



Research paper

Anxiety disorders and falls among older adults



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ABSTRACT

Background: Falls are common among older adults and can lead to serious injuries, including fractures. We aimed to determine associations between anxiety disorders and falls in older adults.

Methods: Participants were 487 men and 376 women aged ≥ 60 years enrolled in the Geelong Osteoporosis Study, Australia. Using the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Non-patient edition (SCID-I/NP), lifetime history of anxiety disorders was determined. Falls were determined by self-report. In men, a falls-risk score (Elderly Falls Screening Test (EFST)) was also calculated.

Results: Among fallers, 24 of 299 (8.0%) had a lifetime history of anxiety disorder compared to 36 of 634 (5.7%) non-fallers ($p=0.014$). Examination of the association between anxiety and falls suggested differential relationships for men and women. In men, following adjustment for psychotropic medications, mobility and blood pressure, lifetime anxiety disorder was associated with falling (OR 2.96; 95%CI 1.07–8.21) and with EFST score (OR 3.46; 95%CI 1.13–10.6). In women, an association between lifetime anxiety disorder and falls was explained by psychotropic medication use, poor mobility and socioeconomic status.

Limitations: Sub-group analyses involving types of anxiety and anxiety disorders over the past 12-months were not performed due to power limitations.

Conclusion: Although anxiety disorders were independently associated with a 3-fold increase in likelihood of reported falls and high falls risk among men, an independent association was not detected among women. These results may aid in prevention of falls through specific interventions aimed at reducing anxiety, particularly in men.

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1. Introduction

The prevalence of fallers in community-dwelling adults is 28–35% for those aged 65 years and over and 42% for those aged over 75 years (Linattiniemi et al., 2009; Masud et al., 2013; Williams et al., 2015). In aged care, falls risk is greater, with residents falling on average, 2–6 times per year (Chen et al., 2008). In Australia, there has been a 4-fold increase in the incidence of falls since 2002, considered to be due to an increasing number of falls associated with an ageing population (Williams et al., 2015). Approximately 40–50% of falls in older adults lead to injuries; 30–50%

experience minor trauma, 10–15% serious injuries, 5–10% fractures and 1–2% hip fractures (Masud et al., 2013).

Almost three-quarters of hospitalisations in older adults are related to falls (AIHW and Bradley, 2013). In Australia during 2009–2010, there were 127,295 separations with an average length of stay of 15.5 days (AIHW and Bradley, 2013). The cost of falls presentations to the emergency department (ED) is substantial; two Australian studies from Western Australia (Hendrie et al., 2004) and New South Wales (Tiedemann et al., 2008) showed averages of \$4619 and \$6756 per ED presentation, respectively, related to falls in older adults. The cost for all falls, including those that did not present to an ED is also substantial; at \$1600 for adults aged 75 years or over (Tiedemann et al., 2008). During the 2001–2002 financial year, the total cost to the healthcare system from the 18,706 ED presentations in Western Australia was \$86.4 million, which is projected to increase to \$181 million by 2021

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with the ageing population (Hendrie et al., 2004) and by 2051, the cost per year in the whole country of Australia is expected to reach \$1.4 billion (Lord et al., 2011). Falls can lead to other sequelae, even if a person is not physically injured, such as loss of independence, fear of falling, institutionalisation and are associated with an increased mortality risk (Chen et al., 2008; Kelly et al., 2003; Morsch et al., 2015). Falls and near falls often go undetected by health professionals due to under-reporting by the patient and the fact that it is not an issue about which enquires are usually made (Miller and Pantel, 2003).

Many risk factors for falls have been identified, including older age, female sex, previous falls and low weight, as well as muscle-related factors such as sarcopenia, and physical inactivity, which lead to decreased balance, thus increasing falls risk (Lord et al., 2003; Pasco et al., 2016; Taylor et al., 2012). Medication use is also an important risk factor for falls. Polypharmacy, as well as specific classes of drugs that cause dizziness and impaired balance (e.g. antidepressants, antipsychotics and anxiolytics) and those that cause orthostatic hypotension (e.g. diuretics, vasodilators and beta blocking agents) can increase the risk of falls (Bath et al., 2000; Iinattiniemi et al., 2009; Masud et al., 2013; Thorell et al., 2014). Other factors that increase the risk of falls through effects on neurological and cognitive function have also been identified, such as excessive daytime sleepiness, dizziness, fear of falling and depression (Bath et al., 2000; Hayley et al., 2015; Iinattiniemi et al., 2009; Painter et al., 2012; Williams et al., 2015). However, there has been little research in the area of anxiety as a risk factor for falls.

The prevalence of anxiety disorders in Australian community-dwelling elderly adults has been estimated to range between 7–14% (Williams et al., 2010, in press), with the prevalence of sub-threshold anxiety considered to be even higher (Miller and Pantel, 2003). Anxiety can affect falls risk through a variety of mechanisms, including gait; individuals taking shorter strides and having a slower gait speed, increasing falls risk (Young and Williams, 2015). Furthermore, people with anxiety may focus more internally (for example on their own feet) rather than externally (such as on an obstacle) and this further increases falls risk (Young and Williams, 2015). Even sub-threshold anxiety can increase falls risk; it is associated with decreased physical activity, poor perceptions of health and reduced quality of life (Miller and Pantel, 2003).

Few studies have investigated the association between anxiety and falls; most existing studies have combined data for men and women and, as far as we are aware, only a single study has examined anxiety and falls risk in men (Chen et al., 2008). That study used data from individuals in a Veterans Care Home and thus the results may not be generalisable to the broader population. Given the paucity of data in this field, the aim of this study was to determine if a lifetime history of anxiety disorder was associated with falls in a sample of older men and women aged 60 years or over enrolled in a population-based study.

2. Methods

2.1. Participants

This cross-sectional study included data obtained from a population-based study, the Geelong Osteoporosis Study (GOS), which recruited residents of the Barwon Statistical Division, located in south-eastern Australia. The Barwon Statistical Division is an ideal region for conducting epidemiological studies as it contains individuals from a range of social, cultural and geographical settings as well as a large, stable population ($n \sim 280,000$). Further details of the study are provided elsewhere (Pasco et al., 2012). At baseline, the GOS included 1538 men and 1494 women, with an age range of 20–97 years. Participants were randomly selected

from Commonwealth electoral rolls. Since voting is compulsory in Australia from age 18 years, this sampling frame effectively captures all adults within the region. Females underwent baseline assessments from 1993 to 1997 (77% response). Baseline recruitment of men occurred from 2001 to 2006 (67% response).

The data for this cross-sectional analysis are drawn from the 5-year follow-up for men (2006–2011) and the 10-year follow-up for women (2004–2008). Only individuals aged 60 years and over were included ($n=487$ men and $n=376$ women) and there were no specific exclusion criteria, although criteria for inclusion in the GOS included living in the BSD, being listed on the electoral roll and being able to provide informed, written consent. The age of 60 years was selected because the Elderly Falls Screening Test (Cwikel et al., 1998) that we utilised to more accurately determine falls risk in men is validated for this age range. All participants provided written, informed consent and Barwon Health Human Research Ethics Committee approved the study.

2.2. Clinical measurements

All clinical measurements were collected at the 5-year follow-up for men (2006–2011) and the 10-year follow-up for women (2004–2008). Weight and height were measured to the nearest ± 0.1 kg and ± 0.1 cm, respectively. Whole body scans using dual energy X-ray absorptiometry (DXA) provided an estimate of “lean” mass (kg) (muscle, skin, connective tissue), and the lean component of adipose tissue (water and protein). A Lunar DPX-L (Lunar, Madison, WI) was used in women and a Lunar Prodigy (GE Lunar, Madison, WI) was used in men. Blood pressure (BP, mmHg) was measured using an automated meter (TakedaMedical UA-751). From these measurements, mean arterial pressure (MAP) was calculated as: Diastolic BP $+1/3*(\text{Systolic BP}-\text{Diastolic BP})$ (Cywinski, 1980).

2.3. Questionnaire data

Self-reported falls were classified for both sexes as one or more falls over the past 12 months, which was collected during the 5-year follow-up for men (2006–2011) and the 10-year follow-up for women (2004–2008). The falls question was based on the definition in Cwikel et al. (1998):

“We all fall from time to time. The definition of a fall is ‘when you suddenly find yourself on the ground, without intending to get there, after you were in either a lying sitting or standing position’ Have you had a fall during the past year?”

This was intended to reduce social desirability bias and to define a fall to the participants. In addition, a falls risk score was determined for men using the Elderly Falls Screening Test (EFST) score (Cwikel et al., 1998). This score was used for men because it is more effective at determining high falls risk than self-reported falls over the past 12 months, particularly since men often do not report falls due to social desirability biases (Smith et al., 2007). One point was given for each positive response to five items:

1. More than one fall reported in the previous year.
2. A fall that resulted in injury in the last year.
3. Reporting “near falls” occasionally or often (near falls defined as “How often does it happen that you think you are about to fall, but manage to grab something and then don’t fall?” (Cwikel et al., 1998)).
4. Slow walking speed (> 10 s over 5 m).
5. Unsteady or uneven gait (gait was observed and recorded and an uneven gait was defined as shuffling, on a wide base, and/or unsteady (Cwikel et al., 1998)).

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