



# Prospective study on risk factors for falling in elderly persons with mild to moderate intellectual disabilities



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## ABSTRACT

Elderly persons with intellectual disabilities (ID) are at increased risk for falls and fall-related injuries. Although there has been extensive research on risk factors for falling in the general elderly population, research on this topic in persons with ID is rather sparse. This is the first study to prospectively investigate risk factors for falling among elderly persons with mild to moderate ID. Seventy-eight ambulatory persons with mild to moderate ID (mean age  $62.8 \pm 7.6$  years; 44 (56%) men; 34 (44%) mild ID) participated in this study. This longitudinal cohort study involved extensive baseline assessments, followed by a one-year follow-up on fall incidents. Falls occurred in 46% of the participants and the fall rate was 1.00 falls per person per year. The most important risk factors for falling in elderly persons with mild to moderate ID were (mild) severity of ID, (high) physical activity, (good) visuo-motor capacity, (good) attentional focus and (high) hyperactivity-impulsiveness, which together explained 56% of the fall risk. This pattern of risk factors identified suggests a complex interplay of personal and environmental factors in the aetiology of falls in elderly persons with ID. We recommend further research on the development of multifactorial screening procedures and individually tailored interventions to prevent falling in persons with ID.

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## 1. Introduction

Falls cause high morbidity and mortality rates in elderly persons (Rubenstein, 2006). In the community-dwelling elderly population, one-third of all individuals fall at least once a year (Close, Lord, Menz, & Sherrington, 2005; Tinetti, Speechley, & Ginter, 1988). Approximately 10% of these falls result in injuries, half of which are fractures. Furthermore, falling can often have psychosocial consequences such as fear of falling (Berg, Alessio, Mills, & Tong, 1997; Tinetti & Williams, 1997). Consequently, this may lead to a reduction in physical activity, which in turn may result in (further) functional decline and a loss of independence (Tinetti et al., 1988; Wagemans & Cluitmans, 2006).

Elderly persons with intellectual disabilities (ID) seem to be at an even higher risk of falling and experiencing fall-related injuries than their mentally healthy peers (Cox, Clemson, Stancliffe, Durvasula, & Sherrington, 2010; Finlayson, Morrison, Jackson, Mantry, & Cooper, 2010; Grant, Pickett, & Lam, 2001; Hsieh, Heller, & Miller, 2001; Wagemans & Cluitmans, 2006).

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The reported percentage of 'fallers' (i.e. persons who fall at least once during the observation period) range from 34% to as high as 70% (Cox et al., 2010; Finlayson et al., 2010; Grant et al., 2001; Hsieh et al., 2001). In the aforementioned studies, the observation period ranged from one year up to five years. Injuries have been attributed to falls in 50–62% of cases (Hsieh et al., 2001; Sherrard, Tonge, & Ozanne-Smith, 2001). Nevertheless, our understanding of the factors that underlie the increased risk of falling among persons with ID is rather limited.

In the general elderly population, the risk factors associated with falling have been studied extensively (Close et al., 2005; Tinetti et al., 1988). These risk factors can be divided into extrinsic (e.g. environmental factors such as obstacles and support surface) and intrinsic (e.g. personal factors related to the physical and/or cognitive status of the individual) factors (Close et al., 2005). In the elderly population, the primary intrinsic risk factors for falling are mobility problems (e.g. impaired balance and/or gait), advanced age, limitations in activities of daily living, sensorimotor impairments, medication use (e.g. polypharmacy and/or psychoactive drugs), and medical conditions such as (pre-)dementia, stroke and Parkinson's disease (Close et al., 2005).

Elderly persons with ID encounter the same extrinsic risk factors for falling. The aforementioned intrinsic risk factors may also apply to persons with ID, but perhaps to a different degree, as several fall risk factors are more prevalent among persons with ID. A recent review has indicated that balance and gait impairments occur more often and start at a younger age in persons with ID (Enkelaar, Smulders, van Schrojenstein Lantman-de Valk, Geurts, & Weerdesteyn, 2012). Moreover, visual impairments and polypharmacy are more prevalent among persons with ID (Evenhuis, Theunissen, Denkers, Verschuure, & Kemme, 2001; Straetmans, van Schrojenstein Lantman-de Valk, Schellevis, & Dinant, 2007). Finally, impaired cognition itself is a known risk factor for falling (Close et al., 2005; Tinetti et al., 1988).

Several exploratory studies have been performed to investigate intrinsic risk factors for falling among persons with ID (Cox et al., 2010; Finlayson et al., 2010; Grant et al., 2001; Hale, Bray, & Littmann, 2007). Although a recent review identified advanced age, impaired mobility, epilepsy, medication use, and behavioural problems as risk factors for falling among persons with ID, the authors concluded that additional research is needed to prospectively investigate these factors in this population (Willgoss, Yohannes, & Mitchell, 2010). Indeed, most of the data regarding fall incidents in previous studies has been collected from retrospective reports, medical records, or client records (Cox et al., 2010; Finlayson et al., 2010; Grant et al., 2001; Wagemans & Cluitmans, 2006), and a retrospective assessment of falls often leads to an underestimation of the fall rate (Ganz, Higashi, & Rubenstein, 2005). Therefore, the Prevention of Falls Network Europe (ProFaNe) recommends prospectively monitoring falls for a follow-up period of at least one year (Lamb, Jorstad-Stein, Hauer, & Becker, 2005). However, to the best of our knowledge, no such prospective study has investigated risk factors for falling among the elderly ID population.

The aim of this study was to identify the specific risk factors that underlie falling among elderly persons with mild-to-moderate ID. In addition, we tested whether differences in risk factors exist between persons who fall indoors and persons who fall outdoors, as in community-dwelling older people, their characteristics have been shown to differ distinctly (Kelsey et al., 2012).

## 2. Methods

### 2.1. Study design

This longitudinal cohort study involved extensive baseline assessments, followed by a one-year follow-up of fall incidents. Risk factors for falling among elderly persons with ID were determined by baseline assessments including clinical assessments of mobility and cognition, questionnaires regarding sensorimotor abilities, activity level and behaviour, and a review of the medical record, including demographics, medication use, and co-morbidities (see Appendix). The study was performed in accordance with the declaration of Helsinki and was approved by the medical ethics committee of the region Arnhem-Nijmegen, the Netherlands.

### 2.2. Participants

Participants were recruited from three service providers for persons with ID in the Netherlands. To be eligible, each participant had to be at least 50 years of age when recruited, with mild-to-moderate ID (defined as an Intelligence Quotient (IQ) of 35–70). Because age-related problems are more prevalent and occur at a younger age in persons with ID than in the general elderly population (Enkelaar et al., 2012; Evenhuis, Hermans, Hilgenkamp, Bastiaanse, & Echteld, 2012; Maaskant et al., 1996), the relatively low minimum age of 50 years was chosen as an inclusion criterion in this study. Furthermore, each participant had to be able to walk at least ten metres without assistance and understand simple instructions. Epilepsy was an exclusion criterion because dropping to the ground during a seizure—which can be considered a fall—has a different cause than falling associated with ID and ageing.

### 2.3. Procedure

Persons with ID who were 50 years of age or older were selected from the service provider database and screened by physicians, allied health professionals, and caregivers using a checklist of the inclusion and exclusion criteria. Two hundred

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