ARCHIVES OF GERONTOLOGY AND GERIATRICS

Accidental falls, health-related quality of life and life satisfaction: A prospective study of the general elderly population

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ABSTRACT

As the physical consequences of accidental falls in the elderly are well-researched, the long-term associations between falls and quality of life and related concepts are less known. The aim of this study was to prospectively examine the long-term relations between falls and health-related quality of life (HRQoL) and life satisfaction (LS) over six years in the general elderly population.

One thousand three hundred and twenty-one subjects (aged 60–93 years), from the general population in the south of Sweden, were included in a baseline assessment and a follow-up after six years. HRQoL was measured with the SF-12 and LS with the life satisfaction index A (LSI-A). The differences in mean scores between fallers at baseline ($n = 113$) and non-fallers were statistical analyzed. Furthermore, the prediction of falls on the outcomes was analyzed using a multivariate linear regression model adjusted for multiple confounding factors.

Fallers scored significant lower in HRQoL and LS at baseline and after six years, compared to non-fallers, especially in the SF-12 physical component ($p = {<}0.001$). In the linear regression analysis, one or more falls at the baseline predicted a significant reduction in the SF-12 physical component at the follow-up assessment (B-Coefficient -1.8, 95% CI -3.4 to -0.2). In conclusion, falls predict a long-term reduction in the physical component of HRQoL in the general elderly population. Over six years, fallers had a notable chronic lowered score in both HRQoL and LS, compared to non-fallers. This long-term depression of elderly fallers in these aspects may be more extent than previous assumed.

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1. Introduction

Accidental falls in the elderly continue to be a major health problem, despite extensive research and preventive efforts (Anonymous, 2001; Hausdorff, Rios, & Edelberg, 2001; Kannus, Sievanen, Palvanen, Jarvinen, & Parkkari, 2005). Unintentional injury is one of the foremost causes of death and ill-health in the western world, and in Sweden, fall-related mortality has risen since the mid-1990s (Björkenstam & Johansson, 2011; Sjogren & Bjornstig, 1989). Besides physical injuries, the consequences of falls in the elderly are broad with additional psychological and social consequences (Akyol, 2007; Gillespie, Robertson, Gillespie, et al., 2012; von Heideken Wagert, Gustafson, Kallin, Jensen, & Lundin-Olsson, 2009). Falls can also affect the family and relatives and are a contributing factor for nursing home admissions (Anonymous, 2011; Tinetti, 2003; Tinetti & Williams, 1997). Falls in the elderly and their physical consequences have been well-researched: A fracture is estimated to occur in about 1–5% of the falls among the elderly residing in the community (Nevitt, Cummings, & Hudes, 1991; Tinetti, Mendes de Leon, Doucette, & Baker, 1994). Additionally, about 30–50% results in minor soft tissue injuries that do not receive medical attention (Nevitt et al., 1991). Although a majority of falls results in no severe physical injury, the psychological and functional consequences can be severe (Rubenstein, Josephson, & Robbins, 1994). A fall can cause fear of falling, where anxiety, loss of self-confidence and activity avoidance result in self-imposed functional limitations (Cumming, Salkeld, Thomas, & Szonyi, 2000; Oliver, Daly, Martin, & McMurdo, 2004; Scheffer, Schuurmans, van Dijk, van der Hooft, & de Rooij, 2008; Suzuki, Ohyama, Yamada, & Kanamori, 2002). This concept was introduced by Murphy and Isaacs' description of a post-fall syndrome in 1982 (Murphy & Isaacs, 1982).

As the concept fear of falling is established in the literature, the concept of health-related quality of life (HRQoL) have increasingly gained recognition as an important tool for evaluating effects on medical treatment (Lin, Wolf, Hwang, Gong, & Chen, 2007). Improved quality of life can be seen as one of the most desirable outcomes of all health polices (Farquhar, 1995). In a large study of the elderly, fear of falling was identified as a major factor related to reduced HRQoL (Chang, Chi, Yang, & Chou, 2010). Fear of falling is even suggested to be the main impact on reduced HRQoL after a fall, rather than the actual fall or its sequelae (Iglesias, Manca, & Torgerson, 2009).

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Although lacking a clear definition, the broad concept of quality of life is frequently used to describe 'the good life' within several disciplines with a range of various aspects (Berg, 2008). HRQoL refers to how health impacts an individual's ability to function and the perceived well-being in physical, mental and social domains of life. As many studies have focused on the physical consequences of falls, there is an explicit need for comprehensive studies of societal impact of falls in the elderly focusing on HRQoL and similar instruments (Hartholt et al., 2011). These measurement can be useful in evaluating the elderly with potential chronic multi-morbidity, where perceived health and well-being can be more adequate apposed medically defined diagnoses and status. A literature review from 2012, assessing the scientific knowledge related to quality of life and falls in the elderly, revealed gaps in knowledge, unclear definition of the concept and a predominance of descriptive studies (Nicolussi et al., 2012).

Although overlapping the term quality of life, the concept of life satisfaction (LS) can be defined as a 'cognitive judgmental global evaluation of one's life', or 'not just an absence of disease or disability but also includes the satisfaction of social and psychological needs' (Diener, 1984; Enkvist, Ekstrom, & Elmstahl, 2011). In comparison, HRQoL can be seen as measuring present health and health past month, while LS is more of a global instrument measuring life satisfaction in a life perspective (Ekström, 2009). Although LS is widely used measuring well-being in later life, no other study have, to our knowledge, analyzed the association between falls and LS in the general elderly population (Berg, 2008).

The aim of this study was to prospective examine the long-term relations between falls and HRQoL and LS over six years in the general elderly population.

2. Methods

2.1. General

This is a prospective study with data from the Swedish epidemiological population study 'Good Ageing in Skåne' (Ekstrom & Elmstahl, 2006; Lagergren et al., 2004). At the baseline assessment, 2931 subjects, aged 60–93 years, were randomly recruited from both urban and rural areas, in the county Region Skåne in the south of Sweden, using the National Population Register. Home visits were offered to those who were unable to meet up at the research center. The only exclusion criterion was the inability to speak Swedish. 1709 subjects participated in a 6-year follow-up assessment, and 1321 of these met the inclusion criteria with recorded fall history and complete data on HRQoL and LS (Fig. 1). The incidence of falls was based on oral questioning by purposed-trained physicians at the baseline and follow-up assessments, using a structured questionnaire. Those with the incidence of one more falls six months prior the baseline assessment were dichotomized as fallers. Recurrent fallers six months prior the follow-up were also included in this group. Debut fallers at the follow-up were excluded.

Social factors included the prevalence of higher education, co-habiting and urban/rural living and were based on questionnaires at the baseline. Walking speed was recorded by timing the subject's maximum walking speed over 15 m without running at the baseline assessment. Slow walking speed was defined as recording a time above the median value of the study population.

The categorization of co-morbidity was based on the International Classifications of Diseases (ICD-10) criteria in a medical examination by a physician at the baseline assessment. Co-morbidity included the prevalence of one or more of the following conditions: heart disease, heart failure with symptoms, chronic obstructive pulmonary disease, osteoporosis-related fracture, cancer and cognitive impairment. Heart disease comprised angina, myocardial infarction and arrhythmia. Heart failure with symptoms was categorized by the New York Heart Association (NYHA) Functional Classification, and included subjects in NYHA class II–IV (American Heart Association, Accessed June 2013). Cognitive impairment was defined as scoring below 24 points on the cognitive Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975). All variables were coded in dichotomized values, except age sorted in decades.

2.2. Health-related quality of life

HRQoL was evaluated using the SF-12, Short Form Health Survey, at the baseline assessment and the follow-up after six years. This is a shorter version of the established SF-36 Survey, which can be useful in testing the geriatric patient. High consistency between this short form version and SF-36 is demonstrated (Sullivan, Karlsson, & Taft, 1997). SF-12 is a generic instrument including 12 items finalized into a physical and mental component summery (PCS, MCS). SF-12 PCS includes the components general health, physical function, physical role limitation and bodily pain, while SF-12 MCS includes mental role limitation, vitality, social functioning and mental health. The total score for SF-12 PCS/MCS range from 0 to 100 respectively, with a higher number indicating a higher HRQoL (Sullivan et al., 1997; Ware, Kosinski, & Keller, 1996). SF-12 is well documented and it
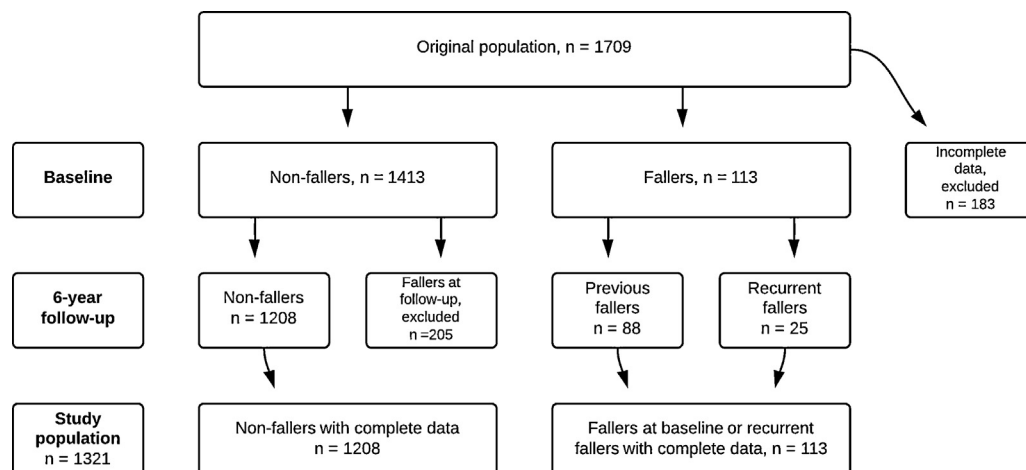

Fig. 1. Flow chart of the inclusion of the study population, *n* = 1321.