



# Knowledge, behavioral practices, and experiences of outdoor fallers: Implications for prevention programs



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## ABSTRACT

**Objective:** Although the epidemiology and prevention of falls has been well studied, the focus has been on indoor rather than outdoor falls. Older adults' knowledge of outdoor risk factors and their outdoor fall prevention practices have not been examined. To fill this gap, and to inform the development of a prevention program, we sought to explore the experiences and fall prevention knowledge and practices of older adults who had sustained an outdoor fall.

**Methods:** A cross-sectional study using random digit telephone dialing was used to survey community dwelling seniors (N = 120) across the five boroughs of New York City. We used the Outdoor Falls Questionnaire (OFQ), a valid and reliable tool as the survey instrument. Perceived outdoor fall risks, strategies used for prevention, and outdoor fall experiences were examined. SPSS version 21 was used for descriptive analysis of participant characteristics and to determine frequencies of perceived outdoor fall risks and strategies used for prevention. Phenomenological analysis was used with the qualitative data. Qualitative and quantitative data were analyzed separately and a mixed methods matrix was used to interpret and integrate the findings.

**Results:** Analysis revealed diverse unmet education and training needs including the importance of using single vision glasses, understanding the fall risks associated with recreational areas and parking lots, safe outdoor walking strategies, safe carrying of items on level and uneven surfaces, as well as when walking up and down stairs, and safety in opening/closing doors.

**Conclusions:** Study findings are informative for outdoor fall prevention programs as well as practice.

## 1. Introduction

Approximately 30% of older adults age 65 and older fall each year. Consequences of falls can include moderate to severe injuries that result in an increased risk of institutionalization and decreased quality of life (Center for Disease Control, 2015). Although the epidemiology and prevention of falls has been well studied, the focus has been on risk factors and prevention programs relevant to indoor rather than outdoor falls. Outdoor falls are a neglected area of research and practice (Chippendale & Bear-Lehman, 2011; Li et al., 2006).

Older adults can sustain falls exclusively indoors, both indoors and outdoors, or exclusively outdoors. Although overlap exists in risk factors for indoor and outdoor falls, such as depression, fall history, and use of psychotropic medications, there are also a number of differences. When indoor and outdoor falls are examined separately, risk factors for indoor falls include physical disability, medication use, and low falls self-efficacy scores. Among middle age and older adults, predictors of outdoor falls include male gender, younger age, partici-

pating in more leisure time physical activity, and having a fast gait speed. Poor balance, physical inactivity, significant difficulty with activities of daily living, slow gait speed, and taking 5 or more medications, which are viewed as common risk factors for falls in general, have been shown to decrease risk for an outdoor fall (Rate Ratios < 0.68) (Kelsey et al., 2010; Li et al., 2006). Outdoor falls are just as common as indoor falls. Approximately 48% of falls among older adults and 58–72% of most recent falls among middle aged adults occurred outdoors, yet the focus of fall prevention has been on intrinsic factors (e.g. balance and strength), and the home environment (Kelsey et al., 2012; Li et al., 2006). Type of surface affects risk for injury, and up to 70% of outdoor falls occur on a hard surface (Li et al., 2006). Outdoor falls are just as likely to result in serious injuries as indoor falls (Kelsey et al., 2012), with a resultant loss of function. Although falls in the home environment are actively addressed with home adaptations and education (Chase, Mann, Wasek & Arbesman, 2012), it is outdoor falls that are more likely to be precipitated by environmental causes (Li et al., 2006).

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In some studies, specific cause and location of outdoor falls have been explored. Kelsey et al. (2012) found that among outdoor fallers, common activities performed at the time of the fall were walking, ascending or descending stairs, engaging in vigorous activity, gardening, and traversing a curb/single step. Among middle age and older adults in northern California who sustained an outdoor fall ( $n = 297$ ), the majority of falls occurred on a street, sidewalk or curb. Other common locations included gardens/patios/porches, and outdoor parks and recreational areas. The most common environmental cause of falls was an uneven surface, followed by a wet surface and tripping on something (Li et al., 2006). In the United Kingdom, Nyman et al. (2013) conducted a qualitative study using focus groups to explore characteristics of outdoor falls among older adults living in rural and urban areas. Consistent with the findings of Li and colleagues, outdoor falls occurred most frequently when participants were on or crossing a road, and included stepping up or down a curb or getting out of a car. With regard to the social environment, falls occurred most frequently when walking in a familiar area and in the presence of other people. Individual factors were also noted to precipitate the fall, e.g. rushing, and poor health. In a third of the cases, there was no reported cause.

The consequences of outdoor falls can be detrimental to the health and well-being of community dwelling older adults. In addition to physical injuries associated with outdoor falls such as open wounds, head injuries, and fractures (Chippendale, Gentile, James & Melnic, 2016), there can also be emotional and psychological consequences. Participant reports revealed that for a number of people, an outdoor fall resulted in anxiety about falling again (Nyman et al., 2013). Other studies have also revealed that features of the neighborhood environment can contribute to fear of falling (Chippendale & Boltz, 2014; Finlay, Franke, McKay & Sims-Gould, 2015).

Although differences between outdoor and indoor fallers have been explored in some studies, few studies have focused specifically on the experiences of outdoor fallers and their needs in relation to prevention programs. Although attitudes about falls and fall prevention in general have been studied (Chen et al., 2016; Hughes et al., 2008), older adults' knowledge of outdoor risk factors and their outdoor fall prevention practices have not been examined. Underreporting of falls has been established (Stark, Silianoff, Kim, Conte & Morris, 2015; Tinetti, Speechley & Ginter, 1988), therefore, studies employing random sampling of community dwelling older adults can help to capture the experiences of outdoor fallers who did not go to the ER, seek medical attention, or report the fall to their primary health care provider. In this mixed methods study, we sought to fill this gap in knowledge by exploring the experiences and fall prevention knowledge and practices of people aged 55 and older who had sustained an outdoor fall. The study was designed as a needs assessment to help develop an outdoor fall prevention program for urban and suburban dwelling seniors. We hypothesized that the survey would reveal gaps in knowledge and practice among community dwelling older adults with regard to outdoor fall prevention, and provide information on participant's experiences of their most recent outdoor fall that would help guide the content of prevention programs.

The overarching framework used to guide this study was the Ecological Perspective (NCL, 2005). Perceived outdoor fall risks and strategies used for prevention are affected by multiple levels of influence including intrapersonal/individual (e.g. knowledge and beliefs), interpersonal (e.g. peers) and community level factors (e.g. neighborhood features). Further, consistent with the theory, the questionnaire/survey was based on the premise that behaviors are shaped by and can shape the social environment.

## 2. Methods

### 2.1. Research design

A cross-sectional study using random digit telephone dialing was

used to survey community dwelling seniors across the five boroughs of New York City. According to Dillman (2000), a sample of 100 participants are needed for a sampling error  $\pm 10\%$  with a 95% CI. Random numbers were generated for a combination of landlines and cell phones. A web-based application "Virtual Genesys" with screening for non-working and business telephone numbers was used to create the random digit sample. The study was approved by the University's IRB. The questionnaire was administered by the PI and by trained research assistants. A script, approved by the IRB, was used to present the study details and included mention that the survey pertained to outdoor falls. Qualitative and quantitative data were analyzed separately and a mixed methods matrix (O' Cathain, Murphy & Nicholl, 2010) was used to interpret and integrate the findings.

### 2.2. Measures

The study was conducted using the Outdoor Falls Questionnaire (OFQ) (Chippendale, 2015), which includes demographic characteristics of individuals shown to be related to outdoor fall risk, fall history, perceived outdoor fall risks, and strategies used in fall prevention by community-dwelling older adults. The OFQ has been shown to have good content and face validity, and internal consistency ranging from 0.7–0.9 for each domain. The questionnaire consists of a series of Likert style questions with additional open-ended questions about the most recent outdoor fall, if any, and what participants viewed to be the most important fall prevention strategies. Details about the development of the questionnaire and specific questions were published previously (Chippendale, 2015).

### 2.3. Participants

Inclusion criteria were: English speaking, age 55 or older, community-dwelling, and able to ambulate outdoors independently with or without an assistive device. Although risk for falls in general increases with age, the age at which risk for outdoor falls peaks is not clear. In a recent study of trauma patients age 55 and older (accepted, blinded for review), the percentage of outdoor as compared to indoor falls was found to be highest among the 55–64 age group. Also, socioeconomic inequities can cause some people to age at a faster rate (Post Hoppers et al., 2015; Sood et al., 2015). Including younger older adults (i.e., 55–64) allows for potential differences in biological age within chronological age categories. Further, younger older adults may also be at risk for falls due to the confluence of typical age related changes in physical and cognitive functioning and other risk factors.

### 2.4. Data analyses

SPSS version 21 was used for descriptive analysis of participant characteristics and to determine frequencies of perceived outdoor fall risks and strategies used for prevention. Collaizzi's (1978) phenomenological analysis method was used for the qualitative analysis. Two researchers, the PI and a co-investigator, each independently coded the data. Each investigator independently read through the transcriptions in their entirety to get a feeling for them. This was followed by each coder independently extracting the significant statements that directly pertained to the research question, i.e. the lived experience of outdoor fallers, with a focus on perceived cause and consequences of the fall. Meaning was assigned to each significant statement. Consensus was achieved between the two coders regarding identification of significant statements and their assigned meanings through open discussion. Working independently, each coder grouped formulated meanings into corresponding themes, and then jointly discussed their decisions until consensus was reached. Themes were related back to the original transcriptions to make sure no significant statements were left unaccounted. In this mixed methods study, integration of qualitative and quantitative findings occurred during the interpretation phase. This

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