IMPACT OF A FALL IN THE ELDERLY: AN ANALYSIS OF THE RISK FACTORS

REPERCUSSÃO DE QUEDAS EM IDOSOS: ANÁLISE DOS FATORES DE RISCO

REPERCUSIÓN DE CAÍDAS EN ANCIANOS: ANÁLISIS DE LOS FACTORES DE RIESGO

Deivson Wendell da Costa Lima[1], Alyne Mara Maia Cruz[2], Fabíola Maria Pitombeira de Morais[3], Arthur Dyego de Morais Torres[4], Maria Célia de Freitas[5]

One aimed to identify the risk factors associated to falls in the elderly, which reflect on their quality of life. This is a descriptive, cross-sectional study. A questionnaire was used to collect data from older adults of an active living group from Russas-CE during the period from August to December 2011. The data were inserted in electronic spreadsheets, analyzed by the descriptive statistics and submitted to odds ratio and chi-square tests with significance level $p<0.05$. The results indicate a high prevalence of falls in the elderly, especially women (OR:14.636; CI- 2.82-75.954). The intrinsic significant factors were hearing problems ($p=0,02$) and foot problems ($p=0,01$). The extrinsic factors were steps in the door (17%), resulting in fractures of the upper limb (69%), morbidity (41%) and psychological complaints (70%). Therefore, it is necessary the development of preventive and rehabilitation actions, ensuring a better quality of life for the elderly.
Descriptors: Elderly; Accidental Falls; Quality of Life; Risk Factors.

Objetivou-se identificar os fatores de risco relacionados às quedas em idosos, que repercutem em sua qualidade de vida. Estudo descritivo, transversal. Foi usado formulário para coletar os dados de idosos do grupo de convivência de Russas-CE, no período de agosto a dezembro de 2011. Os dados foram inseridos em planilhas eletrônicas, analisados pela estatística descritiva e submetidos aos testes de *odds ratio* e qui-quadrado com nível de significância $p<0,05$. Os resultados apontam alta prevalência de quedas em idosos, principalmente do sexo feminino (OR:14,636; IC- 2,82-75,954). Os fatores intrínsecos significantes foram os problemas de audição ($p=0,02$) e problemas nos pés ($p=0,01$). Os fatores extrínsecos relevantes foram degraus na porta (17%), tendo como consequência fraturas no membro superior (69%), morbidades (41%) e queixas psíquicas (70%). Diante disso, é necessário o desenvolvimento de ações de prevenção e de reabilitação, que garantam uma melhor qualidade de vida aos idosos.
Descritores: Idosos; Acidentes por Quedas; Qualidade de Vida; Fatores de Risco.

El Objetivo fue identificar los factores de riesgo relacionados con las caídas en ancianos, que repercuten en su calidad de vida. Estudio descriptivo, transversal. Se utilizó cuestionario para recopilar datos de ancianos del grupo de convivencia Russas-CE, Brasil, de agosto a diciembre 2011. Los datos se introdujeron en planillas electrónicas, analizados por la estadística descriptiva y sometidos a las pruebas de *odds ratio* y chi-cuadrado, con nivel de significación $p <0,05$. Los resultados señalaron alta prevalencia de caídas en ancianos, especialmente mujeres (OR: 14,636; IC- 2,82-75,954). Los factores intrínsecos fueron los problemas de audición y ($p=0,02$) y en los pies ($p=0,01$). Los factores extrínsecos significativos fueron escalones en la puerta (17%), lo que resulta en fracturas en miembro superior (69%), morbilidades (41%) y quejas psicológicas (70%). Por lo tanto, es necesario desarrollar programas de prevención y rehabilitación para garantizar mejor calidad de vida a ancianos.
Descriptores: Ancianos; Accidentes por Caídas; Calidad de Vida; Factores de Riesgo.

[1]Nurse, Master's degree, Nursing Course Professor, Rio Grande do Norte State University (Universidade do Estado do Rio Grande do Norte) and Potiguar University (Universidade Potiguar). Mossoró, RN, Brazil. E-mail: deivsonwendell@hotmail.com
[2]Nurse, Graduated from Potiguar University (Universidade Potiguar). Russas, CE, Brazil. E-mail: alynemara_mc@hotmail.com
[3]Nurse. Graduated from Potiguar University (Universidade Potiguar). Russas, CE, Brazil. E-mail: bia_8288@hotmail.com
[4]Nurse, Nursing Course Professor, Potiguar University (Universidade Potiguar). Natal, RN, Brazil. E-mail: arthur05@yahoo.com. Br
[5]Nurse, Post-PhD, Professor of the Post-graduation Program in Clinical Care Nursing and Health, Ceará State University. Fortaleza (Universidade Estadual do Ceará – UECE). CE, Brazil. E-mail: celfrei@hotmail.com

Corresponding Author: Deivson Wendell da Costa Lima
Address: Universidade do Estado do Rio Grande do Norte, Departamento de Enfermagem. Rua Dionísio Filgueira, 383 - Centro, Mossoró, RN, Brazil.CEP: 59610 090. E-mail: deivsonwendell@hotmail.com

Lima DWC, Cruz AMM, Morais FMP, Torres ADM, Freitas MC

INTRODUCTION

With the increasing age there is a bigger susceptibility of the elderly to fall, usually from some degree of impairment in activities of daily living, high prevalence of present medical comorbidities, living without the company of other people and having cognitive and motor impairing movement.

About 30% of 65-year-old people and older fall at least once a year. Among these who fall, 40% are between 80 and 85 years old[1]. Such statement instigates the following questions: Why are the elderly more likely to fall? What is the prevalence and risk factors which lead to this event occurrence that impacts on theses individuals' life quality?

It is assumed the changes that occur in the aging process and environmental factors contribute significantly to the increase of falls in the elderly, thus bringing multiple consequences on their quality of life. Thus, it is essential in the care with seniors should understand the theme of the aging process well, identifying their needs, so that it can maintain its functionality and prevent them from falls[2].

The elderly suffer serious consequences from falls, such as fractures, immobility, restricted activity, increased risk of institutionalization, mental suffering as the fear of suffering further falls and also the risk of death. In addition, there have been increased costs to the health care, social damage related to the family and increased hospitalizations[3].

Seniors' falls can become a public health problem that involves family members and health professionals. In relation to nursing, this study aims to contribute to the establishment of actions aimed at preventing falls in older people, given that it represents a risk for falls nursing diagnosis, ie, a situation that requires nursing interventions.

This research aimed to identify risk factors related to falls in the elderly, which impact on their quality of life. On the other hand, the specific objectives sought to investigate the frequency and consequences of falls, comparing the main intrinsic and extrinsic risk factors, involving the quality of life of elderly who fall and the ones who don't fall.

METHOD

This is a descriptive transversal study. It was held at the Elders Living Group in Russas-CE, Brazil, socially known as Grandpa's Club, formed by 200 patients of both sexes aged more than sixty years old, who meet weekly to participate in educational, religious and recreational activities.

From this group 50 individuals were selected, 25 men and 25 women. The inclusion criteria were people aged sixty and over, male or female, group participants for at least one year. Older people with communication difficulties and those with more than three absences in group meetings were excluded. During meetings with the elders, the importance and objectives of the research were explained for them.

Subsequently, an evaluation test of cognitive ability was applied with the elderly. They were asked to draw up a picture of a clock and those who managed to do the drawing with the clock hands indicating the hours were selected to respond to the form consisting of 21 objective questions[4]. The collection period was from August to December 2011.

The data were typed into a spreadsheet and after checking they were transferred to the software SPSS 17.0 (*Statistical Package for the Social Sciences*.) Descriptive statistics (frequency and percentage) was used for analysis of the data, being encoded for testing accomplishment.

Wherever possible, several variables were compared obtaining *odds ratio* (OR), confidence intervals of 95%, and significance was determined by chi-square (X^2) And Fisher's exact. The latter, in turn, was used whenever there are often expected values

below 5. A logistic regression model was developed to study simultaneously, the multiple effects that may be involved in falls among the elderly. The significance level adopted was p <0.05.

The study was approved by the Ethics and Research Committee, protocol 054/2011. Seniors signed the consent and at all times, they were treated to the principles of Resolution of the National Health Council 196/96.

RESULTS

In table 1, there are data regarding age, sex, presence or absence of falls, number of falls, vision, hearing and foot problems, difficulty in walking, medications use, medication distribution commonly used by the elderly. It was noticed that the age group highlighted was 60-70 years (56.0%), whichever is the presence of falls (68.0%) and as physiological problems, changes in vision (82.0%).

Table 1 - Intrinsic risk factors for the occurrence of falls in the elderly. Russas, CE, Brazil, in 2011

Characteristics	n	%
Age group (n = 50)		
60 to 70	28	56.0
71 to 80	12	24.0
81 to 90	9	18.0
> Than 90	1	2.0
Sex (n = 50)		
Male	25	50.0
Female	25	50.0
Fall of presence or absence (n = 50)		
Yes	34	68.0
No	16	32.0
Number of falls (n = 34)		
Once	9	26.0
Twice	11	32.0
Three times	6	18.0
Above three	8	24.0
Vision problems (n = 50)		
Yes	41	82.0
No	9	18.0
Hearing problems (n = 50)		
Yes	21	42.0
No	29	58.0
Foot problems (n = 50)		
No	33	59.0
Bunion	10	18.0
Wounds	3	5.0
Ingrown toenails	3	5.0
Toes deformity	2	4.0
Other	5	9.0
Limited mobility (n = 50)		
Yes	20	40.0
No	30	60.0
Use of medications routinely (n = 50)		
Yes	41	82.0
No	9	18.0
Drugs commonly used by seniors (n = 50)		
Do not remember	1	2.0
Antihypertensive	33	47.0
Antihypocalcemic	11	16.0
Antilipemic	9	13.0
Hypoglycemic	8	12.0
Antidepressant	2	3.0
Other	3	4.0

Another intrinsic factor was very common in the elderly drug use (82%) caused by physiological changes of the aging process and potential vulnerabilities resulting from illnesses. According to respondents, the most frequently used medications were antihypertensive (47%).

Table 2 shows the relationship between elderly who fall and don't fall, with risk factors predispose to falls.

Table 2 - Numerical and percentage distribution of the elderly, according to the triggering factors of falls. Russas, CE, Brazil, in 2011

Variables	Falls in the elderly						P
	Present		Absent		Total		
	n	%	n	%	n	%	
Age							
60-70	21	75.0	7	25.0	28	100.0	
71-90	13	59.1	9	40.9	22	100.0	0.23
Sex							
Male	11	44.0	14	56.0	25	100.0	
Female	23	92.0	2	8.0	25	100.0	<0.01*
Vision Problems							
Yes	28	68.3	13	31.7	41	100.0	
No	6	66.7	3	33.3	9	100.0	0.92
Hearing problems							
Yes	18	85.7	3	14.3	21	100.0	
No	16	55.2	13	44.8	29	100.0	0.02*
Mobility problems							
Yes	16	84.2	3	15.8	19	100.0	
No	18	58.1	13	41.9	31	100.0	0.05
Foot problems							
Yes	16	88.9	2	11.1	18	100.0	
No	18	56.3	14	43.8	32	100.0	0.01*
Routine medications							
Use	27	67.5	13	32.5	40	100.0	
Do not use	7	70.0	3	30.0	10	100.0	0.99

* Means statistical difference at p <0.05

The variable sex had an expressive influence in the occurrence of falls, which in turn, concentrated in women (0.01). Hearing problems (0.02) and foot problems (0.01) influenced the rate of falls in the elderly.

According to the test odds ratio in Table 3 it is possible to analyze which variables offer more risk to the event of falling among elderly people. It was found the notorious influence of gender on the risk of falls in the elderly. This, in turn, has shown that females have fourteen times more chances of falling (OR 14,636, CI-2.82-75.954).

Table 3 - Distribution of the elderly victims of falls with respective values of absolute and relative frequency. Russas, CE, Brazil, 2011

Variables	n	%	OR	IC - 95%	P
Age					
60 to 70	21	61.8	2.1	0.6 – 6.9	0.23
71 to 90	13	38.2			
Sex					
Female	23	67.6	14.6	2.8 – 75.9	<0.01
Male	11	32.4			
Vision problems					
Yes	28	82.4	1.1	0.2 – 4.9	0.92
No	6	17.6			
Hearing problems					
Yes	18	52.9	4.8	1.2 – 20.3	0.022
No	16	47.1			
Problems in locomotion					
Yes	16	47.1	3.9	0.1 – 16.1	0.05
No	18	52.9			
Foot problems					
Yes	16	47.1	6.2	1.2 – 31.7	0.01
No	18	52.9			
Use of drugs					
Yes	27	79.4	0.9	0.2 – 4.0	0.88
No	7	20.6			

OR- Odds Ratio; IC- 95 – Confidence Interval of 95%

Table 4 - Numerical and percentage distribution of extrinsic risk factors for the occurrence of falls in the elderly. Russas, CE, Brazil, 2011

Characteristics of the external factors	n	%
Extrinsic risks for falls (n=50)		
Steps in the door	27	17.0
Inappropriate clothes and shoes	25	16.0
Slippery floor	24	16.0
Bathroom with slippery floor	21	14.0
Loose or folded carpet	17	10.0
Inadequate sidewalks	14	8.0
Lack of handrails in hallways and bathrooms	11	7.0
Objects stored in high places	7	4.0
Too high or too low bed	7	4.0
Others	6	4.0
Fractured bones after falls (n=34)		
Yes	13	38.0
No	21	62.0
Consequences of falls (n=34)		
Morbidities	21	41.0
None	9	18.0
Consumption of social and health services	9	17.0
Functional deterioration	6	12.0
Hospitalization	6	12.0
Have psychic complaints (n=34)		
Impaired	24	70.0
Not impaired	10	30.0

According to the data in Table 4, the elderly presented as the main risk factor steps in the door (17%). Other factors were reported by respondents, for example, stairs without a handrail, inappropriate lighting, too high or too low chairs and obstacles inside their homes.

Among the elderly who fell, 38% had some fractures due to the occurrence of the fall. Out of the fractures that happened, the ones which occurred in greater proportion were in the upper limbs (69%). Besides fractures, a representative piece of data of consequences due to falls among the elderly who fell was comorbidities (41%) and psychological complaints (70%). They reported that these psychic complaints were related to fear of falling again, of not being able to carry out any activities performed before daily, changes of address and family rearrangement.

DISCUSSION

Falls are the subject of studies by several experts in Brazil and worldwide. They are also a major cause of problems related to disabilities, especially in the elderly. They need to be studied more closely for the purpose of identifying preventive strategies without compromising the functional capacity of older people who are 60 years

old or older. The data showed the occurrence of greater decline in women (92%). The frequency of decreased outdoor activity, prevalence of disease and heavy use of medications caused greater commitment to them[5].

Regarding the prevalence of falls, one found in Table 1 of this study, a percentage of 68% of the elderly, much higher than in another study that showed 34.8%[6]. Reviewing these data shows that most seniors have fallen in recent years and, as a person ages their susceptibility to the occurrence of this event increases considerably.

Population-based studies with large numbers of elderly estimate a prevalence of 28 to 35% of falls in people aged over 60 years old, 35% in those over 70 years old. A population-based cross-sectional study on elderly people over 65 years old living in areas covered by a basic health unit in 41 municipalities with over 100 thousand inhabitants of seven states of Brazil, verified a prevalence of falls of 34,8% among men and 40.1 among women[6]. The female gender is more susceptible to falls due to greater exposure to risk factors, prevalence of osteoporosis, bone loss, longer life expectancy than men, as well as anthropometric influences and genetic factors related to sex[7] .

Prospective studies indicate that between 30% and 60% of older people living in community, suffer falls every year with about half of them experiencing multiple falls. Falls are an important impact on the functional capacity of the elderly. Among the most commonly cited consequences one mentioned fractures (24.3%), fear of falling (88.5%), the abandonment of activities (26.9%), change of habits (23.1%) and immobilization (19%)[6-8].

In recent studies about falls in the elderly conducted in the states of Piauí and Rio Grande do Sul, 102 and 267 old people were interviewed, respectively. They were predominantly women, with an average age between 60 and 70 years old, wore large number of medications, and had comorbidities associated with prevalence of visual impairment[8-9]. The same reasons

were also identified in the elderly population surveyed, an event that requires attention from healthcare professionals, especially nurses, in the pursuit of educational interventions to prevent falls and maintain the functional capacity of the elderly.

A survey showed that out of the 32.5% of old patients who suffered falls, 42.3% had only one fall, 22.5% two falls and 35.2% had three or more falls. Another study found that among 32 older people who have fallen in the year, 10.3% had only one fall, 7.7% suffered two falls and 14.1% had three or more falls[9-10].

Thus, the fall event and its causes is important in the care of the elderly, because with the aging process there are vision changes, which constitute an important risk factor, especially restriction of the field of vision, increased sensitivity to light, poor depth perception and gaze instability. The aforementioned factors plus the loss of balance influence the postural control mechanism, making the elderly more vulnerable to falls.

There are records of studies that show that 82% of older people are victims of falls due to visual changes, also hearing deficits in approximately 38% of the elderly studied, so visual and auditory changes result in significant damage to the autonomy of the elderly. Medication use is another risk factor for falls, especially when associated with noncommunicable chronic conditions, in the elderly. A Study revealed that 87 (91.6%) of respondents were taking medications for cardiovascular disease (67.81%), anxiolytics (18.39%), anti-inflammatory drugs (11.49%), anticonvulsants (10 , 34%), antidepressants (9.19%) and others (65.51%), which are laxatives, analgesics, antipsychotics and anti-diabetics[8].

Elders have changes in the feet which may happen due to the physiological aging or to disease processes that compromise the integrity of the nails, skin, nerves, vessels and bony structures, causing difficulty in walking[11].

Although changes in health are not unique to the older age group, they may affect the clinical conditions of the elderly, making them more sensitive to any imminent risk, especially falls.

It is difficult to separate the effects of the medications from those of the diseases for which the drugs were prescribed, but it is possible that the use of a medication is associated with a higher risk of falls. Some changes associated with aging alter the pharmacokinetics and pharmacodynamics characteristics of the medication used. Out of these, changes in body fat with a proportional increase of over 35% between the ages of 20-70 years old; changes in the renal metabolism and slight decrease in phase I of the hepatic metabolism and changes in the composition of transportation plasma proteins are important factors in the increase of the risk of medications in the elderly[12].

Regarding the extrinsic factors, one includes the impact area during the fall, the presence of protective responses that interrupt the fall, and bone mass. The falls with direct impact on the wrist or pelvis result more easily in fractures. Those who fall from less higher places than the body itself or are able to hold on to an object, to lessen the impact energy, are less prone to fractures[13].

People with a low body mass index, less than $19kg/m^2$, have more risk of femoral fracture after a fall. A decrease in the standard deviation in the bone mineral density represents a relative risk of fracture of 2.7. In a prospective study that lasted 14 years, men and women shared the same group of risk factors for hip fractures, ie, low bone mineral density, postural instability and/or quadriceps weakness. The combination of these factors accounted for 57% and 37% of hip fractures in women and men, respectively[14-15].

Elderly people who have suffered some type of fall are frightened and afraid to walk, fearing other episodes. This event brings severe consequences for them, as they interfere with the lifestyle of the elderly,

such as self-restriction of activities of daily living and the depreciation of the self[16].

After a fall, up to a half of the elderly with who are very old, even without injuries, may be unable to stand without assistance. These seniors are more prone to dehydration, respiratory failure and infection and they but can also develop skin lesions and become more fragile than those that stand up without help. Besides these conditions of illnesses, the can be loss of independence and institutionalization by the family, justified by the lack of ability to take care. Therefore, falls compromise seniors' quality of life, since other illnesses happen by juxtaposition. It was suggested that professionals identify both extrinsic and intrinsic factors, in the perspective of developing preventive actions for the occurrence of falls. These falls influence directly the quality of life of seniors due to the degree of dependence; the loss of autonomy; physical, functional and psychological limitations. A study reveals that the experience of falling was frequent and influenced negatively the quality of life of the elderly[17].

It is noteworthy that one of the factors associated with aging, which may predispose the elderly to falls is the tendency of slowness in the mechanisms of central integration, important for postural reflexes. Aging seems to reduce the processing power and the ability to divide attention. If the concentration is distracted to another cognitive task, there is a slower recovery from a postural perturbation[12].

CONCLUSION

The results obtained indicate agreement with what has been seen in the literature, as the occurrence of falls is common among the elderly, especially in females, due to the lower functional status, higher morbidity and presence of osteoporosis, as well as greater loss of bone mass after 40 years of age.

It was also perceived that the intrinsic and extrinsic risk factors are prevalent to the occurrence and

recurrence of falls in the elderly. As a result of this event, the subjects revealed that fractures happen in greater proportion in the upper limbs, morbidities and psychological complaints.

This research confirms the Health Pact establishing as a priority the elderly's health, which highlights the falls and the need to train professionals to meet this demand. Among these professionals, it is important to emphasize nurses, who should provide humane care for the elderly, respecting their uniqueness, attending their physical, psychological and also environmental limitations.

The nurses who belong to the multidisciplinary team develop integrated and specialized actions, with the aim of raising awareness among seniors and their families/caregivers about the physiological and morphological alterations of aging in order not to expose them to environmental risk factors, as well as measures to promote health and prevention of illnesses.

Still, preventive, care and rehabilitation interventions are necessary, aimed at the restoration and maintenance of the life quality among those who fell and those who did not fall.

COLLABORATIONS

Cruz AMM and Morais FMP contributed to production data. Lima DWC, Torres ADM and Freitas MC contributed to the data interpretation, drafting of the article and final approval of the version to be published.

REFERENCES

1. Cruz DT, Ribeiro LC, Vieira MT, Teixeira BMT, Basto RR, Leite ICG. Prevalence of falls and associated factors in elderly individuals. Rev Saúde Pública 2012; 46(1):138-46.

2. Santos SSC, Vidal DAS, Gautério DP, Silva ME, Rosales RA, et al. Alterações estruturais numa instituição de longa permanência para idosos visando prevenção de quedas. Rev Rene. 2011; 12(4):790-7.

3. Silva TM, Nakatani AYK, Souza ACS, Lima MCS. A vulnerabilidade do idoso para as quedas: análise dos incidentes críticos. Rev Eletr Enf. [Internet] 2007 [citado 2011 jul 05]; 9(1):64-78. Disponível em: http://www.fen.ufg.br/revista/v9/n1/v9n1a05.htm

4. Martinelli JE, Aprahamian I. O teste do desenho do relógio: revisão crítica de seu valor na triagem de demências iniciais em idosos. In: Neri AL, Yassuda MS, (Org.) Velhice bem-sucedida: aspectos afetivos e cognitivos. Campinas: Papirus. 2004. p.185-203.

5. Albuquerque NLS, Sisnando MJA, Sampaio Filho SPC, Morais HCC, Lopes MVO, Araújo TL. Risk factors for falls in hospitalized patients with ischemic cardiopathy. Rev Rene. 2013; 14(1):158-68.

6. Barros TB, Maio, ER, Pagliuca LMF. Facilidades e dificuldades na assistência ao idoso na estratégia de saúde da família. Rev Rene 2011; 12(4):732-41.

7. Ferreira DCO, Yoshitome AY. Prevalência de quedas em idosos e fatores associados. Rev Bras Enferm. 2010; 63(6):991-7.

8. Luz WAM, Marques MB, Moura NS, Souza EC, Machado ALG. Análise dos fatores de risco associados a quedas de idosos no domicílio. Rev Port Divulg. 2013; 3(31):6-17.

9. Almeida ST, Soldera CLC, Carli GA, Gomes I, Resende TL. Análise de fatores extrínsecos e intrínsecos que predispõem a quedas em idosos. Rev Assoc Med Bras. 2012; 58(4):427-433.

10. Prata HL, Junior EDA, Paula FL, Ferreira SM. Envelhecimento, depressão e quedas: um estudo com os participantes do Projeto Prev-Quedas. Fisioter Mov. 2011; 24(3):437-43.

11. Ferrari SC, Santos FC, Araújo MSL, Cendoroglo MS, Trevisani VFM. Patologias no pé do idoso. Rev Bras Ciênc Envelhec Hum. 2009; 6(1):106-18.

12. Mesquita GV, Lima MALTA, Santos AMR, Alves ELM, Brito JNPO, Martins MCC. Morbimortalidade em idosos por fratura proximal do fêmur. Texto Contexto Enferm. 2009; 18(1):67-73.

13. Paixão Junior CM, Heckman MF. Distúrbios da postura, marcha e quedas. In. Py L, Freitas EV, Cançado FAX, Gorzoni ML, Doll J. Tratado de Geriatria e Gerontologia. 3ª ed. Rio de Janeiro: Guanabara Koogan; 2011. p.1062-74.

14. Prudêncio FA, Nogueira LT. Knowledge of elderly women about the use of psychotropics. Rev Rene. 2013; 14(1):130-8.

15. Nascimento FA, Vareschi AP, Alfieri FM. Prevalência de quedas, fatores associados e mobilidade funcional em idosos institucionalizados. Arq Catarin Med. 2008; 37(2):7-12.

16. Gai J, Gomes L, Cárdenas CJ. Ptofobia- O medo de cair em pessoas idosas. Acta Med Port. 2008; 22(1):83-8.

17. Ribeiro AP, Souza ER, Atie S, Souza AC, Schilithz AO. A influência das quedas na qualidade de vida de idosos. Ciênc Saúde Coletiva. 2008; 13(4):1265-73.