



Risk assessment of falls in the elderly assisted in the Family Health Strategy

Avaliação do risco de quedas em idoso s assistidos na Estratégia Saúde da Família

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Objective: to evaluate the risks, the occurrence and the factors associated with falls in the elderly assisted in the Family Health Strategy. **Methods:** descriptive, observational study carried out with 132 elderly assisted in the Family Health Strategy. Data was collected through questionnaires and analyzed by univariate and inferential exploratory statistics. **Results:** exposure of the elderly to risk factors for falls was significant, with dizziness/vertigo being the most evident among intrinsic factors, indicated by 73.3% of the participants. Regarding the extrinsic factors, the most important reported by the elderly were irregular floors (94.7%), stairs or unevenness of the floor (85.6%), and bathroom without support/bars (92.2%). **Conclusion:** the elderly are potentially vulnerable to falls, especially due to exposure to risk factors at home, as they have shown greater evidence when compared to factors related to aging itself.

Descriptors: Aged; Risk Factors; Accidental Falls; Primary Health Care.

Objetivo: avaliar os riscos, as ocorrências e os fatores associados à quedas em idosos assistidos na Estratégia Saúde da Família. **Métodos:** estudo descritivo, observacional realizado com 132 idosos assistidos na Estratégia Saúde da Família. Os dados foram coletados por meio de questionários e analisados pela estatística exploratória univariada e inferencial. **Resultados:** a exposição dos idosos a fatores de risco para quedas foi significativa, com tontura/vertigem sendo o mais evidente entre os fatores intrínsecos, indicado por 73,3% dos participantes. Em relação aos fatores extrínsecos, os mais importantes relatados pelos idosos foram pisos irregulares (94,7%), escadas ou desnível do chão (85,6%) e banheiros sem barras de suporte (92,2%). **Conclusão:** idosos são potencialmente vulneráveis a quedas, principalmente devido à exposição a fatores de riscos no domicílio, por apresentarem maior evidencia quando comparados a fatores do próprio envelhecimento.

Descritores: Idoso; Fatores de Risco; Acidentes por Quedas; Atenção Primária à Saúde.

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Introduction

Aging is a process in which various organic modifications occur. Whether morphological or functional, the changes lead individuals to lose the capacity to adapt to the natural cycle of life, making them vulnerable to illnesses, which characterizes pathological aging. In contrast, physiological aging involves alterations in the organic and mental functions due to the effects of the advancing age, leading to the loss of the ability to maintain homeostatic balance and to the decline of both functions⁽¹⁻²⁾.

In general, the aging process has been associated with demographic transition, a phenomenon mainly caused by the reduction of the birth rate and the increase in life expectancy, leading to changes in the elderly's health and consequently compromising their physiological, immunological and sensory functions⁽³⁾. As a result of this transition process, people aged 60 years or older increased from 8.0% of the world population in 1950 to 10.8% in 2010 and, according to the United Nations, it is estimated that this proportion will be 25.0% and 29.0% in 2050⁽⁴⁾.

In Brazil, according to data from the Brazilian Institute of Geography and Statistics, it is indicated that approximately 29.6 million people are aged 60 or older⁽⁵⁾. From the perspective of health, the change in the age pyramid is directly related to an epidemiological transition characterized by the change in morbidity and mortality profile previously marked by the prevalence of transmissible diseases, and now predominately driven by chronic-degenerative diseases, such as cardiovascular diseases and neoplasias. In addition, one of the health problems that has also become evident and that has much contributed to morbidity rates due to the demographic explosion of the elderly are the falls, recognized by World Health Organization as an important public health problem^(1,6).

A fall episode can be conceptualized as an unintentional movement of the body to a level lower than

the initial position with inability to be corrected in a timely manner, caused by multifactorial situations that affect stability⁽⁷⁾. The occurrence of falls in the elderly is one of the main clinical and public health problems, since besides the high prevalence of fractures, they have other consequences such as reduced quality of life, fear of walking, complications associated with the reduction of functional capacity and early institutionalization. The risk of falls has a multifactorial etiology, including intrinsic and extrinsic factors. The former are associated with physiological changes in the aging process; and the latter are related to environmental hazards⁽⁸⁾.

Recognizing the possible causal factors and the impacts that falls may cause on the health and the life of the person who falls, the problem is even more serious in the elderly population. In addition to a greater propensity, the elderly present lower defense when falling, especially due to movement limitations, reduced reflexes and acuity of the senses, loss of postural balance, neurological diseases and inadequate environment⁽⁹⁾.

Therefore, the need to evaluate the risks and the occurrence of falls in elderly people assisted in the Family Health Strategy is undeniable. This knowledge may help to expand the elderly care network and implementing coping tactics for this reality with measures of health promotion, prevention of injuries and multidisciplinary interventions, all focused on prolonging the life of the elderly with quality and without falls.

In this sense, this research had the proposal to answer the following questions: What are the risks of falls the elderly in the city of Cuité exposed? What is the frequency of falls in elderly people assisted in the Family Health Strategy? What are the most common causes of these falls? In this line of thought, the present study had as objective to evaluate the risks, the occurrence and the factors associated to falls in the elderly assisted in the Family Health Strategy.

Methods

This is a descriptive, observational study carried out in the city of Cuité-PB, Brazil in all the five Family Health Units located in the urban area. The observational method allowed a high degree of precision in the study execution, and the descriptive research, in turn, made it possible to observe, record and analyze the characteristics and phenomena investigated in the elderly population, and the occurrence of falls⁽¹⁰⁾.

The population involved all elderly enrolled and followed in the Family Health Units, representing a total of 2,460 subjects. Thus, considering a probabilistic sample estimate of simple random type, calculated on the basis of an estimated prevalence of 90% of exposure to risk factors for falls, sampling error of 5% and level of reliability of 95%, the sample was composed of 132 elderly people. Data was collected between August and September 2014 through home visits by community health agents, as well as on specific days of care for the elderly in the Family Health Units.

The following inclusion criteria in the sample was: be 60 years or older, be registered and monitored by the Family Health Strategy of the city of Cuité and present psychological conditions to respond to the data collection questionnaire.

To obtain the information, a self-administered questionnaire was used to be responded by the elderly with the researchers' participation, when necessary. The instrument was composed of four sections: a) personal data (7 questions), b) social profile (2 questions), c) self-reported morbidities (1 question), d) variables associated with the risk of falls (6 questions). Data collection took place both in the spaces of the Family Health Strategies on the days of care for spontaneous and programmatic demand for the elderly, as well as through home visits in the micro areas of the community health agents.

After that, an *Excel* 2010 spreadsheet was used for the construction of the information bank. Initially, univariate analyses of the data were performed, pro-

viding a descriptive characterization of the distribution of subjects' variability in relation to the variables. Then, inferential statistical analyses were used to relate the variables and then to describe the relation between them. The software *Statistical Package for the Social Sciences* version 20 was used to test the 72 assumptions listed for this investigation. The chi-square test was utilized to verify the association between self-reported health problems and previous occurrence of falls as well as between behavioral factors and previous occurrence of falls, accepting as statistically significant *p* values below 0.05.

Authorization was requested from the Research Ethics Committee of the University Hospital Alcides Carneiro of the Federal University of Campina Grande and given under Opinion nº 736,427/2014 (CAAE nº 31300714,0,0000,5182).

Results

It was observed that, in the studied sample, there was predominance of the female gender (61.4%); 44.7% of the elderly are between 70 and 79 years; with mean age was 74.7 years, ranging from 60 to 99 years; 56.1% of the elderly are illiterate; 56.8% are married; 31.1% are widowers; 91.7% have family income between 2 and 3 salaries; 88.6% have caregivers in their homes, being children and spouses the most reported by the participants, with 25.8% of the answers each. The socioeconomic and demographic characterization of the elderly participants of the study can be observed in Table 1.

Table 2 shows that exposure to extrinsic factors, are more evident. The most prevalent categories reported by the elderly were: bathroom without support/bars (99.2%), irregular floors (94.7%) and presence of stairs/unevenness on the floor (85.6%). Regarding the intrinsic factors, the presence of dizziness/vertigo was the most prevalent, reported by 77.3% of the elderly.

Table 1 – Socioeconomic and demographic characteristics of the elderly followed by the Family Health Strategy (n=132)

Variables	Elderly people surveyed		
	n (%)	Yes f (%)	No f (%)
Gender			
Male	51 (38.6)	Difficulty to walk	74 (56.1) 58 (43.9)
Female	81 (61.4)	Balance changes	72 (54.5) 60 (45.5)
Age Group			
60 to 69	35 (26.5)	Muscle weakness	22 (16.7) 110 (83.3)
70 to 79	59 (44.7)	Dizziness/vertigo	102 (77.3) 30 (22.7)
80 to 89	32 (24.2)	Orthostatic hypotension	50 (37.9) 82 (62.1)
> 90	6 (4.5)	Fainting	8 (6.1) 124 (93.9)
Education			
Illiterate	74 (56.1)	Intrinsic	
Marital status			
Single	6 (4.5)	Inadequate lighting	45 (34.1) 87 (65.9)
Married	75 (56.8)	Loose carpets	90 (68.2) 42 (31.8)
Divorced	6 (4.5)	Irregular floors	125 (94.7) 7 (5.3)
Separated	4 (3.0)	Steps/unevenness	113 (85.6) 19 (14.4)
Widow/widower	41 (31.1)	Objects on the floor	40 (30.3) 92 (69.7)
Family Income (minimum salary)			
Up to 1	11 (8.3)	Pets	71 (53.8) 61 (46.2)
2 to 3	121 (91.7)	Stairs without handrail	9 (6.8) 123 (93.2)
Presence of caregiver			
Yes	117 (88.6)	Bathroom without support/bars	131 (99.2) 1 (0.8)
No	15 (11.4)	*Choice of multiple answers	
Caregiver			
Spouse	34 (25.8)		
Spouse and children	27 (20.5)		
Spouse, children, son-in-law/daughter-in-law	17 (12.9)		
Only children	34 (25.8)		
Private caregiver	4 (3.0)		
Others	1 (0.8)		
Without caregiver	15 (11.4)		
Total	132 (100.0)		

Table 2 – Exposure of the elderly to risk factors for falls (n=132)

Risk factors*	Elderly surveyed	
	Yes f (%)	No f (%)
Intrinsic		
Difficulty to walk	74 (56.1)	58 (43.9)
Balance changes	72 (54.5)	60 (45.5)
Muscle weakness	22 (16.7)	110 (83.3)
Dizziness/vertigo	102 (77.3)	30 (22.7)
Orthostatic hypotension	50 (37.9)	82 (62.1)
Fainting	8 (6.1)	124 (93.9)
Extrinsic		
Inadequate lighting	45 (34.1)	87 (65.9)
Loose carpets	90 (68.2)	42 (31.8)
Irregular floors	125 (94.7)	7 (5.3)
Steps/unevenness	113 (85.6)	19 (14.4)
Objects on the floor	40 (30.3)	92 (69.7)
Pets	71 (53.8)	61 (46.2)
Stairs without handrail	9 (6.8)	123 (93.2)
Bathroom without support/bars	131 (99.2)	1 (0.8)

*Choice of multiple answers

The chi-square test was performed to verify the association between self-reported health problems of the elderly and previous occurrence of falls, as shown in Table 3. It showed statistical significance only in the associations between Peripheral Vascular Disease and previous fall from stairs ($p=0.009$); obesity and osteoporosis previous fall from own height, with p-value 0.016 and 0.007, respectively. According the association between behavioral factors and previous occurrence of falls, it was observed that there was statistical significance only in the associations between medication use and previous fall from bed ($p=0.027$), use of medication and inadequate footwear the association previous fall from own height ($p=0.000$ and $p=0.000$) and consumption of alcoholic beverage and previous fall of stairs ($p=0.000$).

Table 3 – Association between place of previous occurrence of falls and self-reported health problems or behavioral factors by the elderly (n=132)

Variables	Place of the fall (p-value)			
	Bed	Chair	Own height	Stairs
Self-reported health problems				
Osteoarthritis	0.070	0.073	0.126	0.258
Impaired hearing	0.160	0.339	0.480	0.560
Diabetes mellitus	0.350	0.559	0.548	0.559
Heart disease	0.951	0.491	0.346	0.491
Peripheral vascular disease	0.563	0.717	0.930	0.009
Neurological disease	0.910	0.756	0.362	0.756
Systemic arterial hypertension	0.684	0.374	0.115	0.486
Urinary incontinence	0.284	0.683	0.061	0.683
Obesity	0.430	0.411	0.016	0.411
Osteoporosis	0.105	0.374	0.007	0.374
Impaired vision	0.432	0.624	0.493	0.624
Anemia	0.135	0.736	0.759	0.736
Depression	0.590	0.736	0.063	0.736
Behavioral factors				
Alcoholic Beverages	0.687	0.801	0.340	0.000
Medication	0.027	0.966	0.000	0.142
Clothing	0.687	0.801	0.340	0.801
Footwear	0.563	0.330	0.000	0.578
Accessories	0.842	0.901	0.330	0.901

Discussion

Research limitation was due to small city size and location, restricting the sample and the representativeness of these subjects to metropolitan regions.

The research contributes to public health due to the high index of exposure of the elderly of the cities to the risk factors associated with falls, in order to encourage the practice of nursing in the Family Health Strategy to collaborate implementation measures that may restrict the risks of falling and improving the quality of life of this population segment.

There was a predominance of females and the mean age of the elderly was 74.7 years. Women are at a higher risk of falls compared to men. The feminization of old age, personal and environmental factors re-

lated to women interfere with the risk of falls, leading female elderly to fall more frequently⁽¹¹⁾. It is worth mentioning that, culturally, women tend to resort to health services more frequently, which may cause a sampling bias.

According with this, the literature points out that, regarding gender, women are at a higher risk of falls because they have a lower amount of lean mass and muscle strength, a greater loss of bone mass due to the reduction of estrogen, increasing the probability of osteoporosis; higher prevalence of chronic diseases; increased exposure to domestic activities; and high risk behaviors. This contributed to women being more susceptible to falls than men⁽¹¹⁻¹²⁾.

The predominant presence of women is remarkable in health care programs, as they seek more often health services and specific groups. This observation rests on the fact that at least 33.0% of the elderly in Brazil suffer a fall episode per year, and women have an incidence of falls slightly higher than men of the same age group⁽¹²⁾.

As far as the variable education is concerned, 56.1% of the elderly were illiterate. This educational profile is consistent with their social conditions. In this sense, the exclusion of the elderly population from education leads to an understanding of the educational system as a bureaucratic structure created to promote the training and qualification of young people for the labor market⁽¹³⁾.

Regarding marital status, the most significant results indicate married participants (56.8%) and widows/widowers (31.1%). As for the influence of companions on the occurrence of falls among the elderly, it is believed that their presence represents a protective factor and their absence, a risk factor. Some factors may explain this assertion: elderly widows/widowers become responsible for all domestic activities, thus becoming more exposed to risks and situations that lead to falls; the fact of being a widow/widower does not only imply having no partner, but also social losses, causing physical, economic and affective dependence⁽¹⁴⁾.

When analyzing family income, it was observed that 91.7% of the participants have family income between 2 and 3 minimal wage, which is not considerably enough to meet basic human needs. It is undeniable that the elderly population care cost is high, because their health problems have mostly chronic nature, and after many years, they tend to lead to disabilities⁽¹⁵⁾. Although retirement income is commonly below the needs of the elderly population, it should be noted that many elderly and family members survive with their resources.

As the family arrangement, there was an average of 2.79 residents, with a significant proportion of them living only with the spouse (25.8%), only with children (25.8%) or with spouse and children (20.5%), who are referred to as the main caregivers. When the dependency occurs, the spouse often plays the role of primary caregiver. In the absence of such, one of the children commonly assume this responsibility, and may need assistance to provide or arrange care and support⁽¹⁶⁾.

The caregiver, in turn, must act as a link between the person cared, the family and the healthcare team. Their main attributions are: listening, being attentive and sympathize with the person cared; help with hygiene care; stimulate and help in feeding; assist in locomotion and physical activities such as walking, sunbathing and practicing physical exercise; stimulate leisure and occupational activities; offer medications according to the prescription and orientation of the health team; communicate the health team about changes in the health status of the person being cared; and other situations that are necessary for the improvement of the quality of life and recovery of the health of the elderly⁽¹⁷⁻¹⁸⁾.

Many risk factors for falls have been reported, with multifactorial etiology resulting from the interaction between predisposing and precipitating factors that may be intrinsic and extrinsic. Intrinsic factors are changes in the individual's own physiological aging process. Dizziness/vertigo stood out as the most prevalent factor reported by the elderly. As for

extrinsic factors, they are conditions originating in the environment in which the elderly live. The lack of support/bars in the bathroom, irregular floors, steps and floor difference were more prevalent⁽¹⁹⁾.

Falls from own height, which were more evident in this study, are considered a public health problem, both because of their high frequency and because their direct and indirect effects on the health of the population. They may determine serious injuries that present imminent risk to life, and worsen previous morbid states, contributing to late mortality⁽¹⁹⁾. The incidence of falls increases with advancing age, ranging from 34 to 67.0% among the elderly people with 65 years or older. This fact points to the importance of carrying out evaluations of the balance system of the elderly, with implementation of measures aimed at reducing the intensity of postural oscillation^(7,20).

In this logic, several hypotheses were statistically tested in order to verify the association between health problems self-reported by the elderly and the previous occurrence of falls. There were significant results only in the associations between peripheral vascular disease and previous falls from stairs, and between obesity/osteoporosis and previous fall from own height.

Peripheral venous disease encompasses a wide variety of arterial and venous diseases, with atherosclerosis being the main cause of obstructive lesions in the arteries of the lower limbs that reduce the functional capacity of the affected muscle group, predisposing the elderly to falls. Obesity is the accumulation of fat in the body. Although treated as an acute disease, it may increase the chances of falling in the elderly during daily activities. Overweight may cause postural imbalance and fat people have less range of motion⁽¹³⁾.

Conclusion

The elderly are potentially vulnerable to falls, especially due to exposure to risk factors at home, as they have shown greater evidence when compared to factors related to aging itself.

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Collaborations

Antunes MJFS and Nogueira MF collaborated with the conception, analysis of the data, interpretation of the results and revision of the intellectual content. Alexandrino A, Macêdo GGC, Costa ARA and Nunes WB collaborated in the writing and revision content and approval of the final version to be published.

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