Fall Prevention
Behavior among Hospitalized Elderly Patients

ORIGINAL

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Abstract

Purpose: This study aimed to check fall prevention behavior among elderly patients admitted to a hospital, by assessing the indicators of a nursing outcome from the "Nursing Outcomes Classification" (NOC).

Methods: This is a quantitative, cross-sectional, survey conducted with elderly patients admitted to a university hospital. For collecting data, a validated instrument was applied, consisting of NOC indicators of the nursing outcome mentioned above.

Results: The indicator asks for physical assistance to the patient, it was correlated to fall within the last six months, and the indicators agitation control and use of safe actions during transfer were associated with difficulty in walking.

Conclusion: Fall prevention behavior by the elderly patient during hospital stay is a co-responsibility of her/his companion and the nursing team. There is a need to train nurses regarding patient safety measures, focusing on preventing falls and encouraging safe behavior among hospitalized elderly patients.

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Introduction

When considering the epidemiology of falls and its implications for the health of hospitalized elderly patients, there is a need to deploy preventive measures in order to provide a safe environment throughout hospital stay [1]. Accordingly, as indicated by Resolução da Diretoria Colegiada (RDC) 36/2013, from the Brazilian National Health Surveillance Agency (ANVISA) [2], the Patient Safety Plan in Health Care Services (PSP) should establish strategies and risk management actions, according to the activities undertaken by a health service for preventing falls among patients.

Thus, the nursing team must be vigilant, because this kind of incident is a relevant indicator of the quality of hospital nursing care. In this regard, it is known that proper assessment of risk of falls among hospitalized elderly patients is essential for planning health promotion actions, especially concerning the safety of these patients within a nosocomial environment [3].

Also in terms of the nursing role, health promotion actions are emphasized, especially those aimed to advise and encourage elderly patients to engage in preventive behaviors that have the potential to favor their autonomy and establish for themselves a safe environment and a hospital stay free from adverse events (AEs).

The concept of preventive behavior refers to the potential to engage in the management of modifiable risk factors by using strategies that facilitate the adaptation process in search of a healthier lifestyle. This individual capacity consists of skills, knowledge, and attitudes that favor patient autonomy in identifying factors, decision making, and constituting her/his own support network. Among the nursing objectives to foster this behavior there are individual self-management, mastery of skills, adaptation, and improvement in quality of life [4].

Given this, the following question emerged: "What is the fall prevention behavior practiced by elderly patients during hospital stay?"

In order to answer this question, it was observed in the nursing process (NP) an effective means to manage fall prevention behavior during hospitalization, as it consists in a deliberate and systematic method to identify risks that allows nurses to view the priority individual human needs and, thus, take situated, comprehensive, and humanized care actions [5].

Faced with the need to standardize and legitimize information related to nursing care, especially to apply NP within a nosocomial environment, there are taxonomies, such as NANDA International (NANDA-I), which stands out to classify nursing diagnoses (ND) [6]; the Nursing Interventions Classification (NIC), which categorizes nursing interventions [7]; and the Nursing Outcomes Classification (NOC), which organizes the nursing outcomes (NO) [8].

Due to its evaluative properties regarding the individual's health status, which provide 26 NOs related to the risk of falls, the taxonomy NOC may be indicated as adequate to support the proposal of this investigation and it may be used as a fall management instrument. The NO fall prevention behavior, which is included in the domain health knowledge and behavior and in the class risk control and safety, stands out. The criteria for assessing it comprise 5 parameters in a Likert scale, ranging from "never demonstrated" to "consistently demonstrated" [8].

Originally, this scale contained only indicators and it has been reviewed through a theoretical-conceptual study, by building and describing constitutive and operational definitions for 27 indicators from the NOC regarding the NO concerned. Then, the content of this scale has been validated by specialists in clinical nursing, and now it contains 20 indicators with their respective definitions [3, 9].

Therefore, this study is justified by recognizing the need for further research aimed at assessing preventive behaviors, since falls are among the most significant AEs within a nosocomial environment, having a potentially disabling nature, and it is un-

derstood that hospitalization significantly increases the risk of falls among the elderly. Thus, this study aimed to check fall prevention behavior among elderly patients admitted to a hospital, by assessing the indicators of a NO from the NOC.

Method

Study design
This is a quantitative, cross-sectional, survey conducted in a public university hospital in Natal, Rio Grande do Norte, Brazil, linked to the Federal University of Rio Grande do Norte (UFRN).

Population and sample
The study population consisted of elderly individuals admitted to clinical in-patient units of the hospitalized under study and the sample was delimited by using a formula for infinite population: $n = (Z\alpha^2.P.Q)/E^2$, and n = sample size, $Z\alpha$ = confidence level, P = prevalence of the risk of falls among hospitalized elderly patients, Q = prevalence complement (100 - P), and E = the sampling error. For the purposes of this research, a 95% (1.96) confidence level and a 5% sampling error were adopted. The prevalence of the event for this calculation was 5%, according to the frequency of the risk of falls among hospitalized elderly patients provided by a previous survey [10]. Thus, the sample amounted to 73 patients, and this number was added with 22 individuals by considering 30% for possible losses and 5 elderly patients to test the instrument, reaching a total of 100 individuals. During the study, 1 patient has been lost, therefore, the final sample consisted of 99 elderly patients.

For selecting the sample, consecutive sampling was used, by convenience, and the inclusion of an elderly patient in the study occurred according to the following criteria: being over 60 years of age, being admitted to clinical in-patient units of the institution under study, and showing, at the time of interview, cognitive and emotional ability to answer to questions and undergoing the required tests. Cognitive ability was assessed by applying the "Mini-Mental Status Exam" (MMSE), based on the following parameters: > 15 (if illiterate), > 22 (if having 1-11 years of school education), and > 27 (if having over 11 years of school education). Emotional ability was measured by self-report of the elderly patients included in the survey. The exclusion criteria were impaired cognitive ability shown during data collection and the presence of a condition preventing physical examination.

Ethical aspects
Data collection was initiated after approval by the Research Ethics Committee of UFRN, under the Opinion 121,028 and the Certificate of Submission for Ethical Appraisal (CAAE) 07614812.6.0000.5537, complying with Resolution 466/2012 from the Brazilian National Health Council (CNS) [11].

Recruitment and data collection
Data collection procedures were applied between June and September 2013 and by 2 female nurses with the aid of 6 students from the undergraduate Nursing course of UFRN. To do this, these examiners participated in a 4-hours specific training session, which explains the main methodological aspects of research, the issue of falls among hospitalized elderly patients, the use of all equipment and techniques used in the physical examination. Subsequently, a data collection simulation was performed with anatomical models, to assess the competence of each examiner to collect data and standardize the assessment of patients.

Thus, first, after signing the free and informed consent term, the individuals' sociodemographic and clinical information were obtained. Then, the Tinetti scale was applied to assess gait and balance and the indicators regarding the NO fall prevention behavior were assessed by means of the NOC scale.

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During data collection, the examiners marked the scale according to the definitions described in the instrument and assigned one of the following scores for each indicator: 1- Not adequate; 2- Slightly adequate; 3- Moderately adequate; 4-Substantially adequate; 5- Totally adequate. In the end, a sum was provided for each participant assessed, which should range from 20 to 100, however, some indicators were not measured because they do not correspond to environmental characteristics or patient's behavior, therefore, the minimum and maximum sums for this survey were, respectively, 15 and 74.

Statistical analysis

After the data collection stage, data were organized into spreadsheets of the software Excel for Windows 2010. The statistical software R, version 3.0.0, freely available on the internet, was used for descriptive and inferential analysis. Mann-Whitney's U test was applied to 2 independent samples, as well as Pearson's coefficient, in order to check the correlation between scalar metric variables. In both tests a p value < 0.05 and a 95% confidence interval were considered.

For this analysis, the variables "history of fall within the last six months" and "difficulty in walking" were regarded as outcomes, because they depict two predominant characteristics of elderly fallers, according to surveys [12, 13].

Results

Among the elderly patients included in our sample, there was a higher prevalence of male (58.6%), white (46.6%), married (63.6%), retired (77.8%), and Catholic individuals (70.3%), with an average age of 68.78 years. Hypertension was the most prevalent morbidity (54.6%). As for the outcome, 31.3% of patients had difficulty in walking and 25.3% reported having fallen within the last six months.

Table 1 shows that there is a strong correlation between the results of the Tinetti scale and the gait

Table 1. Correlation between the results of the scales Tinetti, NOC, and MMES.

	Balance	Gait	Tinetti	NOC	MMES
Balance	-	0.417+	0.874+	-0.240*	-0.113*
Gait		-	0.806+	0.064*	-0.047*
Tinetti			-	-0.101*	-0.102*
NOC				-	0.046*
MMES					-
* Pearson's correlation test (p < 0.05); + Pearson's correlation test (p < 0.01).					

(0.806) and the balance subscales (0.874). There is also a moderate correlation between gait and balance findings (0.417). To establish this correlation, values determined by a previous survey were used, where: Value between 0.10 and 0.30 – weak correlation; Value between 0.40 and 0.60 – moderate correlation; Value between 0.70 and 1.00 – strong correlation [14].

For identification purposes, **Table 2** shows the NOC indicators for the NO fall prevention behavior, encoded by a numeric value in the following order: 1- Correctly uses auxiliary mechanisms to walk; 2- Asks for physical assistance to her/himself; 3- Uses barriers to prevent falls while in the bed; 4- Uses handrails as needed; 5- Keeps the environment free from accumulation of objects and obstacles, as well as liquid on the floor; 6- Adequately uses stool and ladder; 7- Uses appropriate footwear to prevent falls; 8- Adapts the height of the toilet as needed; 9- Adequately uses chairs; 10- Adequately uses the bed; 11- Adequately uses rubber mats on the bathtub floor/shower enclosure; 12- Uses, in the bathroom, safety bars to support hands; 13- Controls agitation; 14- Adopts preventive measures when taking medications that increase the risk of falls; 15- Adequately uses vision correction devices; 16- Takes safe actions during transfer; 17- Correctly uses the alarm system; 18- Manages urinary/bowel urgency; 19- Wears proper-fitting clothes.

The indicator "Correctly uses hearing correction devices as needed" showed did not show the mini-

Table 2. Fall within the last 6 months and difficulty in walking, according to indicators of fall prevention behavior among the elderly.

NOC indicator	Fall within the last 6 months			p value *	Difficulty in walking			p value *
	Minimum	Maximum	Average		Minimum	Maximum	Average	
1	2	4	3.25	0.635	1	5	3.00	0.852
2	1	5	4.56	0.016	1	5	4.38	0.112
3	3	5	4.29	0.767	2	5	4.30	0.279
4	1	5	4.14	0.950	1	5	4.11	0.532
5	4	5	4.57	0.207	4	5	4.80	0.682
6	1	5	3.92	0.413	1	5	3.87	0.430
7	2	4	3.65	0.329	2	5	3.50	0.745
8	1	5	3.47	0.395	1	5	3.00	0.308
9	1	5	4.19	0.570	4	5	4.43	0.081
10	2	5	3.94	0.782	2	5	3.90	0.983
11	1	5	1.53	0.786	1	5	1.59	0.499
12	1	5	3.70	0.305	1	5	3.68	0.176
13	1	5	3.21	0.233	1	5	2.67	0.001
14	2	5	3.71	0.786	2	5	4.00	0.163
15	3	4	3.81	0.805	2	5	3.93	0.468
16	2	5	4.05	0.391	2	5	4.45	0.030
17	1	5	1.58	0.105	1	5	1.71	0.214
18	1	5	3.08	0.108	2	4	3.50	0.789
19	2	5	4.52	0.298	2	5	4.69	0.875

Legend: * Mann-Whitney U test (p <0.05).

mum prevalence among the elderly patients assessed, thus, it was not considered for analysis.

According to **Table 2**, the indicator 2 (Asks for physical assistance to her/himself) was significantly associated with recent occurrence of falls (p = 0.016), as well as the indicators 13 (Controls agitation) (p = 0.001) and 16 (Takes safe actions during transfer) (p = 0.03) showed statistical evidence of difficulty in walking.

The indicator 11 (Adequately uses rubber mats on the bathtub floor/shower enclosure), although showing no statistical significance with regard to difficulty in walking or recent fall, obtained low average values (1.59, 1.53) and this may reflect inadequate application of this mechanism to prevent falls among elderly patients during hospital stay.

The same finding occurred concerning the indicator 17 (Correctly uses the alarm system), whose average value was 1.58 among elderly patients with history of fall within the last 6 months and 1.71 among elderly patients with difficulty in walking.

The indicators with higher scores in the assessment were: 2 (Asks for physical assistance to her/himself); 3 (Uses barriers to prevent falls while in the bed); 4 (Uses handrails as needed); 5 (Keeps the environment free from accumulation of objects and obstacles, as well as liquid on the floor); 9 (Adequately uses chairs); 12 (Uses, in the bathroom, safety bars to support hands) and 19 (Wears proper-fitting clothes). The average value of the sum obtained by applying the NOC scale to the individuals assessed was 50.60 (± 14.15), indicating a fall prevention be-

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havior poorly practiced by the elderly patients in this survey.

Discussion

According to the global report of the World Health Organization (WHO) (2010) on fall prevention in old age, behavioral determinants refer to human actions, emotions, or daily choices potentially modifiable through strategic interventions [15]. So, discussing these preventive behaviors practiced by hospitalized elderly patients may guide the management of falls by nursing and provide it with means to contribute to preventive and autonomous attitudes among these patients.

The sociodemographic profile of the elderly patients participating in this survey is similar to others found in the literature [16, 17]. Some studies point out a higher risk of falls, from 2 to 4 times, among white individuals than among Hispanics or Afro-descendents, highlight those of Asian descent, who have shown the lowest rates of falls, probably due to healthier habits regarding physical activity [18].

Concerning the prevalence of men, according to some studies, the cultural role played by men can affect behaviors, especially when it comes to lower frequency of care seeking and higher probability to engage in physical activities more intense and dangerous [15,19]. Therefore, there is a need to establish various alternatives and strategies to prevent falls based on gender differences and other risk conditions for this event.

The presence of hypertension increases the risk of falls among the elderly patients, something which can be mainly related to orthostatic hypotension caused by the use of antihypertensive medication. The current literature correlates postural stability and the average blood pressure values, so that normotensive individuals have a lower tendency to fall when compared to hypertensive individuals [20].

Postural instability and gait disorders are frequently observed among the elderly and they are constantly related to falls. The strong correlation found between results in the Tinetti scale and the gait (0.806) and balance subscales (0.874) is justified because aging affects the gait coordination mechanism, thus walking becomes more difficult. So, shorter and slower steps undermine an elderly individual's ability to react when faced with an imbalance episode [13, 20].

By means of simple tests, the MMSE is used to determine patient's cognition, which shows a direct correlation to falls. In this regard, it is known that cognitive impairment leads to a higher dependence of an individual as for daily living activities, and, according to a previous survey, a value below 7 on the MMSE strongly predicts the occurrence of falls [1].

The results on the NOC scale showed no statistical association with the Tinetti scale and the MMSE, probably due to the fact it addresses behavior, rather than the other instruments, which are closely related to bodily conditions.

The elderly's attitudes influence on their preventive behavior and affect the way how they interpret and deal with falls [15]. Concerning the indicators of the NO fall prevention behavior, according to evidence, asking for physical assistance may be a protective factor against falls, with a lower prevalence of this incident among the elderly who engaged in this action. As age advances, there is an increased risk of health problems among the elderly, and the presence of a caregiver during hospital stay can provide this age group with more security and prevent most of the AEs.

Given this, Law 10.741 was enacted in Brazil, in 2003, to ensure the right to a companion to the elderly patient during hospital stay, thus any health institution has the duty to provide all needed conditions for her/his full-time presence [21]. The companion is, indeed, a health promotion agent who, along with the multidisciplinary team, can help preventing accidents and providing the elderly individual with a safer hospital stay.

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Agitation control was a significant indicator in patients who had difficulty in walking. In this regard, the literature suggests that this symptom is preferably treated in a non-pharmacological way, considering the increased risk of falls due to the use of multiple medicines. The nurse should educate the patient about relaxation techniques, breath control, maintenance of concentration, and, only as a last resort, administer medicines [22].

Taking safe actions during transfer from the bed, common chair, or wheelchair has shown to be statistically significant as for difficulty in walking among patients. In this regard, the Ministry of Health (MoH) warns that patients awaiting transfer for examination or surgery should always be accompanied, because they have a high risk to fall [13].

Inadequate use of rubber mats on the bathtub floor/shower enclosure has been observed, corroborating other findings [16]. Through clinical experience, it is possible to assign this event not only to the elderly's attitude, but also to the absence of these anti-skid devices in shower enclosures in the selected institution, something which reinforces the possibility of fall during the bath.

The elderly incorrectly used or did not use the alarm system mostly due to ignorance about the utility of the device. This device should be activated in cases of urgency or emergency and its use must be encouraged among patients at high risk of falls. In this regard, the MoH considers as high-risk patients those who depend on third-party help to fulfill basic daily living activities or those who have difficulty in walking and need assistance [13].

With a view to promoting health and patient safety within nosocomial environments, the National Patient Safety Program (PNSP), established by Decree 529/2013, determines general preventive actions concerning falls that should be adopted by the entire health care team when providing every patient with care, regardless of the risk [13].

Patients at risk of falls and showing a risky behavior for the event should preferably be sensitized about the need and importance of preventing the occurrence of an incident during hospital stay. Other measures involve advising the patient to get up only when assisted by a companion or health professional, scheduling time to take her/him to the bathroom, if possible; warning about the need to use devices and place them without hindering patient's mobility; advising on the use of vision or hearing correction devices; and accommodating the patient at risk of fall close to the nursing station. There nursing interventions have preventive potential and they should be prioritized when providing elderly patients with care throughout their hospital stay, because their physiological and clinical condition, non-modifiable factors, already poses risk enough to the occurrence of this event [13, 22].

Health professionals' awareness and attitudes towards falls are crucial to increase the initiatives to install appropriate services to prevent and care for falls in old age. Thus, we must ensure that interventions are planned to meet the needs, preferences, and abilities of people to whom they are aimed [15].

In order to guide the nursing team's actions for specifically promoting the fall prevention behavior, systematic reviews and experimental studies also recommend to: offer or publicize interventions with a clear focus on their benefits and based on the elderly strength rather than on weakness; encourage proactive attitudes by using positive stimulus, approval, and support, with a view to estimulate, in this patient, self-confidence to manage her/his own needs [23, 24].

For this, there should be interventions that increase strength and balance, as well as favor preventive behaviors and encourage independence, everything along with a pleasant and friendly environment, as far as possible, in the context of in-patient hospital stay [15].

Conclusion

It was found out that the fall prevention behavior adopted by elderly patients during hospital stay is a co-responsibility of her/his companion and the nursing team. The institution should provide a favorable environment, architectural and material means, as well as equipment in order to deploy the prevention of this AE among elderly patients on an independent basis.

This study proposed the assessment of 20 indicators, among which asking for assistance to walk showed to be statistically significant concerning falls within the last 6 months, just as agitation control and engaging in safe actions during transfers were associated with difficulty in walking. Inappropriate behavior was observed regarding the use of anti-skid material during the bath and the use of the alarm system by the elderly, which intensifies the need for institutional investment and educational interventions.

There is an urgent need for educating and training nurses concerning patient safety measures, focusing on preventing falls and encouraging safe behavior by patients. Actions that have already proven to promote and maintain preventive behaviors, providing patients with greater autonomy and meeting their personal needs are strongly recommended.

The study managed to achieve its objective of checking the prevention of falls among elderly patients and it pointed out behaviors that should draw greater attention from the health team. In this regard, the results of this study are limited by its proposal and its cross-sectional design, thus they do not generate evidence strong enough to provide a clinical decision-making process with a basis. Other constraints consisted in the sample size and the single research site.

Having all this in mind, there is a need for experimental studies, systematic reviews, and meta-analyses capable of generating strong evidence on actions that promote patient safety, especially with regard to the elderly admitted to hospitals.

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