beurden, E., Eakin, E., Barnett, L., Patterson, E., & Backhouse, J. et al. (2008). Older persons' perception of risk of falling: Implications for fall-prevention

campaigns. *American Journal of Public Health, 98*(2), 351-357. http://dx.doi.org/10.2105/ajph.2007.115055

Iaboni, A., & Flint, A. (2013). The complex interplay of depression and falls in older adults: A clinical review. *The American Journal of Geriatric Psychiatry, 21*(5), 484-492. http://dx.doi.org/10.1016/j.jagp.2013.01.008

Ivers, R., Cumming, R., Mitchell, P., Simpson, J., & Peduto, A. (2003). Visual risk factors for hip fracture in older people. *Journal of the American Geriatrics Society, 51*(3), 356-363.

Jansen, S., Kenny, R., de Rooij, S., & van der Velde, N. (2014). Self-reported cardiovascular conditions are associated with falls and syncope in community-dwelling older adults. *Age And Ageing, 44*(3), 525-529. http://dx.doi.org/10.1093/ageing/afu164

Janz, N., & Becker, M. (1984). The Health Belief Model: A decade later. *Health Education & Behavior*, *11*(1), 1-47. http://dx.doi.org/10.1177/109019818401100101

Jiam, N., Li, C., & Agrawal, Y. (2016). Hearing loss and falls: A systematic review and meta-analysis. *The Laryngoscope, 126*(11), 2587-2596. http://dx.doi.org/10.1002/lary.25927

Jonasson, S., Ullén, S., Iwarsson, S., Lexell, J., & Nilsson, M. (2015). Concerns about falling in Parkinson's disease: Associations with disabilities and personal and environmental factors. *Journal of Parkinson's Disease, 5*(2), 341-349. http://dx.doi.org/10.3233/jpd-140524

Jung, D. (2008). Fear of falling in older adults: Comprehensive review. *Asian Nursing Research*, *2*(4), 214-222. http://dx.doi.org/10.1016/s1976-1317(09)60003-7

Kamil, R., Betz, J., Powers, B., Pratt, S., Kritchevsky, S., & Ayonayon, H. et al. (2015). Association of hearing impairment with incident frailty and falls in older adults. *Journal of Aging and Health, 28*(4), 644-660. http://dx.doi.org/10.1177/0898264315608730

Kelly, C., Fleischer, A., Yalla, S., Grewal, G., Albright, R., & Berns, D. et al. (2013). Fear of falling is prevalent in older adults with Diabetes Mellitus but is unrelated to level of neuropathy. *Journal of the American Podiatric Medical Association, 103*(6), 480- 488. http://dx.doi.org/10.7547/1030480

Kumar, A., Delbaere, K., Zijlstra, G., Carpenter, H., Iliffe, S., & Masud, T. et al. (2016). Exercise for reducing fear of falling in older people living in the community:

Cochrane systematic review and meta-analysis. *Age and Ageing*, *45*(3), 345-352. http://dx.doi.org/10.1093/ageing/afw036

Kvelde, T., Lord, S., Close, J., Reppermund, S., Kochan, N., & Sachdev, P. et al. (2015). Depressive symptoms increase fall risk in older people, independent of antidepressant use, and reduced executive and physical functioning. *Archives of Gerontology And Geriatrics, 60*(1), 190-195. http://dx.doi.org/10.1016/j.archger.2014.09.003

Landers, M., Lopker, M., Newman, M., Gourlie, R., Sorensen, S., & Vong, R. (2017). A cross-sectional analysis of the characteristics of individuals with Parkinson disease who avoid activities and participation due to fear of falling. *Journal of Neurologic Physical Therapy, 41*(1), 31-42. http://dx.doi.org/10.1097/npt.0000000000000162

Lawlor, D., Patel, R., & Ebrahim, S. (2003). Association between falls in elderly women and chronic diseases and drug use: cross sectional study. *BMJ*, *327*(7417), 712-717. http://dx.doi.org/10.1136/bmj.327.7417.712

Lee, J., Kwok, T., Leung, P., & Woo, J. (2006). Medical illnesses are more important than medications as risk factors of falls in older community dwellers? A cross-sectional study. *Age and Ageing*, *35*(3), 246-251. http://dx.doi.org/10.1093/ageing/afj056

Lee, P., Cigolle, C., & Blaum, C. (2009). The co-occurrence of chronic diseases and geriatric syndromes: The health and retirement study. *Journal of the American Geriatrics Society, 57*(3), 511-516. http://dx.doi.org/10.1111/j.1532-5415.2008.02150.x

Liu-Ambrose, T., Khan, K., Donaldson, M., Eng, J., Lord, S., & McKay, H. (2006). Falls-related self-efficacy is independently associated with balance and mobility in older women with low bone mass. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *61*(8), 832-838. http://dx.doi.org/10.1093/25erona/61.8.832

Lopez, D., McCaul, K., Hankey, G., Norman, P., Almeida, O., & Dobson, A. et al. (2011). Falls, injuries from falls, health related quality of life and mortality in older adults with vision and hearing impairment—Is there a gender difference?. *Maturitas, 69*(4), 359-364. http://dx.doi.org/10.1016/j.maturitas.2011.05.006

Maki, B. E., Holliday, P. J., & Topper, A. K. (1991). Fear of falling and postural performance in the elderly. *Journal of Gerontology: Biological Sciences and Medical Sciences, 46*, 123–131.

Matsuda, P., Shumway-Cook, A., Ciol, M., Bombardier, C., & Kartin, D. (2012). Understanding falls in multiple sclerosis: Association of mobility status, concerns about falling, and accumulated impairments. *Physical Therapy, 92*(3), 407-415. http://dx.doi.org/10.2522/ptj.20100380

Mendes de Leon, C., Seeman, T., Baker, D., Richardson, E., & Tinetti, M. (1996). Self-efficacy, physical decline, and change in functioning in community-living elders: A prospective study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *51B*(4), S183-S190. http://dx.doi.org/10.1093/geronb/51b.4.s183

Moreira, M., Bilton, T., Dias, R., Ferriolli, E., & Perracini, M. (2016). What are the main physical functioning factors associated with falls among older people with different perceived fall risk?. *Physiotherapy Research International*, *22*(3), e1664. http://dx.doi.org/10.1002/pri.1664

Murphy, J., & Issacs, B. (1982). The post-fall syndrome. A study of 36 patients. *Gerontology, 28*, 265–270.

Murphy, S. L., Dubin, J. A., & Gill, T. M. (2003). The development of fear of falling among community living older women: Predisposing factors and subsequent fall events. *The Journal of Gerontology; Biological Sciences and Medical Sciences, 58*, 943–947.

Murphy, S., Williams, C., & Gill, T. (2002). Characteristics associated with fear of falling and activity restriction in community-living older persons. *Journal of the American Geriatrics Society*, *50*(3), 516-520. http://dx.doi.org/10.1046/j.1532-5415.2002.50119.x

Nguyen, U., Felson, D., Niu, J., White, D., Segal, N., & Lewis, C. et al. (2014). The impact of knee instability with and without buckling on balance confidence, fear of falling and physical function: The multicenter osteoarthritis study. *Osteoarthritis and Cartilage*, *22*(4), 527-534. http://dx.doi.org/10.1016/j.joca.2014.01.008

Nutbeam, D., Harris, E., & Wise, M. (2014). *Theory in a nutshell: A practical guide to health promotion theories.* (3rd ed.). Sydney: McGraw-Hill.

Painter, J., Allison, L., Dhingra, P., Daughtery, J., Cogdill, K., & Trujillo, L. (2012). Fear of falling and its relationship with anxiety, depression, and activity engagement among community-dwelling older adults. *American Journal of Occupational Therapy, 66*(2), 169-176. http://dx.doi.org/10.5014/ajot.2012.002535

Painter, J., & Elliott, S. (2009). Influence of gender on falls. *Physical & Occupational Therapy in Geriatrics*, *27*(6), 387-404. http://dx.doi.org/10.3109/02703180903259576

Paliwal, Y., Slattum, P., & Ratliff, S. (2017). Chronic health conditions as a risk factor for falls among the community-dwelling US older adults: A zero-inflated regression modeling approach. *Biomed Research International, 2017*, 1-9. http://dx.doi.org/10.1155/2017/5146378

Patel, K., Phelan, E., Leveille, S., Wallace, R., Missikpode, C., & Lamb, S. et al. (2014). High prevalence of falls, fear of falls, and impaired balance among older adults with pain in the United States: Findings from the 2011 National Health and Aging Trends Study. *Journal of the American Geriatrics Society*, *62*(10), 1844-1852. http://dx.doi.org/10.1016/j.jpain.2014.01.037

Pohl, P., Ahlgren, C., Nordin, E., Lundquist, A., & Lundin-Olsson, L. (2014). Gender perspective on fear of falling using the classification of functioning as the model. *Disability and Rehabilitation, 37*(3), 214-222. http://dx.doi.org/10.3109/09638288.2014.914584

Pointer, S., Harrison, J., & Bradley, C. (2003). National injury prevention plan priorities for 2004 and beyond: Discussion paper. Canberra: AIHW Retrieved from http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129553347.

Resnick, B., Nahm, E., Zhu, S., Brown, C., An, M., Park, B., & Brown, J. (2014). The impact of osteoporosis, falls, fear of falling, and efficacy expectations on exercise among community-dwelling older adults. *Orthopaedic Nursing*, *33*(5), 277-286. http://dx.doi.org/10.1097/nor.0000000000000084

Roe, B., Howell, F., Riniotis, K., Beech, R., Crome, P., & Ong, B. (2008). Older people's experience of falls: Understanding, interpretation and autonomy. *Journal of Advanced Nursing*, *63*(6), 586-596. http://dx.doi.org/10.1111/j.1365-2648.2008.04735.x

Roig, M., Eng, J., MacIntyre, D., Road, J., & Reid, W. (2011). Deficits in muscle strength, mass, quality, and mobility in people with Chronic Obstructive Pulmonary Disease. *Journal of Cardiopulmonary Rehabilitation and Prevention, 31*(2), 120-124. http://dx.doi.org/10.1097/hcr.0b013e3181f68ae4

Rosenstock, I., Strecher, V., & Becker, M. (1988). Social Learning Theory and the Health Belief Model. *Health Education & Behavior*, *15*(2), 175-183. http://dx.doi.org/10.1177/109019818801500203

Scheffer, A., Schuurmans, M., van Dijk, N., van der Hooft, T., & de Rooij, S. (2008). Fear of falling: Measurement strategy, prevalence, risk factors and consequences among

older persons. *Age and Ageing*, *37*(1), 19-24. http://dx.doi.org/10.1093/ageing/afm169

Schinkel-Ivy, A., Inness, E., & Mansfield, A. (2016). Relationships between fear of falling, balance confidence, and control of balance, gait, and reactive stepping in individuals with sub-acute stroke. *Gait & Posture*, *43*, 154-159. http://dx.doi.org/10.1016/j.gaitpost.2015.09.015

Schmid, A., & Rittman, M. (2007). Fear of falling: An emerging issue after stroke. *Topics in Stroke Rehabilitation, 14*(5), 46-55. http://dx.doi.org/10.1310/tsr1405-46

Schmid, A., & Rittman, M. (2009). Consequences of poststroke falls: Activity limitation, increased dependence, and the development of fear of falling. *American Journal of Occupational Therapy, 63*(3), 310-316. http://dx.doi.org/10.5014/ajot.63.3.310

Schwartz, S., Segal, O., Barkana, Y., Schwesig, R., Avni, I., & Morad, Y. (2005). The effect of cataract surgery on postural control. *Investigative Opthalmology & Visual Science, 46*(3), 920. http://dx.doi.org/10.1167/iovs.04-0543

Seeman, T., Unger, J., McAvay, G., & Mendes de Leon, C. (1999). Self-efficacy beliefs and perceived declines in functional ability: MacArthur studies of successful aging. *The Journals Of Gerontology Series B: Psychological Sciences And Social Sciences*, *54B*(4), 214-222. http://dx.doi.org/10.1093/geronb/54b.4.p214

Sibley, K., Voth, J., Munce, S., Straus, S., & Jaglal, S. (2014). Chronic disease and falls in community-dwelling Canadians over 65 years old: A population-based study exploring associations with number and pattern of chronic conditions. *BMC Geriatrics*, *14*(1). http://dx.doi.org/10.1186/1471-2318-14-22

Somadder, M., Mondal, S., Kersh, R., & Abdelhafiz, A. (2007). Are recurrent fallers depressed?. *Journal of the American Geriatrics Society, 55*(12), 2097-2099. http://dx.doi.org/10.1111/j.1532-5415.2007.01449.x

Stanmore, E., Oldham, J., Skelton, D., O'Neill, T., Pilling, M., Campbell, A., & Todd, C. (2013). Risk factors for falls in adults with Rheumatoid Arthritis: A prospective study. *Arthritis Care & Research, 65*(8), 1251-1258. http://dx.doi.org/10.1002/acr.21987

Stevens, J., & Sogolow, E. (2005). Gender differences for non-fatal unintentional fall related injuries among older adults. *Injury Prevention*, *11*(2), 115-119. http://dx.doi.org/10.1136/ip.2004.005835

Taylor, S. (2014). *Community-dwelling older adults' adherence to fall prevention recommendations* (Ph.D). Virginia Commonwealth University. Retrieved from http://scholarscompass.vcu.edu/cgi/viewcontent.cgi?article=4342&context=etd

Tideiksaar, R. (2010). *Falls in older people* (4th ed.). Baltimore: Health Professions Press.

Tinetti, M. E. & Powell, L. (1993). Fear of falling and low self-efficacy: A case of dependence in elderly persons. *Journal of Gerontology, 48*, 35–38.

Tinetti, M. E., Speechley, M., & Ginter, S. F. (1988). Risk factors for falls among elderly persons living in the community. *New England Journal of Medicine, 319*, 1701–1707.

Tinetti, M., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journal Of Gerontology*, *45*(6), 239-243. http://dx.doi.org/10.1093/geronj/45.6.p239

Tinetti, M., De Leon, C., Doucette, J., & Baker, D. (1994). Fear of falling and fall-related efficacy in relationship to functioning among community-living elders. *Journal Of Gerontology*, *49*(3), M140-M147. http://dx.doi.org/10.1093/geronj/49.3.m140

van Vliet, R., Hoang, P., Lord, S., Gandevia, S., & Delbaere, K. (2015). Multiple sclerosis severity and concern about falling: Physical, cognitive and psychological mediating factors. *Neurorehabilitation, 37*(1), 139-147. http://dx.doi.org/10.3233/nre-151246

Vieira, E., Mendy, A., Prado, C., Gasana, J., & Albatineh, A. (2015). Falls, physical limitations, confusion and memory problems in people with type II diabetes, undiagnosed diabetes and prediabetes, and the influence of vitamins A, D and E. *Journal of Diabetes and its Complications, 29*(8), 1159-1164. http://dx.doi.org/10.1016/j.jdiacomp.2015.08.005

Vinik, A., Vinik, E., Colberg, S., & Morrison, S. (2015). Falls risk in older adults with type 2 diabetes. *Clinics in Geriatric Medicine, 31*(1), 89-99. http://dx.doi.org/10.1016/j.cger.2014.09.002

Wang, M., Rousseau, J., Boisjoly, H., Schmaltz, H., Kergoat, M., & Moghadaszadeh, S. et al. (2012). Activity limitation due to a fear of falling in older adults with eye disease. *Investigative Opthalmology & Visual Science, 53*(13), 7967. http://dx.doi.org/10.1167/iovs.12-10701

Watanabe, Y. (2005). Fear of falling among stroke survivors after discharge from inpatient rehabilitation. *International Journal of Rehabilitation Research*, *28*(2), 149-152. http://dx.doi.org/10.1097/00004356-200506000-00008

Watson, W., Clapperton, A., & Mitchell, R. T. (2010). *The incidence and cost of falls injury among older people in New South Wales 2006/07*. Sydney, Australia: NSW Department of Health. Available from www.health.nsw.gov.au

White, U., Black, A., Wood, J., & Delbaere, K. (2015). Fear of falling in vision impairment. *Optometry and Vision Science*, 1. http://dx.doi.org/10.1097/opx.0000000000000596

Woolcott, J., Richardson, K., Wiens, M., Patel, B., Marin, J., Khan, K., & Marra, C. (2009). Meta-analysis of the impact of 9 medication classes on falls in elderly persons. *Archives of Internal Medicine, 169*(21), 1952. http://dx.doi.org/10.1001/archinternmed.2009.357

World Health Organisation [WHO]. (2008). WHO Global Report on Falls Prevention in Older Age. Geneva, Switzerland: World Health Organisation Retrieved from http://www.who.int/ageing/publications/Falls_prevention7March.pdf

Zijlstra, G., Van Haastregt, J., Van Rossum, E., Van Eijk, J., Yardley, L., & Kempen, G. (2007). Interventions to reduce fear of falling in community-living older people: A systematic review. *Journal of The American Geriatrics Society*, *55*(4), 603-615. http://dx.doi.org/10.1111/j.1532-5415.2007.01148.x

Section 2: Journal Manuscript

TITLE: Factors Associated with Falls Self-Efficacy in Community-Dwelling Older Adults

TARGET JOURNAL: Australasian Journal on Ageing

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Impact Statement

Falls self-efficacy can be used to understand the concern older people have for falling while doing different activities. Understanding how various factors are associated with falls self-efficacy will lead to more specific interventions aimed at decreasing fear of falling and accidental falls among the elderly.

Abstract

OBJECTIVES: This study aims to investigate associations between falls self-efficacy and other health related factors in community-dwelling older adults.

METHODS: In a quantitative, cross-sectional study of 560 older adults in the Sydney North Primary Health Network (SNPHN) data was collected through completing an interview style questionnaire and analysed through descriptive and inferential statistics.

RESULTS: Significant factors associated with falls self-efficacy were being injured in a past fall, having a walking aid, physical activity, social participation, being hospitalized in the past month, number of comorbidities, and number of medications. Having or using a walking aid, having a higher number of comorbidities, having panic or anxiety disorders, and being concerned about falling were predictors of FES-I score.

CONCLUSION: Having a healthy level of respect for the risk of falls as people age is essential to healthy ageing and understanding falls self-efficacy can be used to implement more effective falls prevention strategies.

KEYWORDS: ‘accidental falls’, ‘comorbidity’, ‘exercise’, ‘social participation’, ‘occupational therapy’

Background

The proportion of people aged over 65 in Australia is predicted to increase from 14% in 2010 to 23% by 2050.[1] In 2006/2007, 27% of the older adult population in Australia experienced at least one fall, with 28% of those falls resulting in injury, and costing the Australian government $558.5 million.[2] With the ageing population growing in Australia, an increase in both the number and cost of falls is anticipated. Thus, there is a need to fully understand the mechanisms of falls and falls prevention in older Australians.

Despite much research identifying effective falls prevention interventions [3], the rate of falls has not significantly reduced and continues to increase.[4] Multiple-component home-based exercise programs and multiple-component group exercise programs were found to significantly decreased both risk of falls and rate of falls.[3] However, no evidence that education on falls prevention or cognitive behavioural interventions had any impact on decreasing falls was found in a systematic review.[3] In contrast, one study found that personal reflection is key in falls prevention, indicating that understanding falls self-efficacy is essential to effective falls prevention strategies.[5]

Self-efficacy describes how individuals perceive their abilities and capacity to complete a specific task or activity [6] and this is an essential component of the Health Belief Model [7], which was used as the theoretical framework to inform this research. Falls self-efficacy was a concept developed to describe the impact of fear and concern about falling on the confidence of older adults and was first defined as, “the degree of confidence a person has in performing common daily activities without falling”.[8 p141] Falls self-efficacy can be used to understand the concern older people have for falling while doing different activities. While not exactly the same, a low falls self-efficacy can be compared to having a high level of fear about falling. Early studies of falls self-efficacy have used measures of falls self-efficacy and found that when older adults have higher falls self-efficacy scores, they are less likely to have functional decline.[9] Falls self-efficacy is more optimistic than fear of falling, and more strength focused, which is beneficial when thinking about including personal reflection in falls prevention. [5]

If falls self-efficacy aims to measure the impact of fear and concern about falling more objectively, it is essential to understand what is associated with falls self-efficacy. Current literature shows that women are more likely to have a fear of falling than men.[10] The association between increased age and increased fear of falling has been inconsistent.[11] Individuals who have a history of falls have higher rates of fear of falling, but a significant

amount of individuals who have not experienced a fall also fear falling.[10] Older adults who have more comorbidities are more likely to have a fear of falls, as are older adults who take more than three medications.[12] An unhealthy fear of falling is associated with being more sedentary and engaging in less physical activity This may put older people at higher risk of falling and injury.[13] Individuals who are afraid of falling are more likely to decrease activity outside their homes, which also leads to less social participation.[10] While there is significant evidence about most of these factors and their association with fear of falling, how they are associated with falls self-efficacy is much less researched.

Aims and Objectives

This study aims to investigate associations between falls self-efficacy and other health related factors in community-dwelling older adults. These factors include, age, falls history, concern about falling, fear of falling, physical activity, social participation, health service use, comorbidities, and medication use. The objectives of this study are:

- To analyse data from the Integrated Solutions for Sustainable Fall Prevention (iSOLVE) project about 560 older adults in the Sydney North Primary Health Network (SNPHN)
- To determine the relationships between each of the factors and falls self-efficacy as hypothesised (see Table 1)
- To examine the relationship between falls self-efficacy and the 17 comorbidities included in the Functional Comorbidity Index
- To examine the association between various factors and individual questions on the Falls Efficacy Scale-International (FES-I)

Methods

This cross-sectional study used secondary data from the iSOLVE project. The iSOLVE trial is a cluster randomised trial and was registered with the Australian New Zealand Clinical Trial Registry (ACTRN12615000401550) and approved by the Human Ethics Committee of The University of Sydney (2014/848).[14]

Participants

General practitioners (GPs) in the Sydney North Primary Health Network (SNPHN) from practices that were recruited for the iSOLVE project were asked to send letters to patients from their database who were over 65 years old and met the inclusion criteria for the study.[14] Of the total population of the SNPHN, 15.5% are over the age of 65, while in New South Wales (NSW) older adults make up 15.7% of the population.[15] Patients were invited

to contact the research assistant if they had fallen in the past 12 months or were worried about falling and were interested in participating in the study.[14] Potential participants were screened by a research assistant based on the following eligibility criteria:

- Reported a fall in the last 12 months or reported concern about falling
- Living in the community
- Living in the SNPHN area
- Able to understand study information
- No unstable medical conditions or severe physical disability
- Not diagnosed with moderate to severe dementia, which was confirmed during screening with the Short Portable Mental Questionnaire

Researchers of the iSOLVE project determined that 560 was an adequate sample size based on 80% power and a two-sided significance level of 5% and accounting for a potential 15% loss of participants over the course of the study.[14]

Data Collection

After screening participants over the phone, the research assistant set up a time to meet participants in their homes or another location that was convenient to them and complete the questionnaire. Participants were advised to have a list of all their medications available for the research assistant on the day of the meeting. Each interview session took about an hour to complete and all 560 sessions were completed within a 16-month time period. The questionnaires were completed with the research assistant asking questions and recording the answers the participants gave.

Instrumentation. A questionnaire was created by the iSOLVE team. The questionnaire included: (a) screening questions to ensure potential participants met the inclusion criteria of the study, including the Short Portable Mental Questionnaire [16]; (b) background questions about falls within the past 12 months; (c) the Short Falls-Efficacy Scale- International (FES-I) [17]; (d) questions about participants physical activity, social participation, medications, and health service use (all non-standardised); and (e) the Functional Comorbidity Index [18] adapted to exclude obesity.

Screening questions. Age, gender, and date of birth were included in the screening questions to obtain baseline information and then determine any association with falls self-efficacy. Each participant was asked how many falls they have had in the last 12 months, as well as if they were concerned of falling or afraid of falling. These questions were asked to determine eligibility and provide a baseline measure to be compared with falls self-efficacy.

The Short Portable Mental Questionnaire has been proven to have acceptable test performance at detecting dementia in older adults [16] and was included to determine eligibility. Participants were also asked if they live at home to determine eligibility. Participation in other studies was considered to assess potential burden on potential participants. Finally, participants were asked to give consent to participate in the study.

Falls history. Participants who reported a fall within the last 12 months were asked to provide details about the cause of the fall, the location of the fall and any injuries suffered during the fall. Participants who reported more than one fall were asked for these details about each fall they reported. Participants were also asked if they have or use a walking aid and what type they use if they responded "yes".

FES-I. The Falls Efficacy Scale (FES) was designed to measure falls self-efficacy in relation to functional activities in older people. The FES-I, developed from the FES, includes more complex activities and addresses the social contexts in which older adults are participating. It also has excellent reliability and validity and may be more effective at assessing fear of falling than the original FES. A shortened version of the FES-I for practical and clinical purposes was developed and determined to be a good alternative when assessing fear of falls in community-dwelling older adults.[17] The FES-I results in a score between seven and 28, and scores indicate low concern, moderate concern or high concern.

Physical activity, social participation, medications, and health service use. The questionnaire included questions about physical activity including whether or not participants engage in regular physical activity and, if so, what types of activities they engage in, how many hours a week do they engage in these activities, and what level of intensity are the activities. Social participation was measured by asking participants how many times they have left their house in the past seven days. Participants provided the research assistant with a list of medications. Participants were asked if they had been admitted to hospital in the past month or the past year to measure health service use. Data for each of these variables was collected in order to determine any associations with falls self-efficacy.

Functional Comorbidity Index. The Functional Comorbidity Index, a valid measure of physical health [19], provides researchers in health services a way to account for comorbid diseases and determine the way these diseases impact physical function and health-related quality of life.[18] Obesity is the only item on the Functional Comorbidity Index that was not included as measuring BMI was outside the scope of the project.

Data Entry and Analysis

Data was entered into RedCap by the primary researcher of this study and the research assistant who collected the data for the iSOLVE project. Once data cleaning was completed, statistical analysis was completed by the first author using IBM SPSS Statistics, Version 23. Descriptive statistics were gathered for each item of the questionnaire to gain insight into the participants of the study. Descriptive statistics about each item of the FES-I scale were also analysed. Comparison analysis was done to test each hypothesis, as shown in Table 1. Chi-square test of independence were done to examine the relationship between FES-I category and gender, concerned about falling, afraid of falling, walking aid, engaging in regular physical activity, and being admitted to the hospital in the past year. Independent sample t-tests and chi-square tests were also done with each of the comorbidities in the Functional Comorbidity Index to examine the relationships between each comorbidity and FES-I score. A one-way ANOVA, with a Tukey HSD (honest significant difference) test for statistically significant results, was completed to compare the effects of the FES-I categories (low concern, moderate concern, and high concern) with each of the continuous variables, including: (a) age; (b) number of falls in the past 12 months; (c) hours of physical activity per week; (d) social participation; (e) number of comorbidities; and (f) total number of medications. Finally, multiple linear regression was conducted between FES-I score and each of the variables that were included in the questionnaire to test if any of the variables can predict FES-I score.

Insert Table 2 Here

Independent Sample t-Test	Pearson's correlation
Women have higher FES-I scores than men	Older participants have higher FES-I scores
Participants who exercise regularly will have lower FES-I scores	Participants who spend more time engaging in physical activity will have lower FES-I scores
Participants who are afraid of falling will have higher FES-I scores	Participants with more comorbidities will have higher FES-I scores
Participants who reported being concerned about falling will have higher FES-I scores	Participants who take more medications will have higher FES-I scores
Participants who have been admitted to the hospital in the last month or year will have higher FES-I scores	Participants who leave their house more often during a week will have lower FES-I scores
Participants who have fallen at least one time in the past year will have a higher FES-I score	The more often a participant has fallen over the past year, the higher their FES-I score will be
Participants with specific comorbidities[1] will have higher FES-I scores as well as have had more falls in the past 12 months	Participants who have experienced more falls in the past 12 months will report more comorbidities
Participants who have fallen in their own home will have lower FES-I scores than those who have fallen outside their own home	
Participants who have injured themselves in a fall in the past 12 months will have a higher FES-I score	

Table 2: Hypotheses Tests
[1]Includes comorbidities included in Functional Comorbidity Index

Results

A total of 560 community-dwelling older adults participated in the iSOLVE study and were included in this study. Some data was missing due to the voluntary nature of the study, but most participants answered all of the questions included in the questionnaire. The mean age of participants was 78.51 (95% CI: 71.45-85.57), ranging from age 65 to 95. Of the 560 participants, 306 (54.6%) had experienced a fall in the past 12 months. The mean number of falls reported was 1.00, with one participant experiencing 20 falls in the past 12 months.

Associations with FES Categories

Demographic information about the participants has been analysed by FES-I category and is presented in Table 2. FES Category was significantly associated with reported concerns about falling, use of a walking aid and physical activity, but not gender or hospital admissions in the past year.

Insert Table 3 Here

Associations with Falls Self-Efficacy Total Score

Each variable was analysed against individual falls self-efficacy scores (Table 3). FES-I score was significantly associated with concern about falling and fear of falling, use of walking aid, location of a fall, injury following a fall, hospital admission in the past month and regular physical activity, but not gender, reporting a fall in the previous year, and being hospitalised in the past year. Significant, but weak correlations were found between FES score and hours of physical activity, number of co-morbidities, number of medications and social participation.

Insert Table 4 Here

Specific Sections of the FES-I Scale

Of the seven questions on the Shortened FES-I scale, the activity that most participants were not at all concerned about was getting in and out of a chair, while going up or down the stairs was the item that most participants reported being very concerned about.

Insert Table 5 Here

Item number four on the FES-I scale asks participants how concerned they are about falling when going up or down stairs. No relationship was found between those participants who had experienced a fall on the stairs and their concern about falling on the stairs ($r(304)= -0.019$, $p=0.741$). When item seven on the FES-I questionnaire, which asks participants to rate how concerned they are about falling when going to a social event, is compared with social participation, a weak but negative relationship was found ($r(558)= -0.137$, $p=0.001$), meaning

that a high FES score on item number seven was associated with low social participation and vice versa.

Comorbidities

There is a significant, moderate positive relationship between FES-I score and number of comorbidities r(558) = 0.289, $p<0.001$. This means that individuals who have more comorbidities are more concerned about falling, as measured by the FES-I. Analysis of individual comorbidities with FES score indicated that 10 out of the 17 comorbidities included in the Functional Comorbidity Index had a significant relationship with FES-I score. When the significance threshold was set at $p=0.05$, a significant difference in the means was found between FES-score and the following comorbidities using an independent sample t-test: (a) depression (n=107, 19.1%, $p<0.001$), (b) degenerative disc disease (n=114, 20.4%, $p=0.001$), (c) anxiety or panic disorders (n=99, 17.7%, $p=0.001$), (d) arthritis (n= 361, 64.5%, $p=0.003$), (e) Chronic Obstructive Pulmonary Disease (COPD), Acquired Respiratory Distress Syndrome (ARDS), or Emphysema (n=30, 5.4%, p=0.011), (f) Stroke or TIA (n=53, 9.5%, $p=0.018$), (g) osteoporosis (n=148, 26.4%, $p=0.019$), (h) heart attack (n=39, 7.0%, $p=0.022$), (i) hearing impairment (n=137, 24.5%, $p=0.025$), and (j) upper gastrointestinal disease (n=229, 40.9%, $p=0.035$). There is also evidence that the number of falls and the number of comorbidities are significantly related (r(558) = 0.130, $p=0.002$), although the positive correlation is weak.

One-way ANOVA Analysis

One-way ANOVA analysis found differences between the categories of the FES-I when looking at hours of exercise per week, how many times participants had left their house in the past seven days, the total number of comorbidities, and the total number of medications. The means of each of these variables by FES-I score category are indicated in Figure 1. There was a significant effect of the FES-I category on hours of physical activity per week for the three categories [F(2, 474) = 3.011, $p=0.050$]. The Tukey HSD test indicated that the mean hours for low concern (M=9.00, SD=6.82) was significantly different ($p=0.041$) than the mean hours for high concern (M=6.67, SD=7.39). No statistical significance was found for a difference in the hours of physical activity per week between high concern and moderate concern ($p=0.209$) or low concern and moderate concern ($p=0.414$).

There was a significant effect of the FES-I category on the number of times participants had left their home in the past week for the three categories [F(2, 557) = 5.178, $p=0.006$]. The Tukey HSD test indicated that the mean times for low concern (M=11.36,

SD=6.83) was significantly different than the mean times for moderate concern (M=9.52, SD=6.02, p=0.025) and high concern (M=8.80, SD=6.03, p=0.005). No statistical significance was found for a difference in the number of times participants had left their home in the past week between high concern and moderate concern (p=0.493).

There was a significant effect of the FES-I category on number of comorbidities for the three categories [F(2, 557) = 13.5, p<0.001]. The Tukey HSD test indicated that the mean number for low concern (M=3.05, SD=1.68) was significantly different than the mean number for moderate concern (M=3.65, SD=1.93, p=0.022) and for high concern (M=4.37, SD=2.18, p<0.001). The mean number of comorbidities was also significantly different between participants with moderate concern and high concern (p=0.001).

Finally, there was almost a significant effect of the FES-I category on the total number of medications that participants were taking for the three categories [F(2, 556) =2.998, p=0.051]. The Tukey HSD test indicated that the mean number for low concern (M=6.45, SD=4.25) was significantly different than the mean number for high concern (M=7.80, SD=4.61, p=0.039).

Insert Figure 2 Here

Multiple Linear Regression

All the significant variables identified were analysed together to determine their associations with FES score using multiple linear regression analysis controlling for age. Four variables had a significant association with FES score and predicted FES-I score by 20.5% [R^2=0.205, F5, 554=28.635, p<0.001]. These variables include being concerned about falling (β=0.251, p<0.001), having anxiety or panic disorders (β=0.102, p=0.014), having a higher number of comorbidities (β=0.202, p<0.001), and having or using a walking aid (β=0.243, p<0.001).

	Low Concern[3] (n=99, 17.7%)	Moderate Concern[3] (n=325, 58.0%)	High Concern[3] (n=136, 24.3%)	Total (n=560)	Chi-Square
Male	40 (22.2%)	95 (52.8%)	45 (25%)	180	$X^2 = 4.417$ (p=0.110)
Female	59 (15.5%)	230 (60.5%)	91 (23.9%)	380	
Not Concerned about Falling	32 (45.1%)	35 (49.3%)	4 (5.6%)	71	$X^2 = 47.227$ (p<0.001)
Concerned about Falling	67 (13.7%)	290 (59.3%)	132 (27.0%)	489	
Not Afraid	49 (41.9%)	57[1] (48.7%)	11[1] (9.4%)	117	$X^2 = 64.071$ (p<0.001)
Afraid	50 (11.4%)	266[1] (60.5%)	124[1] (28.2%)	440	
No walking aid	80 (22.3%)	212 (59.2%)	66 (18.4%)	358	$X^2 = 26.456$ (p<0.001)
Walking aid	19 (9.4%)	113 (55.9%)	70 (34.7%)	202	
No Regular Physical Activity	6 (7.5%)	45 (56.3%)	29 (36.3%)	80	$X^2 = 11.022$ (p=0.004)
Regular Physical Activity	93 (19.4%)	280 (58.3%)	107 (22.3%)	480	
No Hospital Admission (past year)	59 (17.5%)	200 (59.2%)	79 (23.4%)	338	$X^2 = 0.506$ (p=0.776)
Hospital Admission (past year)	40 (18.0%)	125 (56.3%)	57 (25.7%)	222	
Mean for Continuous Variables for each FES-I Category					
	Low Concern[3] (n=99, 17.7%)	**Moderate Concern[3] (n=325, 58.0%)**	**High Concern[3] (n=136, 24.3%)**	**Total Mean (Range)**	

Age (mean)	78.10 (95% CI = 76.70 – 79.50)	78.39 (95% CI = 77.62 – 79.16)	79.10 (95% CI = 77.90 – 80.29)	78.51 (65-95)	
Number of Falls (mean)	1.05 (95% CI = 0.62 – 1.48)	0.90 (95% CI = 0.77 – 1.02)	1.19 (95% CI = 0.91 – 1.46)	1.00 (0-20)	
Hours of Physical Activity per week (mean)	8.53 (95% CI = 7.16-9.90)	6.88 (95% CI = 6.16-7.59)	5.27 (95% CI = 4.07-6.47)	7.88 (0-48)	
Number of Comorbidities[4] (mean)	3.05 (95% CI = 2.72-3.39)	3.65 (95% CI = 3.44-3.86)	4.37 (95% CI = 4.00-4.74)	3.72 (0-11)	
Number of Medications[2] (mean)	6.45 (95% CI = 5.61-7.30)	7.20 (95% CI = 6.78-7.63)	7.80 (95% CI = 7.02-8.58)	7.20 (0-32)	
Number of times left house in Past Week (mean)	11.36 (95% CI = 10.00-12.73)	9.56 (95% CI = 8.89-10.23)	8.80 (95% CI = 7.78-9.82)	9.67 (0-35)	

Table 3: Demographics based on FES-I Score Category

[1]Missing data – n=2 – moderate concern and n=1 – high concern

[2]Missing data n=1 – high concern

[3]Falls Self-Efficacy Scale scored as follows; Low Concern = 7-8, Moderate Concern = 9-13, High Concern = 14-28

[4]Number of Comorbidities measured on the Functional Comorbidity Index

Independent Sample t-Test			
Variable		**Mean FES-I score (95% Confidence Interval)**	**Statistical Significance (*p*-value)**
Gender	Male	11.46 (7.90-15.02)	0.665
	Female	11.60 (8.16-15.04)	
Concerned about Falling	Yes	11.90 (8.40-15.40)	<0.001
	No	9.18 (7.11-11.25)	
Afraid of Falling	Yes	12.04 (8.54-15.54)	<0.001
	No	9.69 (6.97-12.41)	
Fall in past 12 months	Yes	11.53 (8.03-15.03)	0.879
	No	11.57 (8.12-15.02)	
Walking Aid	Yes	12.85 (9.00-16.70)	<0.001
	No	10.82 (7.81-13.83)	
Location of Fall	Own Home (n=155)	11.94 (8.40-15.48)	0.043
	Not Own Home (n=151)	11.13 (7.71-14.55)	
Injured in Fall	Yes (n=241)	11.26 (7.79-14.73)	0.007
	No (n=65)	12.57 (9.13-16.01)	
Hospitalised Past Month	Yes	12.91 (8.57-17.25)	0.019
	No	11.47 (8.07-14.87)	
Hospitalised Past year	Yes	11.63 (8.14-15.12)	0.689
	No	11.51 (8.04-14.98)	
Regular Physical Activity	Yes	11.35 (7.97-14.73)	0.001
	No	12.78 (8.97-16.59)	
	Yes	11.55 (8.07-15.03)	0.966

Taking three or more medications	No	11.57 (8.11-15.03)	
Pearson's Correlation			
Variable		**Pearson's Correlation**	**Statistical Significance (*p*-value)**
Age		0.071	0.095
Number of Falls		0.065	0.124
Hours of Physical Activity		-0.156	<0.001
Number of Comorbidities		0.289	<0.001
Number of Medications		0.129	0.002
Social Participation[1]		-0.136	0.001

Table 4: Statistical Analysis of Variables against FES-I score

[1]Measured by number of times participants left the house in the past seven days

	Not at all Concerned	Somewhat Concerned	Fairly Concerned	Very Concerned
1. Getting dressed or undressed (n=560)	369 (65.9%)	165 (29.5%)	22 (3.9%)	4 (0.7%)
2. Taking a bath or shower (n=560)	278 (49.6%)	222 (39.6%)	43 (7.7%)	17 (3.0%)
3. Getting in or out of a chair (n=560)	432 (77.1%)	111 (19.8%)	15 (2.7%)	2 (0.4%)
4. Going up or down stairs (n=559)	121 (21.6%)	290 (51.8%)	107 (19.1%)	41 (7.3%)
5. Reaching for something above your head or on the ground (n=560)	239 (42.7%)	236 (42.1%)	64 (11.4%)	21 (3.8%)
6. Walking up or down a slope (n=560)	189 (33.8%)	243 (43.4%)	91 (16.3%)	37 (6.6%)
7. Going out to a social event (n=560)	376 (67.1%)	144 (25.7%)	30 (5.4%)	10 (1.8%)

Table 5: Descriptive Statistics for each item of the FES-I Scale

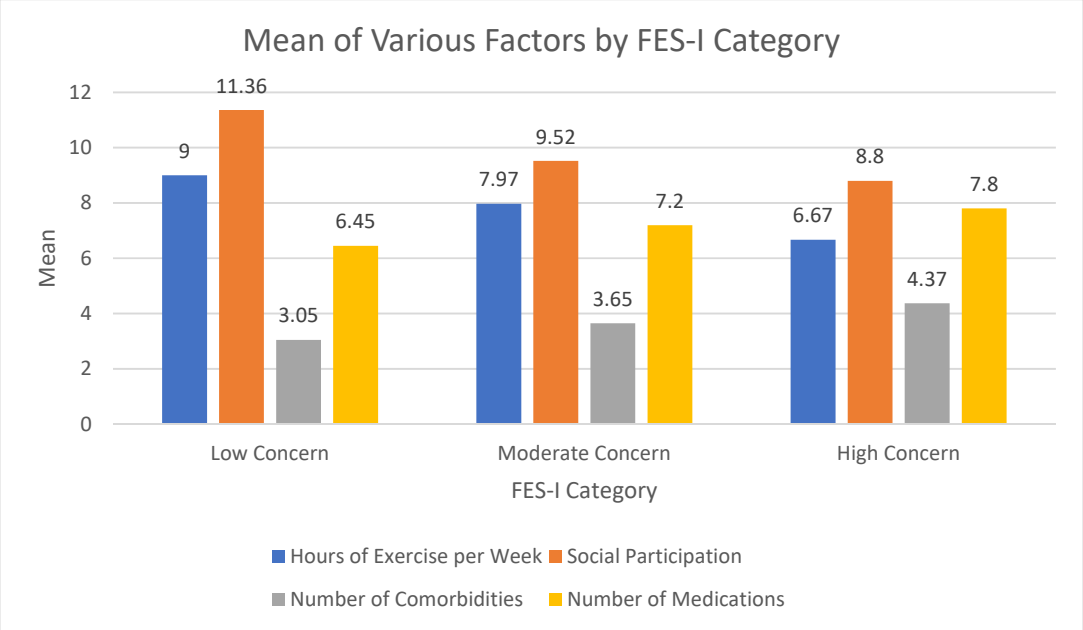


Figure 2: Means of Various Factors by FES-I Category

Discussion

This study aimed to investigate associations between falls self-efficacy and other health related factors in community-dwelling older adults. These investigations were done through various descriptive and inferential statistics, leading to several statistically significant results showing varying degrees of association between falls self-efficacy and being concerned or afraid of falling, circumstances of past falls, having or using a walking aid, physical activity, social participation, health service use, comorbidities, and medications.

Validity of FES-I Scores

There was consistent statistical significance between FES-I score and participants who reported being concerned about falling throughout the data analysis. Therefore, FES-I can be considered a valid measure of concern about falling. The FES-I scores were also found to be associated with fear of falling, which indicates that other research regarding various factors and fear of falling can cautiously be considered to be similar to having low falls self-efficacy. Falls self-efficacy is a better measure than asking older adults if they are afraid of or concerned about falling because self-efficacy predicts behavior and better determines function. [8]

When collecting the data, the research assistant found that the FES-I portion of the questionnaire was often confusing for participants to respond to. Older people needed an explanation about the concept of self-efficacy and confidence to rate their answers to the FES-I instrument, so there may be some inaccurate reporting in the data. By administering the FES-I scale in a face-to-face setting, aspects of the instrument could be clarified with respondents, rather than depending on their responses in a self-completed survey format. This should be considered in future research.

The FES-I scoring system can be misleading, as if participants rated “not at all concerned” on all seven questions, they would still have an overall score of seven, which is categorised as “low concern”. This needs to be considered because a “low concern” result could mean that the participant was not concerned about falling at all.

Factors Associated with Falls Self-Efficacy

It was expected that physical activity would be positively associated with increased falls self-efficacy. Meditative exercise programs, such as Tai Chi, have been shown to increase falls self-efficacy [20], but the relationship between hours of physical activity per week and falls self-efficacy has not previously been explored as in this study.

Social participation was found to have a slightly negative relationship with falls self-efficacy in this study. While the relationship has not been extensively studied previously, one study found that falls self-efficacy was strongly associated with social participation in older adults who were recovering from stroke.[21] While this is a very specific population, in common with this study, it provides insight into the impact that falls self-efficacy can have on social participation, which can lead to a decrease in activity avoidance due to fear of falls.

The number of medications and FES-I score were also associated in this study, and this finding is consistent with Guthrie et al. [12] finding that older adults who are taking three or more medications are more likely to restrict activities due to a fear of falling. Interestingly, the current study did not find that there was any association between FES-I score and taking three or more medications.

Comorbidities

The number of comorbidities had the strongest positive association falls self-efficacy score in these findings. This compares to other research that has found that older adults with more comorbidities have a higher perceived falls risk and more accidental falls than those who have fewer comorbidities.[22] The questionnaire was self-report, which could cause under-reporting about comorbidities.

One surprising outcome was that there was no association between visual impairment and falls self-efficacy. One reason for this may be related to the Functional Comorbidity Index item that asks participants if they have or have had a visual impairment. Of the 383 individuals who reported visual impairment, 268 of them reported that they had had their cataracts removed. Having cataracts removed can reduce falls.[23] Another possible explanation could be that participants who reported visual impairment wear their glasses all the time. In either case, the participants may actually have improved vision and may not have experienced the same level of fear or concern about falling as other participants who had not had their visual impairment corrected.

Neurological diseases were not found to have a significant relationship with falls self-efficacy in this study and few participants reported having a neurological disease. However, neurological diseases, specifically multiple sclerosis and Parkinson disease, have been found to be associated with increased fear of falling and an increase in activity restriction due to that fear. [24-25]

Obesity was not included in the comorbidity section of the questionnaire, despite being part of the Functional Comorbidity Index, because measurement of BMI was outside

the scope of the iSOLVE project. The relationship between obesity and falls is based on obesity being associated many other risk factors for falls, including sedentary activity and some comorbidities.[26] This study was unable to determine if there was a relationship between falls self-efficacy and obesity which might add to the research literature if this was investigated in future studies. Another issue that was not included in the comorbidities section of the questionnaire was incontinence. Urinary incontinence is a risk factor for falls.[27] The association between incontinence and falls self-efficacy should be explored in future research to better understand how managing incontinence better might increase falls self-efficacy.

Healthy Respect for Risk of Falls

Having a healthy level of respect for the personal risk of falls as individuals age is essential to healthy ageing. For instance, "inappropriate high fear of falling may result in worse performance during dynamic balance tests, whereas older people with inappropriate low fear seem to overrate their capacities because of higher strength".[28 p751] It is unreasonable to expect older adults to have no fear of falling at all, yet balance is needed to maintain activity participation alongside a healthy respect for potential risks of falling that may be interpreted as a reduction in falls self-efficacy. Understanding what specific situations cause older adults to be concerned about falling could provide further insights into what leads to activity restriction. As Chen found [5], personal reflection is key to falls prevention. Falls self-efficacy can provide the positive insight into what older adults are able to do confidently, which could lead to less falls and better falls prevention interventions.

Implications for Further Research

Understanding the risk factors for lower levels of falls self-efficacy could be beneficial for general practitioners (GPs). The risk factors that were discovered in this research study were having concern about falling, having an anxiety or panic disorder, having a higher number of comorbidities, and having or using a walking aid. If GPs are aware of these risk factors, they could be more proactive in falls prevention and improving falls self- efficacy for their older patients. More research needs to be done about the impact that GPs can have on falls prevention, but if GPs have more awareness and understanding about the risks associated with falls self-efficacy and their links to falls, they can act to prevent falls in their older clients.

Further research should be done on any possible association between the location of falls and falls self-efficacy. This study found that there was a difference in mean FES-I scores for those participants who fell in their own home compared to those who fell outside their

own home. There could be a link between activity restriction if individuals experience falls outside their own home, but this requires further investigation. Also, greater understanding around the impact that being injured in a fall has on falls self-efficacy is needed. This study found that there was a difference between mean FES-I scores for those participants who were injured in a fall, and those who were not injured. More research in this area could be beneficial to link GPs to the outcomes from emergency departments when they treat and assist older adults after an injurious fall.

Limitations

In conducting this research, there was no universal definition of a fall established, nor was there a definition of falls given to participants during data collection. This is a limitation of the study because having a clear definition of the targeted fall event is essential when doing research.[29] Having participants report falls retrospectively was also a limitation of the study, as prospective systems, such as a falls calendar or diary, are superior, however, any system is susceptible to over- or under-reporting.[29] Because of this limitation, most of the data was analysed against the fact that older adults either fell or did not fall, rather than the number of falls they reported during the past 12 months. By limiting the question to the past 12 months, not any longer, the data is also more likely to be accurate.[30]

Another limitation of the study is that the question about whether or not participants had walking aids was not differentiated between if they had one or used it regularly. Having a walking aid was still found to be a predictor of a higher FES-I score. This may be due to the reasons behind why participants have a walking aid of some sort, whether they currently use it or not.

Conclusion

In conclusion, falls self-efficacy is a valid and accurate measure of the concern that community-dwelling older adults have about falling. This study also found having anxiety, having or using a walking aid, and having a higher number of comorbidities were predictors of lower falls self-efficacy. This research was unique in that it looked specifically at many different factors and how they may be associated with falls self-efficacy, which is not a focus of other studies. Further research needs to be done to verify the results of this study, look at falls self-efficacy in a wider, more global population, and to explore the implications that understanding falls self-efficacy can have on falls prevention programs with community-dwelling older adults.

References

1. *Preventing falls and harm from falls in older people: Best practice guidelines for Australian community care* [Internet]. 2009 [cited 25 August 2017]. Available from URL: https://www.safetyandquality.gov.au/wpcontent/uploads/2012/01/Guidelines-COMM.pdf
2. Watson W, Clapperton A, Mitchell R. *The incidence and cost of falls injury among older people in New South Wales 2006/07*. Sydney, Australia: NSW Department of Health; 2010.
3. Gillespie L, Robertson M, Gillespie W, Sherrington C, Gates S, Clemson L et al. Interventions for preventing falls in older people living in the community. *Cochrane Database of Systematic Reviews* 2012.
4. Watson W, Mitchell R. Conflicting trends in fall-related injury hospitalisations among older people: variations by injury type. *Osteoporosis International* 2010; 22(10): 2623-2631.
5. Chen S, Huang S, Lu L, Wang M, Liao J, Guo J. Patterns of perspectives on fall-prevention beliefs by community-dwelling older adults: A Q method investigation. *BMC Geriatrics* 2016; 16(1).
6. Bandura A. Reflections on self-efficacy. *Advances in Behaviour Research and Therapy* 1978; 1(4): 237-269.
7. Rosenstock I. Historical origins of the Health Belief Model. *Health Education Monographs* 1974; 2(4): 328-335.
8. Tinetti M, De Leon C, Doucette J, Baker D. Fear of falling and fall-related efficacy in relationship to functioning among community-living elders. *Journal of Gerontology* 1994; 49(3): 140-147.
9. Mendes de Leon C, Seeman T, Baker D, Richardson E, Tinetti M. Self-efficacy, physical decline, and change in functioning in community-living elders: A prospective study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 1996; 51B(4): 183-190.
10. Fletcher P, Guthrie D, Berg K, Hirdes J. Risk factors for restriction in activity associated with fear of falling among seniors within the community. *Journal of Patient Safety* 2010; 6(3): 187-191.
11. Jung D. Fear of falling in older adults: Comprehensive review. *Asian Nursing Research* 2008; 2(4): 214-222.

12. Guthrie D, Fletcher P, Berg K, Williams E, Boumans N, Hirdes J. The role of medications in predicting activity restriction due to a fear of falling. *Journal of Aging and Health* 2011; 24(2): 269-286.
13. Gregg E, Pereira M, Caspersen C. Physical activity, falls, and fractures among older adults: A review of the epidemiologic evidence. *Journal of the American Geriatrics Society* 2000; 48(8): 883-893.
14. Clemson L, Mackenzie L, Roberts C, Poulos R, Tan A, Lovarini M et al. Integrated solutions for sustainable fall prevention in primary care, the iSOLVE project: a type 2 hybrid effectiveness-implementation design. *Implementation Science* 2017; 12(1).
15. Sydney North Primary Health Network: Health Profile [Internet]. Sydney, Australia; 2016 [cited 15 October 2017]. Available from URL: http://sydneynorthhealthnetwork.org.au/wp-content/uploads/2016/12/SNPHN-LGA-fact-sheet-SNPHN-NEW-151216-1.pdf
16. Lin J, O'Connor E, Rossom R, Perdue L, Eckstrom E. Screening for cognitive impairment in older adults: A systematic review for the U.S. preventive services task force. *Annals of Internal Medicine* 2013; 159(9): 601-612.
17. Kempen G, Yardley L, Van Haastregt J, Zijlstra G, Beyer N, Hauer K et al. The Short FES-I: a shortened version of the falls efficacy scale-international to assess fear of falling. *Age and Ageing* 2007; 37(1): 45-50.
18. Groll D, To T, Bombardier C, Wright J. The development of a comorbidity index with physical function as the outcome. *Journal of Clinical Epidemiology* 2005; 58(6): 595-602.
19. Fortin M, Hudon C, Dubois M, Almirall J, Lapointe L, Soubhi H. Comparative assessment of three different indices of multimorbidity for studies on health-related quality of life. *Health and Quality of Life Outcomes*. 2005; 3(74).
20. Li F, Fisher K, Harmer P, McAuley E. Falls self-efficacy as a mediator of fear of falling in an exercise intervention for older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 2005; 60(1): 34-40.
21. Robinson C, Shumway-Cook A, Ciol M, Kartin D. Participation in community walking following stroke: Subjective versus objective measures and the impact of personal factors. *Physical Therapy* 2011; 91(12): 1865-1876.

22. Moreira M, Bilton T, Dias R, Ferriolli E, Perracini M. What are the main physical functioning factors associated with falls among older people with different perceived fall risk? *Physiotherapy Research International* 2016; 22(3): 1664.
23. Foss A, Harwood R, Osborn F, Gregson R, Zaman A, Masud T. Falls and health status in elderly women following second eye cataract surgery: a randomised controlled trial. *Age and Ageing* 2006; 35(1): 66-71.
24. Landers M, Lopker M, Newman M, Gourlie R, Sorensen S, Vong R. A cross-sectional analysis of the characteristics of individuals with Parkinson disease who avoid activities and participation due to fear of falling. *Journal of Neurologic Physical Therapy* 2017; 41(1): 31-42.
25. Matsuda P, Shumway-Cook A, Ciol M, Bombardier C, Kartin D. Understanding falls in Multiple Sclerosis: Association of mobility status, concerns about falling, and accumulated impairments. *Physical Therapy* 2012; 92(3): 407-415.
26. Mitchell R, Lord S, Harvey L, Close J. Obesity and falls in older people: Mediating effects of disease, sedentary behavior, mood, pain and medication use. *Archives of Gerontology and Geriatrics* 2015; 60(1): 52-58.
27. Chiarelli P, Mackenzie L, Osmotherly P. Urinary incontinence is associated with an increase in falls: a systematic review. *Australian Journal of Physiotherapy* 2009; 55(2): 89-95.
28. Delbaere K, Crombez G, Van Den Noortgate N, Willems T, Cambier D. The risk of being fearful or fearless of falls in older people: An empirical validation. *Disability and Rehabilitation* 2006; 28(12): 751-756.
29. Hauer K, Lamb S, Jorstad E, Todd C, Becker C. Systematic review of definitions and methods of measuring falls in randomised controlled fall prevention trials. *Age and Ageing* 2006; 35(1): 5-10.
30. Lamb S, Jørstad-Stein E, Hauer K, Becker C. Development of a common outcome data set for fall injury prevention trials: The prevention of falls network Europe consensus. *Journal of the American Geriatrics Society* 2005; 53(9): 1618-1622.

Appendix A

Journal Submission Guidelines

Research Articles

Word limit: 3,000 words maximum (3,500 words for qualitative), excluding abstract and references.

Abstract: 150 words maximum; must be structured, under the sub-headings: Objective(s), Methods, Results, Conclusion.

References: Maximum of 30 references.

Figures/Tables: Total of no more than 5 figures and tables.

Description: Full-length reports of quality current research within any area of gerontology and geriatric medicine. All qualitative research articles must follow the COREQ guidelines and the COREQ checklist must be submitted.

Impact Statement: Please provide an Impact Statement that outlines the potential influence of the paper on policy, practice or future research. This Statement will appear in the article and the table of contents. The Statement will also appear on emailed table of contents alerts, which are sent to academics, practitioners and policy-makers**.** Authors will be asked to include a draft Impact Statement with their submission via the electronic system. The Statement should be approximately 50 words.

Accessed from: http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1741-6612/homepage/ForAuthors.html

THE UNIVERSITY OF SYDNEY

Research Integrity
Human Research Ethics Committee

Wednesday, 19 November 2014

Prof Lindy Clemson
Ageing Work and Health Unit; Faculty of Health Sciences
Email: lindy.clemson@sydney.edu.au

Dear Lindy

I am pleased to inform you that the University of Sydney Human Research Ethics Committee (HREC) has approved your project entitled "**A randomised controlled trial to evaluate the effectiveness of an integrated fall prevention process compared with usual care for older people presenting to primary care"**.

Details of the approval are as follows:

Project No.: **2014/848**

Approval Date: **19 November 2014**

First Annual Report Due: **19 November 2015**

Authorised Personnel: **Clemson Lindy; Roberts Christopher; Sherrington Catherine; Simpson Judith; Tan Amy Chen Wee; Tiedemann Anne; Mackenzie Lynette;**

Documents Approved:

Date Uploaded	Type	Document Name
6/10/2014	Advertisements/Flyer	Attachment 1 - Study flyer (GP)
11/11/2014	Participant Info Statement	Attachment 2 - information sheet (GP) revised
6/10/2014	Recruitment Letter/Email	Attachment 3 - Letter from GP to patient
6/10/2014	Advertisements/Flyer	Attachment 4 - Study flyer (patient)
11/11/2014	Participant Info Statement	Attachment 5 - patient info sheet revised
6/10/2014	Cover Letter/Correspondence	Attachment 6 - NSML letter
6/10/2014	Participant Consent Form	Attachment 7 - Consent form (GP)
11/11/2014	Participant Consent Form	Attachment 8 - consent form (patient) revised
6/10/2014	Safety Protocol	Attachment 9 - Study visiting protocol
6/10/2014	Other Instruments/Tools	Attachment 10 - iSOLVE GP algorithm
6/10/2014	Other Instruments/Tools	Attachment 11 - Patient 'stay independent' checklist
6/10/2014	Other Instruments/Tools	Attachment 12 - GP checklist and management plan
6/10/2014	Other Instruments/Tools	Attachment 13 - Referral contacts (to be mapped by NSML)
6/10/2014	Questionnaires/Surveys	Attachment 14 - GP demographic questionnaire
6/10/2014	Questionnaires/Surveys	Attachment 15 - Patient screening and demographic questions
6/10/2014	Other Instruments/Tools	Attachment 16 - Falls calendar (patient)

HREC approval is valid for four (4) years from the approval date stated in this letter and is granted pending the following conditions being met:

Special Condition/s of Approval

- You are reminded that all Clinical Trials must comply with requirement to register clinical trials on a publicly accessible clinical trials registry that complies with the International Committee of Medical Journal Editors (ICMJE). This trial will require registration on the Australian New Zealand Clinical Trial register before recruitment of the first subject (http://www.anzctr.org.au/). This requirement has been embedded in the University Research Code of Conduct Policy 2013.

Condition/s of Approval

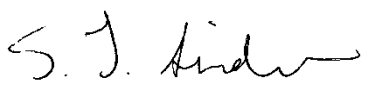
- Continuing compliance with the National Statement on Ethical Conduct in Research Involving Humans.
- Provision of an annual report on this research to the Human Research Ethics Committee from the approval date and at the completion of the study. Failure to submit reports will result in withdrawal of ethics approval for the project.
- All serious and unexpected adverse events should be reported to the HREC within 72 hours.
- All unforeseen events that might affect continued ethical acceptability of the project should be reported to the HREC as soon as possible.
- Any changes to the project including changes to research personnel must be approved by the HREC before the research project can proceed.
- Note that for student research projects, a copy of this letter must be included in the candidate's thesis.

Chief Investigator / Supervisor's responsibilities:

1. You must retain copies of all signed Consent Forms (if applicable) and provide these to the HREC on request.
2. It is your responsibility to provide a copy of this letter to any internal/external granting agencies if requested.

Please do not hesitate to contact Research Integrity (Human Ethics) should you require further information or clarification.

Yours sincerely



Dr Stephen Assinder
Chair
Human Research Ethics Committee

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

Screening

Part ID:
Date:

DOB:

Age:

Gender:

Address & postcode:

Postal address & postcode:

How many falls have you had in the last 12 months? No. _____

Are you concerned about falling? Yes ☐ No ☐

Are you afraid of falling? not at all ☐ somewhat afraid ☐ very afraid ☐

Short Portable Mental Questionnaire:

1) What is the date today?
2) What day of the week is it?
3) What is the name of this place?
4) What is your telephone number?
5) How old are you?
6) When were you born?
7) Who is the prime minister?
8) Who was the last prime minister?
9) What was your mother's maiden name?
10) Subtract 3 from 20 and keep subtracting each new number you get, all the way down.

Total Number of Errors _____/ 10

Living at home (not residential or hostel) Yes ☐ No ☐

Are you currently participating in any other research studies? Yes ☐ No ☐

If YES, what are they?_____

Time commitment/type of assessment?_____

When will this study be finished?_____

Willing and able to participate in the iSOLVE trial? Yes ☐ No ☐

Patient Demographic and Background Information

If fallen in the past 12 months:

Did you injure yourself in any of these falls? Yes / no

If yes give details below.

Injuries suffered during fall:

- ☐ bruising ☐ cuts / grazes ☐ dislocation
- ☐ sprains ☐ head injury/hit head ☐ fractures
- ☐ other (Specify)_____

Where were you when you fell?

- ☐ own home ☐ not own home
- ☐ bedroom ☐ bathroom ☐ toilet ☐ kitchen
- ☐ lounge room ☐ corridor ☐ stairs ☐ garden
- ☐ driveway
- ☐ street ☐ pathway ☐ bus/train ☐ shopping area
- ☐ other: _____

What caused your fall?

- ☐ trip ☐ slip ☐ felt faint ☐ dizzy / giddy
- ☐ lost balance ☐ legs gave way ☐ not sure
- ☐ other_____

Do you have or use a walking aid? (e.g. walking stick, walker, frame)

- ☐ Yes (please specify) ----------
- ☐ No

Below are some questions about how concerned you are about the possibility of falling.

Please reply thinking about how you usually do the activity. If you currently don't do the activity (for example, if someone does your shopping for you), please answer to show whether you think you would be concerned about falling IF you did the activity.

For each of the following activities, please check the box which is closest to your own opinion to show how concerned you are that you might fall if you did this activity.

	Not at all concerned 1	**Somewhat concerned 2**	**Fairly concerned 3**	**Very concerned 4**
1. Getting dressed or undressed				
2. Taking a bath or shower				
3. Getting in or out of a chair				
4. Going up or down stairs				
5. Reaching for something above your head or on the ground				
6. Walking up or down a slope				
7. Going out to a social event (for example, religious service, family gathering or club meeting)				
TOTAL SCORE				

Scoring: Low concern: 7-8; Moderate concern: 9-13; High concern 14-28

Adapted from the Prevention of Falls Network Europe, Falls Efficacy Scale International Kempen GIJM, Yardley L., Haastregt JCM van, Zijlstra GAR, Beyer N, Hauer K, Todd C.

Regular physical activity? ☐ Yes (please give details below) ☐ No

Type/s of activity .....

Hours per week:.....

Is the activity ☐ gentle ☐ medium ☐ vigorous

How often have you left your house in the past seven days? No. of times .....

Have you been admitted into hospital in the past month? Yes ☐ No ☐

Have you been admitted into hospital in the past year? Yes ☐ No ☐

Do you have a history of any of the following conditions?

Comorbidities	**Yes**	**Notes**
Arthritis (rheumatoid and osteoarthritis)		
Osteoporosis		
Asthma		
Chronic obstructive pulmonary disease (COPD), acquired respiratory distress syndrome (ARDS), or emphysema		
Angina		
Congestive heart failure (or heart disease)		
Heart attack (myocardial infarct)		
Neurological disease (such as multiple sclerosis or Parkinson's)		
Stroke or TIA (transient ischemic attack)		
Peripheral vascular disease		
Diabetes types I and II		
Upper gastrointestinal disease (ulcer, hernia, reflux)		
Depression		
Anxiety or panic disorders		
Visual impairment (such as cataracts, glaucoma, macular degeneration)		
Hearing impairment (very hard of hearing, even with hearing aids)		
Degenerative disc disease (back disease, spinal stenosis, or severe chronic back pain)		

There are no right or wrong answers, please tick the box to indicate how strongly you agree with each of the following statements.

For the questions that ask about your doctor, please think of the doctor that prescribes the most (if not all) of your medicines.

	strongly agree	agree	unsure	disagree	strongly disagree
I like to be involved in making decisions about my medicines with my doctors					
I have a good understanding of the reasons I was prescribed each of my medicines					
I like to know as much as possible about my medicines					
I always ask my doctor, pharmacist or other health care professional if there is something I don't understand about my medicines					
I know exactly what medicines I am currently taking, and/or I keep an up to date list of my medicines					
If my doctor said it was possible I would be willing to stop one or more of my regular medicines					
I feel that I am taking a large number of medicines					
Taking my medicines every day is very inconvenient					
I spend a lot of money on my medicines					
Sometimes I think I take too many medicines					
I feel that my medicines are a burden to me					

	strongly agree	agree	unsure	disagree	strongly disagree
I would like to try stopping one of my medicines to see how I feel without it					
I would like my doctor to reduce the dose of one or more of my medicines					
I feel that I may be taking one or more medicines that I no longer need					
I believe one or more of my medicines may be currently giving me side effects					
I think one or more of my medicines may not be working					
I have had a bad experience when stopping a medicine before					
I would be reluctant to stop a medicine that I had been taking for a long time					
If one of my medicines was stopped I would be worried about missing out on future benefits					
I get stressed whenever changes are made to my medicines					
If my doctor recommended stopping a medicine I would feel that he/she was giving up on me					
Overall, I am satisfied with my current medicines					

Adapted by Reeve E from Reeve E, Shakib S, Hendrix I, Roberts MS, Wiese MD. Development and validation of the patients' attitudes towards deprescribing (PATD) questionnaire. Int J Clin Pharm. 2013 Feb;35(1):51-6.