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Fear of falling in older adults living at home: associated factors*

Medo de cair em idosos residentes no domicílio: fatores associados

Miedo de caer en ancianos residentes en su domicilio: factores asociados

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ABSTRACT

Objective: To identify the factors associated with the fear of falling in the older adult living at home. **Method:** Cross-sectional study with probabilistic sampling of older adult enrolled in two Family Health Strategies (FHS). The fear of falling was measured by the Brazilian version of the Falls Efficacy Scale-International and by a household questionnaire that contained the explanatory variables. Multiple Linear Regression using the stepwise selection technique and the Generalized Linear Models were used in the statistical analyses. **Results:** A total of 170 older adults participated in the research, 85 from each FHS. The majority (57.1%) aged between 60 and 69; 67.6% were female; 46.1% fell once in the last year. The majority of the older adults (66.5%) had high fear of falling. In the final multiple linear regression model, it was identified that a higher number of previous falls, female gender, older age, and worse health self-assessment explained 37% of the fear of falling among the older adult. **Conclusion:** The findings reinforce the need to assess the fear of falling among the older adult living at home, in conjunction with the development and use of strategies based on modifiable factors by professionals to reduce falls and improve health status, which may contribute to the reduction of the fear of falling among the older adult.

DESCRIPTORS

Aged; Accidental Falls; Fear; Geriatric Nursing; Family Health Strategy; Cross-Sectional Studies.

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INTRODUCTION

Falls are defined as events in which the individual inadvertently comes to rest on the ground or lower level, against his will. This event has a high incidence among people over 65 years old, reaching 30% of the older adult living at home. Falling is considered one of the most common causes of hospitalization in the older adult population⁽¹⁾. It is estimated that one in three older adult people suffers a fall yearly and less than half report it to their physicians. Among these falls, one in five causes serious injury, such as fractures or head injuries⁽²⁾, which implies in a high impact on health care expenses worldwide^(1,3) and contributes to the fact that falls among the older adult are a public health issue⁽⁴⁾.

Besides the fall itself, an important aspect to be emphasized in the older adult population is the fear of falling, which has been described as a permanent fear or worry of tumbling⁽³⁾. This fear can set up barriers in daily activities and cause a state of anxiety and even inhibition and/or restriction of these activities⁽⁴⁻⁵⁾. This can reduce mobility and physical fitness, compromise lower limb muscles and the balance of the older adult, and consequently increase risk of future falls⁽³⁻⁵⁾. This way, the fear of falling may be a predictor of falls and, consequently, of their negative repercussions for the older adult, including demands for individualized care^(4,6). As a result, there may be a greater need to use health services, resulting in higher expenses considering the cost of long hospitalizations, medical interventions and medication, among other expenses^(2,7).

The “fear of falling” problem has been a major concern not only for the older adult, but also for families and health care providers, considering it can lead to greater use of health services⁽²⁻³⁾. The consequences of the fear of falling go through the clinical, psychological, social and epidemiological spheres, and should receive special attention, since the ramifications of the consequences are important for the health, well-being and quality of life (QoL) of the older adult⁽⁸⁾.

Based on the identification of the factors associated with the fear of falling in the older adult, it is possible to get an overview that can help in the development of actions aimed not only at the target audience but also actions involving health professionals who deal with the older adult, their relatives and caregivers⁽⁸⁻⁹⁾. The relevance of the study is based on the premise that knowledge about the factors associated with fear of falls is crucial, since falls of the older adult are an important public health problem and one of the main causes of mental health and QoL impairment in this population⁽¹⁾. Thus, the present study aimed to identify the factors associated with the fear of falling in older adult living at home.

METHOD

A cross-sectional and probabilistic sampling research was conducted with older adult people aged 60 years or older enrolled in two of the 12 Family Health Strategies (FHS) from a city located in the southern Minas Gerais State, Brazil. The choice for the FHS was made by convenience. The two FHS were chosen because of the familiarity of the institutions with the research team. In 2010, this city had

90,658 inhabitants, with 11,397 (12.57%) people aged 60 and over. FHS1 (n=456) and FHS2 (n=444) had a total of 7,128 registered people, of which 900 (12.62%) were older adult. Data was collected between June and August 2012 by two trained members of the research team.

The sample was calculated based on a finite population⁽¹⁰⁾ of 900 older adult people and at least a 90.5% fear of falling in one of the 16 FES-I-Brazil activities on the study carried out with older adult people from Diamantina, MG⁽¹¹⁾; we adopted a sampling error of $\pm 5\%$ and a 95% confidence interval ($\alpha=1.96$). Thus, the minimum sample required for this study was 136 older adults. The numbers of the records of each older adult enrolled in the two FHS were used to draw 50% of the sample (n=68) in each FHS. For inclusion in the sample, the participants met the following criteria: age ≥ 60 years, be registered and live within the area covered by one of the FHS that were scenarios of this study. The exclusion criterion adopted was the bedridden older adult.

For this study, a sociodemographic and health household questionnaire was conducted, consisting of the explanatory variables: age; gender; level of education; marital status; chronic disease; daily use of medication; number of falls; time of the last fall; use of glasses; difficulty seeing even with the use of glasses; necessity of walking aid and self-assessment of health status. The Falls Efficacy Scale International scale was used to evaluate the outcome: concern about the possibility of falling. This scale was validated for the Brazilian population (FEI-I-BRAZIL) in 2010⁽¹²⁾. It has excellent psychometric properties and has been validated in several countries. For Brazil's validation, the internal consistency measured with Cronbach's alpha presented excellent psychometric properties ($\alpha=0.96$). Through this scale, “it's possible to investigate the concern about the possibility of falling in 16 distinct daily activities, scored on a Likert scale from 1 to 4, with a score that can vary from 16 (no concern) to 64 (extreme concern). The items evaluated cover tasks related to postural control, associated with a higher level of difficulty, and other basic, instrumental and socialization tasks, which involve less physical demand”⁽¹²⁾. Regarding the interpretation of the FES-I-Brazil scale, those responsible for validation in Brazil conclude that the total score is the best element to evaluate the concern about falling⁽¹²⁾. The cut-off score used indicate a score of 16 to 22 as low concern and from 23 to 64 as high concern about falling⁽¹³⁾.

The data was managed by the Statistical Package for the Social Sciences – SPSS® version 21. To describe the sociodemographic characteristics, and the FES-I-Brazil Scale, descriptive statistics were used. The Kolmogorov-Smirnov test with Lilliefors correction demonstrated normal distribution of the FES-I-Brazil scale ($p=0.105$). Simple Linear Regression (SLR) and Multiple Linear Regression (MLR)⁽¹⁴⁾ were used to identify the factors associated with the fear of falling through the FES-I-Brazil scale (dependent variable). The MLR models were constructed using the stepwise selection technique, starting from the model in which all $p \geq 0.05$ variables are excluded. Using two models, it was possible to determine which independent variables were associated with fear of falling among the older adult in this study. The

Generalized Linear Models (GLM)⁽¹⁵⁾ were used in order to test the mean differences of the FES-I-Brazil among the subgroups of statistically significant MLR covariates defined by number of falls (never, once, twice); gender (male, female); age (60 to 69, 70 or more) and health self-assessment (good, regular). The F test and the degrees of freedom (d.f.) were used to describe the GLM univariate analysis. The significance level adopted was 5%, with a 95% confidence interval (95% CI).

The study was conducted in accordance with the guidelines and regulatory norms of the Resolution 466/2012 of the National Health Council/Ministry of Health, on Research Involving Human Beings and approved by the Research Ethics Committee under decision number 50521, July 4th, 2012. The objectives of the research were clarified and all the participants signed an Informed Consent Form.

RESULTS

A total of 188 older adult people were approached, eight of whom refused to participate in the study, three were visitors and did not live in the perimeters of the selected FHS, two had psychological conditions of anxiety/sadness and five were bedridden or were wheelchair users. At the end of data collection, 170 older adult people participated in this research, 85 older adult from each FHS (Table 1).

Table 1 – Characteristics of the older adult – Itajubá, Minas Gerais, Brazil, 2012

Variables		n (%)
Age	60 to 69	97 (57.1)
	70 or more	73 (42.9)
Gender	Male	55 (32.4)
	Female	115 (67.6)
Education	Never studied	26 (15.3)
	<8 years	128 (75.3)
	≥8 years	16 (9.4)
Marital status	With a partner	92 (54.1)
	No partner	78 (45.9)
Chronic disease	Yes	132 (77.6)
	No	38 (22.4)
Daily medication	Yes	141 (82.9)
	No	29 (17.1)
Number of falls	Never fell	40 (23.5)
	Once	34 (20.0)
	Twice	96 (56.5)
Time of the last fall	<1 year	60 (46.1)
	≥1 year	70 (53.9)
Wear glasses	Yes	61 (35.9)
	No	61 (35.9)
	Sometimes	48 (28.2)
Difficulty seeing even with glasses	Yes	95 (55.5)
	No	75 (44.1)
Walking aid	Yes	21 (12.4)
	No	146 (85.9)
	Sometimes	3 (1.8)
Health self-assessment	Good	119 (70.0)
	Regular	51 (30.0)

The majority (57.1%) were between 60 and 69 years old, 67.6% were female and 54.1% of the older adult reported having a partner. Approximately 78.0% reported having at least one chronic disease and 83% had daily use of at least one medication. Regarding the history of falls, 76.5% had had at least one fall and 46.1% had a fall in the last year. The proportion among the older adult who wore glasses and the ones who did not was the same (35.9%), and the majority (55.5%) had difficulty seeing, even with glasses. Approximately, 86% of the older adult did not use walking aids. Regarding the self-assessment of health status, 70.0% of the older adult reported that their health was good.

The fear of the possibility of falling assessed by the FES-I Brazil Scale presented mean of 29.5. (SD=10.2; 95.0% confidence interval= 28.0-31.1). When rating this fear, the results showed that 66.5% (n=113) of the older adult presented a score between 23 and 64 in the FES-I Brazil Scale, which represents a high concern about falling, and 33.5% (n=57) of the older adult had low concern about falling, with a score between 16 and 22.

Table 2 presents two models of Linear Regression used to evaluate the factors associated with the fear of falling among the older adult in the community. In the first SLR model, it is observed that only the variable number of previous falls explained 21.0% of the variance of fear of falling (B=5.6; p<0.001). In the final MLR model, the number of previous falls (B=3.3; p<0.001), plus gender (B=-7.0; p<0.003), age (B=0.2; p<0.001) and health self-assessment (B=-3.7; p=0.001) explained 37.0% of the variance of fear of falling.

Table 2 – Results of simple and multiple linear regression for the fear of falling in older adult in the FES-I-Brazil Scale – Itajubá, Minas Gerais, Brazil, 2012

Models	Variables	B (95% CI)	P Value	Adjusted R ²
1 st model FES-I-Brazil	Number of falls	5.6 (3.9 ; 7.3)	<0.001	0.21
	Number of falls	3.3 (1.6 ; 4.9)	<0.001	
Final model ^a FES-I-Brazil	Gender	-7.0 (-9.7 ; - 4.2)	0.003	0.37
	Age	0.2 (0.1 ; 0.4)	<0.001	
	Health self-assessment	-3.7 (-6.0 ; 1.1)	0.001	

^a: Used in the Generalized Linear Models; B: Beta coefficient is the estimate of the increase or decrease of the dependent variable for each 1-point increase of the independent variable; CI: 95% Confidence Interval.

GLMs (Table 3) were used to explore the mean difference between the covariates associated with the fear of falling among the older adult. The fear of falling presented a statistically significant difference between the number of previous falls: (F=11.1; d.f.=2;; p<0.001); gender: (F=19.5; d.f.=1; p<0.001), age: (F=4.2; d.f.=1; p<0.001) and health self-assessment: (F=9.2; d.f.=1; p=0.003).

Regarding the number of previous falls, it was identified that there was no statistically significant difference between the older adult who had never fell and the older adult who had fell only once (mean difference= - 2.9; p=0.4). But a difference in the fear of falling was observed among the older adult who had never fell and the older adult who had fell twice (mean difference= - 7.7; p<0.001). When comparing

the older adults who fell once with those who fell twice, the difference in fear of falling was lower and statistically significant (mean difference = -4.7; $p=0.021$). Older women presented greater fear of falling than older men (mean difference = -8.0; $p<0.001$). The age difference was also a factor that presented discrepancy in the fear of falling. Younger, 60-69 year-olds were less fearful of falling than older adults aged 70 or over (mean difference = -4.6; $p=0.042$). Older adult patients with worse health self-assessment were more fearful of falling than older adults with better self-assessment (mean difference = -7.8; $p=0.003$) (Table 3).

Table 3 – Mean difference FES-I-Brazil Scale – Itajubá, Minas Gerais, Brazil, 2012

Variables		Mean difference	95% CI	P – Value
Number of falls				
Never	Once	-2.9	-7.7 ; 1.8	0.408
Never	Twice	-7.7	-11.8 ; -3.6	<0.001
Once	Twice	-4.7	-8.9 ; 0.5	0.021
Gender	Male	-8.0	-9.1 ; -3.4	<0.001
	Female			
Age (years old)	60 to 69	-4.6	-5.3 ; 0.1	0.042
	70 or more			
Health self-assessment	Good	-7.8	-8.8 ; -2.4	0.003
	Regular			

Note: Mean difference; SD: standard deviation; CI: confidence interval.

DISCUSSION

The present study investigated the factors associated with fear of falling among older adult people living at home. The majority of these older adults (67.0%) had a high fear of falling. The factors associated with fear of falling were: higher number of falls; women; worse health self-assessment and age, especially for those above 70 years.

A higher number of falls was the main factor that explained the fear of falling among the older adult who lived in their own house. Older adults who fell twice were more afraid of falling than older people who had never fell or had fell once. It is noteworthy that no difference in the fear of falling was found between older adults who fell once and those who had never fell. Any older adult person with a history of falls, with or without injury, is more likely to trigger a fear of falling^(11,13). Recurring falls among the older adult has been highlighted as a relevant factor for the development of fear of falling⁽¹⁶⁻¹⁷⁾. Fear, in most cases, is related to the possibility of fractures, hospitalization and compromising autonomy of the older adult^(13,17). This fear can trigger changes in the behavior of the older adult, such as restrictions of basic daily and instrumental activities and reduction of physical fitness, which lead to cardiovascular risks and musculoskeletal disorders. In addition, it may increase the risk of falls^(4,18) and compromise the QoL of the older adult⁽⁶⁾.

Falls and fear of falling are mutually associated, since the older adult presenting an outcome have a high risk of developing the other⁽⁶⁾. In the present study, no significant

difference was identified between the fear of falling among the older adult who fell once and those who never fell. In previous studies, a statistically significant difference in the fear of falling among older adult people who never fell and who fell once was detected⁽¹¹⁾. It is believed that this finding may be associated with the severity of the fall. Older adults who suffered a fall with complications, such as fractures or injuries, are more afraid of falling than older adult people who did not suffer complications^(6,8). This study did not investigate the outcome fracture/lesions, which may make it difficult to make some inferences with the present findings.

An influence of the female gender on the fear of falling was observed. Older adult women were more likely to fall than older adult men⁽¹⁹⁾. The fear of falling among older adult women was associated with reduced physical activity⁽¹⁹⁾; obesity⁽²⁰⁻²¹⁾; impairment of activities of daily living (ADLs)⁽¹⁹⁾; social isolation⁽⁴⁾; higher depressive symptoms^(20,22); higher probability of future falls⁽²³⁾. The fear of falling among older adult women is influenced by a number of factors peculiar to gender, such as a higher prevalence of chronic non-communicable diseases (NCDs) and musculoskeletal frailty⁽²³⁾; low bone density after menopause and greater and more rapid loss of muscle mass, due to the hormonal decrease⁽²⁴⁾. It is also believed that the higher frequency of household tasks can influence this fear⁽³⁾. Older adult women also have more difficulty engaging in physical activities of muscle strengthening⁽²⁵⁾. Another factor that should be highlighted is that even though women recognize health risks more easily, men are more resistant to accepting these risks⁽²⁶⁾.

Older people who assessed their health status as "regular" were more afraid of falling than the older adult with "good" health self-assessment. A worst health status among the older adult has been associated with greater fear of falling in international studies, such as studies in The United States of America⁽²⁷⁾, England⁽²⁸⁾, Nigeria⁽⁴⁾, and also Brazil⁽⁷⁾. To the World Health Organization⁽⁴⁾, in addition to NCDs, physical and cognitive decline, physical frailty, affective impairment, and depression may exacerbate the fear and risk of falling among the older adult. This study corroborates the need to detect older adult people vulnerable to this fear, with the purpose of elaborating preventive measures against the increase of the fear of falling to contribute to the reduction of the fear of falling and the number of falls among these older adults.

Age was another factor associated with fear of falling. 70 years old or older adults were more fearful of falling than younger older adult people (60-69 years). The older adult usually present with advancing age a decline in physical and mental functioning, as well as an increase in physical frailty and in the number of NCDs⁽²⁹⁾. This set of alterations affects the older and contributes to the greater fear of falling among older individuals⁽¹⁹⁾. A population-based study with 9,033 South Korean, aged over 65, found that older people over 75 years of age are more likely to have fear of falling than younger older adult⁽³⁰⁾. A higher age was also associated with a greater fear of falling in other international studies⁽²⁸⁾. In relation to the published national literature, this study is regarded as different from the others because it identifies

that with the advancement of age, the fear of falling in older adult people living at home increases.

The present study has some limitations. During the research conducted in their homes, it was not investigated whether, after the fall, there were fractures/lesions. It is believed that this questioning could help explain why there was no association of the fear of falling among older adult who had never fell and those who had fell once, which opens a gap for future studies. Other limitations were the reduced number of older adult people aged 80 years or older, which made it difficult to use this category in the results and analysis, and the use of only two categories to assess the perception of the health status of the older adult.

CONCLUSION

This study showed that the older adult who have already fallen twice, female, with worse health self-assessment, and over 70 years of age were more afraid of falling. In terms of recommendations for practice, the findings reinforce the need to assess the fear of falling among older adult people living at home. This assessment does not imply high costs, it

is uncomplicated and can be carried out by members of the multi-professional team of the FHS or Basic Health Units (BHU), which are closer to the community. Supervised physical exercises for strengthening upper and lower limb muscles and developing balance should be provided. Group and individual educational activities are important because they aim to understand the risks of falls and provide the idea that the fear of falling is controllable. The supervision of modifiable risk factors in the older adult households should be carried out by the multi-professional team of the FHS or the BHU, to reduce the possibility of falling. The associated factors found in this study can contribute to the elaboration of preventive actions to reduce the fear of falling and the possible consequences of this fear in ADL, physical and mental health, socialization and in the QoL of the older adult, besides impacting on the costs and organization of health systems and services.

Longitudinal studies in larger samples with a multifactorial approach should be carried out to identify the possible predictive factors of the fear of falling from older adult living at home.

RESUMO

Objetivo: Identificar os fatores associados ao medo de cair em idosos residentes no domicílio. **Métodos:** Estudo transversal com amostragem probabilística de idosos cadastrados em duas Estratégias Saúde da Família (ESF). O medo de cair foi avaliado pela versão brasileira da escala *Falls Efficacy Scale International* e por um inquérito domiciliar que continha as variáveis explicativas. A Regressão Linear Múltipla por meio da técnica *stepwise selection* e os Modelos Lineares Generalizados foram utilizados nas análises estatísticas. **Resultados:** Participaram da pesquisa 170 idosos, 85 de cada ESF. A maioria (57,1%) tinha entre 60 e 69 anos de idade; 67,6% eram do sexo feminino; 46,1 % tiveram queda no último ano. A maioria dos idosos (66,5%) tinha elevado medo de cair. No modelo final de regressão multivariada, identificou-se que maior número de quedas anteriores, sexo feminino, idade mais avançada, e pior autoavaliação de saúde explicaram 37% do medo de cair entre os idosos. **Conclusão:** Os achados reforçam a necessidade da avaliação do medo de cair entre os idosos que residem no próprio domicílio, assim como o desenvolvimento e a utilização de estratégias pelos profissionais voltadas para os fatores modificáveis, de modo a reduzir as quedas e melhorar o estado de saúde, o que pode contribuir para a diminuição do medo de cair entre os idosos.

DESCRIPTORES

Idoso; Acidentes por Quedas; Medo; Enfermagem Geriátrica; Estratégia Saúde da Família; Estudos Transversais.

RESUMEN

Objetivo: Identificar los factores asociados con el miedo de caer en ancianos residentes en su domicilio. **Métodos:** Estudio transversal con muestreo probabilístico de ancianos registrados en dos Estrategias Salud de la Familia (ESF). El miedo de caer fue evaluado por la versión brasileña de la escala *Falls Efficacy Scale International* y por una encuesta domiciliar que contenía las variables explicativas. La Regresión Lineal Múltiple mediante la técnica *stepwise selection* y los Modelos Lineales Generalizados fueron utilizados en los análisis estadísticos. **Resultados:** Participaron en la investigación 170 ancianos, 85 de cada ESF. La mayoría (57,1%) tenía entre 60 y 69 años de edad; el 67,6% eran del sexo femenino; el 46,1 % sufrieron caída el último año. La mayoría de los ancianos (66,5%) tenía elevado miedo de caer. En el modelo final de regresión multivariada, se identificó que mayor número de caídas anteriores, sexo femenino, edad más avanzada y peor autoevaluación de salud explicaron el 37% del miedo de caer entre los ancianos. **Conclusión:** Los hallazgos refuerzan la necesidad de la evaluación del miedo de caer entre los ancianos que residen en su propio domicilio, así como el desarrollo y la utilización de estrategias por los profesionales dirigidos a los factores cambiables, a fin de reducir las caídas y mejorar el estado de salud, lo que puede contribuir para la reducción del miedo de caer entre los ancianos.

DESCRIPTORES

Anciano; Accidentes por Caídas; Miedo; Enfermería Geriátrica; Estrategia de Salud Familiar; Estudios Transversales.

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