The relation between fear of falling and recent and old fall events

La relación del miedo de caer con los eventos de caídas recientes y pasados

Relação do medo de cair com eventos de quedas recentes e antigos

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ABSTRACT: The aim of the study was to evaluate whether the fear of falling is related to episodes of recent and/or old falls. Cross-sectional study with 78 elderly, being applied to Falls Efficacy Scale – International adapted to Portuguese and collecting the history of falls. The elderly were divided into groups according to the number and timing of falls; and comparison tests were conducted.

Keywords: Aged; Accidental Falls; Aging.

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RESUMEN: *El objetivo del estudio fue evaluar si el miedo de caer se relaciona con episodios de caídas recientes y/o pasados. Estudio transversal con 78 ancianas, que se aplica a Falls Efficacy Scale – International adaptado al portugués y se percibe la historia de las caídas. Las ancianas fueron divididas en grupos de acuerdo a la cantidad y el tiempo de las caídas; y pruebas de comparación fueron realizadas.*
Palabras clave: *Anciana; Accidentes por Caídas; Envejecimiento.*

RESUMO*: O objetivo do estudo foi avaliar a relação do medo de cair com episódios de quedas recentes e antigos, para estabelecer qual está mais relacionado com esta variável. Estudo transversal com 78 idosas, sendo aplicada a Falls Efficacy Scale – International adaptada para o português e coletando-se o histórico de quedas. As idosas foram divididas em grupos de acordo com o número e data das quedas; testes de comparação foram realizados para se estabelecer a relação das variáveis.*
Palavras-chave: Idoso; Acidentes por Quedas; Envelhecimento.

Introduction

Over the years, the human being has experienced progressive alterations of a physiologic nature in their organs and tissues. Aging alters variables related to the exercise of full functional capacity, such as strength, balance, flexibility, agility and motor coordination. These alterations can represent risk factors for falls in the elderly population (Gonçalves, *et al.*, 1990; Lindle, *et al.*, 1997; Nóbrega, *et al.*, 1999; Teixeira, & Guariente, 2010).

The high incidence of fractures in the elderly, as a result of fall episodes, is one of the great responsible causes for the high economic value invested in the national public health system, due to the necessity of hospitalization and the employment of surgical procedures, prosthetic materials and medicines. In addition to hospital expenses, the falls lead to great rates of postoperative mortality (Guimarães, *et al*., 2004; Araújo, Oliveira, & Bracco, 2005; Christofoletti, *et al*., 2006).

The fall episodes are considered multifactorial events, being related to low self-efficacy which, among other aspects, is related to the fear of falling.

This fear is a highly prevalent problem and intense in the elderly population, as it is considered functionally limiting independently of other risk factors for falls (Walker, & Howland, 1990; Soares, *et al*., 2014).

It is described the need of physical exercise to avoid falls in the elderly or to attenuate its consequent alterations, such as balance and gait deficits (Vellas, *et al.*, 1997; Hsu, *et al.*, 2014). However, there are few studies explaining the psychological approach that must be taken after a fall episode, and even so, it is not highlighted the ideal moment for its execution, nor whether the fear is related to recent or old fall events.

Besides the fears the subject may experience, it is necessary to verify whether they are related to recent or old fall episodes, highlighting the urgence of the psychological approach (Bandura, 1993; Yeom, 2013).

Fear is intimately connected to self-efficacy, which is the capacity one believes to have to perform a given task, as it is directly related to functional capacity. Along with the need to assess the fear of falling in the elderly population, some instruments have been created and culturally adapted to obtain reliability in the findings. A widely used scale to verify this variable is the Falls Efficacy Scale – International, adapted to Portuguese (FES-I-Brazil, by Camargos, *et al.*, 2010). This scale is composed by a questionnaire with activities commonly performed by the elderly.

The aim of this study was to assess the relation between fear of falling and recent and old fall events, to establish which one is the most related to this variable, and whether any of the studied variables are related to fall events.

Material and Method

A cross-sectional study was conducted, researching the relation between self-efficacy, history of falls and the fear of falling in a specific population and at an exact time.

Elderly women registered at the Senior Community Center (CCI) of the Catholic University of Brasília (UCB) were invited to participate in the study. The aforementioned program attends to 369 elderly that perform different social, physical and school activities, such as choir, handicraft and foreign language studies, among others. Initially, the secretary of the CCI was consulted about the places where the elderly groups performed their activities.

Each of the appointed places was visited, the goals and the study methodology were explained, and afterwards, the invitation to participate in it was made. The research was conducted between February and April of 2013.

The sample was of convenience, with a total of 78 elderly women. The inclusion criteria were: age of 60 or over; not to regularly practice a specific physical activity. The exclusion criteria were: history of lesions or orthopedic, neurologic or rheumatologic diseases that could affect the data collection; history of fractures in the year before the collection; algic state that influenced or impossibilitated the conduction of the proposed tests; congenital or acquired anomalies of upper and lower limbs; inflammatory or infectious process that interfered in the collection procedures; and cognitive alterations.

The participants of the research, after the adequate clarifications, signed the TCLE, an Informed Consent Form, to prevent any doubts from arising. All of the applied questionnaires were conducted at the Laboratory of Strength Studies (LABEF), in the morning and afternoon periods. First, the evaluator conducted the mini-mental state examination (MMSE) so as to exclude the elderly women who could not understand the tests, adopting as minimum score: 13 points for the illiterate, 18 for low/ middle education levels, and 26 for high education levels (Bertolucci, *et al.*, 1994; Brucki, *et al.*, 2003).

Afterwards, in a standard form, the following information of the studied subjects were filled out: name; stature; weight; age; number of falls in the last year; number of falls in the year before the last; and description of how each one of the falling episodes took place. The anthropometric measurements were collected using a Sanny® stadiometer and a Cardiomed® digital scale, both duly calibrated.

Afterwards, the FES-I-Brazil was applied, a questionnaire with 16 items that simulates the elderly population's activities of daily living, in which they had to report their concerns about falling, with each answer being able to be rated with a score from 1 to 4. The purpose of this test is to assess the fear of falling. If the addition of points is: 23 or more, the elderly women are classified as a risk of sporadic falls; higher than 31, recurring falls; and under 23, no risk of falls (Camargos, *et al*., 2010).

In table 1, it can be observed the results of the risk stratification for falls by the FES-I-Brazil according to Camargos, *et al*. (2010).

Each individual responded to the FES-I-Brazil and to the history of falls questionnaire on the same day.

Upon completion of the questionnaires, the elderly women were allocated in groups. Firstly, it was opted to divide them in 4 groups: 1) falls in the last year and falls in the year before the last; 2) falls only in the last year; 3) falls only in the year before the last and 4) no fall events. Afterwards, the division in two groups was opted: 1) with a history of falls and 2) without a history of falls.

In the statistical analysis, the software SPSS 22.0 was utilized for the processing and analysis of data. The statistical tests conducted were ANOVA ONE-WAY for the division in four groups, seeking to compare all of the variables (age, weight, stature, BMI and FES-I-Brazil). For the division in two groups, it was utilized the independent samples t-test, also comparing all of the variables. The significance value adopted was $p \leq 0.05$.

Table 1 – Risk stratification for falls by the FES-I-Brazil according to Camargos, *et al*. (2010)

	Stratification Score	N	%
	≥23 points (sporadic falls)	20	34.48
	>31 points (recurring falls)	6	10.34
	<23 points (no risk for falls)	32	55.17
	Total	58	-

N. = Number of elderly women; FES-I-Brazil = Falls Efficacy Scale – International, culturally adapted for the Brazilian population; % = Percentage

The work has been aproved by the Ethics and Research Committee of the Catholic University of Brasília (CEPE-UCB), under decision n. 170.748, Certificate of Presentation for Ethical Consideration (CAAE) n. 09216312.7.0000.0029, of 12/12/2012.

Results and Discussion

In table 2, it can be observed the data referring to the characterization of the sample as a whole.

All of the groups presented homogeneity in their distributions. In table 3, there can be found the data referring to the characterization of the sample divided in four groups and the result of the ANOVA ONE-WAY test.

In table 4, there are the data referring to the characterization of the sample divided in two groups and the result of the idependent samples t-test.

Table 2 - Characterization of the sample of 58 elderly women as a whole, UCB, 2013

Characteristics	N	Average	SD
Age (years)	58	67.29	5.47
Weight (Kg)	58	64.17	10.83
Stature (m)	58	1.54	0.06
BMI (Kg/m²)	58	27.22	4.52
FES-I-Brazil Score	58	24.02	6.58

N = Number of elderly women; Kg = Kilogram; Kg/m² = Kilogram per square centimeter; FES-I-Brazil = Falls Efficacy Scale – International, culturally adapted for the Brazilian population; SV = Standard deviation

In the statistical test, dividing the elderly women in four groups, there could not be found a significant difference in the comparison of none of the variables. When the women were divided in two groups, a significant difference was found only in the comparison of the age variable (p=0.04).

The present study has not identified a difference in the comparison between the fear of falling in the four groups with divisions of history of fall events, nor between the groups of fallers and non-fallers. These findings corroborate the ones of the Walker and Howland study (1990), which examining elderly aged over 65, found the fear of falling as an intense and prevalent phenomenon, as much in the group of fallers, as in the one of non-fallers.

According to the validation study of the FES-I-Brazil, the scores regarding the fear of falling are more related to the factor falls in the last year (Camargos, *et al.*, 2010). As it has been mentioned above, the present research has not obtained such an answer, with the fear of falling not presenting differences in any of the studied groups. Vellas, *et al.* (1997) reported that elderly individuals who had experienced a fall espisode started to heighten their fears of a new fall event, which is associated to balance and gait deficits.

The present research has not sought to assess such variables, however a discrepancy with the aforementioned study is found, as it did not evidentiate a difference in the level of fear of falls for fallers or non-fallers.

Table 3 - Characterization of the sample of 58 elderly women, divided in four groups, and the result of the ANOVA ONE-WAY test, UCB, 2013

Characteristics	Groups	Nº	Average	SD	p
Age (years)	1	11	67.81	5.68	0.096
	2	13	69.61	5.22	
	3	28	66.92	5.46	
	4	6	63	3.57	
Weight (Kg)	1	11	62.1	9.57	0.302
	2	13	60.08	13.52	
	3	28	66.36	10.04	
	4	6	66.53	9.05	
Stature (m)	1	11	1.51	0.05	0.335
	2	13	1.52	0.06	
	3	28	1.54	0.05	
	4	6	1.56	0.05	
BMI (Kg/m²)	1	11	27.03	5.07	0.536
	2	13	25.74	4.91	
	3	28	27.99	4.33	
	4	6	27.11	3.61	
FES-I-Brazil Score	1	11	25	5.42	0.534
	2	13	21.76	4.16	
	3	28	24.82	8.02	
	4	6	23.33	5.12	

N = Number of elderly women; Kg = Kilogram; Kg/m² = Kilogram per square centimeter; FES-I-Brazil = Falls Efficacy Scale – International, culturally adapted for the Brazilian population; SV = Standard deviation; Group 1 = Falls in the last year and Falls in the year before the last; Group 2 = Falls only in the last year; Group 3 = Falls only in the year before the last; Group 4 = No fall events

McCaffrey, *et al.* (2014), studying Canadian athletes, showed that there is a correlation between sports lesions and the fear of a new lesion. Alongside the knowledge about this matter, a parallel could have been drawn to understand that a fall accident could establish a fear of recurrence in an elderly individual, as it happens when it comes to the fear of another lesion in an athlete. However, this hypothesis has not been confirmed by our research.

Table 4 – Characterization of the sample of 58 elderly women, divided in two groups, and the result of the independent samples t-test, UCB, 2013

Characteristics	Groups	N	Average ±	SD	p
Age (years)	1	52	67.78	5.46	0.041*
	2	6	63	3.57	
Weight (Kg)	1	52	63.89	11.05	0.576
	2	6	66.53	9.05	
Stature (m)	1	52	1.53	0.05	0.164
	2	6	1.56	0.05	
BMI (Kg/m²)	1	52	27.22	4.64	0.954
	2	6	27.11	3.61	
FES-I-Brazil Score	1	52	24.09	6.76	0.791
	2	6	23.33	5.12	

N = Number of elderly women; Kg = Kilogram; Kg/m² = Kilogram per square centimeter; FES-I-Brazil = Falls Efficacy Scale – International, culturally adapted for the Brazilian population; SV = Standard deviation; * = $p < 0.05$; Group 1 = With a history of falls; Group 2 = Without a history of falls

Among the comparison tests, the only one to present a significant result was between the group with falls and no falls in regards to the age variable, being that the fallers group presented a more advanced age. These data are in agreement with the ones from Rodrigues, *et al.* (2014), which established the age variable as one of the most related factors to fall events. Thus, the older the individual, the higher their chance of falling.

In analysing the risk stratification for falls according to the criteria of Camargo, *et al.* (2010), the study has found 55.17% of the sample with a lack of fear of falling and, consequently, no risk for falls.

The stratification scores have also classified 10.34% of the elderly women as very afraid of falling, and a risk of recurring falls. Arfken, Lach, e Birge (1994) studied 1358 community-dwelling elderly of both genders, finding 71% of them unafraid of falling, a high number compared to the present research; and, only 9% with a lot of fear of falling, in accordance with all the data found in the current study.

Conclusion

It has been concluded that the fear of falling in the elderly does not depend on the moment in which the accident took place in their lives. This variable also hasn't differentiated itself for those who had never suffered fall-related accidents; despite other studies having found divergent results.

In this current research, the only variable related to fall episodes was age, demonstrating how aging is a risk factor for this alarming matter.

The descriptive analysis on the risk stratification for falls by the FES-I-Brazil, as well as in other studies, has shown that community-dwelling elderly, in their majority, do not present fear of falls.

There must be conducted future studies with a bigger sample and established comparisons of variables similar to the ones utilized, but dividing the groups according to the results of the risk stratification for falls; in groups by decades of life, and also by gender. In this manner, it will be possible to establish relations between the different levels of fear of falling.

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