



Depressive symptomatology and fall risk among community-dwelling older adults



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ABSTRACT

Rationale: Falls are common among older adults and may be related to depressive symptoms (DS). With advancing age, there is an onset of chronic conditions, sensory impairments, and activity limitations that are associated with falls and with depressive disorders. Prior cross-sectional studies have observed significant associations between DS and subsequent falls as well as between fractures and subsequent clinical depression and DS.

Objective: The directionality of these observed relationship between falls and DS is in need of elaboration given that cross-sectional study designs can yield biased estimates of the DS-falls relationship.

Methods: Using 2006–2010 Health and Retirement Study data, cross-lagged panel structural equation models were used to evaluate associations between falls and DS among 7233 community-dwelling adults ages ≥ 65 . Structural coefficients between falls and DS (in 2006→2008, 2008→2010) were estimated.

Results: A good-fitting model was found: Controlling for baseline (2006) physical functioning, vision, chronic conditions, and social support and neighborhood social cohesion, falls were not associated with subsequent DS, but a 0.5 standard deviation increase in 2006 DS was associated with a 30% increase in fall risk two years later. This DS-falls relationship was no longer significant when use of psychiatric medications, which was positively associated with falls, was included in the model.

Conclusion: Using sophisticated methods and a large U.S. sample, we found larger magnitudes of effect in the DS-falls relationship than in prior studies—highlighting the risk of falls for older adults with DS. Medical providers might assess older individuals for DS as well as use of psychotropic medications as part of a broadened falls prevention approach. National guidelines for fall risk assessments as well as quality indicators for fall prevention should include assessment for clinical depression.

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1. Introduction

Clinical depression is relatively uncommon among older U.S. adults—only 4% of those 60 years or older report clinical depression (CDC 2005–2006)—but depressive symptoms (DS) are much more prevalent (Williamson and Schulz, 1992). Among older adults screened from 1998 to 2004, approximately 15% reported having DS

(Federal Interagency Forum, 2008). DS comprise symptoms of unease and somatic complaints including depressed mood that may accompany, but do not necessarily indicate, clinical depression (Berkman et al., 1986). Major life events and reductions in physical capabilities may result in loss of social support and self-esteem that can then lead to DS in older adults (Aneshensel et al., 1984). Older adults may be victims of accidents including falls that impact physical health and role status (Schoenmakers et al., 2012). Falls may be particularly burdensome because they can reduce the capacity to engage in daily activities (Lazarus and DeLongis, 1983).

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With advancing age, there is an onset of chronic conditions, sensory impairments, and activity limitations that can lead to falls. Chronic medical conditions such as cardiovascular disease and diabetes are also associated with anxiety and depressive disorders (Aina and Susman, 2006). Given the aging of the U.S. population, especially with the older adult population expected to double in the next forty years (Ortman et al., 2014), an increase in chronic medical conditions and related depressive disorders may be expected.

1.1. Falls and DS: multiple potential pathways

Several studies have observed significant associations between DS and falls (Eggermont et al., 2012; Iaboni and Flint, 2013; Spangler et al., 2008; van den Berg et al., 2011) and others have observed a relationship between fractures and both clinical depression and DS (Lenze et al., 2007; Mossey et al., 1990; Scaf-Klomp et al., 2003). However, the directionality of the observed relationship between falls and DS is in need of elaboration. Falls often result in diminished physical capacity, which can result in restricted activities and emotional distress (Peirce et al., 2000). A meta-analysis (Deandrea et al., 2010) and other studies observed significant associations between DS and falls (Eggermont et al., 2012; Iaboni and Flint, 2013; van den Berg et al., 2011).

There are three potential explanations for these findings—or three “pathways” linking DS and falls. One explanation for these findings (“DS-falls pathway”) is that persons with DS have increased fall risk due to factors associated with depression. Some of these factors are fear of falling, fatigue, distractedness, poor nutritional status, or unsteadiness in walking (due to gait changes) (Iaboni and Flint, 2013). A second possibility is that falls lead to DS (“falls-DS pathway”). Also, there are indications that falls are related to anxiety and fear, as well as reductions in self-esteem (Boyd and Stevens, 2009), which may result in increased DS. Activity restriction has been shown to be associated with DS and depression (Painter et al., 2012). However, few studies have explored this potential pathway. Several studies have noted a relationship between fractures and clinical depression and DS (Iaboni and Flint, 2013; Lenze et al., 2007; Mossey et al., 1989; Scaf-Klomp et al., 2003). The third possibility is that there are shared risk factors for DS and falls (“shared pathway”). Several joint risk factors (measured at baseline) have been found to be associated with both future falls and depression (measured 12 months later), such as baseline physical activity, medical problems, and social activities, as well as baseline depression and falls (Biderman et al., 2002).

One study reported increased depression scores *after* participants may have completed physical rehabilitation from a fall-related injury, suggesting that increased DS may be greater over time as older adults comprehend the extent of their physical limitations and loss of independence following an injury (Scaf-Klomp et al., 2003). However, other research suggests that major depressive disorders risks are greater among those with hip fracture immediately following the injury instead of after a delay (Lenze et al., 2007). Thus, it is possible that we will not observe associations between falls and increased DS measured two years later. Some of the studies examining the association between falls and DS are cross-sectional (Ni Mhaolain et al., 2012; van Haastregt et al., 2008), while others are longitudinal but the settings are outside of the U.S. (Biderman et al., 2002; Ni Mhaolain et al., 2012; Peel et al., 2007; van den Berg et al., 2011), over a decade old (Whooley et al., 1999), or are restricted to a local study sample (Biderman et al., 2002; Eggermont et al., 2012). Of several studies directly examining the falls-DS pathway (Bentler et al., 2009; Lenze et al., 2007; Scaf-Klomp et al., 2003), one is a non-U.S. study, and another is confined to a small, local cohort (Lenze et al., 2007) and thus is not representative of the U.S. community-dwelling older

adult population.

Cross-sectional study designs can yield biased estimates of the DS and falls relationship. Second, ignoring the possibility that falls also result in later DS does not account for the various temporal aspects of the relationship. As such, some studies may overstate the strength of the relationship between DS and later falls. Finally, studies on falls and DS have typically controlled for physiological, sociodemographic, and treatment-related factors, but not social support or neighborhood social cohesion (Eggermont et al., 2012; Whooley et al., 1999).

The study uses a sample of community-dwelling older adults, examining the three potential pathways—the DS-falls, falls-DS, and shared pathways. We hypothesize that, after controlling for baseline health status, social support and neighborhood social cohesion: (1) DS will be associated with fall risks two-years later and (2) falls will be associated with DS two years later.

2. Methods

The current study uses data from the 2006, 2008, and 2010 waves of the Health and Retirement Study (HRS), a national longitudinal study of older Americans primarily conducted by telephone. The HRS includes multiple respondent cohorts (with new cohorts introduced each six years) and aims to include a sample that is representative of the population comprising U.S. citizens who are 50 years or older. The HRS uses a multi-stage area probability sampling design (HRS, 2011). Overall response rates during the 2006–2010 period were approximately 90% among those individuals the HRS attempted to interview (excluding those who asked to be removed from the sample and those who died) (HRS, 2011) (<http://hrsonline.isr.umich.edu/>). Also included are data from the HRS Participant Lifestyle Questionnaire (PQ), which began its first wave in 2006. A random half of the 2006 sample received an enhanced in-person interview and those completing at least part of that interview received the PQ leave-behind self-administered survey. The response rate for the PQ survey in 2006 was 82%. Data from respondents with survey proxy respondents were not included, as proxies were not asked about DS. There were 7233 older adults in each survey wave (3276 responded to the 2006 PQ survey), with an average age of 73 (SD: 6); 59% of the sample were female, 76% were white, 14% African-American, 7% Hispanic, and 4% other. In a sensitivity analysis, psychosocial variables (social cohesion and social support) were imputed for missing observations in 2006, 2008, and 2010, and model results were unchanged. Variables used in the analysis are described below; for a more complete description of these variables, see Table A1.

2.1. Variables

2.1.1. Dependent variables

We examined two dependent variables. First, we identified whether any fall (non-injurious or injurious) occurred in each year of the study (2006, 2008, 2010) using self-reported data. Second, we measured DS as latent variables in each year of the study using responses to the Center for Epidemiological Studies Depression Scale (CES-D) 8-item short-form (Radloff, 1977). See Table A2 for further details.

2.1.2. Latent predictor variables

Three latent predictor variables—social support, social cohesion, and poor health—were measured in 2006. These factors were included because they may influence both depression and fall risk (Hoffman et al., 2016; Stafford et al., 2011). The social support and social cohesion (psychosocial) variables were not available for all individuals in each of the three survey waves examined, due to the

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