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Fall Risk Among Elderly Assisted in an Emergency Hospital

ORIGINAL

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Abstract

Objective: To analyze the risk of falling among the elderly assisted in an emergency hospital.

Method: Cross-sectional observational study conducted in the emergency department of a reference hospital in emergency, whose population was patients aged 60 or older, attended due to fall. The sample of 272 elderly was chosen through non-probability intentional sampling.

Result: Among study participants, the mean age was 74.4 years, ranging from 60 to 105 years. Most elderly were in the age group from 60 to 79 years and were females, most were married, illiterate, with monthly income of one to three minimum wages. There was a statistically significant association between high risk of falling, educational level and monthly income.

Conclusion: Results evidence the need to minimize the high prevalence of elderly people suffering injuries from falls and to prevent the loss of autonomy as a result of this type of accident.

Keywords
Elderly People; Fall Accident; Hospitalization.

Introduction

Currently, there has been significant changes in socioeconomic and health conditions of the population and, consequently, in its demographic structure. Thus, the population has undergone a transition

process and this situation has brought consequences both for society and for the health system, particularly in developing countries, which are striving to meet this population aging process [1].

In Brazil, the number of elderly people has grown at an accelerated rate when compared with the beginning of the twentieth century, when life expectancy reached the average of 33.5 years. It is also noteworthy that, according to data from the Brazilian Institute of Geography and Statistics (IBGE), the current numbers of this population group are quite high, especially in relation to the elderly over 80 years, considering that in the 1997-2009 period the elderly population between 60 and 69 years increased by 21.6%, while those with more than 80 increased by 47.8% [2].

In this sense, the consequences are very clear and worrying to Brazilians, since there has been a decrease of young people and a significant growth of the elderly, and the aging phenomenon is occurring faster than the scheduled by public health. Thus, the acceleration of this event has emphasized the creation of social programs to assist this population, making possible the monitoring of this public [3].

Aging causes numerous physiological changes in many body systems, including the skeletal and muscle system, which causes changes such as decreased muscle fibers, mass and muscle strength, and limits the physical and motor performance of individuals in their environment [4].

These changes that occur with advancing age interfere with the performance of daily activities and with functional capacity of older people, and favors the appearance of diseases and increases the risk of falls in this population. Thus, fall ends up being the most common accident that occurs among the elderly people, which results in decreased quality of life due to the limitations occurred after this event [5].

Fall is defined as an unintentional displacement of the body to a lower level than the starting position with inability of correction in a timely manner, determined by multifactorial circumstances that impair stability [6].

Worldwide, approximately 28% to 35% of people over 65 years of age suffer falls every year, and this proportion increases by 32% to 42% among people over 70 years. The incidence of falls in the elderly population varies between different countries. In China, its incidence is from 6% to 31%; in Japan, 20%; and in the Americas the proportion of elderly people suffering falls varies from 21.6% in Barbados to 34% in Chile. Regarding mortality, falls account for 40% of all deaths related to injuries; in the United States its incidence is 36.8% per population of 100,000 [7].

In Brazil, approximately 29% of the elderly people have already fallen at least once a year and 13% have fallen recurrently so that this event has had an important impact on mortality of the elderly. According to preliminary data of the Computer Department of SUS (DATASUS), in 2008 there were 5,142 deaths of people aged 60 or more as a result of falls, ranking second place in mortality from external causes, corresponding to 25.3% [8].

Cross-sectional study conducted in Bahia that aimed to evaluate the risk of falls and associated factors in elderly living in long-term care facilities found that 62.9% of the elderly were victims of falls, and 50.0% had fallen only once [9].

Documentary research conducted in the Emergency Hospital of Teresina (HUT) noted that one of the most serious and frequent problems of the elderly was related to fractures, which were the major cause of hospitalization in that research and were fully associated to falls [10].

Due to the occurrence of this event, there are various instruments that assess the risk of falling. Among them, authors chose the Fall Risk Score, which was published by Downton in 1992 and validated in Portuguese; its sensitivity and specificity were also estimated [11].

In considering the aspects, the aim of this study was to analyze the risk of falls in elderly people assisted in an emergency hospital.

Methods

This is a cross-sectional research conducted in the emergency department of a reference hospital in emergency in the city of Teresina, Piaui, Brazil. Participants were seniors who met the following inclusion criteria: having fallen and been treated at the emergency room of the said hospital in the data collection period, being continuously accompanied by a caregiver if they did not have cognitive conditions or limitations caused by hearing, visual or speech problems that would prevent the application of the instrument.

The sample of 272 elderly people was chosen through a non-probability and intentional sampling, in which participants were interviewed as they were admitted to that service.

Data collection was conducted from January to March 2016, through an interview for filling a sociodemographic form of the elderly and application of Fall Risk Score scale, created by Downton in 1992 and subsequently validated in Portuguese (11). The instrument score ranges from zero to eleven, in which scores equal or superior to three indicate that the elderly has risk to fall. It was also used the Mini Mental State Examination (MMSE) developed by Folstein, Folstein and McHugh in 1975, validated and adapted for the Brazilian population almost 20 years later (12). To define the cognitive state, the following cutoffs were considered: for illiterates 13, for those with low (1 to 4 incomplete years) and middle educational level (4 to 8 incomplete years) 18, and for participants with high educational level (8 or more years) 26.

Researchers conducted descriptive and inferential statistical analysis. The relation between falls and the sociodemographic and clinical profile was made by using Chi-square test and Fisher's exact test, with the confidence level of 5% and risk estimates determined by logistic regression. The study followed the ethical principles advocated in Resolution 466/2012 of the National Health Council and was approved by the Ethics Committee of UNINOVAFAPI through the opinion number 1339339.

Results

The mean age of study participants was 74.4 years (SD = 9.9), median of 73 years, ranging from 60 to 105 years. Most participants were in the age group 60-79 years (67.6%), were females (66.6%), most were married (47.1%), 72.1% had no education, were from Teresina (69.9%), received one to three minimum wages (83.4%).

By establishing an association between high risk for falls and sociodemographic profile of the study participants aged **(Table 1)**, authors found a statistically significant association with schooling and monthly income of the elderly with p-values corresponding to 0.007 and 0.000, respectively.

Table 1. Fall risk in elderly assisted in an emergency hospital according to the Fall Risk Score (FRS), as for sociodemographic characteristics. Teresina, PI, Brazil, 2016.

Variables	Fall Risk (FRS)				Total		p
	High risk		Low risk				
	n	%	n	%	n	%	
Age group							
Younger elderly	124	45.6	60	22.0	184	67.6	0.093[a]
Older elderly	84	30.9	4	1.5	88	32.4	
Gender							
Male	65	23.9	26	9.5	91	33.4	0.227[a]
Female	143	52.7	38	13.9	181	66.6	
Marital status							
Single	25	9.2	11	4.0	36	13.2	0.098[b]
Married	92	33.9	36	13.2	128	47.1	
Divorced	12	4.4	3	1.1	15	5.5	
Widowed	79	29.0	14	5.2	93	34.2	

Variables	Fall Risk (FRS)				Total		p
	High risk		Low risk				
	n	%	n	%	n	%	
Schooling							
Illiterate	159	58.5	37	13.6	196	72.1	0.007[b]
Elementary School	39	14.3	17	6.3	56	20.6	
High School	8	2.9	8	2.9	16	5.8	
Higher Education	2	0.7	2	0.7	4	1.5	
Origin							
Teresina	143	52.6	47	17.3	190	69.9	0.867[b]
Another municipality	52	19.1	15	5.5	67	24.6	
Another state	13	4.8	2	0.7	15	5.5	
Monthly income							
Less than 1 MW	22	8.1	20	7.4	42	15.5	0.000[b]
1 to 3 MW	185	68.0	42	15.4	227	83.4	
4 to 6 MW	-	-	1	0.4	1	0.4	
7 to 9 MW	1	0.4	1	0.4	2	0.7	
Total	208	76.5	64	23.5	272	100	

MW: Minimum wage, Minimum wage 2016: R$ 880.00, [a]: Fisher's exact test, [b]: Chi-square test

Table 2. Distribution of elderly patients of an emergency hospital due to fall, as for gender, according to the risk of falling and the Mini Mental State Examination. Teresina, PI, Brazil, 2016.

Variables	Gender				Total		p*
	Male		Female				
	n	%	n	%	n	%	
Fall Risk (FRS)							
High risk	65	23.9	143	52.7	208	76.6	0.227
Low risk	26	9.5	38	13.9	64	23.4	
Cognitive status							
No deficit	58	21.3	93	34.2	151	55.5	0.028
With deficit	33	12.1	88	32.4	121	44.5	
Total	91	33.4	181	66.6	272	100	

*: Fisher's exact test

The falls were more common among women, and they also had a higher risk of falling, according to Fall Risk Score when compared to men. Regarding the assessment of cognitive status, according to the MMSE, it was possible to identify statistically significant association (p = 0.028) between the test result and the gender of the participants **(Table 2)**.

The logistic regression applied to the fall risk and the values of the MMSE showed that being male and being younger elderly has become a protective factor, as both had risk below one. However, being oriented was 2.05 times higher in males than in females, and being oriented in the age group that corresponds to the younger elderly was 4.0 times higher than the older elderly. **(Table 3)**.

Table 3. Logistic regression results of variables associated with falls in the elderly people. Teresina, 2016.

Variables	Categories	%	n	p-value[a]	Risk[b]
Risco de queda					
Age group	Younger elderly	184	67.6	0.093	0.545
	Older elderly	88	32.4		
Gender	Male	91	33.4	0.227	0.664
	Female	181	66.6		
Cognitive status					
Age group	Younger elderly	184	67.6	0.000	4.0
	Older elderly	88	32.4		
Gender	Male	91	33.4	0.028	2.05
	Female	181	66.6		

[a]: Fisher's exact test, [b]: Logistic regression

Discussion

The sociodemographic data of the present study showed a predominance of females and younger elderly. A similar result was found in a population-based cross-sectional study conducted in Ribeirao Preto [13], in which falls prevailed among females in the age range of 60 to 79 years.

However, another study conducted in Belo Horizonte [14] found that the majority of respondents were female; however, 45.5% of the interviewees were between 60 and 69 years.

There is thus the tendency for the phenomenon of feminization of old age, considering that the female population is growing faster than males [1]. Women have greater longevity than men, which leads to longer periods of chronic diseases and other factors, including low income, loss of the partner and loneliness [15].

With regard to marital status, the elderly participants of this research were married. This result corroborates a study developed with elderly people registered in the Family Health Strategy [FHS] of Joao Pessoa, which found that 47.6% of the elderly at high risk for falls were married. However, it also showed that living alone increased by 75.6% the chance of falling. If the risk of falling is present, the prevalence may increase by 64.8% [1]. However, it is emphasized that a sectional study conducted with elderly people living in the municipality Engenheiro Paulo de Frontin Engineer pointed relationship between widowhood and risk of falling [16].

As for education, it was found in this study that most seniors had no schooling. This fact differs from other studies that investigated the falls among the elderly in Brazil, which found that most of the participants had some schooling, ranging from one to seven years of education in different locations [13-15]. It is noteworthy that the low level of education combined with other deficiencies derived from the aging process can contribute to the difficulty of understanding the guidelines given by health professionals during the provision of care to these elderly.

Most study participants had monthly income between one and three minimum wages. Research conducted with elderly in Minas Gerais found a per capita income of up to one minimum wage and stated that most of the Brazilian seniors live with precarious living conditions. It also showed association between lack of financial resources and superposition of pathologies and difficulties of access to more complex health services. Added to this, there are the difficulties of infrastructure of services, which further complicates the autonomy of the elderly [14].

The application of the Fall Risk Score showed that women had a higher risk of falling than men, even with better cognitive status in relation to the opposite gender. Healthy elderly people tend to fall during instrumental activities outside the home, whereas the occurrence of falls among frail seniors tended to occur during routine activities without great demands on balance [1]. However, there is still need of a conclusive explanation on this fact, which may be related to lower functional status, increased morbidity and occurrence of arthrosis [17].

Other important factors for the risk of falls among women are reduced estrogen that leads to bone loss, which can contribute to the deterioration of functional status, physiological changes of aging, as well as personal and environmental factors that increase the risk of occurrence of this event among women [8].

A multicentric and cross-sectional study aimed to investigate the fragility and its relationship to sociodemographic, psychosocial, clinical, cognitive, anthropometric and functional capacity variables also found that the variables that were significantly and independently associated with higher number of falls were being female, aged over 80 years, having habit of taking naps and having depressive symptoms [18].

This research found a statistically significant association ($p = 0.028$) between the result of the Mini-Mental State Examination (MMSE) and gender.

Cross-sectional study with a sample of 462 elderly developed in Juiz de Fora found that seniors with cognitive impairment showed a higher frequency of falls compared to the elderly population in general. This result, associating cognitive impairment

and falls, reinforces the need for preventive measures and new health practices with an emphasis on healthy aging [19].

On the other hand, cross-sectional study in Sao Carlos in the area covered by the Family Health Strategy found that cognitive status was not significantly associated with falls, noting that there is no increased risk of falls among older adults with cognitive impairment assessed by the MMSE. An explanation for this finding is that older adults with cognitive impairment are less active than those with better mental capacity, not being exposed to some risks, especially outside the residence, which protects them, in a way, of falling. Authors also inferred that as the elderly with cognitive impairment are more fragile, they may receive greater care of the family and this would offset some risks posed by cognitive impairment [20].

The present study found a statistically significant association between the risk of falling, educational level and monthly income, which corroborates a research that estimated the prevalence and the sociodemographic and health profile of elderly restricted to home and registered in a family health unit of the metropolitan region of Belo Horizonte, in which most participants had low levels of education and income. The recognition of this socioeconomic profile is critical to the development of effective health promotion proposals, considering that social status hampers the awareness of people about the need to care for their own health, adherence to treatment and maintaining a healthy lifestyle [14].

However, a study conducted in Belo Horizonte that aimed to determine the occurrence of falls in the elderly, when associating them with some variables, found no statistically significant association between sociodemographic variables and the occurrence of falls, in contrast to the results of this research [21].

There is no single cause for falls; it is a combination of intrinsic and extrinsic factors. Some falls occur due to inadequacies in the environment. In this sense, minimizing household hazards combined with the control of the intrinsic factors of the elderly can reduce the risk of falls [1].

A literature review conducted in the United States also confirmed that there are various causes for falls among older people and that the environment can contribute to accident by falls, especially when there is inadequate lighting [22].

Study conducted in Baltimore [23] highlighted the care for the elderly in the home environment as it identified accidents by falls among the elderly over 65. Among those over 85 years, the study found occurrence of other household accidents such as burns, which even led some to death.

Study carried out in Geriatrics and Gerontology Clinic of the Brazilian Federal District found that the occurrence of falls is due to several factors. Among the factors related to the domestic environment, there was highlight for high-risk places, such as the bathroom and the bedroom, and places with ceramic floors [24].

In the present research, logistic regression developed for the risk of falling and the values of the Mini Mental State Examination revealed that being male and being between 60 and 79 years was a protective factor, as it showed risk below one.

Research conducted in the municipality of Engenheiro Paulo de Frontin, in the state of Rio de Janeiro, showed that the distribution of the falls is not homogeneous and that this accident is more common in certain groups, indicating that gender, advanced age, being separated/widowed, having low socioeconomic level, self-rated health, satisfaction with income and ability to perform everyday activities are all associated with an increased risk of falls and this allows preventive interventions in all levels of action [16].

Logistic regression analysis performed in this study also demonstrated that being male and oriented is 2.05 times higher than in women, and being oriented and in the age group 60-79 years

is 4.0 times higher than being in the age group of 80 or older.

Cross-sectional study conducted in the municipality of Juiz de Fora-MG applied the MMSE in 454 non-institutionalized elderly, of whom 130 showed tendency to cognitive impairment. The comparative analysis of the frequencies between the groups without cognitive impairment and with cognitive impairment evidenced that the elderly with impairment had more advanced age, lower socioeconomic status, had no spouse, did not live alone and were mostly women [19].

Thus, there has been the need to identify older adults at risk of accidents by falling in order to adapt the preventive measures to be taken by older people themselves, their families and health professionals, with the purpose of promoting active aging and healthy life expectancy.

Conclusion

The results of this study show a high incidence of falls in the last year among respondents, being more frequent among women. Most had already had previous history of falls, especially when performing household activities.

Among the elderly attended due to falls, the following profile was idenfied: women, aged 60 to 79 years old, married, illiterate, with monthly income of one to three minimum wages. According to the Fall Risk Score, the falls were more common among women (66.6%) and with regard to the high risk for falling, women also had a higher risk of falling (52.7%). There was statistically significant association between the high risk of falling, educational level and monthly income.

This study has limitations for only considering the local reality. Nevertheless, its results are relevant as they contribute to a wider attention from highly complex health services in order to minimize the suffering of the elderly.

There is need to emphasize prevention and early identification of risk factors for falls in the community, especially with regard to the guidelines provided to the elderly, according to the results found in this study, which showed that most of the seniors had no education and had income between one and three minimum wages.

In view of this, one can infer that the difficulty of understanding and adapting the environment to a comfortable living for the elderly can increase the risk for falls, since aging itself can bring harm to the cognitive aspect. Thus, it is necessary to minimize the high prevalence of elderly people suffering injuries from falls and prevent the loss of autonomy as a result of this type of accident.

The identification of factors associated with the risk for falls is very important so that professionals can develop a prevention method and perform early monitoring of installed disabilities, making prevention more effective and thereby reducing hospital admissions, minimizing physical and psychological harm that directly affects the elderly by the risk of losing their autonomy.

It is recommended, therefore, a more detailed investigation on the risk of accident by falls in order to understand the factors associated with this event, such as comorbidities, medications, low education and osteoporosis control.

The rapid growth of the elderly population in Brazil has increased the difficulties faced by this population in relation to health, so there is need to discuss and program interventions aimed at improving the quality of life of these people.

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