



Investigation of Risk Factors for Recurrent Falls in Iranian Older people: A Cross-Sectional Study

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Abstract

Background: Recurrent falls among the older people can have serious consequences. Frequent falls are a significant health concern for the older people and can lead to serious injuries and reduced quality of life. This cross-sectional study aimed to identify the risk factors associated with frequent falls among older people in Iran.

Methods: 160 older people with a history of falling were recruited. Data was collected using a questionnaire that consisted of three sections: demographic information and falling characteristics, the Activities-Specific Balance Confidence Questionnaire, and the International Short-Form Scale of Efficiency in Falling. Descriptive and analytical statistics, including univariate and multiple logistic regression, were employed to analyze the data in this study.

Results: The most common diseases among the participants were hypertension (35%), heart disease (26.3%), and diabetes (26%). Based on the results of multiple logistic regression analysis, hearing loss (OR=2.36; 95% CI: 1.51–4.38), overweight (OR=1.04; 95% CI: 0.80–1.95), and fear of falling (OR=1.13; 95% CI: 1.01–1.27) were identified as significant predictors of recurrent falls.

Conclusion: This study identified hearing loss, fear of falling, and weight as risk factors for recurrent falls among Iranian older people. Regular screenings for hearing and weight loss in older people help reduce the risk of recurrent falls and improve healthcare.

Keywords: Recurrent, Fall, Older people, Risk factors

Introduction

The world's population has been aging at an accelerated rate in recent years; according to the World Health Organization, 2050 people over 60 will make up 22% of the population, a significant increase from 12% in 2015 (1). Middle Eastern and Asian countries have seen substantial changes in the number of older adults (2), with Iran having over 7 million older adults, a major global challenge (3). One of the common effects of aging is a decrease in skeletal muscle mass, a common side effect of aging. In addition to musculoskeletal issues, older adults frequently suffer from sensory impairments and balance issues, which increase their risk of falling (4). Falls can pose a significant challenge for older people and cause physical and psychological harm (4). Falls are the second most common cause of unintentional injury mortality, accounting for 684,000 deaths annually, according to the World Health Organization (5). Around the world, between 30 and 40 percent of those over 65, fall at least once a year, and 15 percent fall twice or more (6). The percentage is 50% for people over 80 (7). Of the 8,000 people hospitalized in Iran for trauma, 12% are adults 60 years of age or older, and 70% of them fall (8).

Fractures are among the most frequent consequences of recurrent falls and significantly increase healthcare costs. In 2015 alone, falls in the United States—both fatal and non-fatal—accounted for approximately \$50 billion in expenses (9). Recurrent falls are associated with increased mortality, long-term care needs, and a diminished quality of life (10).

Risk factors span psychological, physical, environmental, and pharmacological domains. Use of medications such as antipsychotics, benzodiazepines, and antidepressants may lead to extrapyramidal symptoms, anxiety, postural hypotension, and sleep disturbances, all of which heighten fall risk (11-13). Visual impairments, fear of falling, limited physical function, living alone, gait imbalance, and using walking aids are additional contributing factors (14,15). Although many studies have addressed fall-related risk factors in older populations (16,17), cultural and environmental contexts may influence these factors differently across regions (12). This study aims to identify risk factors for recurrent falls among older people individuals in Iran, thereby supporting the

development of culturally appropriate and targeted prevention strategies.

Materials and Methods

Study design and participants

This cross-sectional study was conducted in 2021 to investigate the risk factors associated with recurrent falls among older people individuals residing in retirement centers in Qom, Iran. The sample size was determined through a power analysis using G*Power software. Assuming a medium effect size ($OR=1.5$), a significance level of $\alpha=0.05$, and a power of 80% ($1-\beta=0.80$), the minimum required sample size was 144. The final sample size was increased to 160 participants to account for potential attrition or incomplete data.

A cluster sampling method was employed. First, two retirement centers were randomly selected from a comprehensive list of active centers provided by the local health authority. Subsequently, the participants were randomly selected from each center using proportional allocation based on the population size of each center while adhering to the predefined inclusion criteria.

The study's inclusion criteria were as follows: participants had to be 60 years or older, living in their own homes, and free from any history of mental or cognitive disorders (scoring six or higher on the Persian version of the Short Cognitive Status Test), willing to participate in the study, capable of communicating and answering questions, and expressing the desire to be part of the research. Older people individuals who declined to complete the questionnaire were excluded from the study.

In this study, the participants were classified as either single-fall or recurrent falls, with recurrent falls defined as two or more falls experienced within a specific timeframe, typically within a year.

Data collection tools

In this study, three-part data collection scales were used.

First part: demographic information and fall characteristics, including age and gender, education level, monthly income, place of income, housing status, history of falls in the past and falls that lead to injury, and medical characteristics (including heart

disease, blood pressure, stroke, depression, *etc.*) and accompanying chronic diseases (such as dizziness, vision loss, hearing loss, muscle weakness, *etc.*).

Second part: the Short Form Self-Assessment Activities-Specific Balance Confidence Questionnaire, created in 1995 by Powell and Myers, was utilized in this study to evaluate balance maintenance in specific activities and explore an individual's perception of their balance trust and fear of falling. This was particularly focused on older people individuals with high levels of mobility. The questionnaire comprises six activities of different difficulty levels, and the participants were required to assess their confidence in their balance while engaging in each activity on a scale ranging from 0 (no confidence) to 100 (complete confidence) (13). The study examined and confirmed the validity and reliability of its Persian version (14). The study also used the International Short Form of Efficiency in Falling, commonly known as the "Fear of Falling Scale" in Persian texts, to measure the fear of falling among the older people participants. This scale was developed by Yardley *et al* and consists of seven items related to daily activities. Each question measures the level of worry about falling while performing each activity on a four-point scale (score 1 to 4) with four options ranging from "I am not worried about falling at all" to "I am completely worried about falling." A higher score indicates a greater level of fear. (15). The Persian translation of the Fear of Falling Scale, titled "Fear of Falling Scale," was psychometrically evaluated in Iran by Khajawi in 2013. The evaluation confirmed the validity and reliability of the translated version for use in the older people population in Iran (16).

Data collection

After obtaining the required permits and coordinating with the officials of the selected retirement centers, the study objectives and the importance of confidentiality were communicated to all the participants. Before commencing the study, informed consent was obtained from each participant. The researcher administered the questionnaire in a private and quiet environment. The researcher read the questions to the participants individually and recorded their responses. This approach ensured that the older people participants understood the questions and were able to provide

accurate and reliable responses.

Data analysis

The collected data were analyzed using SPSS 16.0 software (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were used to determine the demographic characteristics of the study participants. In contrast, the Short Form Self-Assessment Activities-Specific Balance Confidence Questionnaire and the Fear of Falling Scale assessed balance maintenance and fear of falling, respectively. Univariate and multiple logistic regression analyses were used to investigate the effect of independent variables on frequent falling among older people. All the statistical analyses were performed at a confidence level of 95%.

Table 1. Demographic characteristics of the study sample (n=160)

Factor	Number (Percentage)
Gender	
Male	120(75)
Female	25(25)
Marital status	
Married	141(88.1)
Divorced or widow	19(11.9)
Housing	
Owner	148(92.5)
Tenant	12(7.5)
Level of education	
Illiterate	48(30)
Elementary school	42(26.3)
Middle school	6(3.8)
High school	24(15)
Academic degree	38(23.8)
Living with	
Alone	9(5.6)
With spouse	55(34.3)
With their spouse and children	84(52.5)
With children	12(7.5)

Contd. table.1

The number of falls in the past	
Once	45(28.1)
Twice	43(26.9)
Three times	24(15)
Four times and more	38(23)
Vision problems	95(59.3)
Hearing loss	52(32.5)
Dizziness	32(20)
Arthritis	33(20.6)

Results

One hundred sixty older people participants with a history of falling were enrolled in retirement centers in Qom, Iran. The mean age of the participants was 68.4 years (SD=6.9), and 75.5% were male. Most participants were married (88.1%) and had a history of chronic diseases such as hypertension (35%), heart disease (26.3%), and diabetes (26%). The mean BMI was 26.1 kg/m^2 (SD=4.3), indicating that most participants were either of normal weight or overweight. A large portion (60.6%) reported tripping or slipping as the leading cause of their fall. 28% of the participants had experienced a single fall, while the remainder reported recurrent falls (two or more). Vision problems (59.3%), hearing loss (32.5%), and dizziness (20%) were frequently reported (Table1).

As shown in table 2, participants with recurrent falls reported a significantly higher fear of falling than those with a single fall ($p=0.014$). However, the two groups had no statistically significant difference in balance confidence scores ($p=0.328$).

Multiple logistic regression analysis was conducted to identify predictors of recurrent falls among the older people participants (Table 3). Variables with a p -value less than 0.05 in the univariate analysis were included in the final model. The results revealed that hearing loss (OR=2.37, 95% CI: 1.042–5.382), fear of falling (OR=1.13, 95% CI: 1.003–1.277), and overweight (OR=1.04, 95% CI: 1.004–1.083) were statistically significant predictors of recurrent falls. Although dizziness showed a non-significant trend, it did not reach the threshold for inclusion ($p=0.104$).

Discussion

This cross-sectional study examined factors associated with recurrent falls among older people individuals in Iran. The findings indicated that hearing loss, fear of falling, and higher body weight were significantly associated with recurrent falls in this population. Consistent with prior research, fear of falling was identified as a key variable associated with recurrent falls. Fear of falling may lead to reduced physical activity and mobility, indirectly increasing fall risk (18). However, no significant association was observed between changes in balance or gait patterns and fall recurrence, contrasting with some earlier findings (19).

Table 2. Mean and standard deviation of fear of falling and confidence in balance according to the amount of history of falling

Variables	Variable history of one fall(n=44)	History of frequent falls(n=111)	p-value
Fear of falling	16.13(6.08)	18.14(6.66)	0.014
Confidence in balance	391.20(132.78)	363.19(161.84)	0.328

Table 3. The results of logistic regression predicting frequent falls

Variables	Regression coefficient	Standard error	Odds ratio	95% Confidence interval Lower limit/ Upper limit		p-value
Fear of falling	0.124	0.642	1.132	1.003	1.277	0.044
Hearing loss	0.862	0.419	2.368	1.042	5.382	0.040
Dizziness	-0.929	0.571	0.395	0.129	1.209	0.104
Overweight	0.042	0.019	1.043	1.004	1.083	0.029

This discrepancy may reflect the unique characteristics of the Iranian older people population or limitations related to sample size. Cultural factors, such as family-centered living arrangements, limited access to fall-prevention programs, and varying attitudes toward aging and mobility, may also influence how fear and balance impact fall risk in Iran.

The findings regarding sensory impairments, particularly hearing loss, align with other studies indicating that sensory dysfunctions can affect gait rhythm, environmental awareness, and stability, thus contributing to fall risk (20,21). Riska *et al* emphasized that regular hearing assessments may improve postural control and reduce fall risk (22).

Similarly, Zhou *et al* identified fear of falling, vision loss and living alone as key risk factors (23). This parallels the findings that sensory disorders and psychological factors were essential to recurrent falls. An association between body weight and frequent falls was also identified. Although this factor has been less emphasized in previous literature, the results suggest a possible link that merits further investigation. Excess body weight may contribute to joint strain, postural instability, or reduced agility, influencing fall frequency.

Some studies, such as those by Kendrick (24) and MacDonald (25), have proposed that exercise-based interventions may help reduce the fear of falling and its occurrence in older adults (22,23). However, it is essential to note that the current study assessed no intervention programs; therefore, such interpretations should be viewed cautiously and considered as hypothesis-generating rather than conclusive.

Study limitations

This study has several limitations. The cross-sectional design restricted the ability to infer causal relationships between the identified risk factors and recurrent falls. Additionally, the relatively small sample size may limit the generalizability of findings

to the broader older people population in Iran. Further research using longitudinal designs and larger samples is essential to validate the present findings and to assess the effectiveness of specific interventions such as balance training, sensory screening, or cognitive-behavioral therapy.

Conclusion

This study identified sensory impairments, fear of falling, and higher weight as key factors associated with recurrent falls among older adults in Iran. Targeting these factors may help reduce fall-related health burdens. Future research should validate these findings and assess the impact of tailored interventions.

Ethical approval

This study was approved by the Ethics Committee of Qom University of Medical Sciences, Qom, Iran (Ethics code: IR.MUQ.REC.1400.135). All participants provided informed consent before participation. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

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Conflict of Interest

There was no conflict of interest in this manuscript.

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