

Fear among the elderly of suffering recurring falls: the gait as a determining factor of functional independence

Medo do idoso em sofrer quedas recorrentes: a marcha como fator determinante da independência funcional

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ABSTRACT

For older people, falls have psychological repercussions, such as the fear of falling, and can unleash considerable damage to one's autonomy. This study was carried out with 60 sedentary elderly females, aged between 68 and 70 years and with histories of falls, registered in the "Idoso Feliz" (The Happy Elderly) Program in the city of Rio de Janeiro/RJ, and sought to identify the fear of having repeated falls. Initially, an inquiry was done about the occurrence of falls in the group participating in the research. Interviews were then made by means of the Falls Efficacy Scale-International-Brazil to evaluate the group in relation to the concern with falling during the practice of 16 daily activities. Their dynamic gait profile was also evaluated using the Dynamic Gait Index. The statistic treatment concentrated on the descriptive analysis by means of estimating the localization measurements (minimum, maximum and median) and percent measurements; the results showed that the frequency of falls increased proportionally with age. In relation to the concern by the

elderly with falling, 40.11% mentioned no concern, 30% reported some concern, 25.33% moderate concern, and 4.6% were very concerned. The activities for which they showed more concern: taking a bath, walking on slippery or irregular surfaces, walking in a crowded place, and going out to social events. On evaluating the dynamic gait index, the majority of the population had a result considered predictive of falls since most of the elderly scored less than 19 points. It could be concluded that the majority of the investigated population showed at least low or moderate concern for suffering recurrent falls in the practice of everyday life activities, physical activities, and social activities, especially when these require muscular strength and balance. This can be justified, in part, by the unsatisfactory dynamic gait index detected, which implies the presence of abnormalities in that biomechanical function.

Keywords: Aged, Accidental Falls, Gait, Activities of Daily Living

RESUMO

As quedas trazem repercussões psicológicas, como o medo de cair, podendo desencadear prejuízos consideráveis na autonomia do idoso. O objetivo deste estudo, efetuado com 60 idosas, sedentárias, com idades entre 68 e 70 anos, com relatos de quedas, cadastradas no Programa "Idoso Feliz" na cidade do Rio de Janeiro/RJ, foi identificar o medo de sofrer quedas recorrentes no relato de pessoas idosas. Inicialmente foi feito um questionamento acerca da ocorrência de quedas no grupo participante da pesquisa. Em seguida, uma entrevista por meio da Falls Efficacy Scale-International-Brazil para avaliar o grupo com relação à preocupação em cair durante a prática de 16 atividades diárias. Foi também avaliado o perfil da marcha dinâmica utilizando-se o teste de Índice de Marcha Dinâmica. O tratamento estatístico se concentrou na análise descritiva por meio da estimativa de medidas de localização (mínimo, máximo e média) e medidas percentuais e os resultados mostraram que a frequência das quedas aumentou proporcionalmente com a idade. Em relação à preocupação das idosas em cair, 40,11% não referiu preocupação, 30% relatou um pouco de pre-

ocupação, 25,33% moderada preocupação e 4,6% muita preocupação. As atividades para as quais se mostraram mais preocupadas foram: tomar banho, andar em superfícies escorregadias ou irregulares, andar em um local onde haja multidão e sair para eventos sociais. Na avaliação do índice de marcha dinâmica a maioria da população teve um resultado considerado preditivo de quedas, já que todas as idosas perfizeram menos que 19 pontos. Pôde-se concluir que a maioria da população investigada apresentou preocupação, mesmo que pouca ou moderada, em sofrer quedas recorrentes na prática de atividades da vida diária, atividades físicas e atividades sociais, especialmente quando estas requerem força muscular e equilíbrio. Isto pode ser justificado, em parte, pelo insatisfatório índice da marcha dinâmica detectado, o que faz subentender-se a presença de anormalidades naquela função biomecânica.

Palavras-chave: Idoso, Acidentes por Quedas, Marcha, Atividades Cotidianas

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Doi: 10.11606/issn.2317-0190.v17i3a103353

Financial Support: Secretary of Science and Technology of the State of Tocantins

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INTRODUCTION

Aging, which inexorably assails the individual over time, interferes with various organic devices and systems.¹ Functional alterations stemming from this produce different consequences for the elderly, such as gait disturbances.²⁻⁵ One's gait results from the interaction of the neurological, musculoskeletal, vestibular, and somatosensory systems. The compromising of these systems, whether by diseases, injuries or even by the physiological aging process itself, can generate negative effects on such biomechanical functions, with consequent difficulty or dependence for the accomplishment of daily life activities (DLAs) and daily life instrumental activities (DLIAs).⁶

The presence of gait disturbances can also increase the risk of falling.⁷ Falls bring radical changes to the daily lives of the elderly, not only for diminishing their functional capacity even more and for restricting their activities in general, but also for fear of suffering yet another fall. Therefore, it is possible that the decline of physical function affects the perception the elderly have about their own abilities and efficacy, generating the fear of falling.

According to estimates, about 30% of people aged 65 or older fall at least once a year and two thirds of these people suffer recurrent falls in the next year.^{8,9}

Other studies¹⁰ report that 45% of the elderly aged more than 75 who have with histories of falling resulting in injury become afraid of falling, and that 26% start to restrict situations that demand better balance. Thus, after a fall, an older person becomes more inclined to have low self-confidence while carrying out DLAs and DLIAs, whether for fear of recurring falls or for other physical, psychological, or social factors.⁶

Falls that result in physical lesions, functional losses, or prolonged periods of the person remaining on the ground, are those most closely associated with the fear of recurring falls. As a consequence of this, there can occur a progression of fear, justified by the possibility of the person feeling demoralized and showing feelings of frailty, insecurity, vulnerability, loss of control, and anxiety in relation to disease and death, which can be an aggravating and accelerating factor in the aging process.¹¹

Fear can be conceived as a shock-emotion that comes from the perception of a present and urgent danger that threatens the preservation of the individual, then provoking a series of effects in the organism which make it apt

for a defense reaction.¹² For the elderly person who feels insecure walking, or even more poignantly for the one who has already fallen, this reaction is seen in general in the defensive behavior of avoiding perambulation by the utilization of different strategies to maintain balance while walking or even by the precocious and unnecessary use of crutches or wheelchairs, becoming, in this case, dependent while exercising this function.^{13,14}

This study is justified by the hope that the results of this evaluation may in some way serve in the planning and execution of future relevant interventions, or serve as a positive social impact on the quality of life of the elderly population in general, and especially on their autonomy during DLAs and DLIAs.

OBJECTIVE

This study seeks to understand the fear reported by elderly people of suffering recurring falls.

METHOD

This transversal study utilized the method of context evaluation to identify and describe the real conditions related to a phenomenon, to identify needs not fulfilled and opportunities not utilized, aiming at providing a logical foundation to determine objectives.¹⁵

A group of 60 sedentary females was investigated, aged between 68 and 70 years with reports of falls, 25 of whom were aged 68, 25 aged 69, and 10 aged 70, all enrolled in the "Happy Elderly" Program in the city of Rio de Janeiro, RJ, but who had not yet begun the physical activities prescribed in the program. Initially a questionnaire was made about the occurrence of this type of accident for the equalization of the group participating in the research, based on the question: 'How many times have you fallen in the past year?'

After that, one of the duly prepared researchers carried out an interview using an adapted version of the *Falls Efficacy Scale-International-Brazil* (FES-I-BRASIL), validated by Camargos¹⁶ which includes certain psychometric properties suitable for the Brazilian population. Through this scale it is possible to evaluate the group in relation to their concern about falling during the execution of 16 daily activities. In relation to the answer categories, the word "concern" was utilized in the scale to express a rational or cognitive discomfort about the possibility of falling, not connoting, however, the emo-

tional suffering that could be reflected by the term "fear". This term, for its psychiatric connotation and for analogically implying the condition of phobia, would lead to the possibility of the respondents not wanting to admit emotions that could be seen as a sign of weakness.¹⁷

This protocol attributes values according to the degree of concern in falling that the individual demonstrates. The participants answered the questions thinking about how they usually performed the activity and, in case the individual did not perform such an activity, he/she should answer it as if imagining performing it.¹⁶

The FES-I presents four possible answers, with respective scores from one to four. The total score can, thus, vary from 16 to 64, in which the value 16 corresponds to the absence of concern and 64, extreme concern about falling during the execution of the specific activities in the questionnaire.¹⁶

The dynamic gait profile was also evaluated utilizing the Dynamic Gait Index test, developed to identify the probability of falls in the elderly. The test was composed of the following functional tasks: walking on a flat surface; walking with changing gait speeds; walking with horizontal and vertical movements of the head; going over and around obstacles; spinning around his/her own body axis, and climbing up and down stairs.¹⁸ The procedures for the performance of the evaluation followed these suggested criteria: the ground was marked with adhesive tape at the starting point and at each 1.5 meters (m), until reaching the mark of 6 meters, and cones were positioned at the 1.80m and at the 3.60m positions. After the participants were guided at each phase, the verbal command for the execution of the tests was initiated.¹⁹

The maximum score possible for this test was 24 points, and in each item the evaluated subject receives from 0 to 3 points, with "0" indicating the lowest level and "3" indicating the highest level of the function. The interpretation is that a result lower than or equal to 19 points is predictive of falls among the elderly, while a confident walker is one who scores more than 22 points.²⁰

The evaluators who participated in the research were trained with standardized instructions for the execution of these tests.

The statistical treatment concentrated on the descriptive analysis through the estimate of localization measurements (minimum, maximum, and medium) and percentage measurements.²¹

Research Ethics

The project for this research was submitted to the Committee for Ethics in Research involving Human Beings at the Castelo Branco University (UCB/RJ) and approved under protocol No. 0002/2009.

The collection of data occurred after the subjects' signing of the Free and Informed Consent Form as described in resolution 196/96 of the National Health Council from the Ministry of Health.

RESULTS

In Table 1 we can observe the average number of falls in relation to the age bracket, and note that the frequency increases with age.

The concern with falling was not essentially expressed for the performance of the DLAs, except for the activity of taking a shower, when most mentioned feeling a little concerned (Table 3).

However, for the performance of physical activities (Table 4) when the state of concern was also configured, this feeling was more strongly mentioned for the act of walking on slippery or irregular surfaces, respectively.

In the same way, in relation to the performance of social activities (Table 5), the concern of the elderly females with falling became evident, even if slight or moderate, with the higher number of people concerned with activities that demanded walking in places with crowds and going out to social events.

In relation to the results of the evaluation of the dynamic gait index (figure 1) a range was demonstrated between 13 and 18 points, with an average of 15.05, which is a result predictive of falls.¹⁴

Table 1 - Average number of falls in relation to the age bracket.

Age Bracket (years)	No. of elderly	Average No. of falls
68	25	1.36
69	25	1.60
70	10	1.90

In relation to the concern about suffering new falls (Table 2), most of the subjects reported concern, even if slight or moderate.

DISCUSSION

The report of falls from the participants in this study shows agreement with King & Tinetti²² and also with Aggarwal et al²³ which refer to a percentage of about 30% of occurrence of this type of accident, at least once a year, in the elderly of western countries and, that half have already suffered two or more falls (the falling episode reaches 30-60% of the elderly over 65 years old, with 30 to 70% of the falls occurring during normal walking).

In relation to the concern with falling again, this research has shown that 60% of the elderly females investigated expressed some level of concern. This finding corroborates what Legters,²⁴ verified in a study with

elderly individuals (76.3 ± 6.6 years), making it evident that about 20 to 60% of them have already felt the fear of falling, with the highest frequency reported by sedentary females. However, for those who have already suffered falls, the fear of falling varied from 29 to 92%.

The fear of falling affects from 12 to 65% of the elderly above the age of 60 who live independently in communities and who have no history of falls. However, for those who have already suffered falls, the fear of falling varied from 29 to 92%.²⁴

A study made with 147 elderly people verified that 133 of them (90.48%) referred to their fear of falling in at least one of the 16 tasks proposed by the "Falls Efficacy Scale International", with the following tasks scoring more prominently: walking on a slippery sur-

Table 2 - Percentage of elderly females concerned with suffering new falls.

Number of subjects	Feeling expressed			
	Not concerned	Slightly concerned	Moderately concerned	Very concerned
60	40%	30%	25%	5.0%

Table 3 - Feeling of concern with falling during the performance of the daily life activities (DLAs).

Daily Life Activities	Sentimento manifestado							
	Not concerned		Slightly concerned		Moderately concerned		Very concerned	
	AF	RF	AF	RF	AF	RF	AF	RF
Cleaning the house	35	58.33	15	25	10	16.66	0	-
Dressing or undressing	50	83.33	10	16.66	0	-	0	-
Preparing meals	37	61.66	13	21.66	8	13.33	2	3.33
Taking a shower	15	25	27	45	15	25	3	5
Answering the phone before it stops ringing	33	55	20	33.33	7	11.66	0	-
Answering the phone before it stops ringing	33	55	20	33.33	7	11.66	0	-

Legend: AF: absolute frequency (n); RF: relative frequency (5)

face; walking on an irregular surface; climbing up and down stairs; going up and down steep streets; and bathing.²⁵

Another research made with 26 elderly people submitted to the same questionnaire as in this study indicated great concern with new falls in house-keeping activities (73.1%) and moderate concern with basic activities such as dressing or undressing and bathing (46.1%). In relation to physical activities, most people expressed great concern while performing activities such as: sitting down or getting up from a chair (73%); going up and down stairs (61.5%); walking on an irregular surface (96.1%), and walking down a ramp (88.4%). For other social activities, there was great concern about most of the items evaluated: 80.7% reported great concern about walking in crowded places; 61.5% reported concern about walking in the neighborhood, and 57.7% reported concern about going shopping.²⁶

The fear of falling leads to negative repercussions on the physical and functional well-being of the elderly, to their independence and in their capacity to perform the daily activities of life, either social or physical, which explains the sedentary lifestyle of this population. The sedentary lifestyle leads to a reduction of muscle strength and of balance, which can create abnormalities in the gait and also increase the risk of falls, as well as the fear of them occurring.²⁷⁻³¹

CONCLUSION

Based on the results of this study it can be concluded that most elderly females investigated have shown some level of concern about suffering new falls, especially during the execution of activities that demand greater muscular strength and balance. In the same way, tasks that make them leave their familiar environment increase their insecurity and fear of falling, for they certainly understand that a fall could mean disability, limitations, and even death.

It is inferred that this fear of falling happens due to the low dynamic gait index of these subjects, characterized as predictive of falls, which implies the presence of abnormalities in that biomechanical function.

Abnormalities in the gait make the elderly even more prone to low self-confidence, and can aggressively compromise his/her functional capacity over the years and favor sedentary lifestyle as the lifestyle of this population. When this situation is established it can diminish even more the mobility of the individual, disadvantaging his/her life, whether physically, mentally or socially.

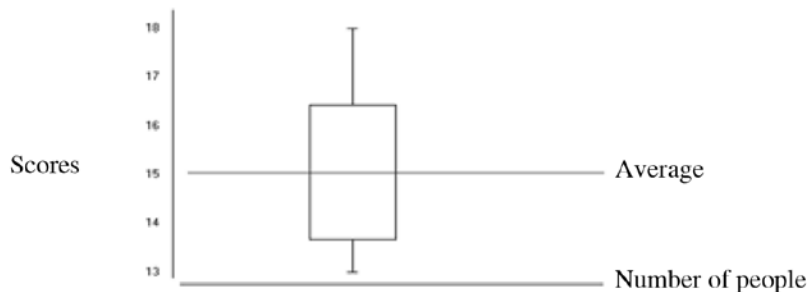


Figure 1 - Dynamic Gait Index average.

Table 4 - Feeling of concern about falling during the performance of physical activities.

Physical Activities	Feeling expressed							
	Not concerned		Slightly concerned		Moderately concerned		Very concerned	
	AF	RF	AF	RF	AF	RF	AF	RF
Sitting or rising from a chair	38	63.33	12	20	5	8.33	5	8.33
Climbing up or down stairs	15	25	20	33.33	20	33.33	5	8.33
Reaching for objects above the head	29	48.33	18	30	13	21.66	0	-
Walking on slippery surfaces	7	11.66	23	38.33	27	45	3	5
Walking on irregular surfaces	3	5	22	36.66	25	41.66	10	16.66

Legend: AF: absolute frequency (n); RF: relative frequency (5)

Table 5 - Feelings of concern about falling during the performance of social activities.

Social Activities	Feeling expressed							
	Not concerned		Slightly concerned		Moderately concerned		Very concerned	
	AF	RF	AF	RF	AF	RF	AF	RF
Going Shopping	30	50	23	38.33	7	11.66	0	-
Walking around the neighborhood	25	41.66	21	35	14	23.33	0	-
Visiting a friend or relative	25	41.66	18	30	17	28.33	0	-
Walking through crowds	8	13.33	15	25	30	50	7	11.66
Going to social events	11	18.33	13	21.66	30	50	6	10

Legend: AF: absolute frequency (n); RF: relative frequency (5)

Thus, it is understood as necessary to recommend exercises to the elderly to maintain or rehabilitate their physical capabilities and their motor abilities which are responsible for their gait, especially muscular strength and balance. Therefore, it is evident how valuable the action of physical education and physiotherapy professionals is for the physical, psychological, and social health of the elderly population.

REFERENCES

- Vandervoort AA. Alterações Biológicas e Fisiológicas. In: Pickles B, Compton A, Cott C, Simpson J, Vandervoort A. Fisioterapia na terceira idade. São Paulo: Santos; 2000. p. 67-79.
- Chandler JM. Equilíbrio e quedas no idoso: questões sobre a avaliação e o tratamento. In: Guccione AA. Fisioterapia geriátrica. 2 ed. Rio de Janeiro: Guanabara; 2002. p. 265-6.
- Faria JC, Machala CC, Dias RC, Dias JMD. Importância do treinamento de força na reabilitação da função muscular, equilíbrio e mobilidade de idosos. *Acta Fisiatr.* 2003;10(3):133-37.
- Ruwer SL, Rossi AG, Simon LF. Equilíbrio no idoso. *Rev Bras Otorrinolaringol.* 2005;71(3):298-303.
- Benedetti TRB, Mazo GZ, Gobbi S, Amorim M, Gobbi LTB, Ferreira L, et al. Valores normativos de aptidão funcional em mulheres de 70 a 79 anos. *Rev Bras Cineantropom Desempenho Hum.* 2007;9(1):28-36.
- Fabrizio SCC, Rodrigues RAP. Percepção de idosos sobre alterações das atividades da vida diária após acidentes por queda. *Rev Enferm UERJ.* 2006;14(4):531-7.
- Wolf SL, Barnhart HX, Kutner NG, McNeely E, Coogler C, Xu T. Reducing frailty and falls in older persons: an investigation of Tai Chi and computerized balance training. Atlanta FICSIT Group. *Frailty and Injuries: Cooperative Studies of Intervention Techniques.* *J Am Geriatr Soc.* 1996;44(5):489-97.
- Campbell AJ, Reinken J, Allan BC, Martinez GS. Falls in old age: a study of frequency and related clinical factors. *Age and Ageing.* 1981;10(4):264-70.
- Nevitt MC, Cummings SR, Kidd S, Black D. Risk factors for recurrent non-syncopal falls. A prospective study. *JAMA.* 1989;261(18):2663-8.
- Shumway-Cook A, Woollacott MH. Controle motor: teoria e aplicações práticas. 2 ed. São Paulo: Manole; 2003.
- Carr J, Sheperd RB. Reabilitação neurológica: otimizando o desempenho motor. São Paulo: Manole; 2008.
- Delumeau J. História do medo no acidente 1300-1800: uma cidade sitiada. Curitiba: Companhia de Bolso; 1989.
- Rocha FL, Cunha UGV. Aspectos psicológicos e psiquiátricos de quedas do idoso. In: Cançado FAX. Noções práticas de geriatria. Belo Horizonte: Health; 1994.
- Pereira SRM, Buksman S, Perrocini M, Py L, Barreto KML, Leite VMM. Queda em idosos. *Bras Geriatr Gerontol.* [periódicos na Internet]. 2001 [citado 2001 Jun 16]. Disponível em: http://www.amb.org.br/projeto_diretrizes/100_diretrizes/quedasesem.pdf
- Stufflebeam DL. Overview of the joint committee's project on evaluation standards. Joint session of the American Educational Research Association and the National Council on Measurement in Education. New York: JCSEE; 1977.
- Camargos FFO. Adaptação transcultural e avaliação das propriedades psicométricas de falls efficacy scale-internacional: um instrumento para avaliar medo de cair em idosos [Dissertação]. Belo Horizonte: Universidade Federal de Minas Gerais; 2007.
- Bandura A. Self-efficacy mechanism in human agency. *Am Psychol.* 1982;37(2): 122-47.
- Shumway-Cook A, Gruber W, Baldwin M, Liao S. The effect of multidimensional exercises on balance, mobility, and fall risk in community-dwelling older adults. *Phys Ther.* 1997;77(1):46-57.
- Castro SM. Versão brasileira do Dynamic Gait Index: adaptação cultural e estudo de confiabilidade [Dissertação]. São Paulo; Universidade Bandeirante de São Paulo; 2005.
- Wrisley DM, Walker ML, Echternach JL, Strasnick B. Reliability of the dynamic gait index in people with vestibular disorders. *Arch Phys Med Rehabil.* 2003; 84(10):1528-33.
- Costa Neto PLO. Estatística. São Paulo: Edgard Blucher; 1992.
- King MB, Tinetti ME. Falls in community-dwelling older persons. *J Am Geriatr Soc.* 1995;43(10):1146-54.
- Aggarwal NT, Bennett DA, Bienias JL, Mendes de Leon CF, Morris MC, Evans DA. The prevalence of dizziness and its association with functional disability in a biracial community population. *J Gerontol A Biol Sci Med Sci.* 2000;55(5):M288-92.
- Legters K. Fear of falling. *Phys Ther.* 2002;82(3):264-72.
- Lopes KT. Prevalência do medo de cair em uma população de idosos da comunidade e sua correlação com mobilidade, equilíbrio dinâmico, risco e histórico de quedas. *Rev Bras Fisioter.* 2009;13(3):223-9.
- Freitas MAV, Scheicher ME. Preocupação de idosos em relação a quedas. *Rev Bras Geriatr Gerontol.* 2008;11(1):57-64.
- Scheffer AC, Shuurmans MJ, Van Dijk N, Van der Hoof T, Rooij SE. Fear of falling: measurement strategy, prevalence, risk factors and consequences among older persons. *Age and Ageing.* 2008;37(1):19-24.
- Fletcher PC, Hirdes JP. Restriction in activity associated with fear of falling among community-based seniors using home care services. *Age Ageing.* 2004;33(3):273-9.
- Delbaere K, Crombez G, Van Den Noortgate N, Willemts T, Cambier D. The risk of being fearful or fearless of falls in older people: an empirical validation. *Disabil Rehabil.* 2006;28(12):751-6.
- Martin FC, Hart D, Spector T, Doyle DV, Harari D. Fear of falling limiting activity in young-old women is associated with reduced functional mobility rather than psychological factors. *Age Ageing.* 2005;34(3):281-7.
- Clague JE, Petrie PJ, Horan MA. Hypocapnia and its relation to fear of falling. *Arch Phys Med Rehabil.* 2000;81(11):1485-8.