Fear of Falling and its Relationship to Depression and Anxiety in Older Adults Living in the Community and in Extended Care Facilities in Australia

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Bachelor of Arts (Psych) Honours

This thesis is submitted in partial fulfillment of the requirements for the degree of

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Declaration

I declare that this thesis is my own account of my research and contains no material which has been accepted for the award of any other degree in any university.

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

Signature: ........................................

Date: ............................................
Acknowledgements

This thesis is dedicated to all of the aged care residents whom I have had the honour to work with and get to know over the past six years. To each and every one of you, our memories together will be forever kept close.

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Abstract

One of the most common psychological costs of falls in older adults is the development of a fear of falling, which can then result in an increased risk of future falls. The purpose of this research was to examine the relationships between fear of falling and two of the most common psychological disorders in later life; depression and anxiety. To extend on previous research, study one aimed to investigate the relationships between fear of falling, depression and anxiety in an Australian community-dwelling population using quantitative analysis. Due to the limited number of studies examining fear of falling in the extended care population, study two was an exploratory investigation of the above relationships in this population using both quantitative and qualitative analysis. A total of 80 community-dwelling older adults and 47 extended care older adults completed the questionnaires. A further 12 older adults participated in the interviews. The findings, overall, extended on previous research, where anxiety was consistently associated with fear of falling constructs in both the community and extended care populations. In contrast, associations between fear or falling and depression were variable within and across studies, depending on the fear of falling measurement that was used. In addition, an important finding from the qualitative analysis revealed that older adults may view their feelings as a “concern” rather than a “fear”, supporting recent suggestions to revise how fear of falling is described. The clinical implications were discussed in terms of the importance for clinicians who work with older adults with mood disorders to screen for fear of falling and address this in clinical interventions. Furthermore, results suggest that assessment should include both an interview and questionnaires in order to capture all fall-related psychological concerns.
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CHAPTER ONE

GENERAL INTRODUCTION

1.1 Introduction to the Project

The current leading cause of accidental death in older adults is falls (Centers for Disease Control and Prevention (CDC), 2015). A “fall” is commonly described as an incident which results in an individual coming to rest inadvertently on the floor or other lower level (World Health Organization (WHO), 2012). Falls are a serious issue for older adults, with research showing that one-third of older adults fall each year and that two-thirds of those who fall then fall again within 6-months (Chang, Lynm & Glass, 2010; Hausdorff, Rios & Edelber, 2001). Falls may also increase the risk of death, where 20% to 30% of those who fall also sustain moderate to severe injuries (Sterling, O’Connor & Bonadies, 2001). Injuries may include bruising, lacerations, hip fractures and head traumas (Alexander, Rivara & Wolf, 1992; Cumming, Nevitt & Cummings, 1997; Norton, 1999). Whilst not all incidents will result in serious injury, there can be psychological consequences for those who experience a fall. One of the most commonly reported psychological consequences of falls is the development of a fear of falling. A fear of falling has been defined as a ‘lasting concern about falling that leads to an individual avoiding activities that he/she remains capable of performing’ (Tinetti & Powell, 1993, p. 36). A fear of falling is a significant issue in itself, as it can result in an increased risk of future falls (National Institute for Health and Care Excellence (NICE), 2004).
The Australian population is aging following the post-war baby boom (Australian Bureau of Statistics, 2013), which poses significant implications for both the Australian economy and public policy. For older adults, commonly defined as individuals aged 65 years and above (NICE, 2015), implications can include housing, income security, residential services, social, cultural and economic opportunities, and importantly, health implications. An ageing population also further raises the issue of falls. As such, the psychological factors associated with falls, such as fear of falling, is worthy of attention. A greater understanding of the relationships between fear of falling and psychological dysfunction will assist multi-disciplinary team members with the detection of older adults at risk of future falls. Furthermore, this will enable falls interventions to be tailored to suit the specific needs of the individual.

1.2 The Current Study

It has been noted that whilst the major risk factors for falls are diverse, many are modifiable (NICE, 2004). Thus, targeting factors associated with falls, such as fear of falling, is important for clinicians1 to consider when working with older adults to reduce falls risk. Emerging research has suggested associations between fear of falling and two of the most common mental health conditions in later life; anxiety and depression (Arfken, Lach, Birge & Miller, 1994; Drozdick & Edelstein, 2001; Gagnon, Flint, Naglie & Devins, 2005; Malini, Lourenço & Lopes, 2015; van Haastregt, Zijlstra, van Rossum, van Eijk & Kempen, 2008). This finding is not surprising given that both

1 For the purpose of this study, the term ‘clinician’ has been used to refer to any member of a multi-disciplinary team who works with older adults, such as Clinical Psychologists, Psychiatrists, Occupational Therapists and Social Workers.
“fear” and “avoidance” are also typical symptoms of psychological dysfunction (van Haastregt, et al., 2008). This research project was motivated by the observation that whilst fear of falling can have significant consequences for older adults, the relationship between fear of falling and affective disorders remains unclear (Gagnon et al., 2005; van Haastregt et al., 2008). That is, some studies have suggested that a relationship exists, whereas others have concluded that there is no relationship between fear of falling, depression and anxiety. The first aim of this study was to therefore extend on previous research by gaining a better understanding of the importance of depression and anxiety in terms of their relationship to fear of falling. Specifically, the above relationships were investigated in a sample of community-dwelling older adults who live independently in their own homes.

Further review of the literature revealed that whilst the incidence of falls are greater in the extended care older adult population2 (Vu, Weintraub & Rubenstein, 2005), the relationships between fear of falling, depression and anxiety in this population have been understudied compared to the community-dwelling older adult population. Moreover, there has been a relative paucity of research specifically investigating these relationships in the extended care population using a qualitative approach. As such, a secondary aim of this research was to obtain a more in-depth understanding of the importance of these relationships in the extended care population. In order to achieve this, both a quantitative and qualitative approach was employed in an attempt to enrich the data that was obtained.

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2 An extended care population/facility will refer to an environment where older adults live within a care facility with supports available, such as a nursing home or supported accommodation (NICE, 2013).
1.2.1 General Project Overview

The project, therefore, consisted of three broad overarching aims:

I. To assess the relationships between fear of falling, depression and anxiety symptoms within a community-dwelling older adult population and the extent to which symptoms of depression and anxiety independently predict fear of falling.

II. To assess the relationships between fear of falling, depression and anxiety symptoms within an extended care older adult population.

III. To further examine the above relationships within the extended care older adult population using a qualitative approach.

In support of the aims outlined above, two studies were conducted:

Study I- A study investigating the associations between fear of falling, depression and anxiety symptoms in a community-dwelling older adult population using quantitative analysis.

Study II- A study investigating the associations between fear of falling, depression and anxiety symptoms in an extended care older adult population using a mixed-method approach (quantitative and qualitative analysis).

It was envisaged that the findings from both the community study and the extended care study would allow for a better understanding of the factors related to fear of falling. This would then enable clinicians to detect and target such factors when implementing treatments to reduce falls risk in older adults.
1.2.2 Outline of Chapters

Chapter 1 aims to provide an overarching understanding of the prevalence of fear of falling in the older adult population and how it may be associated with symptoms of depression and anxiety. Chapter 2 includes a literature review that was conducted on previous studies investigating these relationships within both the community-dwelling and extended care older adult population. Chapters 3 and 4 include both studies that were conducted as a part of this research and Chapter 5 provides an overall conclusion to this project.

1.3 Introduction to Fear of Falling

1.3.1 Definition, Prevalence and Comorbidity

As outlined previously, a fear of falling is a common psychological consequence of a fall and has been defined as an ongoing concern in regards to falling that restricts the performance of daily activities (Tinetti & Powell, 1993). It has been suggested that, on average, fear of falling exists in up to 50% of older adults who have experienced a fall (Downton & Andrews, 1990; Kressig et al., 2001; Tinetti, Speechley & Ginter, 1988). Several factors, such as poorer health status, have shown to be associated with fear of falling in older adults (Cumming, Salkeld, Thomas & Szonyi, 2000). A fear of falling has also shown to be a significant predictor of future falls (Friedman, Munoz, West, Rubin & Fried, 2002; NICE, 2004). For example, Hadjistavropoulos and colleagues (2007) conducted a longitudinal study investigating 571 community-dwelling older adults aged 69 years and above ($M = 76.6$ years, $SD = 5.4$ years) over a 6-month period. Findings demonstrated that fear of falling significantly
predicted the amount of falls that occurred throughout the 6-month period. Other studies have noted similar conclusions (Cumming et al., 2000; Delbaere, Crombez, Vanderstraeten, Willems & Cambier, 2004; Friedman et al., 2002).

Several reasons as to how fear of falling may predict future falls have been proposed. For instance, it has been suggested that as a consequence of fear of falling, individuals may avoid activity (Fletcher, Guthrie, Berg & Hirdes, 2010; Friedman et al., 2002). Such fear related activity avoidance\(^3\) can then result in consequences such as poorer balance, muscular atrophy and de-conditioning which, in turn, increases the risk of future falls (Campbell, Borrie & Spears, 1989). This association is supported by Delbaere and colleagues (2004), where in a sample of 225 community-dwelling older adults (\(M\) age = 72 years, \(SD = 5.6\) years) a significant association was found between fear-related activity avoidance and both prior number of falls and number of falls at 1-year follow-up. Thus, it has been suggested that fear of falling may impact upon older adults’ quality of life (Suzuki, Ohyma, Yamada & Kanamori, 2002). However, fear of falling is also common amongst those who have not experienced a fall (Hotchkiss et al., 2004). For example, a meta-analysis on 21 studies revealed that up to 85% of community-dwelling older adults experience fear of falling, depending on the measurement used (Scheffer, Schuurmans, van Dijk, van der Hooft and Rooij, 2008). In total, eight of these studies included participants who had not experienced a previous fall. Findings showed over 50% of the individuals who had not experienced a fall also reported fear of falling (Scheffer et al., 2008). Furthermore, in terms of older adults

\(^3\) Fear-related activity avoidance and fear-related activity restriction, both of which are terms referred to throughout the fear of falls literature, will be used interchangeably for the purpose of this research paper.
living in extended care facilities, prevalence rates of fear of falling has been reported to exist in up to 55.8% of those with a falls history and 44.2% of those with no falls history, thus highlighting that factors other than a previous fall are likely to be related to fear of falling (Sharaf & Ibrahim, 2008).

Given that fear of falling has shown to impact on quality of life and increase the risk of future falls (NICE, 2004; Suzuki et al., 2002), identifying shared risk factors for the development of fear of falling is an important clinical issue to consider when implementing falls prevention strategies (Friedman et al., 2002). For this reason, previous studies have focused on investigating both the individual and combined relationships between fear of falling and depression and anxiety in older adults living in the community and extended care facilities. Prior to examining the literature that has investigated these relationships, the prevalence of depression and anxiety disorders within these populations and how these factors may relate to fear of falling has been discussed in the following sections.

1.4 Introduction to Depression and Anxiety in Older Adults

1.4.1 Definitions, Presentations and Prevalence

Depression is the most commonly occurring psychological disorder in older adults (Porzych, Kedziora-Kornatowska, Porzych, Polak & Motyl, 2005). Due to its serious consequences, such as an increased risk of morbidity, self-neglect, suicide, and decreased physical, cognitive and social functioning (Blazer, 2003; Fiske, Wetherell & Gatz, 2009), depression has become a significant public health problem. Furthermore, depression is often associated with falls. For example, a meta-analysis of 17 studies
which investigated community-dwelling older adults demonstrated an odds ratio of 1.63 (95% confidence interval: 1.36-1.94) for the association between depression and falls (Deandrea et al., 2010).

Depression in older adults differs compared to its presentation in younger adults, where older adults are more likely to experience somatic symptoms (e.g. appetite disturbances), display cognitive changes (e.g. poor concentration) and have a loss of interest as opposed to experiencing affective symptoms (e.g. a sense of worthlessness) as with younger adults (Fiske et al., 2009). Other common late-life depressive symptoms include sleep disturbance, fatigue, a loss of interest in living, cognitive changes and hopelessness in regards to the future (Christensen et al., 1999; Fiske et al., 2009).

The reported prevalence rate of depression in older adults varies depending on factors such as the definition of depression that is used and the assessment methodology (Teresi, Abrams, Holmes, Ramirez & Eimicke, 2001). Most large-scale epidemiological investigations have reported that the incidence of major depressive disorder in community-dwelling older adults ranges between 1 and 5% (Fiske et al., 2009). In terms of individuals who experience clinically significant depressive symptoms, prevalence rates amongst the community-dwelling older adult population have been reported to range between approximately 8% and 16% (Blazer, 2003).

The prevalence rates for depression in older adults living within the extended care population tend to be much higher compared to community-dwelling older adults. For example, major depressive disorder exists amongst 14.4% of older adults living within extended care facilities. A further 44.2% of this population reported experiencing depressive symptoms (Teresi et al., 2001); a rate much higher than that within the
community-dwelling population. Despite that the prevalence of depressive disorders in older adults living within extended care is high; the detection of depressive symptoms has shown to be low, with reported findings of only 37%-45% of the diagnosed population having previously been recognized by care staff (Teresi et al., 2001). Thus, the treatment for depression in older adults living within extended care facilities has shown to be relatively poor across studies (Blazer, 2003).

As evidenced throughout the literature, there exists a large overlap between depression and anxiety symptoms (Angst, Merikangas & Preisig, 1997; Beekman, de Beurs, van Balkon, Deeg, van Dyck & van Tilburg, 2000; Parmelee, Kats & Lawton, 1993; Smalbrugge, Jongenelis, Pot, Beekman & Eefsting., 2005). Therefore, anxiety disorders also commonly occur alongside depression in older adults and are becoming a source of increasing personal and societal cost (Wolitzky-Taylor, Castriotta, Lenze, Stanley & Craske, 2010). Similar to depression, late life anxiety may manifest itself through emotional symptoms (e.g. tension and inability to relax), cognitive symptoms (e.g. decreased concentration), behavioural symptoms (e.g. inability to rest and necessity to walk) and somatic symptoms (e.g. chest pain and headaches) (Porzych et al., 2005). Due to the high rate of psychological and medical co-morbidity amongst older adults, the presentation of anxiety in later life can be complex and has, therefore, resulted in varied reported prevalence rates (Hersen & Van Hasselt, 1993). Furthermore, the diversity in terms of the operationalization of anxiety as well as the assessment methods used has also possibly contributed to varied prevalence rates (Ayers, Sorrell, Thorp & Wetherell, 2007; Wolitzky-Taylor et al., 2010).
In a comprehensive review of the literature, Byrant, Jackson and Ames (2008) reported the incidence of anxiety disorders in the community-dwelling older adult population ranges between 1.2% and 15%. The prevalence of those who did not meet diagnostic criteria for an anxiety disorder; yet still experienced clinical symptoms of anxiety was reported to range between 15% and 52.3%. For older adults living in extended care facilities, Smalbrugge and colleagues (2005) reported the prevalence rate of having an anxiety disorder was 5.7% and the prevalence of those who did not meet diagnostic criteria for an anxiety disorder, however, experienced significant anxiety symptoms was 29.7% of this population. These reports suggest in contrast to depression, there is a higher prevalence of anxiety disorders in the community-dwelling older adult population compared to the extended care population. It has been proposed this may be the case given that extended care facilities offer highly structured daily routine and professional care, which may allow individuals to gain a sense of safety and a reduction in feelings of anxiety (Smalbrugge et al., 2005).

Nonetheless, as with depression, late-life symptoms of anxiety can have both personal consequences; such as reduced quality of life, and public consequences; such as increased use of medical services (Ayers, et. al., 2007; Brenes et al., 2005; De Beurs et al., 1999). Anxiety in later life has also shown to be related to an increased risk of mortality from suicide and chronic physical illness, such as cardiac disease (Allgulander & Lavori, 1993; Porzych et al., 2005; van Hout et al., 2004).

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4 This systematic review was based on literature published between 1980 and 2007. Due to the heterogeneity in measures used and methodologies, it was not possible for the Authors to provide summary prevalence figures (Byrant et al., 2008). Furthermore, the prevalence of anxiety disorders was based on earlier diagnostic criteria, as indicated in the Diagnostic and Statistical Manual, 3rd edition (American Psychiatric Association, 1980) and Diagnostic and Statistical Manual, 4th edition (American Psychiatric Association, 1994).
1.4.2 Fear of Falling, Depression and Anxiety

Given that the term “fear of falling” implies an affective phenomenon (Gagnon et al., 2005), studies assessing fear of falling in older adults have investigated the possible relationships between fear of falling, depression and anxiety in an aim to reduce falls risk (Austin, Devine, Dick, Prince & Bruce, 2007; Chou, Yeung & Wong, 2005; van Haastregt et al., 2008). Whilst a causal relationship between fear of falling, depression and anxiety cannot be inferred from cross-sectional studies, there have been several explanations as to how such factors may be related.

For example, Lewinsohn and colleagues (1985) hypothesized that the disruption of automatic behaviours leads to a decreased rate of positive reinforcement which, in turn, results in an increased focus on oneself and negative expectancies that can lead to depression. It is then possible that depressive symptoms, such as loss of confidence, may result in the older adult feeling less secure about his or her physical abilities and becomes more fearful of falling (Sharaf & Ibrahim, 2008). Furthermore, if depressed individuals continue to experience an increased expectancy for negative events as has been suggested (Lewinsohn et al., 1985), then their fear of falling and depression may worsen, as shown previously (Pyszczynski, Holt & Greenberg, 1987).

Another explanation may be that older adults with fear of falling may withdraw from everyday social activities (Kressig et al., 2001). Furthermore they may require more assistance with activities of daily living, and therefore, may engage in less pleasurable activities. Consequently, this could result in reduced social interaction and decreased opportunity for positive reinforcement, ultimately leading to depression (Burker et al., 1995). Depressive symptoms alone, such as lack of concentration and
decreased attention to surroundings, could also predispose older adults to falling, which in turn can lead to fear of falling (Means, O’Sullivan & Rodell, 2003; Sharaf & Ibrahim, 2008).

In terms of anxiety, longitudinal data suggests that in many cases, anxiety disorders develop in the context of a depressive disorder (Aström, 1996; Castillo, Schultz & Robinson, 1995; Parmelee et al. 1993). It is therefore possible that for older adults, fear of falling is an anxious manifestation of depression. That is, fear of falling may be associated with an anxious state, as has been suggested previously (Gagnon et al., 2005; Hughes, Kneebone, Jones & Brady, 2015). Alternatively, certain personality traits such as anxiety may also contribute to the development of fear of falling (Tinetti, Richman & Powell, 1990). For example, research has suggested that fear of falling may be an expression of generalized anxiety; similar to other fears that older adults’ experience (Lawrence et al., 1998). Accordingly, older adults who have trait anxiety may perceive the aging process as well as their entire life situation as threatening (Sharaf & Ibrahim, 2008), which may then lead to fear of falling.

The above theories are reflective of the potential relationships that exist between fear of falling and two of the most common psychological disorders in older adults; depression and anxiety. More recently, these potential associations in the community-dwelling older adult population have been researched and will be discussed in the following chapters.
CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Studies Investigating Fear of Falling, Depression and Anxiety in Community-Dwelling Older Adults

As outlined previously, there have been reports of up to 85% of community-dwelling older adults who experience fear of falling (Scheffer et al., 2008). Whilst individuals who experience a fall may go on to develop fear of falling (Ambrose, Paul & Hausdorff, 2013), it is also known that fear of falling is present in older adults who have not previously fallen (Legters, 2002). This suggests that factors other than a previous fall may contribute to the development of fear of falling. With the expected increase in the population of older adults (Australian Bureau of Statistics, 2013), the identification of factors associated with fear of falling is imperative in order to prepare for the escalating issue of falls (Painter et al., 2012). This will allow clinicians to better detect individuals at risk of falls and, where possible, for important factors associated with fear of falling to be targeted in clinical interventions.

Several studies that have investigated the community-dwelling older population have examined the relationships between fear of falling and two of the most common mental health conditions in later life; anxiety and depression. While most of the research has shown to be promising, issues concerning the methodology and sample characteristics have contributed to limitations in the generalizability of results. The purpose of this literature review is to provide a summary of the findings from past studies that have investigated the relationships between fear of falling, depression and anxiety. Furthermore, the limitations of previous studies will be highlighted along with
recommendations for future research aimed at improving the understanding of the factors related to fear of falling.

As mentioned previously, past studies investigating community-dwelling older adults have aimed to identify the factors associated with fear of falling (Dias et al., 2011; Gagnon et al., 2005; Howland et al., 1998; Jung, 2008; Malini et al., 2015; Murphy, Williams & Gill, 2002). Specifically, research has examined the relationships between fear of falling and depression and has reported significant findings (Andersson, Kamwendo & Peter, 2008; Arfken et al., 1994; Burker et al., 1995; Malini et al., 2015). For example, a cross-sectional study by Kressig and colleagues (2001) investigated the characteristics associated with fear of falling in a sample of community-dwelling older adults. A significant relationship between depression and fear of falling was shown, where depressed individuals were more than twice as likely to report fear of falling as were non-depressed individuals. Regression analysis also showed that depression was a significant predictor of fear of falling (Kressig et al., 2001). A more recent cross-sectional investigation by Malini and colleagues (2015) has corroborated previous findings where results also showed a significant association between fear of falling and depressive symptoms in community-dwelling older adults. These findings suggest that depression may contribute to the development of fear of falling, or alternatively, may be the result of activity restriction, social withdrawal and a loss of independence that can occur when fear of falling arises (Kressig et al., 2001).

A number of longitudinal investigations have also been conducted to examine the causal relationship between fear of falling and depression. For example, Austin and colleagues (2007) examined the predictors of fear of falling in older women. Baseline
data was used to compare participants who never reported fear of falling with those who reported persistent and newly developed fear of falling over the follow-up period. Participants with persistent fear of falling showed significantly higher depression scores at baseline compared to those who developed new fear of falling. Further analysis revealed that depression at baseline was also a significant independent predictor of persistent fear of falling, whereas depression at baseline was not a significant predictor of new fear of falling. It was therefore concluded that early intervention may be important for the prevention of persistent fear of falling in older adults. However, Oh-Park and colleagues (2011) also conducted a longitudinal study to investigate the incidence of fear of falling and the risk factors related to transient versus persistent fear of falling. Results showed that higher depression scores at baseline were significantly associated with a greater risk of developing new fear of falling in addition to a higher risk of both persistent and transient fear of falling. This finding therefore implies that fear of falling status in older adults changes over time, with depression being one of the risk factors for persistent and transient fear of falling. The importance of understanding such factors in order to identify groups at a high risk of fear of falling was therefore highlighted (Oh-Park et al., 2011).

In a more recent longitudinal study, Iaboni and colleagues (2015) aimed to determine whether depression predicted less improvement in fear of falling in older adults who participated in a falls prevention program. Whilst a significant association was found between fear of falling and depressive disorders at baseline, inconsistent with the above studies there was no significant association found between depression scores at baseline and changes in fear of falling at follow-up. There was, however, a significant
association shown between improvements in fear of falling and improvements in depressive symptoms with treatment over the follow-up period. It was therefore suggested that treatments targeting both fear of falling and depression may be worthwhile when implementing falls preventions (Iaboni and colleagues, 2015).

Nonetheless, similar to previous cross-sectional investigations (Kressig et al., 2001; Malini et al., 2015) the above longitudinal findings provide growing support for the important role of depression in the existence and development of fear of falling. It has, therefore, been suggested that early interventions aimed at targeting depression may be required in order reduce the risk of fear of falling (Austin et al., 2007).

Importantly, whilst the majority of the above studies found a significant relationship between fear of falling and depression, these studies did not directly assess the relationship between fear of falling and anxiety, despite that anxiety symptoms remain common in older adults (Byers, Yaffe, Covinsky, Friedman & Bruce, 2010). There exist few studies that have examined the relationships between fear of falling and depression whilst also measuring symptoms of anxiety. For example, Gagnon and colleagues (2005) assessed whether clinically significant depression and anxiety as well as the severity of these symptoms are independently associated with fear of falling. Consistent with previous findings (Drozdick & Edelstein, 2001; Kressig et al., 2001), results demonstrated that depression and anxiety symptoms and disorders all had significant independent associations with fear of falling. In particular, depression (disorder and symptom severity) had a stronger association with fear of falling than did anxiety (disorder and symptom severity). These findings imply that the detection and treatment of both depression and anxiety in individuals with fear of falling may be an
integrated component of successful treatment of fear of falling in older adults (Gagnon et al., 2005).

A study by van Haastregt and colleagues (2008) also investigated the associations between fear of falling, depression and anxiety and found that anxiety and depression scores significantly differed between individuals with mild fear of falling and severe fear of falling. In particular, anxious individuals were 1.84 times more likely to experience severe fear of falling whereas depressed individuals were 2.74 times more likely to have severe fear of falling. Importantly, however, unlike Gagnon and colleagues (2005), when both feelings of anxiety and symptoms of depression were entered into the regression analysis, only symptoms of depression were independently associated with fear of falling. It was, therefore, suggested that clinicians should maintain an alert attitude to the presence of underlying depression disorders in older adults in order to optimize treatments tailored to the individual’s specific needs. Furthermore, it was noted that psychotherapy combined with treatments that specifically address fear of falling may be required (van Haastregt et al., 2008).

Painter and colleagues (2012) also assessed the relationships between fear of falling, depression and anxiety in a series of regression analyses to determine whether depression and anxiety combined were able to predict fear of falling. Whilst results demonstrated that anxiety was a significant predictor of fear of falling, contrary to the above studies (Gagnon et al., 2005; van Haastregt et al., 2008), depression was not a significant predictor in the combined regression analysis. Similarly, a study by Hull, Kneebone & Farquharson (2013) investigated the associations between fear of falling, depression and anxiety. A series of regression analyses revealed that anxiety
significantly predicted all four measures related to fear of falling. Depression, however, was only a significant predictor of one measure of fear of falling (fear of falling item); therefore implying that anxiety has stronger associations with fear of falling than depression.

In a more recent longitudinal study, van der Meulen and colleagues (2014) aimed to compare symptoms of depression and anxiety in older adults with low and high fear of falling. Consistent with previous studies (Hull et al., 2013; Painter et al., 2012) there were no significant differences in symptoms of depression found between individuals with low and high fear of falling at baseline or follow-up. However, there was a significant difference in symptoms of anxiety between individuals with low fear of falling and high fear of falling at 14-months follow-up. It was noted that these discrepancies compared to previous studies may be due to issues such as inadequate power in their study, or differences in the measurement tools used to assess fear of falling (van der Meulen et al., 2014).

Table 2.1 provides a detailed summary of the above studies that have investigated the relationships between fear of falling, depression and anxiety in the community-dwelling older adult population.
### Table 2.1

*Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kressig et al., 2001</td>
<td>340</td>
<td>80.9 (6.2)</td>
<td>Atlanta, United States of America</td>
<td>Included only those individuals who had experienced a fall.</td>
<td>FES</td>
<td>CES-D</td>
<td>n/a</td>
<td>Depression was significantly associated with fear of falling and was also a significant predictor.</td>
<td>n/a</td>
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<tr>
<td>Gagnon et al., 2005</td>
<td>105</td>
<td>78.2 (8.9)</td>
<td>Toronto, Canada</td>
<td>A sample of hospitalized patients and only those who also reported fear-related activity avoidance.</td>
<td>Question</td>
<td>SCID</td>
<td>SCID</td>
<td>Depression was significantly associated with fear of falling and was also a significant predictor.</td>
<td>Anxiety was significantly associated with fear of falling and was also significant predictor.</td>
</tr>
</tbody>
</table>
### Table 2.1

*Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population (Continued).*

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin et al., (2007)</td>
<td>1282</td>
<td>75 (2.6)</td>
<td>Perth, Western Australia</td>
<td>Included both individuals with and without fear of falling and/or a falls history.</td>
<td>Question</td>
<td>SF-36</td>
<td>SF-36</td>
<td>Depression was significantly associated with fear of falling and was also a significant predictor.</td>
<td>n/a</td>
</tr>
<tr>
<td>van Haastregt et al., 2008</td>
<td>540</td>
<td>77.6 (4.8)</td>
<td>Netherlands</td>
<td>Included only those with fear of falling and associated fear-related activity avoidance.</td>
<td>Question</td>
<td>HADS</td>
<td>HADS</td>
<td>Depression was significantly associated with fear of falling and Anxiety was not a significant predictor after accounting for depression.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.1
Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population (Continued).

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
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<tbody>
<tr>
<td>Oh-Park et al., 2011</td>
<td>380</td>
<td>79.4 (5.3)</td>
<td>Bronx County, New York</td>
<td>Included only those participants who reported no fear of falling at baseline.</td>
<td>GDS-15</td>
<td>n/a</td>
<td>n/a</td>
<td>Depression was a significant predictor of incident, transient and persistent fear of falling.</td>
<td>n/a</td>
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<td></td>
<td></td>
<td>80.5 (5.2)</td>
<td></td>
<td>“Did you have fear of falling in the last 2-months or since the last interview?”</td>
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<tr>
<td>Hull et al., (2013)</td>
<td>205</td>
<td>81 (7.5)</td>
<td>London, United Kingdom</td>
<td>Included both those with and without fear of falling and/or a falls history</td>
<td>FES-I</td>
<td>GDS-15</td>
<td>GAI</td>
<td>Depression was only a significant predictor of the mSAFFE measure.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mSAFFFE</td>
<td></td>
<td></td>
<td>Anxiety was significantly associated with fear of falling and was also a significant predictor of all four measures of fear of falling.</td>
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<td>ABC</td>
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<td>CoF</td>
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</tr>
</tbody>
</table>
### Table 2.1: Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population (Continued).

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painter et al., (2012)</td>
<td>99</td>
<td>73.71</td>
<td>North Carolina, the United States of America</td>
<td>Included both those with and without fear of falling and/or a falls history.</td>
<td>SAFE</td>
<td>GDS</td>
<td>HAMA</td>
<td>Depression was associated with fear of falling however not a significant predictor.</td>
<td>Anxiety was associated with fear of falling and was also a significant predictor.</td>
</tr>
<tr>
<td>van der Meulen et al., 2014</td>
<td>256 (5.0)</td>
<td>77.9</td>
<td>Netherlands</td>
<td>Included only participants with fall-related concerns and related activity avoidance.</td>
<td>MFES</td>
<td>HADS</td>
<td>HADS</td>
<td>No significant difference in depressive symptoms was found between individuals with low of high fear of falling.</td>
<td>Anxiety symptoms were significantly different between individuals with low and high fear of falling at 14-months follow-up.</td>
</tr>
</tbody>
</table>
Table 2.1
Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population (Continued).

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iaboni et al.,</td>
<td>69</td>
<td>77.8 (8.9)</td>
<td>Toronto, Canada</td>
<td>Included only those who had experienced a fall and who enrolled in a hospital-based falls prevention program.</td>
<td>Question</td>
<td>DSM-IV</td>
<td>n/a</td>
<td>Baseline depression was associated with fear of falling however was not a significant predictor of change in fear of falling at treatment follow-up.</td>
<td>n/a</td>
</tr>
<tr>
<td>2015</td>
<td></td>
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<td></td>
<td></td>
<td>MFES</td>
<td>HADS</td>
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<td></td>
<td>SAFE</td>
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<tr>
<td>Malini et al.,</td>
<td>742</td>
<td>76.7 (7.03)</td>
<td>Rio de Janeiro, Brazil</td>
<td>Included both those with and without fear of falling and/or a falls history</td>
<td>FES-I-BR</td>
<td>GDS</td>
<td>n/a</td>
<td>Depression was associated with fear of falling and was also a significant predictor.</td>
<td>n/a</td>
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<tr>
<td>2015</td>
<td></td>
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</table>
Table 2.1
Summary of Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Community-Dwelling Older Adult Population (Continued).

Notes: ABC = the Activities Specific Balance Confidence Scale (Powell & Myers, 1995); CESD = the Centre for Epidemiologic Studies Depression Scale Revised (Radloff, 1977); CoF = Fall-Related Outcome Expectancy (Yardley & Smith, 2002); DSM-IV = Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (American Psychiatric Association, 2000); Falls Efficacy Scale (Tinetti et al., 1990); Falls-Efficacy Scale International (Yardley et al., 2005); FES-I-BR = Falls Efficacy Scale-International Brazil (Camargos, Dias, Dias & Freire, 2010); GAI = Geriatric Anxiety Inventory (Pachana et al., 2007); GDS = Geriatric Depression Scale (Yesavage et al., 1982); GDS-15 = Geriatric Depression Scale (Sheikh & Yesavage, 1986); HADS = the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 2983); HAMA = the Hamilton Anxiety Rating Scale (Hamilton, 1969); MFES = the Modified Falls Efficacy Scale (Hill, Schwarz, Kalogeropolous & Gibson, 1996); mSAFFE = the Modified Survey of Activities and Fear of Falling (Tinetti, Speechley & Ginter, 1988); n/a = not assessed; Question = “Are you afraid of falling?”; SAFE = the Surveys of Activities and Fear of Falling in the Elderly (Lachman et al., 1998); SCID = the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon & Williams, 1996); SD = standard deviation; SF-36 = the Short Form (36) Health Survey (Ware, 1996).
2.1.1 Limitations

The aforementioned studies show that the relationships between fear of falling, depression and anxiety have been investigated in the community-dwelling older adult population with promising results. However, due to the mixed results across the previous literature, these relationships remain unclear. Further investigation has, therefore, been recommended in order to achieve a better understanding of these relationships (Painter et al., 2012). Moreover, a review of the current literature revealed several limitations that should be considered, such as issues pertaining to both the measurement tools that were used and the sample characteristics in previous studies.

2.1.1.1 Measurement Tools

As previously identified by Painter and colleagues (2012), the comparison of findings across research is a daunting task because of the great variation in measurement tools that are used to investigate fear of falling. This is evidenced in Table 2.1 in that there seems to be no general consensus in regards to the measurement of fear of falling. Use of varying measures of fear of falling may explain the contrast in findings across studies. For example, Gagnon and colleagues (2005) measured fear of falling using the Modified Falls Efficacy Scale (Hill et al., 1996) and showed a significant relationship between fear of falling and anxiety. In contrast, van Haastregt and colleagues (2008) reported that there was no significant association between fear of falling and anxiety and measured fear of falling using the question “Are you afraid of falling?”. It is therefore possible that the difference in measurement tools that were used may explain the discrepancy in results. As fall-related self-efficacy has previously been conceptualized as a measure of fear of falling (Tinneti et al., 1990), the terms fear of falling and fall-
related self-efficacy have been used interchangeably throughout the research (Iaboni, & Flint, 2013). More recently however, both fall-related self-efficacy and fear of falling have been viewed as distinct constructs (Hadjistavropoulos, Delbaere & Fitzgerald, 2011; Hughes et al., 2015; Moore & Ellis, 2008; Moore et al., 2011; Payette, Bèlanger, Lèveillè & Grenier, 2016). Therefore, Moore and Ellis (2008) have proposed these two constructs are better conceptualized under the umbrella term of ‘fall-related psychological concerns’. Whilst this is an emerging concept in the literature, to maintain consistency with the majority of previous research, fear of falling will continue to be used in the current studies.

Another issue that has been raised previously, and identified in the literature review above, is the use of depression and anxiety measures that are non-specific to a geriatric population in several previous studies (Payette et al., 2016). For example, as seen in Table 2.1, Gagnon and colleagues (2005) administered the Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983), and found findings that supported a stronger relationship between fear of falling and depression when compared to anxiety. However the Anxiety subscale of the Hospital Anxiety and Depression Scale has shown to perform poorly in samples of older adults (Therrien et al., 2012). Furthermore the use of a depression and anxiety measure that is non-specific to the geriatric population raises concern, given that symptoms of depression and anxiety are known to manifest differently in older adults compared to younger adults (Fiske et al., 2009; Kogan, Edelstein & McKee, 2000). As the few studies that have used measures specific to the geriatric population (Hull et al., 2013; Malini et al., 2015; Painter et al., 2012) have
shown mixed findings, further investigation using measures of depression and anxiety specifically designed for the geriatric population is warranted.

2.1.1.2 Sample Characteristics

Further issues are raised when considering the characteristics of the samples of community-dwelling older adults that have previously been studied. For example, as seen in Table 2.1, van Haastregt and colleagues (2008) included only those individuals who reported both fear of falling and fear-related activity avoidance and concluded that there is no significant relationship between fear of falling and anxiety after controlling for depressive symptoms. However, the study failed to include those older adults who may experience fear of falling yet do not engage in associated fear-related activity restriction. It can be argued that excluding such individuals is a limitation given that important information that may assist in understanding the factors related to fear of falling is likely to be missed. Moreover, Gagnon and colleagues (2005) included a convenience sample of hospitalized patients; a sample that is likely to be of poorer health status when compared to the wider community of older adults. Therefore, further research examining a more diverse sample of older adults is required in order to determine whether results generalize to the wider community-dwelling population. As suggested by van Haastregt and colleagues (2008), including individuals who have and have not experienced a fall, who are fearful and non-fearful of falls, and who do and do not restrict their activities due to fear of falling would also enable a clearer picture of the relationships between fear of falling, depression and anxiety.

Another issue outlined in Table 2.1 is that only one of the previous studies (Austin et al., 2007) assessing the relationships between fear of falling, depression and
anxiety was based on sample derived from an Australian population. This is an issue given that the prevalence of depression and anxiety varies throughout the world, most likely due to cross cultural differences (Somers, Goldner, Waraich & Hsu, 2006; Weissman, et al., 1996). For example, culture can influence how a group’s members view and interact with the world (Garcia, 2006). That is, it has been suggested that culture may affect health-promoting behaviours, such as physical activity (Mathews, et al., 2010). Similarly, cross cultural differences may influence an older adult’s perceptions around falls and fear of falling. Due to cross cultural differences that are therefore likely to exist, it can be argued the majority of conclusions from previous studies are not generalizable to the Australian population. Whilst Austin and colleagues (2007) examined the Australian population, this study included females only, therefore, limiting the generalizability of results across the wider Australian population. The above issues raise concern as not only is the Australian population expected to increase significantly over the next few decades; the number of older adults in the population is also increasing (Australian Institute of Health and Welfare, 2007). This, therefore, indicates that falls in the Australian older adult population are likely to become more of an issue. For such reasons it is important for future research to examine the relationships between fear of falling, depression and anxiety in the Australian population whilst accounting for the above limitations.

2.1.2 Summary

An improvement in an understanding of the factors related to fear of falling constitutes an important step forward in terms of reducing falls risk in older adults. The mixed findings throughout the literature coupled with the aforementioned complexities
suggest that further investigation in the community-dwelling older adult population is warranted. This would allow for a better understanding of the relationships between fear of falling, depression and anxiety, which will then enable multi-disciplinary teams to target such factors in interventions aimed at reducing falls.

2.2 Studies Investigating Fear of Falling, Depression and Anxiety in Older Adults Living in Extended Care Facilities

Few studies have investigated the relationships between fear of falling and depression in the extended care population, where results have also shown mixed findings. For example, a longitudinal study by Franzoni, Rozzini, Boffelli, Frisoni and Trabucchi (1994) examined the independent effect of fear of falling on change in functional status. Results at baseline and throughout the 24-month follow-up period showed that there was no significant difference in depression scores between the fear and no fear groups. It was, therefore, concluded that depressive symptoms are not significantly related to fear of falling in older adults living in extended care facilities (Franzoni et al., 1994).

The above finding is, however, inconsistent with various investigations that have shown a significant relationship between fear of falling and depression in this population. For example, Chou and colleagues (2005) examined the relationship between fear of falling and depression as well as the mediating and moderating role of falls-efficacy in this relationship. Results from a multiple regression analysis revealed that there was a significant and positive association between fear of falling and depression after adjusting for secondary variables. The mediated effect was then
examined where results from a multiple regression analysis demonstrated that falls-efficacy was a complete mediator in the relationship between fear of falling and depression. When the moderating effect of falls-efficacy was examined, results showed the impact of fear of falling on depression was lower when participants had stronger falls-efficacy compared to those with weaker falls-efficacy. In summary, inconsistent with Franzoni and colleagues (1994), it was suggested that older adults who reported depressive symptoms more frequently also reported higher levels of fear of falling (Chou et al., 2005). Furthermore, results demonstrated that falls-efficacy has a mediating and moderating effect on the relationship between fear of falling and depression. It was, therefore, suggested that health care practitioners should aim to strengthen falls-efficacy in an attempt to disrupt the relationship between fear of falling and depression in older adults (Chou et al., 2005).

Important to note is the above studies did not measure symptoms of anxiety, which are known to commonly occur alongside symptoms of depression in older adults (Smalbrugge et al., 2005). The few studies that have measured both depression and anxiety have shown promising results. For example, in an aim to develop the Falls Efficacy Scale (FES), Tinetti and colleagues (1990) examined the characteristics of participants who reported fear of falling. Results from a series of bivariate analyses showed that anxiety was significantly associated with fear of falling. Depression, however, was not significantly related to fear of falling. A series of multiple linear regression analyses were conducted to determine the independent predictors of fear of falling. It was revealed that fear of falling was independently associated with both anxiety and depression. Interestingly, whilst depression was not significantly associated
with fear of falling scores in the bivariate analysis, consistent with findings by Chou and colleagues (2005), depression was a significant predictor of fear of falling in the multiple regression analysis. It was, therefore, suggested that the association between fear of falling, depression and anxiety implies that certain personality traits may assist in the prediction of fear of falling in older adults (Tinetti et al., 1990). The above findings are in contrast to Franzoni and colleagues (1994), where results showed no significant difference in depression scores between those with and without fear of falling.

A study by Sharaf and Ibrahim (2008) also assessed whether fear of falling had a significant relationship with depression, trait anxiety and state anxiety. Results from a stepwise multiple linear regression analysis showed that both depression and trait anxiety were associated with fear of falling; where depression demonstrated to have a stronger relationship with fear of falling than trait anxiety. Findings, therefore, support previous studies that have found a significant association between fear of falling, depression and anxiety in the extended care population (Chou et al., 2005; Tinetti et al., 1990). Sharaf and Ibrahim (2008) proposed that depression may erode one’s sense of independence and confidence to perform daily activities, which may eventuate to both social isolation and restriction. This may then lead to the individual feeling less secure and focused on their physical abilities, resulting in a fear of falling. In terms of anxiety, it was suggested that older adults with trait anxiety may perceive the aging process as threatening (Sharaf & Ibrahim, 2008). Alternatively, given that studies have suggested that state anxiety in later life is commonly related with depression (Flint, 1994), the link found between state anxiety and fear of falling in this study may be mediated by depression. It was suggested that further research in this population is conducted in
order to clarify the relationships between fear of falling, depression and state and trait anxiety (Sharaf & Ibrahim, 2008).

Table 2.2 provides a detailed summary of the above studies that have investigated the relationships between fear of falling, depression and anxiety in the extended care older adult population.
Table 2.2

*Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Extended Care Older Adult Population.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression Main Findings</th>
<th>Anxiety Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tinetti et al., 1990.</td>
<td>56</td>
<td>78 (range: 66-89 years)</td>
<td>West Haven, Connecticut</td>
<td>Recruited from two extended care facilities. Included individuals both with and without a fear of falling and/or falls history were included.</td>
<td>FES</td>
<td>CESD</td>
<td>STAI</td>
<td>Depression was not associated with fear of falling in the correlation analysis however was a significant predictor of fear of falling.</td>
<td>Anxiety was associated with fear of falling and was also a significant predictor of fear of falling.</td>
</tr>
</tbody>
</table>
Table 2.2
Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Extended Care Older Adult Population (Continued).

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Franzoni et al., 1994</td>
<td>54</td>
<td>81.9 (7.9)</td>
<td>Italy</td>
<td>Recruited from one extended care facility. Included individuals with or without fear of falling and/or a falls history.</td>
<td>Question</td>
<td>GDS</td>
<td>n/a</td>
<td>No relationship was found between fear of falling and depression.</td>
<td>n/a</td>
</tr>
<tr>
<td>Chou et al., 2005</td>
<td>100</td>
<td>79.83</td>
<td>Hong Kong, China</td>
<td>Recruited from two extended care facilities. Included individuals with or without fear of falling.</td>
<td>FES</td>
<td>GDS-15</td>
<td>n/a</td>
<td>Depression was significantly associated with fear of falling and was also a significant predictor of fear of falling.</td>
<td>n/a</td>
</tr>
</tbody>
</table>
### Table 2.2

**Summary of Studies Investigating the Relationships between Fear of Falling, Depression and Anxiety in the Extended Care Older Adult Population (Continued).**

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Mean Age (SD)</th>
<th>Population</th>
<th>Sample Characteristics</th>
<th>Fear of Falling Measure</th>
<th>Depression Measure</th>
<th>Anxiety Measure</th>
<th>Depression: Main Findings</th>
<th>Anxiety: Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharaf &amp; Ibrahim (2008)</td>
<td>208</td>
<td>73.21 (8.86)</td>
<td>Alexandria, Egypt.</td>
<td>Recruited from a number of extended care facilities.</td>
<td>Question</td>
<td>GDS</td>
<td>STAI</td>
<td>Depression was significantly associated with fear of falling and was also a significant predictor.</td>
<td>Anxiety was significantly associated with fear of falling and was also a significant predictor.</td>
</tr>
</tbody>
</table>

*Includes individuals with or without a fear of falling and/or falls history.*

---

*Notes: FES= Falls Efficacy Scale (Tinetti et al., 1990); FES= Falls Efficacy Scale (Tinetti et al., 1990); CESD= the Centre for Epidemiologic Studies Depression Scale (Radloff, 1977); Notes: N= sample size; SD= standard deviation; FES= Falls Efficacy Scale (Tinetti et al., 1990); Question= “Are you afraid of falling?”; GDS= Geriatric Depression Scale (Sheikh & Yesavage, 1986); GDS= Geriatric Depression Scale (Yesavage et al., 1982); MFES= the Modified Falls Efficacy Scale (Hill et al., 1996); n/a = not assessed; Question= “Are you afraid of falling?”; SD= standard deviation; STAI= the State Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).*
2.2.1 Limitations

To date, it is evident that very few studies have investigated the relationships between fear of falling, depression and anxiety in the extended care older adult population. This is an issue, given that falls occur more frequently in older adults living in extended care facilities compared to community-dwelling older adults (Kenny, 2011). Of the existing research, the majority of studies have reported a significant relationship between fear of falling and depression (Chou et al., 2005; Sharaf & Ibrahim, 2008; Tinetti et al., 1990). However, others have reported that there exists no significant association between fear of falling and depression (Franzoni et al., 1994). Across the literature, it is evident that an even smaller number of studies have explored the relationship between fear of falling and anxiety (Sharaf & Ibrahim, 2008; Tinetti et al., 1990). Due to the mixed findings, in addition to the limited number of studies investigating this population, it can be argued that further research is required. This will allow clinicians who work with older adults to gain a better understanding of the relationships between fear of falling, depression and anxiety. Moreover, a review of the previous literature revealed several limitations which may impact the generalizability of the findings in previous studies. This includes issues pertaining to both the measurements of depression and anxiety that were used and to the sample characteristics.

2.2.1.1 Measurement

As mentioned previously, not all of the above studies took into account both symptoms of anxiety and depression which commonly co-occur in the older adult population (Fiske et al., 2009). For example, Chou and colleagues (2005) only measured
depression, despite evidence for the co-morbidity of anxiety symptoms (Smalbrugge et al., 2005). Furthermore, the studies that investigated these relationships administered measures of depression and anxiety that were not developed specifically for the geriatric population. For example, as seen in Table 2.2, Sharaf and Ibrahim (2008) concluded that fear of falling is not significantly related to anxiety in older adults living in extended care facilities; however, a generic measure of anxiety (the STAI; Spielberger et al., 1983) was used. Future research assessing symptoms of depression and anxiety using measures specific to the geriatric population would allow for a clearer understanding of their relationship to fear of falling.

2.2.1.2 Sample Characteristics

As can be seen in Table 2.2, the studies have investigated the relationships between fear of falling, depression and anxiety in older adults living in extended care facilities have taken place in samples other than from the Australian population. This is an issue given that the care system in Australia for older adults living in extended care facilities is likely to differ to other parts of the world. Furthermore, the prevalence of depression and anxiety is likely to vary due to cross-cultural differences (Somers et al., 2006; Weissman, et al., 1996). Given the higher falls risk that exists in older adults living within extended care facilities coupled with the expected increase in the Australian older adult population (Australian Bureau of Statistics, 2013), further investigation is warranted. Future research should aim to recruit participants from an Australian population in order to determine whether results from past studies can be generalized. In addition, as previous investigations recruited older adults from one or two extended care facilities only (e.g. Chou et al., 2005; Franzoni et al., 1994).
Therefore, future investigations should aim to recruit participants from a number of extended care facilities in order to provide a wider and more accurate representation of the extended-care older adult population.

### 2.2.2 Summary

As mentioned earlier, research suggests older adults living within extended care facilities are three times more likely to fall compared to community-dwelling older adults (Vu et al., 2005). This is a serious issue, as falls can have both physical and psychological consequences resulting in an increased risk of future falls, or even death (NICE, 2004; Sterling, et al., 2001). Given the mixed findings across the existing studies coupled with the highlighted limitations, further investigation is necessary. Specifically, future research should aim to investigate the Australian population of older adults living in extended care facilities whilst accounting for the aforementioned limitations.

In addition, whilst quantitative analysis can provide valuable information, use of an in-depth analysis such as a qualitative approach may also allow for a better and enriched understanding of these relationships. In a systematic review of qualitative studies investigating falls prevention in older adults, McInnes and Askie (2004) highlighted that most qualitative studies have investigated people’s views on strategies to reduce falls, with very few examining older adult’s perceptions, motivations and barriers to physical activity. Further, to our knowledge, qualitative studies that have specifically investigated fear of falling (e.g. Mahler & Sarvimäki, 2011) have largely focused on the community-dwelling older adult population, with limited studies investigating fear of falling in the extended care population. Thus, a qualitative approach may be useful in terms of complimenting quantitative findings and providing further
understanding of the factors related to fear of falling in this population. This would enable multi-disciplinary teams to gain a better understanding of the experiences and factors contributing to fear of falling, depression and anxiety in this population. Overall, this would then allow for improvements in falls interventions, such as by tailoring treatments specific to the individual’s needs in an aim to reduce falls risk.

2.3 Chapter Two: Overall Summary

A review of the existing literature has highlighted that mixed findings exist in terms of the relationships between fear of falling, depression and anxiety in the community-dwelling and extended care older adult population. Whilst there has been wide investigation of these relationships in the community-dwelling population, very few studies have investigated the extended care population. Specifically, the relationship between fear of falling and anxiety has been largely understudied. Several limitations pertaining to both sample characteristics and the measurement tools that were used also need to be addressed in order to generalize previous findings. Further research is, therefore, necessary in order to obtain a clearer understanding of the relationships between fear of falling, depression and anxiety in the community and extended care older adult population. This will enable earlier detection of fear of falling and allow for clinicians to target appropriate factors, such as depression and anxiety, when implementing interventions to reduce falls risk in older adults.
CHAPTER THREE

STUDY ONE: AN INVESTIGATION OF FEAR OF FALLING, DEPRESSION AND ANXIETY IN COMMUNITY-DWELLING OLDER ADULTS

3.1 Introduction

Falls are the current leading cause of accidental death in older adults (Centers for Disease Control and Prevention, 2015). Whilst the major risk factors for falls are diverse, it has been suggested that many are modifiable (NICE, 2004). Thus, targeting fear of falling and associated factors is important for clinicians to consider when working closely with older adults to reduce the risk of falls.

The literature suggests that the relationships between fear of falling, depression and anxiety have been widely investigated in the community-dwelling older adult population. However, a review of past research has revealed that findings remain unclear, where some studies have reported significant associations between these factors whilst others have not. Moreover, it is apparent that issues pertaining to both sample characteristics and the measurement tools that were used in previous studies exist, suggesting that further investigation accounting for such limitations is necessary. Further research would, for example, allow for factors associated with fear of falling to be specifically targeted in interventions. In turn, this may reduce the risk of future falls.

The aim of this study was to, therefore, assess the relationships between fear of falling, depression and anxiety in the community-dwelling older adult population.
Several other confounding variables that have been identified throughout the literature as related to fear falling were also measured.

Unlike the majority of previous research, measures of depression and anxiety that were developed specifically for use within the geriatric population were administered. Furthermore, it has been identified that the use of different measures of fear of falling may explain the contrast in findings across the literature (Jung, 2008). Therefore, in contrast to several previous studies where only one measure of fear of falling has been used (Austin et al., 2007; Painter et al., 2012; van Haastregt et al., 2008), this study assessed fear of falling by administering both a question related to fear of falling as well as the Falls Efficacy Scale-International (FES-I; Yardley et al., 2005) to allow for comparison to previous research.

In order to account for previous limitations pertaining to sample characteristics, participants in this study were recruited from an Australian population of community-dwelling older adults. To improve the understanding and generalizability of previous findings, individuals who were both fearful and non-fearful of falls and with and/or without a falls history were also eligible. Based on the above, the following hypotheses were derived:
3.1.2 Hypotheses

I. Depression symptoms will be significantly associated with fear of falling and will also be a significant independent predictor of fear of falling.

II. Anxiety symptoms will be significantly associated with fear of falling and will also be a significant independent predictor of fear of falling.

III. Secondary variables (age, gender, walking aid use, self-reported and objective activity levels, self-reported falls history and falls history injury) measured will each demonstrate unique associations and predictions with fear of falling, as shown in previous studies.

3.2 Method

3.2.1 Participants

A total of 80 older adults (49 females, 31 males) aged between 60 and 90 years ($M = 72$ years, $SD = 8$ years) consented to participate in this study. Inclusion criteria included both male and females aged 60 years and above who were living independently throughout the community in Perth, Western Australia (W.A), and who were able to provide informed consent. Individuals were eligible for the study regardless of whether they had a fear of falling and/or falls history and/or activity avoidance. Recruitment took place within the context of a broader research program being conducted in the local area (see Appendix A for ethics approval), which potentially included later participation in an exercise training program aimed at assessing the psychological and physiological efficacy of exercise on older adults. Individuals were required to attend a baseline assessment session involving a number of physical tests as well as completion of a
battery of questionnaires, including those described in this study. Eligible individuals were then invited to participate in three weekly exercise classes for 12-weeks and a 6-week detraining phase. A number of eligibility criteria applied for participation in the exercise training, such as individuals were excluded if they had a history of lumbar surgery or prescribed medications and medical conditions which may have precluded safe participation in the program. Individuals who were excluded from the exercise program based on the above eligibility criteria were offered the option to participate in the current study only.

Further recruitment took place separate to this larger study. This was in order to avoid any biases that may arise if only those older adults who are interested in participating in an exercise program were included (Iaboni & Flint, 2013). Recruitment for additional participants took place via information sessions held in local communities throughout Perth, W.A. In total, 64 individuals volunteered to participate in the exercise program in addition to the current study and 16 individuals volunteered to participate in this study only.

### 3.2.2 Questionnaire Measures

#### 3.2.2.1 Primary Measures

**Fear of Falling.** Fear of falling was assessed by asking the question: “*Are you afraid of falling?*”. The use of a single item fear of falling measure has been used in previous studies assessing fear of falling in older adults (Gagnon et al., 2005; Iaboni et al., 2015; van Haastregt et al., 2008). A single question assessing fear of falling has been found to have high concurrent validity with continuous measures of fear of falling and
high test-retest reliability (Drozdick & Edelstein, 2001; Gagnon et al., 2005; Lachman et al., 1998; Moore et al., 2011; Tinetti et al., 1990). Response options included never, almost never, sometimes, often or very often. Similar to previous studies (Gagnon et al., 2005, Kressig et al., 2001), participants were then dichotomized into two groups; fear of falling (sometimes, often and very often) and no fear of falling (never and almost never), to provide a dichotomous measure of fear of falling (FOF item).

Fear of falling was also assessed using the Falls Efficacy Scale-International (Yardley et al., 2005). The 16-item questionnaire provides a measure of participants’ fall-related self-efficacy (FrSe), or confidence in regards to performing a range of activities of daily living without falling. Whilst different versions have been used in previous studies assessing fear of falling (Chou et al., 2005; Gagnon et al., 2005; Kressig et al., 2001), the Falls Efficacy Scale-International was chosen as opposed to the original Falls Efficacy Scale (FES; Tinetti et al., 1990) as reports indicate that it has higher sensitivity to between group differences and good psychometric properties (Moore & Ellis, 2008; Tinetti, Mendes de Leon, Doucette & Baker, 1994). In addition, it includes instructions that accommodate for individuals who do not engage in an activity by asking them to answer based on their perceived concerns around falling if they were to do the activity activities (e.g. “how concerned are you that you might fall if you cleaned the house?”).

Response options vary from not at all concerned (1), somewhat concerned (2), fairly concerned (3) or very concerned (4), thereby providing a continuous measure of fear of falling. Scores are then added to yield a total score (maximum score= 64). The Falls Efficacy Scale-International has shown to have high internal reliability ($\alpha = 0.96$)
and test-retest reliability ($r = 0.96$) (Yardley et al., 2005). Cut points have also been established to indicate low concern (16-19), moderate concern (20-27) and high concern (28-64) of falling (Delbaere et al, 2010).

**Depression.** The *Geriatric Depression Scale Short Form* (GDS-15; Sheikh & Yesavage, 1986) was administered as a measure of symptoms of depression that was specifically designed for use within the geriatric population. The GDS-15 has been used extensively across the community-dwelling older adult population to assess individuals who are ill/well, easily fatigued, have a shorter attention span and/or have mild to moderate cognitive impairment (Greenberg, 2007). The GDS-15 can be completed in less than seven minutes and is, therefore, well suited to the older adult population. The questionnaire is presented in an easy yes/no format and asks participants to report on how they have been feeling over the past week. Cut points have been established where scores indicate normal (0-4), mild (5-8), moderate (9-11) or severe (12-15) depression (Greenberg, 2007). Previous research has shown that the GDS-15 has acceptable internal consistency ($\alpha = .79$) (Friedman, Heisel & Delavan, 2005) and validity, with a sensitivity of 85% and a specificity of 74% (Herrmann et al., 1996).

**Anxiety.** The *Geriatric Anxiety Inventory* (GAI; Pachana et al., 2007) was administered to assess for symptoms of anxiety. This is a 20-item self-report screening questionnaire developed specifically to measure anxiety within the geriatric population. The GAI has shown to be a reliable and valid instrument for assessing anxiety in older adults (Pachana et al., 2007). Participants are asked to rate items (i.e. “I worry a lot of the time”) according to how they have felt in the past week; by either ticking agree (score of 0) or disagree (score of 1). Scores are summated to provide a total score,
where the minimum possible score is 0 and the highest possible score is 20. Higher
scores representing greater anxiety. A score of 9 or above has been considered as the
optimum cut-point by which to identify individuals with the presence of clinically
significant self-reported anxiety (Pachana et al., 2007a). The GAI has been validated for
use within the community and in long-term in-care facilities (Boddice, Pachana &
Byrne, 2008; Byrne et al., 2010; Gerolimatos, Gregg & Edelstein, 2013) and has been
demonstrated to have high internal consistency in normal functioning older adults as
well as the psycho-geriatric population (α = .91 and α = .93, respectively; Pachana, et
al., 2007a).

3.2.2.2 Secondary Measures

Demographics. Participants’ demographic details and a number of health-
related variables were also measured. For the purpose of this study, information
regarding participants’ age, gender, living status, educational level, eyesight abilities,
hearing abilities and walking abilities were assessed (see Appendix B for full details of
these measurements5).

Fear-Related Activity Avoidance. This measure was assessed by asking
participants “Do you avoid certain activities due to fear of falling?”. This method has
also been used in past research assessing fear-related activity avoidance in older adults
(Tinetti et al., 1990; van Haastregt et al., 2008). Response options ranged from never,
almost never, sometimes, often or very often. Similar to van Haastregt and colleagues
(2008), this measure of fear-related activity avoidance was then dichotomized into two
separate groups where participants who answered never or almost never were

5 As this research was part of a larger study, the questionnaires assessed a number of
factors that were not analysed in the current study.
considered to have no fear-related activity avoidance (‘no fear-related activity avoidance’ group) and participants who answered sometimes, often or very often were considered to have fear-related activity avoidance (‘fear-related activity avoidance’ group).

*Physical Activity Levels.* As Chou and colleagues (2005) demonstrated that activity levels have a mediating and moderating effect on the relationship between fear of falling and depression, participants’ daily activity levels were also measured. Whilst previous studies have relied heavily on participants’ self-reported levels of activity (e.g. the Survey of Activities and Fear of Falling in the Elderly (SAFE) assessment (Lachman et al., 1998), as a strength of this study we aimed to improve the accuracy of activity levels measured in past research by obtaining an objective measure of activity levels. Therefore, participants were asked to wear a hip-mounted accelerometer (except in water) for a 7-day period. The accelerometer device records participant’s daily levels of activity in steps, and therefore, provided a measure of average daily activity levels (objective activity levels). Researchers worldwide recommend 10,000 steps as the reasonable estimate of daily activity by healthy adults (Tudor-Locke & Bassett, 2010), whereas it has been found that Australian adults aged 50 years and over average 7,400 steps per day (Australian Bureau of Statistics, 2013). The accelerometer also measures an individual’s sleep patterns, allowing for the time the participant is sleeping to be excluded from analysis (see Appendix C for the sleep diary). The use of an accelerometer is, therefore, a novel component to this study investigating fear of falling, depression and anxiety, and was included in an attempt to improve the overall measure of activity levels and the use of self-report.
In addition to an objective measure, participants’ self-report activity levels (self-reported activity levels) were also obtained. For the purpose of this study, a modified question based on the *Falls Risk for Older People- Community Setting screening tool* (FROP-Com; Russell et al., 2009) and the *International Physical Activity Questionnaire* (Booth et al., 2003) was created, where participants were asked to describe their levels of physical activity using the following response options: *very active* (exercise 3 times per week), *moderately active* (exercise once or twice per week), *not very active* (rarely leaves the house), or *inactive* (rarely leaves one room of house).

**Falls History.** A description of a fall was firstly provided (“A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level”). Participants were then asked “how many falls have you had in the past 12-months”, where response options included *none*, *one fall* or *more than one fall*. This provided a measure of the participant’s falls history (self-reported falls history).

### 3.2.3 Procedure

#### 3.2.3.1 Phase 1

Participants were recruited via information sessions held at various community centres located throughout the community in Perth, W.A. Further recruitment took place though Murdoch University information distribution channels. Individuals who were interested in participating were provided with both an information sheet and a consent form to complete (see Appendix D and E for the information sheet and consent forms, respectively). All participants provided written informed consent prior to study enrolment.
3.2.3.2 Phase 2

Participants who were eligible for the study were then contacted via phone call and a meeting time was arranged between the researcher and participant. At the initial session, the participant was invited to wear a hip-mounted accelerometer over a 7-day period in order to obtain an objective measure of activity levels. A daily sleep diary was also administered for participants to record their in and out of bed times over the 7-day period. This was used to support eliminating this time period from participants’ daily activities.

3.2.3.3 Phase 3

Following 7-days the researcher arranged a time to meet the participants where they were asked to complete a battery of questionnaires. The measures invited participants to record basic demographic details as well as information regarding fear of falling and other health-related factors. The accelerometers and completed sleep diaries were then collected from participants at this time.
Figure 3.1. Recruitment and Testing Procedures.

3.2.4 Data preparation

All completed questionnaires were examined for patterns of erroneous responding. Prior to analyses, the data were screened and each variable was examined to determine whether statistical assumptions were met and to detect for outliers and violations of normality. This included examination of the scatter plots, box plots and histograms. Each variable was also assessed for outliers, skewness, and kurtosis. As a
result, appropriate analyses were performed on each variable, and therefore, included conducting parametric and non-parametric bivariate correlation analyses, independent samples t-tests and one way ANOVAs.

3.2.5 Analytic Strategy

As a preliminary analysis, descriptive statistics (means and standard deviations or frequencies and percentages, as appropriate) were calculated for each variable for the entire sample.

A series of analyses (parametric and non-parametric bivariate correlations, independent samples t-tests and one-way analyses of variance (ANOVAs), as appropriate) were then performed between the dependent variable fear of falling (FOF item and FrSe) and independent variables (depression, anxiety and secondary variables) in order to examine for significant relationships prior to conducting a regression analysis. The secondary variables that were analysed included age, gender, walking aid use, self-reported falls history, falls history injury, and activity levels (self-report and objective), as previous literature has shown that these variables were related to fear of falling (Bruce, Devine & Prince., 2002; Chou et al., 2005; Howland et al., 1998; Kumar, Carpenter, Morris, Iuffe & Kendrick, 2014; Lachman et al., 1998; Sharaf & Ibrahim, 2008; Tinneti et al., 1994; Zijlstra et al., 2007).

A linear hierarchical multiple regression analysis was then conducted to assess whether depression or anxiety contributed to the prediction of fear of falling (FrSe). As previous literature has shown significant relationships that exist between fear of falling and a number of secondary variables that were measured, a hierarchical method of entry was used where only significant secondary variables were entered into the model first.
(Field, 2009; Tabachnick & Fidell, 2007). Therefore, in this analysis, fear of falling was the outcome variable and both age and objective activity levels were the predictor variables included at step one.\(^5\) Anxiety was the predictor variable entered at step two. Depression was not included in this analysis as results from the bivariate correlation analysis showed that depression was not significantly related to fear of falling.

A binary logistic regression analysis was also performed to assess whether depression and anxiety contributed to the prediction of fear of falling (FOF item). Due to the separate hypotheses that were made for both depression and anxiety, two separate models (model one and model two) were conducted. In each analysis, fear of falling was the outcome variable. As bivariate correlation analysis showed that both depression and anxiety were correlated with fear of falling, these variables were included as the predictor variables in each analysis. Given that gender was also significantly associated to fear of falling, this secondary variable was controlled for in each analysis.\(^6\)

The power estimation software G-Power (Faul, Erdfelder, Lang & Buchner, 2007) was used to determine sample size requirements. According to this program, a sample size of \(N = 81\) would be sufficient to detect a medium effect size in a regression analysis with three predictors, a power of .80 and a conventional alpha level of .05. All statistical analyses were performed using SPSS for Windows Version 21.0.

\(^6\) For the purpose of this regression analyses, fear-related activity avoidance was not included as a secondary variable in the regression analyses as, conceptually, it can be argued that fear-related activity avoidance is a likely result of fear of falling.
3.3 Results

3.3.1 Preliminary Analysis- Descriptives

Descriptive statistics were obtained where the means and standard deviations or the frequencies and percentiles for the entire sample were calculated. In total, 49 females and 31 males participated in this study (Total \( N = 80 \), \( M = 71.58 \), \( SD = 8.40 \) years). A full description of the demographic details for the study sample has been provided in the Appendix (see Appendix F, Table F.1).

In terms of the primary variables, the mean score on the fear of falling (FrSe) measure was 20.48 indicating that, on average, participants reported having a moderate concern in regards to their ability to complete activities without falling. For fear of falling (FOF item), 77.5% of participants were classified as having “no fear of falling”. A further 23.8% of participants noted they restricted their activities due to fear of falling. In terms of depression and anxiety, only 5% of participants scored within the mild-to-severe range for depression (score of 5-15) and only 5% reported symptoms of anxiety within the clinically significant range (score of \( \geq 9 \)).

Analysis of the secondary variables revealed that most participants reported they were married, had completed a graduate or professional degree, and were living with one or more persons. The majority of participants reported that they did not use a walking or hearing aid (93.8% and 86.4%, respectively), however, 86.4% noted that they wore glasses. Most participants had not experienced a fall or an injury from falling in the past 12-months (74.1% and 84%, respectively) and 12.3% had experienced at least one fall in the past 12-months. For activity levels, the majority of participants self-
reported that they were moderately active (48.1%). The accelerometer data (objective activity levels) indicated that participants completed, on average, approximately 6,000 steps per day. This is less than the recommended average of 10,000 steps per day for healthy adults worldwide (Tudor-Locke & Bassett, 2004), and less than the average of 7,400 steps per day that has been found for Australian adults aged 50 years and over (Australian Bureau of Statistics, 2013). Full details of the descriptive statistics for the primary and secondary variables for the entire study sample have been provided in the Appendix (see Appendix F, Tables F.2 and F.3, respectively).

3.3.2 Associations with Fear of Falling

3.3.2.1 Assumption Testing

Prior to conducting the analysis, each variable was examined to determine whether statistical assumptions were met and to detect for outliers and violations of normality (Tabachnick & Fidell, 2007). Scatter plots suggested that linearity and homoscedasticity were violated for several variables. Furthermore, examinations of distributions using box plots and histograms indicated several variables had mild-to-moderate departures from normality. There were several univariate outliers on each scale and values of skewness and kurtosis indicated that the samples of the variables departed from normality. As the parametric bivariate Pearson correlation analysis requires data to be normally distributed (Field, 2009), non-parametric correlation analyses were conducted on variables that violated this assumption. Further, not all variables were measured at either an interval or ratio level, which violated another assumption required for conducting a bivariate Pearson correlation. Analysis therefore comprised parametric and non-parametric bivariate correlations, independent samples t-
tests, one-way ANOVAs and chi-square analysis (as appropriate) in order to examine the associations between fear of falling (FrSe and FOF item) and primary and secondary variables.

As was expected, there was a medium positive association shown between fear of falling (FrSe) and anxiety (GAI; \( r_s(80) = .44, p < .001 \)). For the secondary variables that were analysed, FrSe was significantly associated with both age (\( r_s(80) = .43, p < .001 \)) and objective activity levels (\( r(77) = -.35, p = .002 \)). All other associations with FrSe (depression, gender, falls history injury and self-reported activity levels) were small and non-significant (\( p > .05 \); see Appendix G, Tables G.1, G.2 and G.3 for results). A number of variables (walking aid use and self-reported falls history) were excluded from the analysis due to the absence of variance; which resulted in violations of the assumptions required for conducting independent samples t-tests and one-way ANOVAs (Field, 2005).

For the fear of falling (FOF) item, as was hypothesized, there was a small-to-medium positive association found with anxiety (GAI; \( r_s(80) = .37, p = .001 \)) and depression (GDS-15; \( r_s(80) = .30, p = .008 \)). In terms of the secondary variables, a significant association was observed with gender (\( \chi^2(1, N = 80) = 7.48, p = .006 \)) where females were more likely to report fear of falling (32.7%) than males (6.5%). All other associations with the FOF item (age and objective activity levels) were small and non-significant (\( p > .05 \); see Appendix G, Table G.1 for the results). A number of variables (walking aid use, falls history, falls history injury and self-reported activity levels) were excluded from the analysis due to expected cell counts of less than five, which is an assumption required for conducting the chi-squared test (Field, 2005).
3.3.3 Unique Associations with Fall-Related Self-Efficacy (FrSe)

3.3.3.1 Assumption Testing

A hierarchical multiple regression was performed where fear of falling (FrSe) was the dependent variable and age, objective activity levels and anxiety were the independent variables. Prior to conducting the analysis the data were examined to determine whether the underlying assumptions for conducting a linear multiple regression analysis were met. Results of evaluation of assumptions led to transformation of the variables to improve the normality, linearity, and homoscedasticity of residuals. As transformation of the variables did not have an influence on the normality of the data, a more robust method was employed by applying a bootstrap (Efron & Tibshirani, 1993) to all cases that were included in the regression analysis in order to estimate the shape of the sampling distribution (Field, 2009). The results of the multiple regression analysis were, therefore, based on $N = 200$ bootstrapped samples with 95% confidence intervals.

3.3.3.2 Linear Hierarchical Multiple Regression Analysis

A series of bivariate Pearson correlations were performed to test the associations between primary and secondary variables with fear of falling (FrSe). Table 3.1 displays the Pearson correlation coefficients between the dependent and independent variables and the 95% confidence intervals.
Table 3.1

**Bivariate Pearson Correlations Between Fear of Falling (FrSe) and the Independent Variables Included in the Linear Hierarchical Multiple Regression Analysis (N = 77), with BCa 95% Confidence Intervals.**

<table>
<thead>
<tr>
<th></th>
<th>FrSe</th>
<th>Age</th>
<th>Activity Levels ³</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. FrSe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[0.03, 0.56]</td>
<td></td>
</tr>
<tr>
<td>3. Activity Levels ³</td>
<td>-.35</td>
<td>-.32</td>
<td>-.32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[-.54, .07]</td>
<td>[-.48, .18]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Anxiety</td>
<td>.46</td>
<td>.17</td>
<td>-.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[.14, .69]</td>
<td>[-.12, .37]</td>
<td>[-.47, .08]</td>
<td></td>
</tr>
</tbody>
</table>

*Notes:* ³ = objective activity levels (accelerometer data); 95% confidence intervals shown in brackets.

A linear hierarchical multiple regression analysis revealed that at step one, both age and objective activity levels contributed significantly to the regression model, $F(2, 74) = 6.13, p = .003$, and accounted for 14.2% of the variance in FrSe. Introducing anxiety explained an additional 13.6% of the variation in FrSe and this change in $R^2$ was significant, $F(3, 73) = 13.71, p < .001$. When all three independent variables were included in the regression model however, both age and objective activity levels were no longer significant predictors of FrSe. In the final mode, the most important predictor of
FrSe was anxiety, which uniquely explained a significant amount of the variance in FrSe. Together the three independent variables accounted for 27.8% of the variance in FrSe. Model coefficients for the linear hierarchical multiple regression analysis have been displayed in Table 3.2 below.

Table 3.2

Summary of a Linear Hierarchical Multiple Regression Analysis for Variables Predicting Fear of Falling (FrSe) (N = 77), with Bootstrapped 95% Confidence Intervals.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>95% CI</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>16.78</td>
<td>[-.93, 35.66]</td>
<td>11.08</td>
<td>–</td>
</tr>
<tr>
<td>Age</td>
<td>0.12</td>
<td>[-.12, .38]</td>
<td>0.11</td>
<td>.14</td>
</tr>
<tr>
<td>Activity a</td>
<td>-.00</td>
<td>[-.00, .00]</td>
<td>0.00</td>
<td>-.31</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>15.70</td>
<td>[-.70, 33.54]</td>
<td>9.88</td>
<td>–</td>
</tr>
<tr>
<td>Age</td>
<td>0.09</td>
<td>[-.15, .32]</td>
<td>0.10</td>
<td>.11</td>
</tr>
<tr>
<td>Activity a</td>
<td>-.00</td>
<td>[-.00, .00]</td>
<td>0.00</td>
<td>-.21</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.87</td>
<td>[.33, 2.20]</td>
<td>0.43</td>
<td>.39</td>
</tr>
</tbody>
</table>

Notes: a = objective activity levels (accelerometer data); B = unstandardized coefficient; β = standardized coefficient; p = significance value; \( R^2 = .14 \) for Step 1; \( \Delta R^2 = .14 \) for Step 2 (ps < .05); SE B = standard error of B.
3.3.4 Unique Associations with Fear of Falling (FOF Item)

3.3.4.1 Assumption Testing

Prior to conducting a binary logistic regression analysis, the data were examined to assess whether assumptions for this analysis were met. Inspection of the pattern of correlations amongst predictor variables as well as consideration of the VIF and tolerance values showed that multicollinearity was not an issue (Field, 2009). Recommendations from Tabachnick and Fidell (1996) were used to confirm the ratio of cases to independent variables was adequate. There were no issues identified in terms of screening for outliers and the data also fulfilled the assumption of independence of errors.

3.3.4.2 Binary Logistic Regression Analysis

3.3.4.2.1 Model One

A binary logistic regression analysis was conducted to test the aforementioned hypotheses. As mentioned previously, due to the separate hypotheses that were made for both depression and anxiety, two separate multiple regression models were conducted to control for the influence of gender. Therefore, in the first binary logistic regression analysis (model one) the independent variables were gender (entered at step one) and depression (entered at step two) and the dependent variable was fear of falling (FOF item). The results from this analysis can be seen in Table 3.3.
### Table 3.3

**Model One: Summary of a Binary Logistic Regression Analysis for Variables Predicting Fear of Falling (FOF Item) by Depression Controlling for Gender (N = 80), with 95% Confidence Intervals.**

<table>
<thead>
<tr>
<th>Step</th>
<th>B (SE)</th>
<th>Wald</th>
<th>Odds Ratio [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.67 (.73)</td>
<td>13.38 ***</td>
<td>.07</td>
</tr>
<tr>
<td>Gender</td>
<td>1.95 (.79)</td>
<td>6.06 *</td>
<td>7.03 [1.49, 33.20]</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-3.68 (.96)</td>
<td>14.88 ***</td>
<td>.03</td>
</tr>
<tr>
<td>Gender</td>
<td>2.42 (.91)</td>
<td>7.06 **</td>
<td>11.25 [1.89, 67.05]</td>
</tr>
<tr>
<td>Depression</td>
<td>.53 (.22)</td>
<td>5.65 *</td>
<td>1.69 [1.10, 2.61]</td>
</tr>
</tbody>
</table>

*Notes:* Fear of falling coded as 1 for *Yes* and 0 for *No*; *p < .05** **p < .01*** ***p < .001.

A test of the full model against a constant only model revealed that the model was statistically significant, indicating that the predictors as a set reliably distinguished between individuals with and without a fear of falling ($\chi^2 = 16.92$, df = 2, $p < .001$, Nagelkerke $R^2 = .29$ and Cox and Snell $R^2 = .19$).

The prediction success overall was 78.8% and the Wald criterion demonstrated that both depression and gender made a significant contribution to prediction. The odds ratio for depression indicated that when depression is raised by one unit (i.e. one symptom of depression), the odds ratio is 1.69 with a 95% confidence interval of [1.10 –
2.61]. This suggests that individuals who report depressive symptoms are 70% more likely to report fear of falling compared to individuals who do not report depressive symptoms. For gender, the odds of reporting fear of falling are 11 times greater in females compared to males.

3.3.4.2.2 Model Two

In the second logistic regression model (model two), the independent variables were gender (entered at step one) and anxiety (entered at step two) and fear of falling (FOF item) was the dependent variable. The results can be seen in Table 3.4.

Table 3.4

Model Two: Summary of a Binary Logistic Regression Analysis for Variables Predicting Fear of Falling (FOF Item) by Anxiety Controlling for Gender (N = 80), with 95% Confidence Intervals.

<table>
<thead>
<tr>
<th></th>
<th>B (SE)</th>
<th>Wald</th>
<th>Odds Ratio [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.67 (.73)</td>
<td>13.38</td>
<td>.07</td>
</tr>
<tr>
<td>Gender</td>
<td>1.95 (.80)</td>
<td>6.06 *</td>
<td>7.03 [1.49, 33.20]</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.98 (.76)</td>
<td>15.54 ***</td>
<td>.05</td>
</tr>
<tr>
<td>Gender</td>
<td>1.71 (.81)</td>
<td>4.47 *</td>
<td>5.51 [1.13, 26.83]</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.23 (.10)</td>
<td>4.91 *</td>
<td>1.26 [1.03, 1.54]</td>
</tr>
</tbody>
</table>

Notes: Fear of falling coded as 1 for Yes and 0 for No; * p <.05 ** p <.01 *** p <.001.
A test of the full model against a constant only model revealed that the model was statistically significant, indicating that the predictors as a set reliably distinguished between individuals with and without a fear of falling, $\chi^2 = 15.63$, df = 2, $p < .001$, Nagelkerke $R^2 = .27$ and Cox and Snell $R^2 = .18$.

The prediction success overall was 81.3% and the Wald criterion demonstrated that both anxiety and gender made a significant contribution to prediction. The odds ratio for anxiety indicated that when anxiety is raised by one unit (i.e. one symptom of anxiety), the odds ratio is 1.26 with a 95% confidence interval of [1.03 – 1.54]. This suggests that individuals who report anxiety symptoms are 26% more likely to report fear of falling than people who do not report anxiety symptoms. For gender, the odds of reporting fear of falling are five times greater in females compared to males.

### 3.4 Discussion

#### 3.4.1 Hypothesis I: Associations between Fear of Falling and Depression

The present study aimed to examine the relationships between fear of falling and symptoms of depression. We hypothesized there would be a significant association between depression and fear of falling (fear of falling item and fall-related self-efficacy), and further, that depression would independently predict fear of falling. Similar to previous research (Arfken et al., 1994; Burker et al., 1995; Hull et al., 2013; Kressig et al., 2001; van Haastregt et al., 2008) results partially supported this hypothesis in that a significant and positive association was found between the fear of falling item and depression symptoms. That is, participants who reported symptoms of depression were also more likely to report having a fear of falling. Contrary to
predictions, however, consistent with Hull and colleagues (2013) there was no significant association found between fall-related self-efficacy and depression symptoms. This therefore implies that participants’ falls-efficacy, or confidence in performing daily activities without falling, was not related to symptoms of depression.

One explanation for the above findings is that whilst depressive symptoms may be related to the individual’s reported fear of falling, these symptoms may not have an impact upon the individual’s confidence in their abilities to carry out activities without falling. That is, the depressive symptoms may not impact upon the individuals’ direct behaviours, in that individuals may choose to continue with their daily activities regardless of their fears. This is supported by the results in this study, where 33% of the individuals who reported fear of falling did not report associated fear-related activity avoidance, thus suggesting they continued with their activities regardless. Furthermore, a total of 22.5% of the sample self-reported they were moderately active and, therefore, that they exercised one-to-two times per week. As higher levels of activity performance has also shown to be associated with higher fall-related efficacy (Schepens, Sen, Painter & Murphy, 2012), the higher levels of activity engagement in this study may also explain why symptoms of depression were not related to fall-related self-efficacy.

In terms of the ability for depression symptoms to predict fear of falling, analysis revealed that depression symptoms were a significant predictor of the fear of falling item after adjusting for gender. This result supports previous studies that have shown depression significantly predicts fear of falling (Austin et al., 2007; Gagnon et al., 2005; Kressig et al., 2001; van Haastregt et al., 2008). Whilst past research has investigated the relationships between depression and fear of falling, our study has
advanced this knowledge in several important ways. For example, unlike several previous studies where generalized measures of depression have been used, the current study used a measure of depression (the GDS-15) that is specific to the geriatric population. This was considered to be important given that symptoms of depression manifest differently in older adults compared to young adults (Fiske et al., 2009). Furthermore, whereas past research (Gagnon et al., 2005; Kressig et al., 2001; van Haastregt et al., 2008) had included only those individuals who reported fear of falling in addition to a falls history and/or fear-related activity avoidance, the current study included individuals both with and without fear of falling and/or a falls history and/or fear-related activity avoidance. Unlike previously (i.e. Austin et al., 2007), we also investigated a sample of both male and female community-dwelling older adults living in Australia. Addressing the above limitations has, therefore, assisted in generalizing results to the wider community-dwelling older adult population.

Given the significant association between depression and fear of falling that was found, the clinical implications highlight the importance for multi-disciplinary team members, such as Occupational Therapists and Psychologists, to screen for symptoms of depression when assessing older adults who may be at risk of falls. Furthermore, clinicians who work with older adults with depressive symptoms should also screen for fear of falling, which may be an important factor to target in terms of falls prevention. This would allow such individuals to be identified and included in falls prevention treatments. Findings also imply that when implementing treatments to reduce falls in community-dwelling older adults, it may be beneficial to target symptoms of depression and/or fear of falling. For example, clinicians could use evidence-based psychological
therapies for older adults, such as Cognitive Behavioural Therapy (CBT). Indeed, CBT approaches tailored to fear of falling have shown success, where both cognitive restructuring and behavioural change to improve self-efficacy and sense of control over falling has demonstrated improvements in fear of falling (Iaboni & Flint, 2013; Zijlstra et al., 2009). However, as studies have shown mixed results in terms of whether this approach can prevent falls and increase activity levels (Tennstedt et al., 1998; Zijlstra et al., 2009), it has been suggested that psychological therapies take place using a multi-factorial approach, such as alongside an effective exercise intervention (Iaboni et al., 2015; Oh et al., 2012). For example, research has shown that Tai Chi programs can reduce the number of falls, risk of falling and fear of falling in older adults (Fuzhong et al., 2005). Individuals who have been identified as being at risk of falling should therefore be included in such interventions alongside CBT programs.

In addition to the above, as caregivers have shown to be instrumental in increasing older adults’ engagement in pleasant activities (Fiske et al., 2009), it may also be beneficial for clinicians to consider involving family members. For example, clinicians could involve family members in both the initial assessment and treatment planning for community-dwelling older adults who are identified as being at risk of falls. This may improve older adults’ treatment adherence and outcomes and overall, assist in reducing future falls risk.

3.4.2 Hypothesis II: Associations between Fear of Falling and Anxiety

A second aim of this research was to examine the relationship between fear of falling (fear of falling item and fall-related self-efficacy) and anxiety symptoms. It was hypothesized that anxiety would be significantly associated with fear of falling and
further, that it would independently predict fear of falling in the sample of community-dwelling older adults.

The above predictions were supported, where findings showed that symptoms of anxiety were significantly and positively associated with fear of falling (fear of falling item and fall-related self-efficacy). Analysis revealed that after adjusting for covariates, anxiety symptoms were also a significant independent predictor of both the fear of falling item and falls-related self-efficacy. Specifically, results imply that individuals who reported symptoms of anxiety were also more likely to report fear of falling than individuals who reported no symptoms of anxiety. Furthermore, findings imply that participants who reported increased symptoms of anxiety were also more likely to report a lower falls-efficacy, or confidence in their abilities to carry out activities without falling.

The significant association between symptoms of anxiety and fear of falling corresponds with previous research (Delbaere et al., 2010; Drozdick & Edelstein, 2001; Hull et al., 2013; Painter et al., 2012). Furthermore findings are consistent with results from a recent systematic review and meta-analysis which showed that anxiety is moderately and significantly associated with fear of falling (Payette et al., 2016). However, unlike several past studies that have included only hospitalized patients who have fallen and/or individuals with associated activity avoidance (Gagnon et al., 2005; van Haastregt et al., 2008), this study assessed older adults with and without a falls history and/or fear of falling. Inclusion of such participants was considered important given that fear of falling may also exist in older adults who have not previously fallen (Painter et al., 2012). In addition, unlike past research, this study examined both male
and female community-dwelling older adults living in Australia and, therefore, accounted for possible cross-cultural differences that exist.

Moreover, whereas the majority of past research has administered more generalized measures of anxiety (Gagnon et al., 2005; van Haastregt et al., 2008), the current study used the GAI; a measure specifically developed to assess anxiety in the geriatric population. This was considered a strength of our study given that anxiety is known to manifest differently in the older adults compared to younger adults (Kogan et al., 2000). Whilst Hull and colleagues (2013) also used the GAI measure, this investigation took place in a sample of community-dwelling older adults in the United Kingdom. Current results, therefore, confirm previous findings using a measure of anxiety specific to the geriatric population in a sample of community-dwelling older adults living in Australia.

Several explanations exist for the current findings. As discussed earlier in Chapter 2, it has been proposed that certain personality traits, such as anxiety, may contribute to the development of fear of falling (Tinetti et al., 1990). Therefore, fear of falling may be an expression of generalized anxiety; similar to other fears that older adults’ experience (Lawrence et al., 1998). Accordingly, older adults who have trait anxiety may perceive the aging process as well as their entire life situation as threatening (Sharaf & Ibrahim, 2008), which may then lead to fear of falling. Another explanation is that fear of falling may result as a consequence of a fall, which then leads to anticipatory anxiety in regards to future falls (NICE, 2004). As this study was a cross-sectional design, however, a causal relationship between anxiety and fear of falling
cannot be inferred. Future investigation employing a longitudinal design is therefore necessary to clarify the relationship between fear of falling and anxiety.

Nonetheless, from a clinical viewpoint the results coupled with previous findings highlight that clinicians who work with older adults who present with anxiety symptoms should also screen for fear of falling. This factor may play an important role in terms of clinical case formulations, such as the identification of factors that may serve to maintain the individual’s anxiety. Furthermore, results highlight the importance of targeting symptoms of anxiety when implementing falls prevention programs. That is, individuals who are involved in delivering falls prevention programs in older adults should also assess for underlying symptoms of anxiety. This would enable clinical interventions to address anxiety and associated fear of falling and potentially enhance outcomes of falls prevention outcomes. Across the literature it has been found that the primary components of interventions aimed at reducing fear of falling include the use of education, a review of risk-taking behaviours, environmental safety considerations, assertiveness training and physical exercise (Legters, 2002). Whilst interventions, in the past, for fear of falling have shown mixed results (Cameron et al., 2000; Tennstedt et al., 1998; Tinetti et al., 1994; Wolf et al., 1996), the present findings suggest that targeting anxiety may be an integral component of successful treatment of fear of falling. This may be achieved by administering CBT; which has been effective in treating older adults (Hendriks, Voshaar, Keijsers, Hoogduin & Balkom, 2008). For example, the therapeutic techniques employed in CBT could be used to target negative thinking patterns around the individual’s confidence in their ability to not fall whilst engaging in activities. The individual could then be encouraged to identify a more ‘balanced
thought’ in terms of their ability to engage in an activity, which may assist with their confidence levels.

As per the National Institute for Health and Care Excellence (2013) recommendations, the above psychological treatment should take place using a multi-disciplinary approach, such as alongside strength and balance training. Also important to consider is that older adults have shown to appear more reluctant to seek help from mental health professionals (Conner et al., 2010; De Beurs et al., 1999). For this reason, it has been suggested that interventions that follow a more naturalistic structure may be more successful (Gonçalves & Byrne, 2012). For example, previous research has shown that older adults with anxiety symptoms are more willing to attend psycho-educational classes rather than participating in a group therapy setting (Arean, Alvidrez, Barrera, Robinson & Hicks, 2002). Such factors should be acknowledged when implementing interventions to target anxiety and fear of falling in community-dwelling older adults.

For example, it may be more useful for clinicians to provide psycho-educational classes on the prevalence and consequences of falls in addition to individual therapy in order to target symptoms of anxiety and fall-related self-efficacy.

3.4.3 Hypothesis III: Associations between Fear of Falling and Secondary Variables

Consistent with predictions, a number of secondary variables showed significant associations with measures of fear of falling. For example, there was a significant positive association found between fear of falling (fall-related self-efficacy) and age. This suggests that individuals who are older also report higher levels of fear of falling, or less confidence in their ability to complete daily activities without falling.
These results support findings reflected throughout the literature (Arfken et al., 1994; Howland et al., 1998; Malini et al., 2015; Sharaf & Ibrahim, 2008; van Haastregt et al., 2008; Vellas, Wayne, Romero, Baumgartner & Garry, 1997). There was also a significant negative relationship found between fear of falling (fall-related self-efficacy) and objective activity levels, thus, suggesting participants who had lower average daily activity levels (as measured by the accelerometer device) also reported higher levels of fear of falling, or less confidence in their abilities to perform daily activities without falling. This supports findings throughout the literature which have shown that fear of falling is associated with activity curtailment, or an increase in activity avoidance (Howland et al., 1993; Howland et al., 1998; Jefferis et al., 2014; Luukinen, Koski, Kivela & Laippala, 1996; Malini et al., 2015; Petrella, Payne, Myers, Overend & Chesworth, 2000; Tinetti et al., 1994).

Although these findings support existing literature, regression analysis revealed that whilst both age and objective activity levels demonstrated independent associations with fear of falling at step one, when anxiety was entered into the regression model both age and objective activity levels were no longer significant predictors of fall-related self-efficacy. This suggests that symptoms of anxiety play an integral role in fear of falling, above and beyond that of both age and activity levels. In terms of the clinical implications, this further highlights the importance of assessing for symptoms of anxiety in older adults regardless of the individual’s age and daily activity levels.

In addition to both depression and anxiety, gender demonstrated to have a unique association and prediction with fear of falling (fear of falling item). In particular, it was found that females were more likely than males to report fear of falling. This
finding is consistent with reports throughout the literature (Arfken et al., 1994; Hull et al., 2013; Kressig et al., 2001; Lawson & Gonzalez, 2014; Malini et al., 2015; Oh-Park et al., 2011).

In contrast to past research (Arfken et al., 1994; Austin et al., 2007; Howland et al., 1993; Howland et al., 1998; Kressig et al., 2001, Lachman et al., 1998; Luukinen et al., 1996; Malini et al., 2015; Petrella et al., 2000; Sharaf & Ibrahim, 2008; Tinetti et al., 1994), all other secondary variables showed non-significant associations with measures of fear of falling. A possible reason for this is that there were a number of variables that were unable to be examined due to the limited variability in each of these measures, therefore, violating the assumptions that were required to conduct the appropriate statistical analysis. For example, only four participants (4.9%) in the current sample reported use of a walking aid compared to 76 participants (93.8%) who reported no use of a walking aid. There are several explanations for the above, such that the majority (80%) of the community-dwelling older adults recruited in this study sample had also volunteered to participate in an exercise program. A study by Halbert, Silagy Finucane, Withers and Hamdorf (1999) found that older adults who volunteer in exercise intervention studies tend to be healthier and more interested in physical activity than are those older adults who do not participate. Whilst the current study aimed to reduce this bias by also recruiting participants from the community separate to this exercise program, this may have potentially had an influence on results. The limited variance for each of the secondary factors that were measured suggests that additional research would be beneficial in order to determine whether similar findings occur in a more diverse sample of community-dwelling older adults.
3.4.4 Limitations and Areas for Future Research

As mentioned previously, strengths of the current study include having used both measures of depression and anxiety that were specifically developed for use in the geriatric population. Furthermore, unlike previous studies investigating the relationships between fear of falling, depression and anxiety (Austin et al., 2007; Gagnon et al., 2005, van Haastregt et al., 2008) this study relied less heavily on self-reported activity levels by administering a hip-mounted accelerometer to measure participants’ activity levels. In terms of the sample population, another strong point of our study exists in that unlike past research (see Chapter 2, Table 2.1 for eligibility criteria in previous studies), individuals were eligible to participate regardless of whether or not that had a fear of falling, falls history and/or fear-related activity restriction. Therefore it can be argued that our results can be generalized to the wider community-dwelling older adult population.

Despite the above noted strengths, there are some limitations. Firstly, it is important to recognize that this study was a cross-sectional design and therefore a causal relationship cannot be inferred from the results that were found. Future studies should aim to investigate these relationships using a longitudinal design in order to examine whether or not the relationships that were found are causal in nature.

Furthermore, it is evident that there was limited variability in symptoms of anxiety, depression and other secondary factors in this study sample which may have influenced these results. For example, only four participants were classified as experiencing severe symptoms of anxiety and only one participant was classified as experiencing moderate symptoms of depression; with no participants who reported
severe symptoms of depression. This finding was somewhat unexpected, particularly given that high rates of anxiety in community-dwelling older adults has been reported in the existing literature (Byrant et al., 2008). Whilst we aimed to recruit individuals separate to the exercise program being offered in an attempt to reduce selection bias, it is possible that the individuals who volunteered to participate are more active and in better health compared to those who chose not to participate in the study (Halbert et al., 1999). In addition, the sample characteristics in this study may assist in providing an explanation for the limited variability in study measures. For example, one of the main community centres from which participants were recruited includes on-site facilities, such as a gym, pool, arts and craft centre and regular announcements for community events. Therefore, it is possible that symptoms of anxiety and depression were less prevalent in this particular community-dwelling older adult population, where facilities aimed at improving and maintaining health status are readily available. The relatively low number of participants who scored within the higher range for depression and anxiety symptoms in this sample raises a question about how well the findings relate to other sample populations where depression and anxiety is more prevalent. Further replication is required with broader community samples to assess the external validity of our findings. Whilst the current study was constrained by the available recruitment sources, a larger sample size inclusive of a more diverse sample of older adults from different community living environments would enhance generalizability of findings. Furthermore, due to high comorbidity rates of depression and anxiety (Smalbrugge et al., 2005), future research could possibly examine the potential relationship between fear
of falling and individuals who experience comorbid symptoms of depression and anxiety.

3.4.5 Conclusions

Overall, approximately 22.45% of the sample of community-dwelling older adults indicated they experience some level of fear of falling according to the fear of falling item. Furthermore, on average, participants reported experiencing a moderate level of concern in regards to their confidence in their ability to carry-out activities without falling, as indicated by the fall-related self-efficacy measure. This finding was independent of whether or not the participant had experienced a fall in the previous 12-months. Such rates are slightly lower than the reported prevalence of fear of falling in community-dwelling older adults in previous literature (Downton & Andrews, 1990; Kressig et al., 2001; Painter et al., 2012). For fear-related activity avoidance, a total of 19 participants (23.8%) noted they restricted their activities due to fear of falling. In this sample, this is also somewhat less than reports throughout the literature, which suggest that up to two-thirds of older adults with fear of falling also report fear-related activity restriction (Martin, Hart, Spector, Doyle & Harari, 2005; Murphy et al., 2002; Zijlstra et al., 2007).

Nonetheless, in terms of the overall clinical implications, the results suggest that whilst both depression and anxiety were shown to be associated with fear of falling, anxiety is a particularly important factor that was consistently associated with fear of falling. Implications suggest that clinicians should screen for fear of falling when working with community-dwelling older adults who present with symptoms of anxiety and depression. Importantly, measures appropriate to the geriatric population, such as
the GAI measure, should be used. Regular screening should particularly take place for female community-dwelling older adults, who reported fear of falling more frequently in this study compared to males. For interventions aimed at reducing falls risk, findings further imply that it important for treatments to address symptoms of depression and anxiety that may be associated with fear of falling. As this study also included older adults who have not experienced a previous fall, it is further recommended that clinicians assess for fear of falling regardless of whether or not the individual has experienced a fall.
CHAPTER FOUR

STUDY TWO: AN INVESTIGATION OF FEAR OF FALLING, DEPRESSION AND ANXIETY IN THE EXTENDED CARE POPULATION

4.1 Introduction

Research exploring the relationships between fear of falling, depression and anxiety has focused largely on older adults living in the community. In contrast, very few studies have examined these relationships in the extended care population of older adults using a quantitative approach. Furthermore, strong conclusions from existing research on the extended care older adult population are problematic, in that some studies have found significant relationships between these factors whilst others have not (Chou et al., 2005; Franzoni and colleagues, 1994; Sharaf & Ibrahim, 2008; Tinetti et al., 1990). There also exist methodological limitations, such as the use of measures of depression and anxiety that are not specific to the geriatric population, which are a potential source of bias. For example, depressive symptoms can present differently in later life than they do in earlier adulthood (Fiske et al., 2009). Also, the assessment of anxiety among residents of extended care facilities also presents a challenge, due to levels of cognitive impairments and other considerations (Boddice et al., 2008). Consequently, previous studies may not have captured the full extent to which depression and anxiety were present in these sample populations when these investigations took place.
Quantitative studies help to understand the distribution, magnitude or frequency of fear of falling and its statistical relationship with depression and anxiety. However, quantitative studies may be limited in providing a deeper understanding of these relationships from an individual’s perspective. In contrast, qualitative studies allow for a more in-depth exploration of complex issues, such as an individual’s attitudes and motivations (Stead, Wimbush, Eadie & Teer, 1997), which may not be captured on self-report questionnaires. Moreover, they can capture the contextual factors that affect the experience of the individual (Barg et al., 2006). Despite these advantages, there is an absence of qualitative studies providing insight into older adults living in extended care facilities and their views on fear of falling. Given that falls are up to 2-3 times greater within extended care facilities compared to the community (NICE, 2004; 2013), further qualitative studies exploring the factors related to fear of falling in this population are an important compliment to quantitative approaches. Such factors may then be targeted by clinicians to enhance falls prevention interventions.

A systematic review of qualitative studies investigating falls prevention in older adults revealed that most studies have investigated older adults’ views on strategies to reduce falls, with very few examining the participant’s perceptions, motivations and barriers to physical activity (McInnes & Askie, 2004). Also, qualitative studies which have looked specifically at fear of falling (e.g. Bruce et al., 2002; Kong, Lee, Mackenzie & Lee, 2002; Mahler & Sarvimäki, 2011; Trujillo, Painter & Berry, 2014) have focused on the community-dwelling population, with limited qualitative findings available on the extended care older adult population. To our knowledge, no previous studies have
employed a mixed-method approach to examine the associations between fear of falling, depression, and anxiety in older adults living in extended care facilities.

The purpose of this study was to address the above gap by employing a mixed method exploratory approach where qualitative data was collected within the context of a quantitative study. Understanding the nature and experience of falls and fear of falling in this population of older adults is important for several reasons. For example, it may be possible for multi-disciplinary team members at extended care facilities to readily identify individuals at risk of falls so that they can receive the appropriate physical and psychological interventions. For clinicians, knowledge about the relationships between fear of falling, depression, and anxiety may enable fear of falling to be addressed in individuals who present with depression and anxiety, and perhaps even play a stronger role in falls prevention. In addition, an understanding of the factors associated with fear of falling will allow for a stronger formulation of the individual’s presenting issues, which will contribute to the effectiveness of the treatment provided (Hayes, Nelson & Jarrett, 1987). Based on the previous research, the following hypotheses were derived:

4.1.1 Hypotheses

I. Depression symptoms will be significantly associated with fear of falling.

II. Anxiety symptoms will be significantly associated with fear of falling.

III. Secondary variables (age, gender, walking aid use, self-reported health status, activity levels (self-reported and objective), falls history (self-reported and objective), and fear-related activity avoidance) that were measured will be significantly associated with fear of falling, as suggested in the literature.
4.2 Method Overview

As there is limited research using a mixed-method approach in this population, a pilot study was conducted at an extended care facility in metropolitan Western Australia in order to test the feasibility of the larger study. For example, assessing the time it may take to complete a battery of questionnaires, in addition to participating in an interview, were considered important in terms of minimizing the issue of time burden on participants.

4.2.1 Pilot Study

An information session was held at West Australian extended care facility where a total of 12 participants volunteered to complete the questionnaires. Of these participants a further six individuals volunteered to participate in the semi-structured interviews aimed at assessing fear of falling and participants’ views on falls.

The pilot study was intended to pilot the study protocols rather than for statistical analysis and this provided important information about implementing the study on a broader scale. Firstly, participants on average took 45-minutes to complete the questionnaire; which was deemed to be too long when considered in addition to the interviews. Therefore, the semi-structured interview questions were reduced to minimize time burden, the selection of which was guided by the literature and pilot interviews. Furthermore, as participants were unable to remove the hip-mounted accelerometer from their waist with ease, it was decided that an independent measure of participant’s daily activity would be obtained from the database located at the extended care facility.
4.2.2 Main Study

4.2.2.1 Participants

Participants were recruited from a group of five extended care facilities in metropolitan Western Australia that agreed to participate in the study. In total, 38 females and 9 males participated (Total $N = 47$, $M = 85.36$ years, $SD = 8.13$ years). Of the above sample, a further 12 participants (11 females, 1 male) also volunteered to participate in the semi-structured interviews. Ethics approval was obtained prior to conducting the study (see Appendix H).

Inclusion criteria were males and females aged 60 years and above who were able to provide informed consent. Cognitive functioning was assessed using the Psychogeriatric Assessment Scale (PAS; Jorm & Mackinnon, 1995) as this is the standard cognitive assessment used within extended care facilities in Australia (Australian Government Department of Social Services, 2014). The Cognitive Impairment Scale (a subscale of the PAS) uses nine questions to determine the individual’s memory and other cognitive functions (Jorm & Mackinnon, 1995). Scores are then summed to indicate *no or minimal impairment* (0-3), *mild impairment* (4-9), *moderate impairment* (10-15) or *severe impairment* (16-21). Individuals who showed moderate to severe impairments in cognitive functioning were excluded from the study.
4.2.2.3 Questionnaires: Measures and Procedures

Information sessions were held at five extended care facilities across Perth, Western Australia. All participants provided written informed consent prior to study enrollment (see Appendix I for consent form).

4.2.2.3.1 Primary Measures

Fear of Falling. The fear of falling construct was measured in two ways in the current study. Firstly, a single item was used to assess fear of falling by asking the question: “Are you afraid of falling?”. Response options included never, almost never, sometimes, often or very often. Similar to previous research (Austin et al., 2007; Gagnon et al., 2005; van Haastregt et al., 2008; Zijlstra et al., 2007), we categorized answers into two groups; fear of falling (sometimes, often or very often) and no fear of falling (never or almost never) to provide a dichotomous measure of fear of falling (FOF item).

Secondly, fear of falling was also assessed using the Falls Efficacy Scale-International (Yardley et al., 2005). Specifically, this is a measure of fall-related self-efficacy (FrSe) and includes instructions that accommodate for individuals who do not engage in an activity by asking them to answer based on their perceived concerns around falling if they were to do the activities. This questionnaire, therefore, caters to residents of extended care facilities where services, such as cleaning, may be provided by care staff. Response options vary from not at all concerned (1), somewhat concerned (2), fairly concerned (3) or very concerned (4). Cut points have also been established
to indicate low concern (16-19), moderate concern (20-27) and high concern (28-64) of falling (Delbaere et al, 2010).\(^7\)

**Depression.** The *Geriatric Depression Scale Short Form* (Sheikh & Yesavage, 1986) was used to measure depression. As this measure can be completed in 7-minutes (Greenberg, 2007) and is presented in an easy yes/no format, it was considered to be appropriate for this population. Cut points have been established where scores indicate normal (0-4), mild (5-8), moderate (9-11) or severe (12-15) depression (Greenberg, 2007). The GDS-15 has also been used extensively in older adults living in the community as well as acute and long-term settings (Greenberg, 2007).\(^6\)

**Anxiety.** The *Geriatric Anxiety Inventory* (GAI; Pachana et al., 2007a) was used in this study to assess the relationship between fear of falling and anxiety using a measure specific to the geriatric population. Importantly, this 20-item self-report measure has been validated for use in long-term in-care facilities (Boddice, et al., 2008; Gerolimatos et al., 2013) and has demonstrated high internal consistency amongst healthy older adults in addition to the psycho-geriatric population (\(\alpha=0.91\) and \(\alpha=0.93\), respectively; Pachana, et al., 2007a). Scores are summed to provide a total score and therefore the minimum possible score is 0 and the highest possible score is 20 with higher scores representing greater anxiety. A score of 9 or above has been considered as the optimum cut-point by which to identify individuals with the presence of clinically significant self-reported anxiety (Pachana et al., 2007a).\(^6\)

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\(^7\) For information regarding the psychometric properties of this measure, please refer to Chapter 3, section 3.2.2.1.
4.2.2.3.2 Secondary Measures

Demographics. Participants’ demographic details and a number of health-related factors were also measured as secondary variables. This included information regarding participants’ age, gender, living status, educational level, eyesight abilities, hearing abilities, walking aid use and perceived health status (see Appendix J for full details of the above measures).

Fear-Related Activity Avoidance. This was assessed by asking participants the question: “Do you avoid certain activities due to fear of falling?” This single item method has been employed in previous studies (van Haastregt et al., 2008; Zijlstra et al., 2007) and was, therefore, used in the current study to allow for comparison. Response options included never, almost never, sometimes, often or very often. This variable was then dichotomized into two groups; fear-related activity avoidance (sometimes, often or very often) and no fear-related activity avoidance (never or almost never), similar to previous research (van Haastregt et al., 2008).

Falls History. As falls history relates to fear of falling (Malini et al., 2015; van Haastregt et al., 2008) this measure was also obtained. A description of a fall was provided (“A fall is defined as “an event which results in a person coming to rest inadvertently on the ground or floor or other lower level” (WHO, 2012). Participants were then asked “how many falls have you had in the previous 12-months?”. Response options included none, one fall or more than one fall. This measure provided a self-report measure of participants’ falls history (self-reported falls history).

We also obtained an objective measure of participants’ falls history over the past 12-months (objective falls history) by collecting information recorded by care staff
on each facility’s data base. This was in order to minimize the possibility of recall errors, or under-reporting or over-reporting of previous falls occurring.

*Physical Activity Levels.* Previous studies have relied on participants’ self-reported levels of activity (e.g. the Survey of Activities and Fear of Falling in the Elderly; Lachman, et al., 1998). As the pilot study identified that it was not feasible to ask participants to wear hip-mounted accelerometers (as used in study one), each participant’s record of activity attendance from the facility database was obtained. Whilst this is not a validated measure, it was used for the purpose of this study to reduce the potential for participant burden, which could have resulted from administering the hip-mounted accelerometers. The facility-based activities were recorded by care staff and included a range of cognitive (e.g. board games, bingo and quizzes), social (e.g. high teas), motor (e.g. carpet bowls and art groups) and spiritual-based activities (e.g. church services). The number of facility-based activities that each participant had attended over the past 7-days was, therefore, obtained to provide a weekly average number of activities attended (objective activity levels).

Participants’ self-reported activity levels (self-report activity levels) were also measured by using a modified question based on both the Falls Risk for Older People-Community Setting screening tool (FROP-Com; Russell et al., 2009) and the International Physical Activity Questionnaire (Booth et al., 2003). Participants were asked to describe their levels of physical activity from *very active* (exercise 3 times per week), *moderately active* (exercise once or twice per week), *not very active* (rarely leaves the house) or *inactive* (rarely leaves one room of house).
4.2.2.4 Interviews: Questions and Procedures

Participants who completed the questionnaire package were also invited via an information letter to participate in a 30-minute semi-structured interview (see Appendix K for information letter). This letter included an explanation that the researcher was interested in interviewing a range of participants (e.g. a range of individuals from no fear of falling to severe fear of falling), and therefore, that participants may or may not be selected to participate. Unlike previously where only individuals who express fear of falling have been included (van Haastregt et al., 2008), the purpose of this was to capture variation in levels of fear of falling within the study sample. This was in order to enhance our understanding of the experience of older adults who do not express fear of falling, which could be used to inform clinical intervention and promote resilience. Furthermore, sampling a wide range of experiences was considered important so that clinicians are able to understand older adults who may present differently and who may require a more individualized treatment plan.

Appointments for the interviews were made in concert with the participant and a time was chosen that met the needs of the individual to keep the burden as low as possible. All interviews were held at the participant’s extended care facility. After consent was provided (see Appendix I for consent form) the interviews were recorded on an MP3 recorder and later transcribed verbatim. The interviews had no fixed duration and ended when no new information was brought forward; all interviews were completed within 25 minutes.

A total of 12 interviews were conducted. The open-ended interview questions were based on the conclusions made from the pilot study (see section 4.2.1) in an aim to
obtain each individual’s views and personal experiences of falls and fear of falling. The main topics covered were participants’ views on fear of falling, the impact of fear of falling on their daily activities, beliefs around the causes and consequences of falls and possible efforts to prevent falls (see Appendix L for interview questions).

The style of the interview was such that the respondent directed and structured the conversation. The interview followed the participants’ responses and the interviewer checked afterwards whether all topics, as derived from the predetermined topic list, were discussed (Kvale, 1996). Both probing and listening were essential and care was taken to prevent common pitfalls, such as outside interruptions, jumping from one subject to another and the temptation to counsel respondents (Field & Morse, 1989).

4.3 Results

4.3.1 Associations between Questionnaire Measures

4.3.1.1 Overview of Study Analysis

The study aimed to examine the associations between fear of falling (FOF item and FrSe), depression and anxiety. The relationships between fear of falling and a number of secondary factors was also explored (age, gender, walking aid use, activity levels (objective and self-reported), self-reported health status, falls history (objective and self-reported) and fear-related activity avoidance) as these variables have shown to be significantly related to fear of falling in previous research (Bruce et al., 2002; Howland et al., 1998; Kumar et al., 2014; Lachman et al., 1998; Sharaf & Ibrahim, 2008; Tinneti et al., 1994; Zijlstra et al., 2007).
Descriptive statistics were firstly obtained as a preliminary analysis, where the means and standard deviations or frequencies and percentages were calculated for all variables. For the main analysis, bivariate correlations, independent samples t-tests, chi-squared tests and one-way ANOVAs, as appropriate, were performed in order to examine the aforementioned associations between variables.

4.3.1.2 Analytic Strategy

All statistical analyses were performed using SPSS for Windows version 21.0. Due to the sample size of the study, analyses are necessarily exploratory in nature.

Prior to analyses the data was screened and each variable was examined to determine whether statistical assumptions were met and to detect for outliers and violations of normality. This included examination of the scatter plots, box plots and histograms. Each variable was also assessed for outliers, skewness and kurtosis. As a result, appropriate analyses were performed on each variable and therefore included conducting parametric and non-parametric bivariate correlation analyses, independent samples t-tests, chi-squared tests and one-way ANOVAs.

4.3.1.3 Preliminary Analysis- Descriptives

Prior to determining whether significant associations exist, descriptive statistics were obtained for the entire sample ($N = 47$). As such, the means and standard deviations or frequencies and percentages (as appropriate) were calculated.

In terms of the primary variables, the mean fear of falling (FrSe) score was 34.26 indicating that, on average, participants reported having a high level of concern in regards to their ability to complete activities without falling. For fear of falling (FOF
item), most participants (64.6%) were classified in the ‘fear of falling’ group. In terms of depression symptoms (GDS-15), the majority of participants (62.5%) scored within the normal range (score between 0-4), where 4.2% were classified as having severe depression (score between 12-15). For anxiety (GAI), 19.1% of the sample reported symptoms of anxiety within the clinically significant range (score of ≥ 9).

Analysis of the secondary variables revealed that most participants reported that they were widowed (62.5%) and lived alone (79.2%). Consistent with other health-related measures (e.g. eyesight and hearing abilities), 45.8% self-reported their health status was fair (45.8%). A large number of participants (85.4%) self-reported they use a walking aid. In terms of activity levels, the majority of participants (47.9%) self-reported they were very active and exercised three or more times per week. Objective measures of activity levels revealed that, on average, participants attended only one facility-based activity per week. In total, 48.9% of participants were classified as avoiding daily activities due to their fear of falling. In terms of falls history, the majority of participants (54.2%) self-reported no falls in the past 12-months and 22.9% reported three or more falls. Objective data obtained revealed that 64.6% had no falls in the past 12-months and 8.3% had three or more falls. Full details of the descriptive statistics for the primary and secondary variables for the entire study sample have been provided in the Appendix (see Appendix M, Tables M.1, M.2 and M.3).

4.3.1.4 Associations with Fall-Related Self-Efficacy (FrSe)

A number of analyses (bivariate correlations, independent samples t-tests and one way ANOVAs, as appropriate) were conducted in order to examine associations and differences between fear of falling, depression, anxiety and a number of secondary
variables (age, gender, walking aid use, objective activity levels, objective and self-reported falls history and fear-related activity avoidance). Several variables (self-reported activity levels and self-reported health status) were excluded from analysis due to there being a violation of the assumptions required for conducting a one way ANOVA (Field, 2005).

Findings from the bivariate Pearson correlation analyses revealed significant associations between fear of falling (FrSe) and several variables, including symptoms of depression (GDS-15; \( r(47) = .44, p = .002 \)), anxiety (GAI; \( r(47) = .33, p = .024 \)) and fear-related activity avoidance (\( r(47) = .74, p < .001 \)). A series of bivariate correlation analyses revealed that age and objective activity levels were not significantly related to fear of falling (FrSe) and have been included in the Appendix (see Appendix N; Table N.1).

In terms of fear of falling (FrSe) and gender, an independent samples t-test indicated that the mean fear of falling scores was significantly higher for women (\( M = 36.56, SD = 14.88 \)) than for men (\( M = 24.56, SD = 8.16 \)), \( t(23) = -3.30, p = .003 \). For fear of falling (FrSe) and walking aid use, an independent samples t-test indicated that the mean fear of falling scores was significantly higher for participants who use a walking aid (\( M = 36.64, SD = 14.09 \)) compared to those who did not use a walking aid (\( M = 18.00, SD = 1.67 \)), \( t(45) = 3.21, p = .002 \).

A one-way ANOVA also revealed a main effect of fear of falling (FrSe) on objective falls history, \( F(3,43) = 3.88, p = .015 \). Participants who had fallen more than twice in the past 12-months (\( M = 53.25, SD = 3.20 \)) scored higher on the FrSe measure than those who did not fall in the past 12-months (\( M = 31.46, SD = 13.90 \)). Self-reported
falls history was not significantly associated with fear of falling (FrSe) and has been provided in the Appendix (see Appendix N; Table N.2).

4.3.1.5 Associations with Fear of Falling (FOF Item)

A number of analyses (chi squared tests and independent samples t-tests, as appropriate) were conducted in order to examine the associations between fear of falling, depression, anxiety and a number of secondary variables (depression, anxiety, age, objective activity levels and fear-related activity avoidance). Several variables (gender, walking aid use, self-reported health status, self-reported activity levels and falls history (objective and self-reported) were excluded from analysis due to a violation of the chi-squared assumption which requires a minimum count of five in each cell (Field, 2005).

An independent samples t-test was conducted between anxiety and fear of falling (FOF item). Results indicated that the mean scores for anxiety (GAI) were significantly higher for participants who reported fear of falling ($M = 4.32, SD = 3.39$) than participants who reported no fear of falling ($M = 2.88, SD = 2.94$); $t(43) = -2.70, p = .010$. All other variables (age, depression and objective activity levels) showed non-significant associations with fear of falling (FOF item) and have been provided in the Appendix (see Appendix N, Table N.3).

A chi-squared analysis was also conducted to determine the association between fear of falling (FOF item) and fear-related activity avoidance. Results revealed a significant association ($\chi^2(1, N = 47) = 14.44, p < .001$), where participants with fear of falling were more likely to report associated fear-related activity restriction (71%) than participants without fear of falling (12.5%).
4.3.1.6 Summary

In summary, as was hypothesized, results revealed fear of falling (FrSe) was significantly associated with symptoms of depression, anxiety, and a number of secondary variables (gender, fear-related activity avoidance, walking aid use and objective falls history). Inconsistent with the hypotheses, all other variables (age, objective activity levels and self-reported falls history) demonstrated non-significant associations with fear of falling (FrSe).

For fear of falling (fear of falling item), as was expected, a significant association was found with both symptoms of anxiety and fear-related activity avoidance. Inconsistent with the hypotheses, all other variables (age, depression and objective activity levels) demonstrated non-significant associations with fear of falling (fear of falling item).

4.3.2 Interviews

4.3.2.1 Sampling

Given the exploratory nature of the qualitative study, the selection of respondents for semi-structured interviews was guided by the ‘maximum variation’ criterion in order to gain as many aspects of the phenomenon as possible (Kuper, Lingard & Levinson, 2008; Meadows & Morse, 2001). Therefore, respondents from different extended care facilities with varying levels of fear of falling, anxiety, depression and fear-related activity avoidance were interviewed in an attempt to map the widest possible range of experiences. This allows clinicians to better understand older
adults who may present with varying levels of mood or anxiety difficulties and therefore who may require a more individualized treatment plan.

A total of 12 respondents who completed the questionnaires, and who also provided consent for the interviews, were invited to participate. Only 1 male consented to participate along with 11 females.

All recorded interviews were transcribed and thematic analysis of the transcripts then followed. As outlined by Meadows and Morse (2001), the process of data collection and analysis in qualitative research ends when “saturation” has been reached, or when no new information is added and replication of data occurs. In the current study, saturation was reached after 7 themes and 13 sub-themes were identified.

Thematic analysis then took place in accordance with the steps outlined by Braun and Clarke (2006). As this is an exploratory study, this approach was selected as it is not attached to any particular epistemology or theory, and thus, is commonly used in qualitative research as a flexible and reliable method of analysing data (Vaismoradi, Turunen & Bondas, 2013). Thematic analysis requires identifying, analysing and describing patterns that occur across the data set in detail. This, therefore, allowed for interpretations of participants’ comments which are assumed to be reflective of their falls experiences and fear of falling. In this way, thematic analysis in the present study is considered to be an essentialist or realist method (Braun & Clarke, 2006) and is inductive in the way that themes are predominantly data driven as opposed to based on preconceived theoretical frameworks.

In accordance with Braun and Clarke (2006), analysis required the researcher to move through six phases. Familiarization of the data was the first step, where the
researcher read and re-read the transcripts to gain a clear understanding of the data. During this process, observations and thoughts were recorded. The researcher then generated initial codes, systematically highlighting key words and sentences reflecting on participants’ experiences. Following this, patterns, connections and divergences across these codes were explored in an attempt to search for themes. Important quotes were also extracted to highlight such interpretations. The coherence of data within each theme and the extent to which the themes were different from one another were examined, as described in Patton’s (1990) criteria of internal homogeneity and external heterogeneity. The researcher then reviewed how each theme was related to the data set and how accurately it reflected participants’ experiences of falls and fear of falling. Using this procedure, a final set of themes and subthemes that were reflective of the participants’ experiences was created. The researcher then met with the primary supervisor of the study in order to discuss methodological decisions (peer debriefing). Both the sampling procedure and the point of saturation were subjects of this conversation. The primary supervisor also crosschecked the themes that were coded in an attempt to overcome potential biases and preconceptions and ensure credibility of the analyses.

In addition, a journal was kept from the commencement of the study where thoughts and reflections relevant to the study were recorded. As suggested by Kitto, Chesters and Grbich (2008) these notes were then used as a form of triangulation in order to ensure a comprehensive and well-substantiated understanding of the participants’ experiences was achieved. The created themes and subthemes were checked against these notes and also served as a method for allowing the researcher to
consider their role in the analysis of patients’ experiences. This process contributed to the thoroughness of interpretation in this study, as the researcher was able to examine their personal influence on interpretations and obtain a more comprehensive and credible understanding of the participants’ experiences (Dickson-Swift, James, Kippen, & Liamputtong, 2007; Kitto et al., 2008).

4.3.2.2 Themes

Analysis resulted in seven main themes and 13 sub-themes expressing the experiences of falls and fear of falling in a daily-life context of older adults. The themes included: being “careful” versus being “fearful” of falls, the possible causes of falling, the possible consequences of falling, efforts to prevent falls, gaining falls awareness, the recovery process and having the determination to go on. These themes as well as their associated subthemes are outlined in Table 4.1. As is typical of qualitative research, a summary of the patients’ views have been illustrated with quotes from the interviews (Morse & Richards, 2002). Additional quotes supporting each theme has also been provided in the Appendix (see Appendix O, Table O.1). As the semi-structured interviews took place following the quantitative analysis, the quantitative results were then re-visited after analysis of the interviews and an integrated interpretation of both results has been provided in the discussion section of this paper.
Table 4.1

*Overview of Themes Derived From the Interviews.*

<table>
<thead>
<tr>
<th>Main Themes</th>
<th>Sub-themes</th>
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<tbody>
<tr>
<td>Being “careful” versus being “fearful” of falls</td>
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<tr>
<td>The possible causes of falling</td>
<td>• External factors.</td>
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<tr>
<td></td>
<td>• Personal factors.</td>
</tr>
<tr>
<td>The possible consequences of falling</td>
<td>• Feelings of helplessness, shame and embarrassment.</td>
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<td></td>
<td>• Fear of physical threat.</td>
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<td></td>
<td>• Fear of loss of independence.</td>
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<tr>
<td>Efforts to prevent falls</td>
<td>• Use of prevention strategies.</td>
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<td></td>
<td>• Reliance on support networks.</td>
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<tr>
<td>Gaining falls awareness</td>
<td>• Personal Experiences.</td>
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<tr>
<td></td>
<td>• External prompts.</td>
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<tr>
<td>The recovery process</td>
<td>• The impact of falls on future activity engagement.</td>
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<td></td>
<td>• Barriers to physical activity.</td>
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<tr>
<td>Having the determination to go on</td>
<td>• Use of cognitive coping techniques.</td>
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<td></td>
<td>• Motivating factors.</td>
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</table>
Being “Careful” versus being “Fearful” of Falls

A total of seven participants expressed that it is not so much a ‘fear’ that they experience, but rather a feeling of the need to be ‘careful’ on a daily basis, particularly when engaging in activities. For example, one participant stated “I don’t know if I could explain it as a fear, but more being conscious of fear” (P3). She then spoke of the need to be careful of falling within her home environment, such as when having to maneuver around furniture with her walking aid. Other participants described this in more general terms, such as the “need to walk steadily” and “take one’s time”.

The majority of participants reported that their need to be “careful” commenced after they had a fall. Interestingly, those who did describe their feelings as a “fear” of falling tended to express that they were not conscious of the possibility of falling until after they had the fall; “Well I am not conscious of what I am doing, I am not fully aware of things around me like I should be” (P10). One of the participants explained that their fear of falling manifests as a more of an “anxious response” and went on to describe that they “just feel sick” (P11).

The Possible Causes of Falling

External Factors

Numerous participants indicated that they perceived the causes of falls to be due to environmental factors; “I sort of walk along a path and its usually pavement and you know the wheels get caught in the spaces between each paver and you get caught in that and you don’t know how to handle it so you just push a bit harder to get out of the rut as the saying goes and of course over you go” (P10). Environments such as
bathroom floors and uneven surfaces were also commonly referred to. Participants also noted other external factors as the cause of falls, such as their walking aids; “I got caught up with the walker blocking something and I sort of fell over” (P8).

Personal Factors

Five of the participants highlighted they perceived balance issues and a loss of control over their actions to be the cause of falls; “It’s my balance because I had to put my other sleeve in and I fell on my hips and from then on I rely on that [points to walking aid] for everything” (P7). Other participants (P4 and P5) attributed their previous falls experiences to their personal health issues, such as having high blood pressure or poor eyesight.

The Possible Consequences of Falling

Feelings of Helplessness, Shame and Embarrassment

Participants commonly expressed their fear of not being able to get up off the floor, particularly if they fell in an environment which they perceived to be dangerous. For example, one participant reported that she had once fallen under a light with electrical cords surrounding her and expressed her fears of danger and concern in regards to how she would be able to call for help, “I lay there [on the ground] thinking, well how am I going to get up?” (P1). Another participant noted that falling in a public environment is what induced fear for her as she did not know how to get up off the floor and felt shame and embarrassment at the thought of other people seeing her. She then went on to explain that this led to feelings of incompetence; “I have fallen in the dirt and you know that makes me cross. I sort of shouldn’t be doing this I should be able to
cope with it, but I fall over and I feel...I hate this people staring at me and coming like ants around me” (P10). Other participants also expressed feeling humiliated when having to call for help to get up from the floor; “I fell at the bottom of the bed and I couldn’t get up and I feel such a fool having to press the button [for help]” (P5).

Fear of Physical Threat

Fear of obtaining an injury from falling, such as a broken hip, were described by several participants. This was mainly reported by those individuals who had obtained a previous injury from falling; “I have had a very bad fall recently in my kitchen and I hurt my hip...so I’m very afraid of falling” (P12). Another participant explained that in addition to injury, she feared being sent to hospital due to the possibility of not returning home afterwards; “That I will go to hospital... and then if I go to hospital that I won’t come back” (P4).

Fear of Loss of Independence

Participants also expressed fear of a loss of independence from falling. In particular, feelings of restriction after having a fall were commonly expressed; “Well that revolves around my claustrophobia, it all revolves if, say at night time I’m sitting here and the doors are locked and the lights are out I feel like I can’t get out, so claustrophobic I can’t get out” (P3). Another participant noted that their fear of falling comes from the possibility of not being able to walk, and therefore, not having the freedom to do what you want to do; “Oh that I won’t be able to walk eventually you know because you’re getting older though you can’t take them chances because that could be the end you know that you would have no freedom to do what you want to do, so that makes me careful” (P7).
Efforts to Prevent Falls

Use of Prevention Strategies

Being very careful, taking one’s time and walking slowly were all frequently reported behaviours that participants noted they would engage in to prevent falls. Participants also described being observant of one’s environment by always having their eyes on the ground; “looking down at where my feet are going and what I could walk into you know” (P3).

Several participants who denied that they restrict their activities due to fear explained the importance of prevention strategies such as use of hand railings and walking aids, “so I keep the walking stick and the walker close to me so I am ready when I get up out of bed because I do get up once only during the night to go to the toilet and so I make it a point well I hold onto one of these things and then get to the toilet” (P6).

Reliance on Support Networks

Six participants stated that they would rely on others, such as care staff, family and other residents, as a way to prevent falls. For example, one of the participants explained that during family outings, prompts were helpful in terms of being a reminder of the possibility of falling; “they are taking me out to a pub to have lunch and they keep saying to me you must not fall you must not fall” (P4). In addition, prompts from care staff to use walking aids around their facilities were also considered helpful; “I forget about it but they make you use it, it is compulsory” (P12).
Gaining Falls Awareness

Personal Experiences

Participants’ personal falls experiences played an important role in creating awareness of the dangerousness of falls. For example, one participant explained her previous falls experiences and explained that as a result, “I am very careful and I think, well I don’t want to fall again” (P1). Another participant also spoke of how her own falls experiences have reminded her to be more aware; “I’m more careful than I used to be” (P12).

External Prompts

Participants also spoke of their awareness of falls having come from observing or hearing about other people’s experiences; “I think just hearing about the ones that do fall just helps to make me more cautious” (P8). Further awareness came from prompts given by care staff, with one of the participants noting; “I was watering because the plants were dry, and they [care staff] said, ‘what if you fell and broke your leg, would that be happy?’ I never thought of that, even the hose was twisted” (P3).

The Recovery Process

The Impact of Falls on Future Activity Engagement

Recognition of the importance of engaging in activities despite having had a fall was a commonly identified theme throughout the interviews; “Yes I try to do it as much as I can, I just don’t want to get to a stage where I cannot move more or less you know and then never get up for meals and everything you see” (P1). The consequences of not continuing with activity engagement following a fall was also noted; “I can’t just
stand on one leg, even to hang onto a bar I don’t have the strength in my legs because my muscle tone had deteriorated because I haven’t been open to doing activities since the fall” (P3).

Individuals did, however, discussed how the development of a fear of falling and a loss of confidence in regards to their abilities to not have a fall in the future had influenced their usual daily activities. For example, participants commonly reported that they had increased their reliance on prevention strategies, such as walking aids, after having a fall. Further, their ability to maintain independence in their activities of daily living (e.g. showering without care assistance) had also decreased. Participants also discussed how they would modify their usual physical exercises after a fall; “I join in on everything that’s going on and I might sit down for a few hours and then get some fresh air and walk around you know” (P5). Another important factor that seemed to influence future activity engagement was whether or not the individual maintained a positive attitude despite having experienced a fall. For example, one participant who reported that she continued with her routine daily activities explained; “well I just think no good of crying you go to just keep laughing, and so I just try to laugh things off you know” (P7).

**Barriers to Physical Exercise**

Several participants reported that changes in the level of difficulty of the exercise routine being offered by care staff influenced their choice on whether or not to engage in the exercise class. Injuries sustained from falls, as well as the severity of the injury, was also a commonly reported barrier to engaging in exercise after a fall; “It’s my knee the osteoarthritis in my knee can sometimes curve my flexibility to do things”
Health status was another influencing factor, such that if an individual had deteriorating health s/he noted being less likely to engage in physical exercise, "well I got firm on my feet I walked around quite confidently I did exercise and good exercise classes and then I got pneumonia" (P12).

Having the Determination to Go On

Use of Cognitive Coping Techniques

Having the determination to not fall again, and furthermore, to not allow the fall to interrupt their daily activities was mentioned by a number of participants; “Oh yes I’ve had a couple of falls, but not in recent times. But when I had a fall I had got into my head I must not let that fall cut me off from not doing things” (P6). Several participants discussed the use of positive beliefs such as self-encouragement and self-talk as a coping strategy to help them pass activities throughout the day; “You see if you think positive on things, because grump head grows in and says you can’t do it, you can you know it will take some time but you’ve got to sort of make yourself or teach yourself to say well I must do this and take a few steps” (P6).

It was observed that those participants who held a positive attitude in regards to the future were also less likely to note that the fall had an impact upon their daily lives. For example, one of the participants explained; “It is the determination in me. Some people say oh well I am 90 I am old and I say no, I am not old and I am 92” (P12). Fostering acceptance was also another approach to moving forward after having a fall. For example, one participant who explained; “I cannot do the things that I did before, so those are the things, so each one of us knows our capacity to do it love. You know your capacity how much you can take how much you can’t take” (P6).
Motivating Factors

Factors such as family outings and the enjoyment of going to the shopping centre were also described by participants as motivators which helped them to continue with physical activity despite having experienced a fall; “I like to walk to the shops at least one time a day and once you go in and out the shop you’ve done a good walk you see because you can take these things [walking aid] in there” (P7).

4.3.2.3 Overall Summary of Themes

In summary, the aim of the qualitative study was to complement the quantitative findings and assist with an understanding of the nature and experiences of falls and fear of falling in the extended care older adult population. A total of 12 participants were interviewed and analysis revealed seven main themes (being “careful” versus being “fearful” of falls, the possible causes of falling, the possible consequences of falling, efforts to prevent falls, gaining falls awareness, the recovery process and having the determination to go on) as well as 13 subthemes, each of which provide an overview of the participants’ views on falls and fear of falling.

4.4 Discussion

The reported incident rates of falls in older adults who live in extended care facilities are not only higher than for those who live throughout the community; they also tend to result in more serious consequences (Rubenstein, 2006). It is, therefore, important to understand the factors related to falls, such as fear of falling, in the extended care population. The current study aimed to achieve this by employing both a quantitative and qualitative approach. Specifically, the research explored fear of falling
and its relationship with symptoms of two of the most common psychological disorders in older adults; depression and anxiety.

In order to assist with the integration of both the qualitative and quantitative findings, the method of triangulation was used to describe and interpret the relations found between the quantitative and qualitative studies (Erzberger & Kelle 2003). Analysis revealed the findings were mostly consistent and, therefore, the results were complimentary to one another. The findings and interpretations in relation to the research questions and hypotheses are discussed below.

### 4.4.1 Fear of Falling and Depression

It was hypothesized that there would be a significant association between fear of falling and symptoms of depression. Results partially supported this prediction in that there was a significant and positive association found between fear of falling (fall-related self-efficacy) and symptoms of depression. This finding implies that older adults who experience depressive symptoms are also more likely to report having less confidence in their abilities to perform activities of daily living without falling. Results provide convergent evidence for past quantitative research that has shown a significant relationship between fear of falling and depression in the extended care older adult population (Austin et al., 2007; Chou et al, 2005; Sharaf & Ibrahim, 2008; Tinetti et al., 1990).

This finding may be explained by considering common symptoms of depression in older adults, which often include feelings of hopelessness in regards to one’s future (Fiske et al., 2009). For example, older adults who experience depressive symptoms may report being concerned about engaging in activity as they may perceive
the consequences of falling to be negative compared to older adults without depressive symptoms. This was observed in the qualitative interviews where, for example, one participant (P10) expressed fear of falling due to not knowing how one would get up of the floor and also due to social embarrassment. This participant also scored within the cut-point range for anxiety and within the severe range for depression on the quantitative measures. These findings from both the quantitative and qualitative investigations highlight there is a possible need to address feelings of hopelessness in regards to one’s future and in particular, the perceived consequences of falling. As suggested by Sharaf and Ibrahim (2008), this could be achieved by identifying older adults who experience depressive symptoms and applying cognitive therapy to target misconceptions in regards to falls. Furthermore, negative thought patterns could be restructured into self-compassionate and self-motivating thoughts to assist with building an individual’s confidence in their ability to engage in activities without falling. This treatment option is supported by findings in the qualitative interviews, whereby those participants who noted the use of self-talk and maintaining a positive attitude in regards to falls also scored within the normal range on measures of depression. This also supports the theory of psychological stress and coping that has been established over many years (Coyne & Lazarus, 1980; Lazarus, Kanner & Folkman, 1980; Lazarus 1981). This theory identifies both cognitive appraisal and coping as a vehicle of stressful person-environment relations and the associated short-term and long-term outcomes (Folkman, Lazarus, Dunkel-Schetter, DeLongis & Gruen, 1986). For example, one participant who self-reported she continued with her daily activities despite having had a fall explained; “well I just think no good of crying you go to just keep laughing, and so I
just try to laugh things off you know” (P7). This participant also scored within the normal range for both anxiety (GAI score of 1) and depression (GDS-15 score of 3). Another participant explained “It is the determination in me. Some people say oh well I am 90 I am old and I say no, I am not old and I am 92” (P12). This participant also scored within the normal range for depression (GDS-15 score of 2) and anxiety (GAI score of 0). As the above participants expressed a more positive attitude in regards to falls and also scored within the normal range for symptoms of depression, results provide convergent evidence towards implementing cognitive therapy. This may allow for techniques such as cognitive restructuring (Iaboni & Flint, 2013) to be used in order to promote more ‘balanced’ thought patterns in regards to the individual’s confidence in activity engagement.

Inconsistent with predictions, however, the quantitative analysis revealed there was no statistically significant difference between fear of falling (fear of falling item) and depression. That is, individuals who were classified as having a fear of falling, on this measure, did not significantly differ in terms of depressive symptoms compared to individuals who were classified as having no fear of falling. The finding that depression was related to fear of falling (fall-related self-efficacy), however, but not to fear of falling (fear of falling item) somewhat makes senses when considering the results from the qualitative analysis. For example, the fear of falling item asked participants, “Are you afraid of falling?” However, most participants revealed during the interviews that they disagreed in terms of viewing their feelings in regards to falls necessarily as a “fear” or as being “afraid”. Instead, participants described their feelings as more of a “concern” or need to be “careful”. For example, one participant answered “almost
never” to the question “Are you afraid of falling”, however then went on to explain that it wasn’t so much that she was fearful or “afraid, but rather “concerned” (P8). This indicates the fear of falling item may not have captured the true meaning of participants’ feelings in this study, and may explain why there was no relationship found with depression. Alternatively, the fall-related self-efficacy measure asks participants if they have a “concern” in regards to falling, which may have therefore attuned better with how the participants described their feelings. This is supported in that the above participant (P8) scored within the moderate range for level of concern on the fall-related self-efficacy measure, yet was classified as having no fear of falling on the fear of falling item.

Other qualitative studies investigating older adults have reported similar findings where participants have described their feelings in regards to falls as more of a “concern” (Calhoun et al., 2011; Mahler & Sarviamäki, 2011). Furthermore, Morse and Ellis (2008) reviewed the quantitative literature on community-dwelling older adults and concluded that “fear” and “fall-related self-efficacy” are unique constructs. This is further supported by previous studies which have attempted to clarify the relationship between fear of falling and fall-related self-efficacy where results indicated that whilst these constructs are related, they are also unique (Hotchkiss et al., 2004; Lachman et al., 1998; Li et al., 2002). The above findings in combination with results from the current study suggests the need to re-evaluate measures of fear of falling that are used to assess older adults living in extended care facilities. For example, Morse and Ellis (2012) suggest that a solitary questionnaire where researchers can measure all fall-related psychological constructs (e.g. “fear” and “fall-related self-efficacy”) at one time may be
more appropriate. This would ensure that all psychological views and feelings in regards to falls are detected and treated within this population.

In addition to self-report questionnaires, the current findings suggest it may also be important for clinicians to ensure they conduct a clinical interview with the older adult. This would help to ensure the full experiences of the older adult, who may not view their feelings in regards to falls as a “fear”, are captured during assessment. Furthermore it is important for clinicians to identify the appropriate psychological needs of the individual, such as whether or not they experience a ‘fear’ or low ‘fall-related self-efficacy’, which appear to be unique constructs. This is important in terms of ensuring that the treatment plan targets the appropriate psychological construct that is related to the individual’s concerns in regards to falls.

Nonetheless, the present findings in conjunction with the existing research provide promising evidence for depression as a possible factor to consider when assessing falls risk. However, as this study was exploratory in nature, further research is warranted in order to clarify the relationship between fear of falling and depressive symptoms within the extended care older adult population.

**4.4.2 Fear of Falling and Anxiety**

Consistent with predictions, symptoms of anxiety were significantly associated with fear of falling (fear of falling item and fall-related self-efficacy). This result implies that older adults who reported symptoms of anxiety were also more likely to report a higher concern in regards to their ability to perform activities of daily living without falling. Furthermore, results demonstrated participants who were classified as having a fear of falling significantly differed in terms of self-reported anxiety symptoms
compared to participants who were classified as having no fear of falling. In contrast to the non-significant finding for the relationship between depression and the fear of falling item, the significant relationship between anxiety and the fear of falling item suggests that individuals with anxiety also tend to describe their feelings as a ‘fear’ of falling. Evidence for this was observed throughout the interviews in that there was a tendency for participants who described their feelings towards falls as a ‘fear’ to also score within the higher range for anxiety on the GAI measure (e.g. P10).

In terms of the previous literature, the few studies that have investigated the relationship between fear of falling and anxiety in the extended care older adult population have reported results are consistent with our findings (Sharaf and Ibrahim, 2008; Tinetti et al., 1990). However, unlike the majority of past research that has administered more generalized measures of anxiety, this study confirms previous results using a measure of anxiety (the GAI) specific to the geriatric population. As symptoms of anxiety are known to manifest differently in older adults compared to young adults, and as the report of anxiety may differ with age (Kogan et al., 2000; Wolitzky-Taylor et al., 2010), use of the GAI is a strength of the study.

The finding that fear of falling is related to anxiety is supported by both the qualitative and quantitative results in this study. For example, the majority of participants in the interviews described they would engage in behaviours to prevent falls which commonly included a reliance on the use of railings, walking aids, family and carer supports, and the importance of having a strict daily routine. In some cases, these may be viewed as behaviours which serve to maintain anxiety, through an overreliance on ‘safety behaviours’ (Kim, 2005; Thwaites & Freeston, 2005). Another behaviour
which serves to maintain anxiety symptoms is ‘avoidance’ of feared situations (Kogan et al., 2000; Mowrer, 1960; Salters-Pedneault, Tull & Roemer, 2004). Avoidant behaviors were also expressed by participants in the interviews. For example, several participants noted they would avoid completing certain exercises offered by the extended care facility if they were concerned in regards to their abilities to do so without falling. Such reports are supported by the objective measures of activity levels in this study whereby, on average, participants were engaging in only one activity offered by the extended care facility on a daily basis. This low attendance number possibly reflects activity avoidance due to symptoms of anxiety, and therefore, an issue given that activity avoidance can then lead to muscle de-conditioning and the development of fear of falling and future falls (Campbell, Borrie & Spears, 1989). Another possibility is the activities being offered by the facility were not fulfilling to the older adults and therefore that they chose not to attend. It is also possible that the activities were not at an appropriate functional level suited to the older adults. Given the consequences of activity avoidance (Campbell, Borrie & Spears, 1989), this warrants further investigation into avoidant and safety behaviours in older adults living in extended care facilities.

Overall, the results from this research coupled with previous findings provide growing evidence towards the importance for clinicians to address anxiety in older adults living in extended care facilities. For example, older adults entering into extended care homes could perhaps undergo a pre-admission assessment and screening of anxiety and fear of falling. This would allow for an individualized plan of action to be developed so that the older adult can receive appropriate treatment. As noted previously by Schepens and colleagues (2012), results showed that fall-related self-efficacy
influences an individual’s perceptions of their capabilities and activity levels to a high
degree. Therefore, such treatments could aim to target fall-related self-efficacy, which
has shown to be amenable to behavioural modification and influenced through
interventions (Bandura, 1982; Bandura, Jeffrey & Gajdos, 1975; Zijlstra et al., 2007).
Providing psycho-education on the impact of activity restriction on future falls risk may
also be helpful in terms of encouraging older adults to attend facility-based activities.
Indeed, the role of exercise as a method to improve fall-related self-efficacy has been
the focus of research over the years (Stathi & Simey, 2007; Steadman, Donaldson &
Kalra, 2003). Therefore, encouraging older adults to attend specific facility-based
activities such as exercise groups is likely to be beneficial. Carter and colleagues (2002)
recommend a minimum of two-to-three exercise sessions per week in order to reduce
falls risk. This recommendation is supported by the quantitative results in this study,
whereby several participants who noted engaging in regular daily activities (e.g. walking
and facility-based activities) also scored within the ‘low concern’ range on the fall-
related self-efficacy measure (e.g. P2). Therefore, implementing a minimum of two-to-
three weekly exercise programs that specifically target fall-related self-efficacy may be
beneficial. This could be achieved, for example, through the development of a
standardized “fear of falling” exercise program, which could then be implemented to
older adults across all extended care facilities.

The qualitative findings in this study also revealed the use of self-talk was
important in terms of assisting older adults to overcome their fear of falling. It may
therefore be useful for clinicians to incorporate helpful self-talk as a coping strategy in
therapy with older adults, as opposed to the use of safety behaviours and avoidance;
both of which can serve to maintain an individual’s anxiety symptoms. It has been suggested that whilst a certain amount of caution is appropriate, there is likely an individual optimal range of vigilance and arousal for falls relative to the individual’s personal fall risk (Delbaere et al., 2010; Iaboni, & Flint, 2013). Members of multi-disciplinary teams should therefore aim to determine the appropriate balance between the older adult being cautious of falling versus engaging in unhealthy coping strategies to avoid falls, such as the use of safety behaviours. This could be achieved by ensuring that a discussion takes place with the older adult in terms of what one would be willing to modify and change to reduce their risk of falling (McInnes & Askie, 2004) in order to determine an adaptive level of fear of falling and use of healthy coping strategies.

In considering the above, it is important to note this study was only exploratory in nature. Therefore, future investigation would be beneficial in order to improve the understanding of the relationship between fear of falling and anxiety in the extended care population of older adults.

**4.4.3 Fear of Falling and Secondary Variables**

Consistent with Hypothesis III, a number of secondary variables showed significant associations with fear of falling (fear of falling item and fall-related self-efficacy). For example, participant’s gender was positively related to fear of falling (fall-related self-efficacy), where results showed females had a lower fall-related self-efficacy, or confidence in their ability to carry out activities without falling, compared to males. This finding is consistent with results throughout the existing research (Howland et al., 1998; Sharaf & Ibrahim, 2008; Zijlstra et al., 2007). This result implies it may be
important for ongoing monitoring of women to take place in extended care facilities in order to ensure that any development of a fear of falling is detected.

Furthermore, there was a significant relationship between fear of falling (fall-related self-efficacy) and walking aid use, whereby participants who reported using a walking aid also reported significantly higher scores on the fall-related self-efficacy measure, indicating that these individuals had a lower falls self-efficacy compared to participants who did not use a walking aid. The above findings are supported by results in previous studies (Howland et al., 1998; Kumar et al., 2014; Malini et al., 2015; Sharaf & Ibrahim, 2008; Zijlstra et al., 2007). This finding is also consistent with results of the qualitative results in this study, where several participants who expressed being fearful of falling also noted a reliance on the use of walking aids as a way to prevent future falls. In total, 85.4% of the study sample reported use of a walking aid. This high proportion suggests that it may be worthwhile for clinicians to independently assess older adults who use a walking aid in order to screen for possible fear of falling. Those older adults who use a walking aid may and express fear of falling may then benefit from therapy to increase their fall-related self-efficacy. Furthermore, as suggested by Sharaf and Ibrahim (2008), cognitive behavioural therapy could be implemented to restructure overestimations of the probability of falling, such as the older adult’s perceived falls risk if they were to not use a walking aid.

A significant association was also found between fear of falling (fall-related self-efficacy) and participants’ objective falls history; thus, implying older adults who experienced a higher number of falls also had a lower fall-related efficacy. In particular, participants who had experienced more than two falls had a significantly higher score on
the fall-related self-efficacy measure compared to individuals who had experienced no falls or one fall in the past 12-months. This supports findings by Sharaf and Ibrahim (2008) where it was shown participants’ falls history was a significant predictor of fear of falling, and further, fear of falling significantly increased as the number of previous falls increased. As suggested by Sharaf and Ibrahim (2008), this finding may be explained in that a previous fall may trigger fear of physical harm, loss of functioning disability, pain and social embarrassment, all of which may increase fear of falling. Other studies have noted similar findings (Howland et al., 1998; Lachman et al., 1998; Malini et al., 2015; Zijlstra et al., 2007). In terms of the clinical implications, this result suggests that clinicians should screen for fear of falling, particularly in older adults who have experienced more than one fall in the past 12-months, and therefore, who may be at a higher risk of developing a fear of falling. As participants’ self-reported falls histories in this study were higher than the objective falls history reports, this finding further highlights it may be necessary for care staff at extended care facilities to be mindful of under-reporting that may exist in this population. Furthermore, rather than the care staff relying on older adults to report to them when they have a fall, it may be useful for routine screening for fall incidents to take place in this population. This could be achieved via conducting regular clinical assessments with the older adult that specifically addresses the issue of falls.

Consistent with the hypothesis, results also showed that fear of falling (fall-related self-efficacy and the fear of falling item) was significantly associated with fear-related activity avoidance. Specifically, it was found participants, who were classified as having a fear of falling and who expressed lower confidence in their abilities to perform
activities without having a fall, were also more likely to report avoiding activities due to fear of falling. This finding is consistent with the previous literature (Maki, Holliday & Topper, 1991; Petrella et al., 2000; Sharaf & Ibrahim, 2008; Tinetti et al., 1990; Tinetti et al., 1994). The current result coupled with previous findings highlights an important issue to consider, as inactivity has demonstrated to have a negative impact on muscle strength, co-ordination and endurance which then precipitates balance deterioration and future falls (Maki et al., 1991; Myers & Gonda, 1986). Psychological consequences of inactivity have also been documented throughout the literature. For example, it has been reported that activity restriction may impact quality of life by limiting leisure activities and social contact (Li, Fisher, Harmer, McAuley & Wilson, 2003). Furthermore, Kressig and colleagues (2001) showed that individuals with fear of falling who also experience severe fear-related activity avoidance were more like to experience anxiety compared to those with mild fear-related activity avoidance. As a decline in mental and physical health as a result of reduced physical activity may lead to admission to an extended care facility (Cumming et al., 2000), the findings coupled with the existing research emphasizes the importance of detecting older adults who are at risk of developing a fear of falling and associated fear-related activity avoidance. This would allow for appropriate interventions to take place.

Inconsistent with existing research (Bruce et al., 2002; Howland et al., 1998; Lachman et al., 1994; Malini et al., 2015; Zijlstra et al., 2007), findings showed that associations between fear of falling (fear of falling item and fall-related self-efficacy) and all other secondary variables (age, objective activity levels and self-reported falls history) were non-significant. Important to note is a number of variables (self-reported
activity levels and self-reported health status) were unable to be analysed with either measure of fear of falling in the current study due to violations of the assumptions required to conduct the appropriate analyses. Future research investigating a more diverse sample of older adults living in extended care facilities would therefore be beneficial in order to determine whether significant relationships exist between fear of falling and the above factors. This would allow for such factors to be targeted in clinical interventions aimed at reducing falls risk.

4.4.4 Limitations and Areas for Future Research

Painter and colleagues (2012) investigated community-dwelling older adults and reported the need to examine the relationships between fear of falling, anxiety and depression in a more diverse sample of older adults of varying health status and living environments. This study aimed to achieve this by investigating older adults living in extended care facilities using both quantitative and qualitative analysis. Furthermore, unlike previous mixed-method studies investigating this population, we recruited participants from an Australian population in an aim to improve the generalization of past findings. The quantitative findings indicated participants experienced a fear of falling yet the qualitative findings revealed this description of participants’ feelings in regards to falls varied in meaningful ways not reflected in the quantitative findings. Therefore, the use of a mixed-method approach is considered to be a strength of the current study. Specifically, our findings suggest that mixed-methods approaches to evaluating fear of falling have potentially more to offer than either approach can provide individually.
Another notable strength of this study is that the questionnaires and interviews in this study were carried out within the participant’s home environment. This, therefore, minimized the possibility of selection bias of individuals who avoid activities outside the home or with mobility issues as a result of fear of falling (Malini et al., 2015).

In terms of the measurements that were used, this study administered measures of depression and anxiety that were designed specifically for use within the geriatric population. This is in contrast to past research (Sharaf & Ibrahim, 2008; Tinetti et al., 1990) where general measures of depression and anxiety have been used to assess their relationship with fear of falling. Furthermore, it has previously been suggested that it would be useful not to rely so heavily on self-report measures and participants’ memories of past events, with the risk of underestimation of fear of falling and its associated factors (Painter et al., 2012). Our study aimed to fill this gap by obtaining both objective as well as self-report measures of participants’ activity levels and falls history.

Despite the above noted strengths of this research, findings are subject to several limitations. For example, several of the analyses were underpowered due to the sample size. In addition, there were a number of associations with fear of falling that were unable to be assessed due to limited variability in various measures and possible inadequate power. The sample size in this study can be explained by considering the limited number of past studies investigating fear of falling, depression and anxiety in the extended care population. This highlights the possible difficulty that is often faced when trying to access this population of older adults. Whilst we recruited participants from
across five different extended care facilities, the number of facilities we were able to recruit from, as advised by management that would be appropriate for our study, were saturated. In addition, there were more females than males in the study sample (38 and 9 respectively), where only one male who completed the questionnaires also volunteered to participate in an interview. This possibly reflects the proportion of males and females in extended care facilities, given that frailty tends to be twofold higher for women than for men (Fried et al., 2001). Replication of the current study using a larger sample size of males and females with more diverse variability is therefore necessary. For example, the participants in this study were recruited from a facility that was considered by management to consist of residents who required “low care”. Therefore future research should investigate fear of falling across a wider range of the extended care population (i.e. across both medium and high level of care facilities, such as nursing homes). As care staff were identified in the interviews as important in terms of older adults’ gaining falls awareness and the recovery process, it would also be interesting for future research to investigate the potential impact of care staff’s perceptions and behaviours on fear of falling in older adults.

Furthermore, whilst the cross sectional design of this study supports the hypothesis that fear of falling is significantly associated with anxiety and depression in the extended care older adult population, a causal relationship cannot be inferred due to the nature of the study. For this reason, it is suggested results are treated with caution. Future studies should aim to conduct a longitudinal design study which would allow for an improved understanding of the potential causal basis between the factors that were measured. The promising findings from our mixed-method study further suggest that it
may be beneficial to conduct a longitudinal investigation using both a quantitative and qualitative approach. It would also be interesting to examine whether our findings would be replicated in future studies adopting a mixed method approach. This would allow for additional therapeutic outcomes of interest to be identified and used to develop interventions that could target factors associated with fear of falling that are not currently being recognized.

Lastly, our study also revealed that most participants viewed their feelings in relation to falls as a “concern” rather than a “fear” or something they were “afraid” of. The self-report single item measure that was used (“Are you afraid of falling?”) to provide a dichotomous measure of fear of falling may have, therefore, failed to capture the full extent to which individuals were concerned in regards to falls, thus highlighting an important issue to be addressed. This also raises a question in regards to the common measures of fear of falling that have been used in past research. As identified previously (Hughes et al., 2015; Jørstad, Hauer, Becker & Lamb, 2005), it is, therefore, suggested that in order to capture the full experiences of older adults, future studies should dedicate special attention to the measures that are used to assess older adults’ views on falls and in particular, the wording and measures that are employed. A study by Moore and Ellis (2008) aimed to review the use of the different measurements throughout the published research among community-dwelling older adults. It was concluded that, whilst similar in nature, both ‘fear of falling’ and ‘fall-related self-efficacy’ are unique constructs that are better categorized under an umbrella term of ‘fall-related psychological concerns’. As such, it was suggested that each construct should be measured in unique ways rather than interchangeably (Moore & Ellis, 2008).
In consideration of the above, results from the current study suggest that it may be beneficial for future studies to develop a multidimensional measure that has questions to individually assess both ‘fear’ and ‘fall-related psychological concerns’ as separate constructs. This may assist in capturing the full experiences of older adults and also help to avoid any underestimation of the incidence of fear of falling that may be caused by use of a single item measure (Howland et al., 1993; Lachman et al., 1998; Yardley et al., 1998). Furthermore, by administering measures that accurately characterize which fall-related psychological issue older adults face, this would allow falls interventions to be tailored by clinicians to meet the psychological need of the individual (Moore & Ellis, 2008). Due to differences in, for example, levels of independence, future research should also examine whether or not there is a need for such measures to be developed specifically for populations of older adults living in extended care facilities as opposed to community-dwelling older adults.

Overall, the results from our study provide promising evidence towards the importance of targeting both depression and anxiety when implementing interventions to reduce falls and fear of falling in the extended-care older adult population. Furthermore, clinicians who work with older adults in this population who present to therapy with symptoms of anxiety and depression should screen for fear of falling. As anxiety was associated with both measures of fear of falling in this study, it is particularly important for older adults who present with anxiety symptoms. Again, it is recommended that psychological interventions employ a multi-factorial approach by including an exercise component, as per the recommendations for older adults who are at risk of falls and are living in extended care facilities (NICE, 2004).
CHAPTER FIVE
GENERAL DISCUSSION

5.1 Introduction

As highlighted at the beginning of this research, falls are the leading cause of accidental death in older adults (CDC, 2015). One of the most common psychological consequences of a fall is the development of a fear of falling which, in turn, can result in an increased risk of future falls (NICE, 2004). The overarching aim of this project was to investigate the factors associated with fear of falling. Specifically, the relationships between fear of falling and symptoms of depression and anxiety were investigated in a sample of older adults living within both the community (Study One) and extended care facilities (Study Two). Identifying the factors related to fear of falling can allow for earlier detection of older adults at risk of falls and for clinicians to target such factors via clinical intervention. Our improvement in the understanding of the factors related to fear of falling, therefore, constitutes an important step forward in terms of reducing falls risk. The following sections provide a summary of the key findings and implications that can be drawn from across both studies. The overall project limitations and areas for future research are also discussed.

5.2 Summary of the Main Findings and Conclusions

Across the literature it has been reported that up to 85% of community-dwelling older adults experience a fear of falling (Scheffer et al., 2008). Study one, therefore, aimed to investigate the associations between fear of falling, depression and anxiety in a sample of 80 community-dwelling older adults. Partially consistent with our
hypotheses, results showed that anxiety was a significant predictor of both measures of fear of falling (fear of falling item and fall-related self-efficacy), whereas depression was only a significant predictor of the fear of falling item. These findings suggest that older adults who report symptoms of depression and anxiety are more likely to report fear of falling compared to older adults who report no symptoms of depression and anxiety. Furthermore, older adults who experience symptoms of anxiety are also more likely to report lower fall-related self-efficacy, or less confidence in their abilities to carry out activities without falling. Similar results have been found in previous research (Austin et al., 2007; Hull et al., 2013; Malini et al., 2015; Painter et al., 2012).

As a fear of falling has shown to result in future falls (NICE, 2004), findings have important implications for clinicians to consider when working with older adults. For example, clinicians may play a key role in terms of regular screening for symptoms of depression and anxiety when assessing community-dwelling older adults who are at risk of falls. As findings also showed that females were more likely than males to report fear of falling, regular screening for such symptoms in female community-dwelling older adults who may be at a higher risk of fear of falling should also be considered. Earlier detection could then reduce falls risk by allowing appropriate interventions to take place. Whilst both age and activity levels have previously shown to be related to fear of falling (Arfken et al., 1994; Howland, et al., 1998; Malini et al., 2015; Sharaf & Ibrahim, 2008; Tinetti et al., 1994), the current results revealed that symptoms of anxiety predicted fear of falling (fall-related self-efficacy) above and beyond that of both age and objective activity levels (i.e. step count). Therefore, it is important for
clinicians to screen for symptoms of anxiety in community-dwelling older adults, regardless of the individual’s age and daily activity levels.

In terms of clinicians who work with community-dwelling older adults to treat mood disorders, the current findings highlight that clinicians may need to specifically address fear of falling as a part of treatment. Given that anxiety was consistently associated with both measures of fear of falling in our study, this implies that fear of falling should be assessed particularly in community-dwelling older adults who present with symptoms of anxiety.

Furthermore, our findings imply that in addition to exercise interventions, psychological therapy to target symptoms of depression and anxiety are important. Whilst exercise interventions may aim to reduce fear of falling, symptoms of depression and anxiety may be easily overlooked in such treatments. Clinicians may, therefore, play an integral role in addressing such symptoms which have shown to predict fear of falling. For example, through case formulations, Clinical Psychologists may play an important role in terms of identifying the specific needs of the older adult, which could involve targeting both depression and anxiety symptoms. As a part of intervention, older adults could then be referred to Cognitive Behavioural Therapy (CBT); a known effective treatment for depression and anxiety in older adults (Fiske et al., 2009; Laidlaw, Thompson, Gallagher-Thompson & Dick-Siskin, 2003). This would allow for negative thinking patterns to be identified and translated into more ‘balanced thoughts’. Importantly, intervention should take place using a multi-disciplinary approach, such as alongside strength and balance training. For example, exercise such as ‘Tai Chi’ has shown to reduce the number of falls and fear of falling in older adults in addition to
improving physical performance and functional balance (Fuzhong et al., 2005). Occupational Therapists could therefore be involved in the implementation of exercise programs to assist older adults with fear of falling.

Whilst the majority of past research has focused on the community-dwelling older adult population, a review of the literature revealed limited investigation of the relationships between fear of falling, depression and anxiety in the extended care population. Study Two, therefore, aimed to investigate the above associations in a sample of older adults living in extended care facilities. Both a quantitative and qualitative approach was employed where 47 participants completed the questionnaires and a further 12 participants were interviewed.

Partially consistent with our predictions, findings from the quantitative analysis revealed that fear of falling (fall-related self-efficacy) was significantly associated with symptoms of depression and anxiety. This, therefore, suggests that individuals who report having lower confidence in their ability to perform daily activities without falling are also more likely to report symptoms of depression and anxiety. In addition, anxiety was significantly associated with the fear of falling item in this study. This result implies that individuals who report symptoms of anxiety are also more likely to report fear of falling compared to individuals who report no symptoms of anxiety.

Therefore consistent with findings from the community-dwelling older adult sample in Study One, anxiety was associated with both measures of fear of falling (fear of falling item and fall-related self-efficacy). In contrast to Study One, however, symptoms of depression were not related to the fear of falling item in this population. It
is, therefore, apparent that across both studies anxiety is more frequently associated with fear of falling than depression.

In terms of the interviews that were conducted as a part of Study Two, results revealed seven main themes and 13 subthemes which summarized the experiences of falls and fear of falling in the daily-life context of older adults. The main themes included: being “careful” versus being “fearful” of falls, the possible causes of falling, the possible consequences of falling, efforts to prevent falls, gaining falls awareness, the recovery process and having the determination to go on.

In consideration of the above quantitative and qualitative findings, several implications for multidisciplinary team members who work with the extended care older adult population can be made. For example, results suggest the possibly importance of addressing symptoms of depression and anxiety in older adults living in extended care facilities. Females were also more likely than males to report fear of falling in this population. Furthermore, findings revealed a significant relationship between fear of falling and participant’s falls history in this population. Specifically, individuals who experienced more than two falls in the past 12-months were more likely to report fear of falling compared to individuals who had not experienced a fall in the past 12-months. This finding may be due to the higher incidence of falls in the extended care sample compared to the community-dwelling older adult sample, as noted previously (Vu et al., 2005). Individuals who used a walking aid also reported significantly higher levels of fear of falling. Whilst this has also shown to be the case in the community-dwelling older adult population (Hull et al., 2013), this relationship was not assessed in Study Two due to the limited variation in this study measure. Nonetheless, the above findings
suggest that factors such as female gender, having fallen more than twice in the past year and use of a walking aid represent sub-populations of older adults who are at risk of fear of falling and may, therefore, require additional screening by clinicians. The use of CBT to target symptoms of depression and anxiety was also suggested as a possible treatment for symptoms of depression and anxiety in the extended care population. As a part of this intervention, clinicians should determine the appropriate balance between the older adult being cautious of falling versus engaging in unhealthy coping strategies to avoid falls. That is, distinguishing between the use of a walking aid for support as opposed to what are commonly known as ‘safety behaviours’ (Kim, 2005; Thwaites & Freeston, 2005), may be useful in order to identify factors that may serve to maintain symptoms of depression, anxiety and fear of falling.

As the qualitative analysis in this study revealed the tendency for participants to view their feelings around falls as “concern” rather than a “fear”, clinicians who work with this population may need to prioritize clarifying the individual’s psychological concern around falls through interviews rather than relying on self-report measures. This is important given that self-report measures may not reveal the full extent to which older adults in this population experience a fear of falls. Furthermore, findings suggest the need to re-evaluate measures of fear of falling that are used to assess older adults living in extended care facilities. This is consistent with recent developments, where fear of falling has been referred to and measured under the umbrella term ‘fall-related psychological constructs’ (Hughes et al., 2015; Hull et al., 2013; Jørstad et al., 2005; Moore & Ellis., 2008; Payette et al., 2016). It was suggested that future research could develop a single measure that assesses a range of fall-related psychological constructs in
order to improve the current measurement of fear of falling. By administering measures that accurately capture which fall-related psychological construct older adults face, appropriate intervention strategies can then be used to, for example, enhance fall-efficacy (Moore & Ellis, 2008).

5.3 Overall Project Strengths

There are several overall strengths of the study that can be noted. For example, unlike past research that has included only individuals who report fear of falling in addition to a falls history and/or fear-related activity avoidance, our study assisted in generalizing past findings by including individuals with and without fear of falling and/or a falls history and/or fear-related activity avoidance. Furthermore, unlike the majority of previous studies, we found these results using measures of depression and anxiety that are specific to the geriatric population. This was considered important given that symptoms of depression and anxiety are known to manifest differently in older adults compared to young adults (Fiske et al., 2009; Kogan, Edelstein & McKee, 2000). It can, therefore, be argued that past studies may not have measured the full extent to which depression and anxiety was present in their study samples. Participants were also recruited from an Australian population, therefore, assisting in generalizing past studies that have reported similar findings across different populations where cross-cultural differences are likely to exist. This was also considered important given that the Australian care system may be different in comparison to care systems that apply for extended care facilities in other parts of the world.
Unique to Study One, in an attempt to improve the accuracy of reported activity levels, accelerometers were utilized to obtain an objective measure of daily activity levels. This is in contrast to previous studies where self-report measures such as the SAFE assessment (Lachman et al., 1998) have been used. Based on our knowledge no other previous studies investigating fear of falling, depression and anxiety in the community-dwelling older adult population have measured activity levels in this way, this was considered a strength of the research given the biases that tend to arise with self-report measures. In terms of Study Two, the semi-structured interviews revealed that the description of participants’ views in regards to falls varied in meaningful ways not reflected in the quantitative analysis. As the majority of previous studies have employed quantitative analysis, it is possible that past research may have failed to capture the fall-related psychological concerns that were present in their sample of older adults who may not view their concerns as a “fear”. The use of a mixed-method approach was therefore also considered to be a strength of our study.

5.4 Overall Project Limitations and Areas for Future Research

Despite the promising findings of this research, it is important to consider the limitations of the research project as a whole. As the specific limitations of each study have already been addressed in the discussion sections corresponding to each study, this section highlights the key limitations that impacted on the study overall.

Firstly, it is necessary to consider that all participation in Study One and Study Two were voluntary, therefore the participants may have been less likely to suffer from activity restriction compared to the spectrum of older adults living throughout the
community and extended care facilities. Whilst we tried to minimize the impact of this issue by recruiting participants from within their home environment and those who were not interested in the exercise program, it is also possible that such individuals are more willing to participate in studies compared to individuals who experience more anxiety and/or depressive symptoms.

Furthermore, as noted previously by Painter and colleagues (2012) the comparison of results to past research can be difficult due to the large variation in measurement tools that are used to investigate fear of falling, depression and anxiety. Moreover, fear of falling has been investigated in differing environments to determine the factors related and its consequences (Painter et al., 2012). Our findings reinforced that there is a need to re-evaluate measures of fear of falling that are suitable for use both within the community-dwelling older adult population and the extended care older adult population. This would allow for a more consistent measurement of fear of falling and comparison amongst studies to occur, thus decreasing confusion. Moore and Ellis (2008) suggested that fear of falling may be better viewed under an umbrella term of “fall-related psychological concerns”. The combined findings from the quantitative and qualitative analyses support this view in that there is a need for fear of falling measures to be multidimensional so as to capture the full experience of older adults. As suggested by Moore and Ellis (2008), future research could develop one measure which combines several questions from each of the fall-related psychological constructs (i.e. ‘fear’, ‘concern’ and ‘fall-related self-efficacy’). This would ensure that all psychological views in regards to falls are captured by clinicians to enable treatments to target the appropriate psychological construct related to older adults’ concerns. Furthermore, this
would allow researchers to measure all fall-related psychological concerns at the one time, therefore, decreasing the confusion that has been caused throughout the literature with the use of different measures of fear of falling.

Another important issue that follows is the need for future research to address the use of self-report measures. That is, whilst the current study administered reliable and valid measures of fear of falling, depression and anxiety specific to the geriatric population, it is possible that factors such as social desirability bias (Fisher, 1993) may have influenced our findings. In addition, some of the measures that were used (i.e. the GDS-15) were reflective of “the past week”; therefore it is possible that participants reporting on their symptoms of depression were biased by factors such as primary and recency effects (Ogden, 2008). Future studies that use self-report measures of depression and anxiety should therefore also administer an established rater measure, such as The Structured Clinical Interview for DSM-5 Disorders- Clinician Version (First, Williams, Karg & Spitzer, 2015), which may assist with accounting for such influences.

We also recognize that this research is cross-sectional in nature, and therefore, any conclusions about associations and predictions in this study cannot be viewed in a causal sense. Longitudinal investigations are warranted in order to further understand the causal relationships between fear of falling, depression and anxiety in community dwell and extended care facilities. This would allow for further clarification around the specific factors necessary for clinicians to target in clinical interventions aimed at reducing falls.
5.5 Conclusion

Finally, as described in the opening chapter of this thesis, the Australian population is aging due to the post-war baby boom (Australian Bureau of Statistics, 2013). As such, investigation of the factors related to falls, such as fear of falling, remains paramount. A fear of falling can have detrimental effects, including poorer health status and an increased risk of future falls. Whilst future research is necessary in order to account for the limitations in this study, our research has assisted with understanding fear of falling in older adults through the following key findings and implications:

- As both symptoms of depression and anxiety were related to fear of falling in each study sample, clinicians who work with older adults with mood disorders should screen for fear of falling. Furthermore, it may be necessary to target symptoms of depression and anxiety in clinical interventions aimed at reducing fear of falling and falls in older adults. The above is particularly important for older adults who present with symptoms of anxiety, as anxiety was consistently related to both measures of fear of falling in each study.

- As results suggest that females are at higher risk of reporting fear of falling in both the community-dwelling and extended care older adult population, clinicians should ensure that regular screening for fear of falling takes place in female older adults.

- Findings showed that older adults living in extended care facilities who have had more than two falls in the previous year and/or who use a walking aid are at a
higher risk of reporting fear of falling. Therefore, clinicians should ensure that regular screening for fear of falling takes place in these sub-populations.

- As older adults in the extended care sample reported that they viewed their feelings in regards to falls as “concern” rather than a “fear”, results combined with previous literature emphasized the need to re-evaluate measures of fear of falling. Clinicians should employ both interviewing and questionnaires as a part of their assessment of fear of falling when working with older adults in order to capture all fall-related psychological concerns.

It is envisaged that the knowledge gained from this research will allow clinicians to better detect older adults living in the community and extended care facilities that are at risk of falls. Furthermore, it is hoped that our findings will allow for enhanced treatment programs for falls prevention in older adults, who remain a vulnerable population for future falls.
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Appendix A

Ethical Approval for Study One

Thursday, 14 November 2013

Dr Timothy Fairchild
School of Psychology and Exercise Science
Murdoch University

Dear Timothy,

Project No. 2013/140
Project Title Assessing the psychological and physiological efficacy of an exercise intervention in aged individuals: Is there a role for core-stability training?

Thank you for addressing the conditions placed on the above application to the Murdoch University Human Research Ethics Committee. On behalf of the Committee, I am pleased to advise the application now has:

OUTRIGHT APPROVAL

Approval is granted on the understanding that research will be conducted according the standards of the National Statement on Ethical Conduct in Human Research (2007), the Australian Code for the Responsible Conduct of Research (2007) and Murdoch University policies at all times. You must also abide by the Human Research Ethics Committee’s standard conditions of approval (see attached). All reporting forms are available on the Research Ethics website.

I wish you every success for your research.

Please quote your ethics project number in all correspondence.

Kind Regards,

[Signature]

Dr. Erich von Dette
Manager of Research Ethics

cc: Dr Jeffrey Herbert, Dr Mark Hechmovich, Dr Helen Correia, Behnaz Shahtahmassebi and Jacinta Hatton
Appendix B

Study One Measures\(^8\)

Assessing the psychological and physiological efficacy of an exercise intervention in aged care individuals: Is there a role for core-stability training?

The following questions on these forms ask about some general information about yourself. Then there are some questions about how you feel and the kinds of activities you do.

**Demographics**

Gender

- Male
- Female

Date of birth

Please tick your answer to the following questions:

1. Living Status (room)
   - Living Alone
   - Living with another person

2. Educational Level
   - No formal schooling
   - Primary school

\(^8\) Note: Font size and formatting have been slightly altered to fit page format.
Appendix B

(Education Level- Continued)  □ Some secondary school

□ Completed secondary school

□ Bachelor’s degree

□ Graduate degree/professional

□ Other (please specify): __________

3. Marital Status  □ Never married

□ Married/Partnered

□ Separated/Divorced

□ Widowed

4. Do you use a walking aid?  □ Yes  □ No

If YES, what type?  □ Stick  □ Walking Frame

□ Other (please specify): ______________

5. Do you wear hearing aids?  □ Yes  □ No
Appendix B

6. How well can you hear (with or without a hearing aid)?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

7. Do you wear glasses/contact lenses?  Yes  No

8. How well can you see (with or without glasses/lenses)?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

9. How would you rate your health at the present time?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

10. Which of the following best describes your physical activity status?
    - Very active (exercise 3 times per week)
    - Moderately active (exercise once or twice per week)
    - Not very active (rarely leaves the house)
    - Inactive (rarely leaves one room of the house)
Appendix C

Daily Sleep Diary

Date:

Dear ________________.

In today’s testing, you completed a set of questionnaires and some functional tests (exercises) with Behnaz and Jacinta. We have also given you an Actigraph to wear around your waist. This measures your levels of activity over the next 7-days, and you can wear the Actigraph at ALL times EXCEPT for when you are in water (e.g. showering, pools, etc).

* Please make note of the approximate time you go to bed and the time you get out of bed:

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This is a friendly reminder that your next appointments are on the following dates:

We thank you again for your participation in our study and we look forward to seeing you again soon. If you have any queries or problems please do not hesitate to contact:

Jacinta:  0412 418 712

Behnaz:  0434 214 552 - Please contact for all exercise program questions

Thank you ☺️
Appendix D

Study One Information Letter

Assessing the psychological and physiological efficacy of an exercise intervention in aged individuals: Is there a role for core-stability training?

We invite you to participate in a research study aiming to identify the effects of a 12-week exercise training program on physical (muscle strength and size) and psychological (mood) measures. We then aim to see whether those changes have a positive effect on your quality of life. This study is being conducted by Miss Behnaz Shahtahmassebi as part of her PhD, as well as Ms Jacinta Hatton and Ms Sarah Malley, as part of their postgraduate (Clinical Masters) training. The supervisors of the project include Dr. Timothy Fairchild, Dr. Jeffrey Hebert, Dr Helen Correia and Dr. Mark Hecimovich from the School of Psychology and Exercise Science at Murdoch University.

Nature and Purpose of the Study
Age-related loss of muscle size and strength leads to reduced engagement in physical activity, and difficulty in performing some daily tasks. This may then affect quality of life and have negative effects on mood and sleep. Here we aim to explore whether the usual benefits of participation in exercise such as improved health, strength and overall fitness may improve the multiple factors comprising quality of life.

If you consent to take part in this research study, it is important that you understand the purpose of the study and the procedures you will be asked to undertake. Please make sure that you ask any questions you may have, and that all your questions have been answered to your satisfaction before you agree to participate.
Appendix D

Eligibility criteria
Regarding the inclusion criteria of this study, we are seeking to engage individuals who are 60 years or older and are able to participate in a structured exercise program. We will ask you a series of questions regarding your health and at the end of these questions we may request that you seek clearance from your doctor prior to participation in this exercise program. Please note that there may be circumstances where the doctor may not grant this clearance and we may then not be able to enrol you into the exercise training program.

Since this project includes assessment of strength and a training program which targets the lower back, we will need to exclude you from the evaluation and training program if you have any of the following:

1. A history of lumbar surgery
2. Any medical condition and prescribed medication, which may preclude safe participation in an exercise intervention
3. Unable to communicate and fill in the questionnaires in English

What the Study will Involve
If you decide to participate in this study, we will take a series of measurements at the start of the program including:

(i) The size of muscles in your lower back and stomach area with an ultrasound device
(ii) Assessing the strength of the muscles in your stomach and lower back using a purpose-built commercially available machine
(iii) Assess your balance

This testing is expected to take 45-60min.

We will also ask you to fill in a number of forms which will be used to assess:

(iv) Your falls-risk score, performance of activities of daily living, quality of life
(v) Your mood and well-being

This testing is expected to take 30-45min.
Appendix D

To measure your physical activity and sleep, we will also ask you to wear a device called an Actigraph, for one week during the day and night. This small device measures your movement (but not your location), much like a step counter.

After this testing we will invite you to participate in an 18-week supervised exercise program which will include either walking or an indoor-based exercise training program. The researchers will assign you to one of these exercise programs. Each session will be held 3 times per week for 45 minutes per session.

The measures and questionnaires mentioned above will then be repeated after 6-, 12- and 18-weeks. This testing will occur at Murdoch University.

What will happen with the information?

Once all the information has been received, we will then de-identify the data using a unique code (numbering system) prior to storing the data. This means that a random number will be assigned to you which we will then use throughout the study to be able to compare your scores from the start, to week 6, 12 and 18. It also means that anyone who looks through the files will not know who the actual individual is. All analysis will then be performed on this data that has been de-identified. All information will then be released as group-data, so no one individual will be identifiable from the research findings.

Since we are collecting a large amount of information, it is important to note that we may use some of that information for some additional analysis at a later stage. There could for example, be some very important relationships between the strength of stomach muscles and back muscles with quality of life which we did not anticipate, but we feel is important to announce since it will be beneficial to the community.
Appendix D

Voluntary Participation and Withdrawal from the Study
Your participation in this study is entirely voluntary. You may withdraw at any time without discrimination or prejudice. All information is treated as confidential and no names or other details that might identify you will be used in any publication arising from the research. If you withdraw prior to data analysis, all information you have provided will be destroyed.

Benefits of the Study
Participants in our study will be provided with:

a) A free exercise training program (36 exercise sessions in total), supervised by exercise experts.

b) Accurate information regarding their dynamic and static balance, falls-risk scores, level of daily living activities and quality of life. Accurate information regarding their dynamic and static balance, falls-risk scores, level of daily living activities and quality of life.

c) Information related to the benefits of exercise in aging; specifically related to musculoskeletal performance.

d) A $20 reimbursement for participation.

Possible Risks
There are some minor risks associated with the testing sessions, which include feelings of fatigue afterwards and feelings of muscular discomfort due to the level of exertion required during these sessions. We will minimize the risks by monitoring and supervising you closely during the tests.

Furthermore, if you experience any feeling of great discomfort during the exercise conditions, it is important for you to understand that you can ask the investigator to stop the experiment at any stage without having to provide an explanation. The risks associated with the exercise training are expected to be minor only since we will closely supervise you at all times.
Appendix D

If you have any questions about this project please feel free to contact either Miss Behnaz Shahtahmassebi (9360 6474; or 0434214532; or b.shahtahmassebi@murdoch.edu.au), or Ms Jacinta Hatton (31791875@student.murdoch.edu.au; or 0412418712) or one of the supervisors:
Dr Tim Fairchild (9360 2959; or t.fairchild@murdoch.edu.au)
Dr Jeffrey Hebert (9360 2566 or J.Hebert@murdoch.edu.au)
Dr Helen Correia (9360 2290 or h.correia@murdoch.edu.au)

Once we have analyzed the information from this study we will publish the results of the study on the Murdoch University School of Psychology and Exercise Science website: http://www.murdoch.edu.au/School-of-Psychology-and-Exercise-Science/Research/Exercise-Science-Research/.

We will also provide a talk at the completion of the study presenting a summary of the findings. You can expect to receive this feedback within a few months of completing the project and we expect the information to be available by December 2014.

If you are willing to consent to participation in this study, please complete the Consent Form. Thank you for your assistance with this research project.

Thank you for your assistance with this research project.

Sincerely,

Timothy Fairchild

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval 2013/140). If you have any reservation or complaint about the ethical conduct of this research, and wish to talk with an independent person, you may contact Murdoch University's Research Ethics Office (Tel. 08 9360 6677 for overseas studies, +61 8 9360 6677) or e-mail ethics@murdoch.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix E

Study One Consent Form

Assessing the psychological and physiological efficacy of an exercise intervention in aged individuals: Is there a role for core-stability training?

1. I agree voluntarily to take part in this study.

2. I have read the Information Sheet provided and been given a full explanation of the purpose of this study, of the procedures involved and of what is expected of me. The researcher has answered all my questions and has explained the possible problems that may arise as a result of my participation in this study.

3. I understand I am free to withdraw from the study at any time without needing to give any reason.

4. I understand I will not be identified in any publication arising out of this study.

5. I understand that my name and identity will be stored separately from the data, and these are accessible only to the investigators. All data provided by me will be analysed anonymously using code numbers.

6. I understand that there may be some secondary analysis of data. This may be conducted to explore any unexpected research findings.

7. I understand that all information provided by me is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

Signature of Participant: __________________________  Date: ……/……./…….
(Name) ..........................................................  (Day)  (Month)  (Year)

Signature of researcher: __________________________ Date: ……/……./…….
(Name) ..........................................................  (Day)  (Month)  (Year)
# Appendix F

## Study One Descriptive Statistics

Table F.1

*Demographic Details for the Entire Study Sample as Shown Using Frequencies and Percentages (N = 80).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, M (SD)</strong></td>
<td>72 (8.4)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>male, n (%)</td>
<td>31 (38.3)</td>
</tr>
<tr>
<td>female, n (%)</td>
<td>49 (60.5)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>never married, n (%)</td>
<td>2 (2.5)</td>
</tr>
<tr>
<td>married, n (%)</td>
<td>49 (60.5)</td>
</tr>
<tr>
<td>separated/divorced, n (%)</td>
<td>11 (13.6)</td>
</tr>
<tr>
<td>widow, n (%)</td>
<td>18 (22.2)</td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
</tr>
<tr>
<td>primary school, n (%)</td>
<td>4 (4.9)</td>
</tr>
</tbody>
</table>
### Appendix F

Table F.1

*Demographic Details of the Entire Study Sample as Shown Using Frequencies and Percentages (N = 80) (Continued).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education Level (continued)</strong></td>
<td></td>
</tr>
<tr>
<td>some secondary school, n (%)</td>
<td>16 (19.8)</td>
</tr>
<tr>
<td>completed secondary school, n (%)</td>
<td>15 (18.5)</td>
</tr>
<tr>
<td>bachelor degree, n (%)</td>
<td>14 (17.3)</td>
</tr>
<tr>
<td>graduate degree or professional, n (%)</td>
<td>20 (24.7)</td>
</tr>
<tr>
<td>other, n (%)*</td>
<td>11 (13.6)</td>
</tr>
<tr>
<td><strong>Living status</strong></td>
<td></td>
</tr>
<tr>
<td>living alone, n (%)</td>
<td>28 (34.6)</td>
</tr>
<tr>
<td>living with 1 or more people, n (%)</td>
<td>52 (64.2)</td>
</tr>
<tr>
<td><strong>Walking Aid Use</strong></td>
<td></td>
</tr>
<tr>
<td>Yes, n (%)</td>
<td>4 (4.9)</td>
</tr>
<tr>
<td>No, n (%)</td>
<td>76 (93.8)</td>
</tr>
</tbody>
</table>
**Appendix F**

Table F.1

*Demographic Details of the Entire Study Sample as Shown Using Frequencies and Percentages (N = 80) (Continued).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hearing Aids</strong></td>
<td></td>
</tr>
<tr>
<td>Yes, n (%)</td>
<td>10 (12.3)</td>
</tr>
<tr>
<td>No, n (%)</td>
<td>70 (86.4)</td>
</tr>
<tr>
<td><strong>Glasses or Contacts</strong></td>
<td></td>
</tr>
<tr>
<td>Yes, n (%)</td>
<td>70 (86.4)</td>
</tr>
<tr>
<td>No, n (%)</td>
<td>10 (12.3)</td>
</tr>
<tr>
<td><strong>Fear-Related Activity Avoidance</strong></td>
<td></td>
</tr>
<tr>
<td>Yes, n (%)</td>
<td>19 (23.8)</td>
</tr>
<tr>
<td>No, n (%)</td>
<td>61 (76.3)</td>
</tr>
</tbody>
</table>

*Notes: M = mean; SD = standard deviation; n = number of participants; % = percentage of participants.*
Table F.2

*Descriptive Statistics for the Primary Variables as Shown Using Means and Standard Deviations or Frequencies and Percentages (N=80).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FrSe, $M$ (SD)</td>
<td>20.48 (7.33)</td>
</tr>
<tr>
<td>FOF item</td>
<td></td>
</tr>
<tr>
<td>No, n (%)</td>
<td>62 (77.5)</td>
</tr>
<tr>
<td>Yes, n (%)</td>
<td>18 (22.5)</td>
</tr>
<tr>
<td>GAI, $M$ (SD)</td>
<td>2 (3.31)</td>
</tr>
<tr>
<td>Clinically significant (≥ 9), n (%)</td>
<td>4 (5.0)</td>
</tr>
<tr>
<td>GDS-15, $M$ (SD)</td>
<td>1 (1.81)</td>
</tr>
<tr>
<td>normal (0-4), n (%)</td>
<td>76 (95.0)</td>
</tr>
<tr>
<td>mild (5-8), n (%)</td>
<td>3 (3.8)</td>
</tr>
<tr>
<td>moderate (9-11), n (%)</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>severe (12-15), n (%)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

*Notes:* FOF item = fear of falling item; FrSe = fall-related self-efficacy measure; GAI = Geriatric Anxiety Scale (Pachana et al., 2007); GDS-15 = Geriatric Depression Scale- Short Form (Sheikh & Yesavage, 1986); $M$ = mean; n = number of participants; % = percentage of participants.
## Appendix F

Table F.3

*Descriptive Statistics for the Secondary Variables as Shown Using Means and Standard Deviations or Frequencies and Percentages.*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Reported Activity Levels</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>inactive, n (%)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>not very active, n (%)</td>
<td>3 (3.7)</td>
<td></td>
</tr>
<tr>
<td>moderately active, n (%)</td>
<td>39 (48.1)</td>
<td></td>
</tr>
<tr>
<td>very active, n (%)</td>
<td>38 (46.9)</td>
<td></td>
</tr>
<tr>
<td>Objective Activity Levels, $M$ (SD)</td>
<td>6157.49 (2535.47)</td>
<td>77</td>
</tr>
<tr>
<td>Self-Reported Falls History</td>
<td></td>
<td>79</td>
</tr>
<tr>
<td>no fall, n (%)</td>
<td>60 (74.1)</td>
<td></td>
</tr>
<tr>
<td>1 fall, n (%)</td>
<td>10 (12.3)</td>
<td></td>
</tr>
<tr>
<td>2 falls, n (%)</td>
<td>8 (9.9)</td>
<td></td>
</tr>
<tr>
<td>3 or more falls, n (%)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix F

Table F.3

*Descriptive Statistics for the Secondary Variables asShown Using Means and Standard Deviations or Frequencies and Percentages (Continued).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls History Injury</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>no injury, n (%)</td>
<td>68 (84.0)</td>
<td></td>
</tr>
<tr>
<td>minor injury (no medical attention), n (%)</td>
<td>4 (4.9)</td>
<td></td>
</tr>
<tr>
<td>minor injury (medical attention), n (%)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
<tr>
<td>severe injury, n (%)</td>
<td>6 (7.4)</td>
<td></td>
</tr>
</tbody>
</table>

*Notes: M= mean; n = number of participants, SD = standard deviation, %= percentage of participants.*
Appendix G

Study One: Associations with Fear of Falling

Table G.1

_Bivariate Correlation Analyses Between Measures of Fear of Falling (Fall-Related Self-Efficacy and Fear of Falling Item) and Non-Significant Study Variables (p > .05)._

<table>
<thead>
<tr>
<th>Measure</th>
<th>Age N = 80</th>
<th>Activity Levels N = 77</th>
<th>Depression N = 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>FrSe</td>
<td>-</td>
<td>-</td>
<td>.19_s</td>
</tr>
<tr>
<td>FOF item</td>
<td>.14_pb</td>
<td>-.10_pb</td>
<td>-</td>
</tr>
</tbody>
</table>

_Notes: FOF item= fear of falling item; FrSe= fall-related self-efficacy; N = total sample size; pb biserial correlation coefficient; s = spearman's rho correlation coefficient; - represents significant estimates incorporated into thesis._

Table G.2

_Group Differences Between Fear of Falling (Fall-Related Self-Efficacy) and Non-Significant Study Variables._

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Df</th>
<th>MS</th>
<th>Test Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-report activity levels</td>
<td>80</td>
<td>2, 77</td>
<td>32.484</td>
<td>.55_F</td>
<td>.552</td>
</tr>
<tr>
<td>Falls history injury</td>
<td>79</td>
<td>3, 75</td>
<td>-</td>
<td>7.12_H</td>
<td>.068</td>
</tr>
</tbody>
</table>

_Notes: Df = degrees of freedom; F = ANOVA statistic, H = Kruskal-Wallis statistic; MS = mean square statistic; N = total sample size; p = significance value; - statistic not available._
Appendix G

Table G.3

*Independent Samples T-Tests Examining the Relationships between Fear of Falling (Fall-Related Self-Efficacy) and Gender (N = 80).*

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FrSe</td>
<td>19.06</td>
<td>21.37</td>
<td>-1.38</td>
<td>78</td>
<td>.17</td>
</tr>
</tbody>
</table>

Notes: df = degrees of freedom; FrSe = fall-related self-efficacy; M = mean; p = significance value; SD = standard deviation; t = t-test statistic.
Appendix H

Study Two Ethical Approval

Friday, 31 January 2014

Dear Helen,

Project No. 2014/011
Project Title An investigation of fear of falling and its relationship with depression, anxiety and fear-related activity restriction in older adults living within an aged care facility

Your application in support of the above project was reviewed by the Murdoch University Human Research Ethics Sub-Committee and was:

APPROVED

Approval is granted on the understanding that research will be conducted according the standards of the National Statement on Ethical Conduct in Human Research (2007), the Australian Code for the Responsible Conduct of Research (2007) and Murdoch University policies at all times. You must also abide by the Human Research Ethics Committee’s standard conditions of approval (see attached). All reporting forms are available on the Research Ethics website.

I wish you every success for your research.

Kind Regards,

[Signature]

Dr Erich von Diste
Manager of Research Ethics

c: Dr Jeffrey Habert and Jacinta Hutton

HRREC Approval Letter: 140113
Appendix I

Study Two Consent Form

Fear of falling and its relationship to the health and wellbeing of older adults living within a residential care facility: Phase 1 (Questionnaires)

1. I agree voluntarily to take part in this study.

2. I have read the Information Sheet provided and been given a full explanation of the purpose of this study, the procedures involved and what is expected of me.

3. I understand that:
   a. I will be asked to complete a number of questionnaires and return them to the researcher.
   b. As part of the study, data about my cognitive functioning, falls history and current activity levels, that is contained in the system at the Aged Care Facility will be provided to the researcher.
   c. I may be asked to participate in a short 10-minute assessment of my cognitive abilities.

4. The researcher has answered all my questions and has explained any possible problems that may arise as a result of my participation in this study.

5. I understand I am free to withdraw from the study at any time without needing to give any reason.

6. I understand I will not be identified in any publication arising out of this study.

7. I understand that all of my data will be kept securely and confidentially.

8. I understand that all information provided by me is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

My Name: __________________________

My Signature: __________________________ Date: ……/……/……

I confirm that I have provided the Information Letter concerning this study to the above participant; I have explained the study and have answered all questions asked of me.

Researcher’s Name: __________________________

Researcher’s Signature: __________________________ Date: ……/……/……
Appendix I

Consent Form

Fear of falling and its relationship with the health and wellbeing of older adults living within a residential care facility: Phase 2 (Interviews)

1. I agree voluntarily to take part in this study.

2. I have read the Information Sheet provided and been given a full explanation of the purpose of this study, the procedures involved and what is expected of me.

3. I understand that:
   a. I will be asked to partake in an interview with the researcher which will last up to 30-minutes.
   b. I agree to the interview being audio recorded: [ ] Yes [ ] No

4. The researcher has answered all my questions and has explained any possible problems that may arise as a result of my participation in this study.

5. I understand I am free to withdraw from the study at any time without needing to give any reason.

6. I understand I will not be identified in any publication arising out of this study.

7. I understand that all of my data will be kept securely and confidentially

8. I understand that all information provided by me is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

My Name: __________________________

My Signature: __________________________ Date: ....../....../......

I confirm that I have provided the Information Letter concerning this study to the above participant; I have explained the study and have answered all questions asked of me.

Researcher’s Name: __________________________

Researcher’s Signature: __________________________ Date: ....../....../......
Appendix J

Study Two Measures

Fear of falling and its impact on the health and wellbeing of older adults living within a residential care facility: A Pilot Study.

The following questions on these forms ask about some general information about yourself. Then there are some questions about how you feel and the kinds of activities you do.

Demographics

Gender

☐ Male

☐ Female

Date of birth

Please tick your answer to the following questions:

1. Living Status (room)

☐ Living Alone

☐ Living with another person

2. Educational Level

☐ No formal schooling

☐ Primary school

☐ Some secondary school

Note: Font size and formatting have been slightly altered to fit page format.
Appendix J

(Education Level- Continued)  ☐ Completed secondary school

☐ Bachelor’s degree

☐ Graduate degree/professional

☐ Other (please specify): ________

3. Marital Status  ☐ Never married

☐ Married/Partnered

☐ Separated/Divorced

☐ Widowed

4. Do you use a walking aid?  ☐ Yes  ☐ No

If YES, what type?  ☐ Stick  ☐ Walking Frame

☐ Other (please specify): ______________

5. Do you wear hearing aids?  ☐ Yes  ☐ No
Appendix J

6. How well can you hear (with or without a hearing aid)?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

7. Do you wear glasses/contact lenses? □ Yes □ No

8. How well can you see (with or without glasses/lenses)?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

9. How would you rate your health at the present time?
   - Very Poor
   - Poor
   - Fair
   - Good
   - Very Good

10. Which of the following best describes your physical activity status?
    - Very active (exercise 3 times per week)
    - Moderately active (exercise once or twice per week)
    - Not very active (rarely leaves the house)
    - Inactive (rarely leaves one room of the house)
Appendix K

Study Two Information Letter

Fear of falling and the health and wellbeing of older adults living within a residential care facility.

Information Letter

Investigators Supervisors
Jacinta Hatton
Dr Helen Correia and Dr Jeffrey Hebert

Contact Person
Dr Helen Correia: Ph: 08 9360 2290

This study is part of Jacinta Hatton’s Doctorate degree in Clinical Psychology at Murdoch University, Perth. The primary supervisor for this study, Dr Helen Correia, is a Clinical Psychologist and staff member at Murdoch University. The co-supervisor, Dr Jeffrey Hebert, is also staff member at Murdoch University.

Background and Aim of the Study
Many older adults experience a fear of falling. A fear of falling can have a significant impact on an individual’s health and wellbeing. I am interested in exploring fear of falls and how this impacts on the health and wellbeing of residents who live in a Residential Aged Care facility, so we are inviting you to participate in our study.

What Does Your Participation Involve?
Individuals eligible to participate are those people who are aged 60 years and older.

Phase 1 of the study involves completing some questionnaires. These will look at your feelings around fear of falling, and your levels of daily activity. There will also be some questions asking about your background, current health status, pain, and whether you have experienced any falls. In addition, if you consent to participate in this study, then we may also access some of your data on the system at the Bethanie Aged Care facility. Specifically this will be information about your cognitive functioning (for example, memory and language), as well as falls history and current activity levels. We will make sure that this information remains private and your identity protected. If this data has not been collected recently, you may be asked to participate in a short 10-minute assessment which will aim to obtain a better understanding of your current abilities to think, understand and remember.

Phase 2 of the study we would also like to invite you to participate in a brief 30-minute interview to tell us a little more about the information you have provided in the questionnaires and for you to give us feedback about participating in the study. To make it easier and to make sure we don’t miss out any information, we would like to make a recording of the interview (sound only). This is also completely voluntary and you do not have to participate if you do not want to.
Appendix K

Voluntary Participation and Withdrawal from the Study
It is important that you understand that your involvement in this study is voluntary. While we would be pleased to have you participate, we respect your right to decline. There will be no consequences to you if you decide not to participate. If you decide to discontinue participation at any time, you may do so without providing an explanation. If you withdraw, all information you have provided will be destroyed.

Your privacy
Your privacy is very important to us. Therefore, participation in this study and any information you provide will be treated in a confidential manner. Your name and identifying details will not be used in any publication arising out of the research.

Benefits of the Study
If we are able to take the findings of this study and link these to findings from other studies, then this will give us a better understanding of older adults’ experiences of fear of falling and the mental health conditions which may also be associated with this. This information will allow health care providers to provide better quality of care to older adults living both within the community and within aged care homes.

Possible Risks
There are no specific risks anticipated with participation in this study. However, if you find that you are becoming distressed following participation, please speak to the care staff, or you can contact Dr Helen Correia (9360 2290).

Reimbursement
Each individual who wishes to participate will go in the draw to win a raffle prize valued at $30. The raffle will be drawn once all of the completed questionnaires and interviews have been conducted.

Questions
If you would like to discuss any aspect of this study further, please feel free to contact Dr Helen Correia on 9360 2290. We would be more than happy to talk with you. Once we have analysed the information from this study we will provide some information to your residential facility to pass on to you. We would like to thank you in advance for your assistance with this research project; it is very much appreciated. We look forward to hearing from you soon.

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval 2014/011). If you have any reservation or complaint about the ethical conduct of this research, and wish to talk with an independent person, you may contact Murdoch University’s Research Ethics Office (Tel. 08 9360 5677 (for overseas studies, +61 8 9360 6677) or e-mail ethics@murdoch.edu.au). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix L

Semi-Structured Interview Questions

1) The questionnaires that you completed were aimed at examining your previous falls experiences and fear of falling. Can you tell me more about your thoughts on falls?

2) How do you think that your fear of falling influences what you do?

3) Can you tell me about your previous falls experiences?

4) How do you prevent yourself from having a fall?

5) To get a sense of the kinds of things that you’re worried about, can you tell me a little bit about what you are afraid of happening if you did have a fall?
Appendix M

Study Two Descriptive Statistics

Table M.1

Demographic Details of the Entire Study Sample as Shown Using Means and Standard Deviations or Frequencies and Percentages.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), $M$ (SD)</td>
<td>85.4 (47, 8.13)</td>
<td>47</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>47</td>
</tr>
<tr>
<td>male, n (%)</td>
<td>9.0 (19.1)</td>
<td></td>
</tr>
<tr>
<td>female, n (%)</td>
<td>38.0 (80.9)</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td>never married, n (%)</td>
<td>2.0 (4.2)</td>
<td></td>
</tr>
<tr>
<td>married, n (%)</td>
<td>7.0 (14.6)</td>
<td></td>
</tr>
<tr>
<td>separated/divorced, n (%)</td>
<td>7.0 (14.6)</td>
<td></td>
</tr>
<tr>
<td>widow</td>
<td>30.0 (62.5)</td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td>primary school, n (%)</td>
<td>13.0 (27.1)</td>
<td></td>
</tr>
<tr>
<td>some secondary school, n (%)</td>
<td>18.0 (37.5)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix M

Table M.1

**Demographic Details of the Entire Study Sample as Shown Using Means and Standard Deviations or Frequencies and Percentages (N = 47). (Continued).**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education Level (continued)</strong></td>
<td></td>
</tr>
<tr>
<td>completed secondary school, n (%)</td>
<td>8 (16.7)</td>
</tr>
<tr>
<td>bachelor degree, n (%)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>graduate degree or professional, n (%)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>other, n (%)</td>
<td>5 (10.4)</td>
</tr>
<tr>
<td><strong>Living status</strong></td>
<td></td>
</tr>
<tr>
<td>living alone, n (%)</td>
<td>38 (79.2)</td>
</tr>
<tr>
<td>living with 1 or more people, n (%)</td>
<td>9 (18.8)</td>
</tr>
<tr>
<td><strong>Walking Aid Use</strong></td>
<td></td>
</tr>
<tr>
<td>yes, n (%)</td>
<td>41 (85.4)</td>
</tr>
<tr>
<td>no, n (%)</td>
<td>6 (12.5)</td>
</tr>
<tr>
<td><strong>Hearing Aid Use</strong></td>
<td></td>
</tr>
<tr>
<td>yes, n (%)</td>
<td>14 (29.2)</td>
</tr>
<tr>
<td>no, n (%)</td>
<td>33 (68.8)</td>
</tr>
</tbody>
</table>
### Table M.1

**Demographic Details of the Entire Study Sample as Shown Using Means and Standard Deviations or Frequencies and Percentages (N = 47) (Continued).**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasses or Contacts Use</td>
<td></td>
</tr>
<tr>
<td>yes, n (%)</td>
<td>42 (87.5)</td>
</tr>
<tr>
<td>no, n (%)</td>
<td>5 (10.4)</td>
</tr>
</tbody>
</table>

*Notes: M= mean; n = sample size; SD= standard deviation; n= number of individuals; other= denotes a course other university, such as a tafe course; %= percentage of individuals.*
Appendix M

Table M.2

Descriptive Statistics for the Primary Variables for the Entire Study Sample as Shown Using Means and Standard Deviations or Frequencies and Percentages (N = 47).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FrSe, n, M (SD)</td>
<td>47, 34.26 (14.58)</td>
</tr>
</tbody>
</table>

FOF item

No Fear of Falling, n (%)    16 (33.3)
Fear of Falling, n (%)       31 (64.6)

GAI, M (SD)                  4.91 (5.85)

GAI Severity

Clinically significant (≥9), n (%) 9 (19.1)

GDS-15, n, M (SD)            47, 3.83 (3.29)

GDS-15 Severity

normal (0-4), n (%)          30 (62.5)
mild (5-8), n (%)            14 (29.2)
moderate (9-11), n (%)       1 (2.1)
severe (12-15), n (%)        2 (4.2)

Notes: FOF item= fear of falling item; FrSe= fall-related self-efficacy; GAI= Geriatric Anxiety Scale (Pachana et al., 2007); GDS-15= Geriatric Depression Scale- Short Form (Sheikh & Yesavage, 1986); M= mean; n = sample size; SD= standard deviation, n= number of participants, %= percentage of participants.
Appendix M

Table M.3

*Descriptive Statistics for the Secondary Variables for the Entire Study Sample as Shown using Means and Standard Deviations and Frequencies and Percentages (N = 47).*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hearing Ability</strong></td>
<td></td>
</tr>
<tr>
<td>very poor, n (%)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>poor, n (%)</td>
<td>5 (10.4)</td>
</tr>
<tr>
<td>fair, n (%)</td>
<td>8 (16.7)</td>
</tr>
<tr>
<td>good, n (%)</td>
<td>19 (39.6)</td>
</tr>
<tr>
<td>very good, n (%)</td>
<td>13 (27.1)</td>
</tr>
<tr>
<td><strong>Eyesight Ability</strong></td>
<td></td>
</tr>
<tr>
<td>very poor, n (%)</td>
<td>4 (8.3)</td>
</tr>
<tr>
<td>poor, n (%)</td>
<td>4 (8.3)</td>
</tr>
<tr>
<td>fair, n (%)</td>
<td>10 (20.8)</td>
</tr>
<tr>
<td>good, n (%)</td>
<td>17 (35.4)</td>
</tr>
<tr>
<td>very good, n (%)</td>
<td>12 (25.0)</td>
</tr>
</tbody>
</table>
### Appendix M

Table M.3

*Descriptive Statistics for the Secondary Variables for the Entire Study Sample as Shown using Means and Standard Deviations and Frequencies and Percentages (Continued).*

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Reported Health Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very poor, n (%)</td>
<td>1</td>
<td>(2.1)</td>
</tr>
<tr>
<td>poor, n (%)</td>
<td>2</td>
<td>(4.2)</td>
</tr>
<tr>
<td>fair, n (%)</td>
<td>22</td>
<td>(45.8)</td>
</tr>
<tr>
<td>good, n (%)</td>
<td>15</td>
<td>(31.3)</td>
</tr>
<tr>
<td>very good, n (%)</td>
<td>7</td>
<td>(14.6)</td>
</tr>
<tr>
<td><strong>Cognitive Functioning, M (n, SD)</strong></td>
<td>4.34</td>
<td>(47, 2.55)</td>
</tr>
<tr>
<td><strong>Cognitive Functioning- PAS Severity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no/minimal impairment, n (%)</td>
<td>22</td>
<td>(45.8)</td>
</tr>
<tr>
<td>mild impairment, n (%)</td>
<td>25</td>
<td>(52.1)</td>
</tr>
<tr>
<td><strong>Self-Reported Activity Levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>inactive, n (%)</td>
<td>1</td>
<td>(2.1)</td>
</tr>
<tr>
<td>not very active, n (%)</td>
<td>10</td>
<td>(20.8)</td>
</tr>
<tr>
<td>moderately active, n (%)</td>
<td>13</td>
<td>(27.1)</td>
</tr>
</tbody>
</table>
Appendix M

Table M.3


<table>
<thead>
<tr>
<th>Self-Reported Activity Levels (continued)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>very active, n (%)</td>
<td>23 (47.9)</td>
</tr>
</tbody>
</table>

| Objective Activity Levels, M (n, SD)   | 0.86 (47, .67) |

<table>
<thead>
<tr>
<th>Self-Reported Falls History</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no fall, n (%)</td>
<td>26 (54.2)</td>
</tr>
<tr>
<td>1 fall, n (%)</td>
<td>6 (12.5)</td>
</tr>
<tr>
<td>2 falls , n (%)</td>
<td>3 (6.3)</td>
</tr>
<tr>
<td>3 or more falls, n (%)</td>
<td>11 (22.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Falls History (Objective)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no falls, n (%)</td>
<td>31 (64.6)</td>
</tr>
<tr>
<td>1 fall, n (%)</td>
<td>9 (18.8)</td>
</tr>
<tr>
<td>2 falls, n (%)</td>
<td>3 (6.3)</td>
</tr>
<tr>
<td>3 or more falls, n (%)</td>
<td>4 (8.3)</td>
</tr>
</tbody>
</table>
Appendix M

Table M.3

*Descriptive Statistics for the Secondary Variables for the Entire Study Sample as Shown using Means and Standard Deviations and Frequencies and Percentages (Continued).*

<table>
<thead>
<tr>
<th>Fear Related Activity Avoidance Categorized</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, n (%)</td>
<td>23 (48.9)</td>
</tr>
<tr>
<td>No, n (%)</td>
<td>24 (51.1)</td>
</tr>
</tbody>
</table>

*Notes: M = mean; n = sample size, % = percentage of participants.*
Appendix N

Study Two: Associations with Fear of Falling

Table N.1

*Bivariate Pearson Correlation Analyses Between Measures of Fear of Falling (Fall-Related Self-Efficacy) and Non-Significant Study Variables (N = 47).*

<table>
<thead>
<tr>
<th>Measure</th>
<th>FES-I</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.07</td>
<td>.67</td>
</tr>
<tr>
<td>Objective activity levels</td>
<td>.232</td>
<td>.12</td>
</tr>
</tbody>
</table>

*Note: p= significance value.*

Table N.2

*Group Differences Between Fear of Falling (Fall-Related Self-Efficacy) and Non-Significant Study Variables (N = 46).*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Reported Falls History</td>
<td>3, 42</td>
<td>274.461</td>
<td>1.37</td>
<td>.27</td>
</tr>
</tbody>
</table>

*Notes: df = degrees of freedom; F = ANOVA statistic; MS = mean square statistic; p = significance value.*
## Appendix N

Table N.3

*Independent Samples T-Tests between Fear of Falling (Fear of Falling Item) and Non-Significant Study Variables (N = 47).*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Fear of Falling</th>
<th>No Fear of Falling</th>
<th>T(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>GDS-15</td>
<td>4.32</td>
<td>3.39</td>
<td>2.88</td>
<td>2.94</td>
</tr>
<tr>
<td>Age</td>
<td>84.77</td>
<td>8.56</td>
<td>86.50</td>
<td>7.36</td>
</tr>
<tr>
<td>Objective Activity Levels</td>
<td>.85</td>
<td>.67</td>
<td>.88</td>
<td>.70</td>
</tr>
</tbody>
</table>

*Notes: df = degrees of freedom; GDS-15 = Geriatric Depression Scale-Short Form (Sheikh & Yesavage, 1986); M = mean; p = significance value; SD = standard deviation; T = t-test value.*
## Appendix O

### Study Two- Supporting Quotes

Table O.1

*Supporting Quotes for the Themes Derived in the Interviews.*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Supporting Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being careful versus being fearful of falls</td>
<td>• “Oh I think it is not a fear but just being careful, careful with where I walk and with where I am going” (P3).</td>
</tr>
<tr>
<td></td>
<td>• “I am not afraid really but I just feel...insecure” (P2).</td>
</tr>
<tr>
<td>The possible causes of falling</td>
<td>• “Yeah I think so, I sort of walk along a path and it is usually pavements, and you know the wheels get caught in the spaces between each paver” (P10).</td>
</tr>
<tr>
<td></td>
<td>• “Yeah there was something slippery on the floor on the heel and I went backwards and ah that white rubbish bin round the corner I caught my eye on that but it is getting better” (P4).</td>
</tr>
<tr>
<td>The possible consequences of falling</td>
<td>• “It was bad enough with the wrist, I could get up with help, but just to go to the toilet for the first six weeks I had to ring my bell and get help into the toilet and I would hate to go where your legs are no good to you, you’ve broken it and have it up and you are restricted to what you can do” (P3).</td>
</tr>
<tr>
<td></td>
<td>• “Oh well I don’t like to fall in case I break an arm or a leg” (P9).</td>
</tr>
<tr>
<td>Efforts to prevent falls</td>
<td>• “I walk out down to the lounge room for meals, I walk quite slowly I have got to stop every now and then to stop or I start to get airy fairy you know” (P1).</td>
</tr>
<tr>
<td></td>
<td>• “Yes well because that was the first thing because of my balance its my balance, because I had to put my other sleeve in and I fell on my hips and from then on I rely on that [walking aid] for everything” (P7).</td>
</tr>
<tr>
<td></td>
<td>• “Oh yeah I don’t trust standing in the shower unless I am holding onto something and when I am getting up off the toilet I have got the hand rails are down I grab the hand rails” (P7).</td>
</tr>
</tbody>
</table>
## Appendix O

Table O.1

Supporting Quotes for the Themes Derived in the Interviews (Continued).

<table>
<thead>
<tr>
<th>Theme</th>
<th>Supporting Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaining falls awareness</td>
<td>“Yes well hearing about other people that have had falls and there are a few of them, there is a lady that I have lunch with, she knew this lady/other one, very well and I got friendly with her too and she had a fall and died” (P1).</td>
</tr>
<tr>
<td></td>
<td>“I know of people that have fallen Yes and they’ve ended up with broken bones and in hospital” (P8).</td>
</tr>
<tr>
<td>The recovery process</td>
<td>“It is my knee the osteoarthritis in my knee can sometimes curve my flexibility to do things” (P6).</td>
</tr>
<tr>
<td></td>
<td>“I was just determined not to do it [fall] again” (P4).</td>
</tr>
<tr>
<td>Having the determination to go on</td>
<td>“Well I just think no good of crying you go to just keep laughing, and so I just try to laugh things off you know” (P7).</td>
</tr>
<tr>
<td></td>
<td>“Well if stop doing it then I become stagnant you see and I will be no good to myself or anybody else” (P9).</td>
</tr>
<tr>
<td></td>
<td>“We are aging and so we’ve got to use this thing and that’s why they’ve got these things because they help us a lot, life can get better than just thinking oh my god I can’t walk life will get better when now I can walk about, I don’t go more than what I can do and it’s a pattern” (P6).</td>
</tr>
<tr>
<td></td>
<td>“I am a fighter, all my life I have had to fight for what I have wanted” (P12).</td>
</tr>
<tr>
<td></td>
<td>“I’m not trying to let that get the better of me you see because we can overcome it, you can overcome it, like if I want to do something I know I can’t do what is my other way of doing it how can I get to that? If I can’t go straight to my point well can I go right around and then find it you see? So there are ways and means and it’s always in your mind and if you don’t use your thoughts or knowledge to do things then yeah you are useless” (P6).</td>
</tr>
</tbody>
</table>