Original Article

Functional capacity: association with risk for falls, fear of falling and pain in the elderly

Capacidade funcional: associação ao risco para quedas, medo de cair e dor em idosos

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ABSTRACT

Objective: to associate functional capacity with the risk of falls, fear of falling, and pain in hospitalized elderly. **Methods:** cross-sectional study with 130 elderlies. The following scales were applied: Activities of Daily Living, Instrumental Activities of Daily Living, Morse Falls, Fear of Falling and Pain. The Kruskal-Wallis test was used to associate the categorical variables to the Daily Living Activities and Pain Scales and the Chi-square test to the Morse Falls. Spearman's Correlation Coefficient was used to associate the continuous variables with the Fear of Falling Scale. **Results:** most of the elderlies were independent for basic and instrumental activities of daily living, had high risk for falls, little concern about the possibility of falling, and no pain. Those with higher risk for falls are those with more dependence and have more concern about falling. **Conclusion**: there was an association between functional capacity and the scales fear of falling and pain.

Descriptors: Aged; Accidental Falls; Pain; Fear.

RESUMO

Objetivo: associar a capacidade funcional ao risco de quedas, medo de cair e dor nos idosos hospitalizados. **Métodos:** estudo transversal com 130 idosos. Foram aplicadas as escalas: atividades de Vida Diária, Atividades Instrumentais de Vida Diária, Morse *Falls*, Medo de Cair e Dor. Utilizou-se o teste de Kruskal-Wallis para associar as variáveis categóricas às Escalas de Atividades de Vida Diária e de Dor e o teste Qui-Quadrado à Morse Falls. Para associar as variáveis contínuas à escala Medo de Cair, utilizou-se o Coeficiente de Correlação de Spearman. **Resultados:** a maioria dos idosos era independente para as atividades básicas e instrumentais de vida diária, apresentava risco alto para quedas, pouca preocupação mediante a possibilidade de cair e ausência de dor. Aqueles com maior risco para quedas são os com maior dependência e apresentam maior preocupação com a queda. **Conclusão:** verificou-se associação entre capacidade funcional às escalas medo de cair e dor.

Descritores: Idoso; Acidentes por Quedas; Dor; Medo.

Introduction

With the aging of the population, the world demography has been changing. In Brazil, this phenomenon occurs even faster[1], and the concern with disabling events among the elderly is already on the agenda of the National Policy for the Health of the Elderly[2].

It is necessary to understand that aging is marked by progressive losses of functional capacity and social roles of individual and heterogeneous character. People with the same chronological age may have different levels of functional capacity, the result of events that occurred during life and their relationships that, sometimes, could be modifiable[3].

In this context, the elderly person is subject to events such as falling, defined as the failure to correct body movement during the displacement from an upper level to a lower level[4]. Falls are considered one of the Geriatric Syndromes and a public health issue, being the third most reported adverse event in hospitals, present in the community and in health services, with significant impact on hospitalization time, health care costs, negative outcomes, and increased mortality. Special attention should be paid not only because of its frequency, but also because of its somatic, psychological, social, and economic consequences among the elderly[5].

Falls can induce loss of confidence, fear of further falls, chronic pain, loss of independence, and reduced quality of life. In 10 to 20.0% of cases, falls result in bone fractures and head injuries, which can lead to increased mortality. It may not be possible to prevent falls completely, but people who tend to fall frequently can be enabled to fall less frequently[5] after undergoing careful professional assessment.

It is known that the elderly should be encouraged to perform their activities of daily living to remain independent for longer. However, one should not lose sight of a care plan for fall prevention, even among populations with greater functional capacity. The use of scales for the multifactorial assessment of the risk of falls can anticipate the identification of possible elderly people with the potential to fall and, thus, help nurses in the care planning that aims at the safety of the elderly in the hospital environment. The concern with the possibility of falls can be protective when the elderly takes more care not to expose themselves to the event of a fall.

This study proposes to investigate factors that are relevant for preventing the risk of falls in the elderly, such as functional capacity, fear of falling and pain, since the association between these factors is not completely established. Thus, it becomes important to analyze the association of factors that correlate with falling, to contribute to the establishment of a more effective preventive care plan.

The aim of this study was to associate functional capacity with the risk of falls, fear of falling, and pain in hospitalized elderly.

Methods

Cross-sectional study, conducted in clinical and surgical units of a University Hospital in the state of São Paulo. The study included elderly individuals aged 60 years and older who were admitted to clinical and surgical units at the data collection site. The study excluded elderly individuals who were disoriented and confused according to what was verbalized by the duty nurse and who had dementia registered in their medical records. The sample of this study was by convenience and composed of 130 elderly people. Data collection occurred from June 2018 to December 2019.

The primary data source was the hospitalized elderly who answered questions on the Falls Efficacy Scale-International-Brazil (FES-I Brazil), Morse Falls Scale and the Numerical Pain Scale. These instruments were translated and validated in Brazil. Additionally, a structured questionnaire was applied with information about age, sex, skin color, education, marital status, occupation, days of hospitalization, family income, presence of caregiver and comorbidities[6-11].

The Katz scale measures independence in the performance of Activities of Daily Living (ADL) in six items: bathing, dressing, sphincter control, transference, personal hygiene, and eating. The scale has three classification categories according to the score: totally dependent, with score ≤ 2; partially dependent, with score between 3 and 5; and independent, with score equal to 6[7].

The Instrumental Activities of Daily Living (IADL) scale measures the dependence in nine activities: using the telephone, using means of transportation, shopping, preparing meals, doing house chores, cleaning the house, washing clothes, using medication, and managing finances. Each item has three alternatives, and each has a score: total dependence, with a score of 1; partial dependence, with a score of 2; independence, with a score of 3. At the end of the test, the scores of all items are added up, with a maximum of 27. The higher the score, the greater the degree of independence[8].

The syndrome of fear of falling was evaluated through the FES-I Brazil scale that investigates the concern with the possibility of falling when performing 16 activities. Each item has four alternatives, scored from one to four. The total score can range from 16 (no concern about falling) to 64 (extreme concern about falling[9].

The risk for falls was assessed by the Morse Fall Scale, composed of six criteria: history of falls in the last three months or during hospitalization, secondary diagnosis, aid in walking, use of intravenous device with continuous infusion or not, walking and cognition. Each item has a score from zero to 30 points, with scores from 0-24= low risk, from 25-44= medium risk and equal or higher than 45= high risk[10].

Pain was assessed by the Numeric Scale, and its intensity was classified as: 0 (no pain); 1-4 (mild pain); 5-7 (moderate pain) and 8-10 (severe pain)[11]. Daily, the researcher requested from the admission sector the list of elderly patients admitted to clinical and surgical wards who were 60 years of age or older.

Then, he went to the units, and checked the patient's ability to participate in the research by consulting the medical records or the report from the nurse in charge of the shift. Those who met the inclusion criteria were invited to participate in the research.

The data collection strategy adopted in this research was reading the instruments. This was done by the researcher in a single moment. The researcher marked the alternative that the interviewee considered the most adequate. The interview was individual and lasted an average of 40 minutes.

Among the variables of the investigated model, only those that obtained statistical significance were highlighted. Descriptive statistical analysis was used for the characterization of the variables: sociodemographic, economic, days of hospitalization, presence of caregiver and comorbidities. To associate the continuous variables to the Katz Scale, the Pain Scale and the Morse Scale the Kruskal-Wallis test was used. To associate the categorical variables with the Katz Scale, the Pain Scale, and the Morse Scale, the Chi-square test was used. To verify the association between the continuous variables and the Fear of Falling Scale, Spearman's Correlation Coefficient was applied. To verify the association between the Katz Scale and the Pain and Morse scales the Fisher-Freeman-Halton test was used, and to verify the association between the Katz Scale and the IADL and FES-I Brazil scales the Kruskal-Wallis test was used; and for multiple comparisons the Bonferroni correction was used. The association between categorical variables and the Fear of Falling Scale was verified by the Mann-Whitney test. A significance level of 5% ($p < 0.05$) was used.

This study was approved by the Research Ethics Committee of the Federal University of São Paulo under opinion 2,776,076/2018 and Certificate of Submission for Ethical Consideration No. 93293018.3.0000.5505 and is in accordance with the Declaration of Helsinki and Resolution No. 466/2012 that provides for research with human subjects.

Results

The mean age, hospitalization and income of the elderly was 70.8 (standard deviation (SD)±8.3) years; 12.6 (SD±15.8) days of hospitalization and monthly family income of 2,124.75 (SD±2079.44) reais. Most were women (56.2%), married (58.50%), retired or pensioner (63.1%), unlettered (64.6%), with a caregiver (50.8%). The most prevalent clinical condition was hypertension (73.8%).

It is noted that most of the interviewees were independent for the DLAs, presented high risk for falls, had little concern about the possibility of falling and had no pain. The mean score for the IADLs was 22.3 (SD±12.5).

Most of the interviewees were independent for the mentioned scales (63.1%), followed by partially dependent (28.5%) and totally dependent (8.5%). Most of them presented high risk for falls (52.3%). Medium risk was verified in 27.7% of the elderly, as well as low risk was found in 20.0% of the participants. The absence of pain was verified in 81.5% of the study participants. Moderate, mild, and severe pain were found in 9.2%, 4.6% and 4.6% of the respondents, respectively. The mean scores in the IADLs and FES-I Brazil Scales were 22.5 (SD±4.8) and 22.3 (SD±12.5), respectively.

The independent elderly presented a lower age when compared to those partially dependent. Patients with a caregiver presented a higher percentage of partially and totally dependent for the scales when compared to those without a caregiver. Those who used psychotropic drugs presented higher percentage of independent and totally dependent for these scales when compared with those without psychotropic drugs (Table 1).

It was also verified that the elderly who were independent in the DLAs presented higher scores for these and in the Fear of falling scale in relation to partially or totally dependent patients. Elderly with mild pain presented a higher percentage of partial dependence for the mentioned scales; and those with no pain presented a higher percentage of independence (Table 1).

Table 1 – Association between variables and scales Instrumental Activities of Daily Living, Fear of falling, pain, and risk for falling that were associated with Activity of Daily Living. São Paulo, SP, Brazil, 2019. n=130

Variables	Independents n (%)	Partially Dependent n (%)	Totally Dependent n (%)	p-value
Age (years) Median (minimum - maximum)	65.5 (60-92)[a]	73.0 (60-91)[b]	71.0 (60-92)[ab]	0.006*
Caregiver				
Yes	32 (48.5)[a]	24 (36.4)[a]	10 (15.2)[a]	0.001[†]
No	50 (78.1)[b]	13 (20.3)[b]	1 (1.6)[b]	
Psychotropics				
No	80 (66.1)[a]	33 (27.3)[a]	8 (6.6)[a]	0.015[†]
Yes	2 (22.2)[b]	4 (44.4)[b]	3 (33.3)[b]	
IADL[‡] Median (minimum - maximum)	25.0 (9-27)[a]	23.0 (11-27)[b]	14.0 (9-27)[a]	0.001*
FES-I Brazil[§] Median (minimum - maximum)	23.0 (16-64)[a]	29.0 (16-64)[b]	33.0 (19-64)[b]	0.006*
Numerical pain scale				
Absence of pain	74 (69.8)[a]	24 (22.6)[a]	8 (7.5)[ab]	0.008[‖]
Mild	1 (16.7)[b]	5 (83.3)[b]	0(0.0)[ab]	
Moderate	5 (41.7)[ab]	5 (41.7)[ab]	2 (16.7)[ab]	
Intense	2 (33.3)[ab]	3 (50.0)[ab]	1 (16.7)[ab]	
Morse Fall Scale				
Low risk	21 (80.8)[a]	5 (19.2)[b]	0(0.0)[ab]	0.220[‖]
Medium Risk	21 (58.3)[a]	12 (33.3)[b]	3 (8.3)[ab]	
High risk	40 (58.8)[a]	20 (29.4)[b]	8 (11.8)[ab]	

*Kruskal-Wallis test; [†]Chi-square test; [‡]IADL: Instrumental Activities of Daily Living; [§]FES-I: Falls Efficacy Scale-International-Brazil; [‖]Fisher-Freeman-Halton test; Medians followed by different letters in the same row are statistically different according to Bonferroni's correction (p<0.05); Frequencies followed by different letters in the same column are statistically different according to Bonferroni's correction (p<0.05)

It can be observed in Table 2 that men presented a higher percentage of low risk for falls when compared to women, and those with a caregiver presented a higher percentage of high risk for falls when compared to those without a caregiver. In addition, it shows that the elderly at low risk for falls had higher scores in the IADL scale and lower scores in the Fear of falling scale than patients at high risk.

Table 2 – Association between the variables and the Instrumental Activities of Daily Living scale with the Morse Fall Scale. São Paulo, SP, Brazil, 2019. (n=130)

Variables	Morse Fall Scale			p-value
	Low risk	Medium risk	High risk	
Gender				
Male	21 (36.8)[a]	9 (15.8)[a]	27 (47.4)[ab]	<0.000*
Female	5 (6.8)[b]	27 (37.0)[b]	41 (56.2)[ab]	
Caregiver				
Yes	9 (136)[ab]	14 (21.2)[ab]	43 (65.2%)[a]	0.011*
No	17 (266)[ab]	22 (34.4)[ab]	25 (39.1%)[b]	
IADL[†] Median (minimum - maximum)	26.0(17-27)[a]	24.5(11-27)[ab]	24.0 (9-27)[b]	0.031[‡]
FES-I Brazil[§] Median (minimum - maximum)	20.5(16-50)[a]	25.0(16-64)[ab]	28.5 (16-64)[b]	0.041[‡]

*Chi-square test; [†]IADL: Instrumental Activities of Daily Living; [‡]Kruskal-Wallis test; [§]FES-I: Falls Efficacy Scale-International-Brazil; Medians followed by different letters in the same row are statistically different according to Bonferroni's Correction (p<0.05); Frequencies followed by different letters in the same column are statistically different according to Bonferroni's Correction (p<0.05)

Women had higher scores on the Fear of Falling scale than men. Those with a caregiver presented higher scores for fear of falling when compared to those without a caregiver. Elderly who used analgesics or psychotropic drugs presented higher scores on the scale of fear of falling when compared to patients who did not use these drugs. The greater the concern with the fear of falling, the greater was the dependence for IADLs (Table 3).

Table 3 – Association between variables and Instrumental Activities of Daily Living scale to Falls Efficacy Scale-International-Brazil. São Paulo, SP, Brazil, 2019. (n=130)

Variables	Falls Efficacy Scale-International-Brazil	p-value
	Median (minimum-maximum)	
Gender		
Male	22.0 (16-64)	0.000*
Female	29.0 (16-64)	
Caregiver		
Yes	31.0 (16-64)	0.000*
No	22.0 (16-64)	
Use of painkillers		0.000*
Yes	35.0 (16-64)	
No	23.0 (16-64)	
Use of psychotropics		
Yes	33.0 (19-64)	0.048*
No	24.0 (16-64)	
Instrumental activities of daily living	-0.48[†]	<0.001

*Mann-Whitney test; [†]Spearman correlation coefficient

Discussion

A limitation of this study is the fact that it was carried out only in a public health service, which does not allow the generalization of its results. Besides, the cross-sectional method does not allow establishing causality relations. For the elderly in a more critical clinical condition, the instruments applied became extensive.

The findings of this study may help nursing professionals to better understand the factors involved in the falling event. Thus, the orientations provided by nurses to prevent falls in hospitalized elderly should be directed not only to mitigate the risk factors for falls, but also to know the concern that the elderly have about falling.

The findings related to socio-demographic, economic and clinical characteristics of the respondents

were like those of another research, in which most elderly were married, retired, with many non-literate people, but with a mean of 5.5 (±7.1) days of hospitalization, much lower than that found in this study[12]. This difference seems to demonstrate that our population presents factors associated with greater frailty when facing a long hospitalization.

In this study, there was a high proportion of hypertensive elderly people. This result corroborates that found in another study that points out predictive factors for the occurrence of falls, among them systemic arterial hypertension, visual impairment, spine problems, osteoporosis, and rheumatic diseases as[13-14], which shows that the clinical profile of hospitalized elderly in this study presents components that increase the risk of falling. It is known that older age is accompanied by impairments in the health and functional capacity of many elderly[15]. In this study, the elderly with younger age were the independent ones.

In old age, one of the most prevalent ways to control chronic diseases is the use of medication. The high consumption of psychotropic drugs may be related to reduced functional capacity and consequent poorer quality of life[16]. The literature also points out that psychotropic drugs and analgesics are risk factors significantly associated with the frequency of falls in geriatric patients, since they can cause hypotension, drowsiness, balance alteration and decreased muscle tone[17]. Our findings show the need to pay attention to the elderly group that uses analgesics and psychotropic drugs, not only because they present a higher percentage of dependence, but also because of the greater concern with the fear of falling.

Another study shows that the combination of intrinsic and extrinsic components increases the risk of falls with aging, such as female gender, stiff joints, hearing problems, vision changes, side effects of medications, tiredness or confusion, poorly lit places, slippery or uneven surfaces, and inadequate footwear[16]. Our findings also showed that men had a higher percentage of low risk for falls.

The functional capacity impairment due to ad-vanced age can lead to situations in which the elderly needs another person to help them perform the ADLs and IADLs. This data probably explains the presence of caregivers in half of the sample studied, demonstrating the importance of this person in the hospital care scenario. Furthermore, this result can suggest a cause-effect relationship, i.e., the elderly who had caregivers were probably fallers. However, this function is usually added to the caregiver's already existing ones, which often occur without proper preparation and for an unpredictable time[13].

The concern with the fear of falling has been pointed as an event that depends on an experience of falling. This can be positive when the elderly person develops strategies to reduce or eliminate the risk factors for the event, or negative, when it becomes another obstacle for routine activities[18]. Although the absence of pain was reported by most of the elderly in this study, it is important to note that pain often decreases the performance of ADLs, as well as limits the interaction and social interaction, besides being one of the multiple causes of falls[10].

Another finding of this research is the fact that the elderly with low risk for falls have greater independence in Instrumental Activities of Daily Living, which is in line with what the literature shows about the impairment in ADLs and IADLs being associated with dependence, frailty, increased risk of falls, mobility problems and early institutionalization[19]. However, the fact that the elderly report little concern about falling causes uneasiness. This situation shows a possible neglect of the risks to which they are exposed.

The findings indicate the indispensability of a multifactorial fall prevention approach. It is worth noting that prevention activities and surveillance of the fall event in hospital care is a quality indicator. It is also emphasized the importance of applying the scale of concern about the fear of falling together, and the scale of risk of falling may be a way for the nurse's care plan, aiming at preventing falls in the elderly, to be more effective.

Conclusion

This study identified that most of the hospitalized elderly were independent for activities of daily living, had high risk for falls, little concern about falling, and no pain.

There was an association between functional capacity, fear of falling and pain, but no association between these and the risk of falls. The elderly with preserved functional capacity had greater fear of falling and mild pain. There was an association between the risk of falls and the Instrumental Activities of Daily Living scale and fear of falling, and the elderly with low risk of falling had a higher score in the Instrumental Activities of Daily Living scale and a lower score in the Fear of Falling scale when compared to those with high risk.

Collaborations

Nadu AA, Sala DCP, Silva CL, Monteiro OO, Costa PCP, and Okuno MFP contributed to the conception and design, data analysis and interpretation, writing of the article, relevant critical review of the intellectual content, and final approval of the version to be published.

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