

Characterization of the adult patients' falling incidents in a university hospital

Caracterização dos incidentes de quedas de pacientes adultos internados em um hospital universitário

Caracterización de los incidentes de caídas de pacientes adultos internados en un hospital universitario



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ABSTRACT

Objective: To evaluate the occurrences and to characterize the falling incidents of adult patients hospitalized in clinical and surgical units of a university hospital in the southern region of the country, in the period from 2011 to 2014.

Method: Descriptive, cross-sectional and retrospective study, carried out from December 2016 to December 2017. The sample consisted of 1112 reports, covering all hospitalized patients who were notified with falls occurring in the studied period. Data were analyzed using descriptive and analytical statistics.

Results: Female and elderly patients were predominant in the sample, in which 69.4% of the incidents did not present any damage. The occurrence of falls was significantly higher at night. Limitation to walking and being unaccompanied were the most prevalent factors in the patient's conditions before the fall.

Conclusion: The fall is a multifactorial event that requires periodic evaluation of the risk factors by the team to plan their prevention.

Keywords: Patient safety. Accidental falls. Inpatients. Nursing care. Quality of health care.

RESUMO

Objetivo: Avaliar as notificações e caracterizar os incidentes de quedas dos pacientes adultos internados em unidades clínicas e cirúrgicas de um hospital universitário na região sul do país, no período de 2011 a 2014.

Método: Estudo descritivo, transversal e retrospectivo, realizado no período de dezembro de 2016 a dezembro de 2017. A amostra foi de 1112 notificações, abrangendo todos os pacientes internados que foram notificados com ocorrência de quedas no período estudado. Os dados foram analisados por meio de estatística descritiva e analítica.

Resultados: Foram predominantes na amostra os pacientes do sexo feminino e idosos, onde 69,4% dos incidentes não apresentaram dano. A ocorrência de quedas foi significativamente maior no período noturno. Limitação para deambular e estar desacompanhado foram os fatores mais prevalentes nas condições do paciente antes da queda.

Conclusão: Queda é um evento multifatorial que necessita avaliação periódica dos fatores de risco pela equipe para planejar sua prevenção.

Palavras-chave: Segurança do paciente. Acidentes por quedas. Pacientes internados. Cuidados de enfermagem. Qualidade da assistência à saúde.

RESUMEN

Objetivo: Evaluar las notificaciones y caracterizar los incidentes de caídas de los pacientes adultos internados en unidades clínicas y quirúrgicas de un hospital universitario en la región sur del país, en el período 2011 a 2014.

Método: Estudio descriptivo, transversal y retrospectivo, realizado en el período de diciembre de 2016 a diciembre de 2017. La muestra fue de 1112 notificaciones, abarcando a todos los pacientes internados que fueron notificados con ocurrencia de caídas en el período estudiado. Los datos fueron analizados por medio de estadística descriptiva y analítica.

Resultados: Fueron predominantes en la muestra los pacientes del sexo femenino y ancianos, donde el 69,4% de los incidentes no presentaron daño. La ocurrencia de caídas fue significativamente mayor en el período nocturno. La limitación para deambular y estar desatendido fueron los factores más prevalentes en las condiciones del paciente antes de la caída.

Conclusión: La caída es un evento multifactorial que necesita evaluación periódica de los factores de riesgo por el equipo para planificar su prevención.

Palabras clave: Seguridad del paciente. Accidentes por caídas. Pacientes internos. Atención de enfermería. Calidad de la atención de salud.

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INTRODUCTION

Quality measurement has been receiving special attention from health services around the world as a condition for the high standard of customer demand and the need to ensure excellence in assistance offered. A health service can not be considered of quality if the risks of damage are not controlled and the safety of the processes ensured⁽¹⁻²⁾.

As a consequence of the extension of the problem of patient safety in the world in 2004, the *World Alliance for Patient Safety* was created by the World Health Organization (WHO) to define and identify priorities in this area⁽³⁾. According to the WHO, falling is defined as "inadvertently being left on the ground or at a lower level, excluding intentional changes of position to lean on furniture, walls or other objects"^(4,451) and are identified as adverse events related to health care, disrupting patient safety⁽⁴⁾.

The indicator to measure this adverse event used by the Ministry of Health (MH) is the result of the fraction where the numerator is the number of falls occurring in the month and the denominator is the number of patients/day in the corresponding period⁽⁵⁾. In the hospital under study, the control of occurrences related to the number of falls is currently performed through the notification of falls available in the hospital's electronic system, and is usually performed by the nursing staff⁽⁶⁾.

International studies point to a wide variation in the rates of inpatient falls, with values from 1.03 to 4.18/1000 patients/day⁽⁷⁾. In Brazil, there are studies that have shown an incidence of falls of 1.7 to 7.2/1000 inpatients⁽⁸⁻⁹⁾.

Identifying risk factors is clearly the first and most important step in the whole process⁽¹⁰⁾. Risk factors are situations that increase the likelihood of a patient falling. The main risk factor associated with falls is the patient's age, especially when it comes to children under 5 years of age or elderly people over 65 years. Another important condition is the patient's psycho-cognitive state, i.e. when the patient is confused, disoriented, depressed or anxious, there is an increase in the patient's chance of suffering a fall^(5,8).

Chronic diseases such as postural hypotension, convulsions, anemia, urinary and/or bowel incontinence or urgency, previous stroke, previous history of falls, joint or muscle weakness, impairment of the senses, especially vision, gait alteration or impaired physical mobility, or the use of medications such as benzodiazepines, antiarrhythmics, diuretics, laxatives, muscle relaxants, vasodilators are some of the risk factors described as predictors of falls^(5,8).

Based on the arguments listed above and literature findings, the following guiding question emerges from the present study: what are the characteristics of adult patients who suffered falls based on the reports of these incidents? Therefore, this study aims to evaluate the reports and characterize the incidents of falls of adult patients hospitalized in clinical and surgical units of a university hospital in the southern region of the country, from 2011 to 2014.

METHOD

This is a descriptive, cross-sectional and retrospective study with a quantitative approach. This study was derived from the elaboration of the course completion work of one of the authors⁽¹¹⁾. Quantitative research is a way of testing objective theories, analyzing the relation between variables⁽¹²⁾. The hospital under study is a public, university institution located in the southern region of the country, accredited by the *Joint Commission International* since 2013⁽⁶⁾. The institution has 842 beds in total, being 445 beds of clinical and surgical hospitalization, distributed in 13 units of hospitalization of adults⁽⁶⁾.

The population was constituted by the adult patients hospitalized in these units between January 2011 and December 2014. All notifications of occurrence of falls in the delimited period were included in the sample. The sample size was calculated considering a 95% confidence interval and a margin of error of 3%, constituting of 1112 notifications in the period under study. The inclusion criterion was the notification of falls, being an adult patient and hospitalized during the study period. Exclusion criteria were falls occurring in the emergency and psychiatric areas, as well as pregnant women in obstetric areas, incorrectly completed or incomplete reporting forms.

The data were collected in the Management Information system (IS) and database of the Falls Group of the institution in the period from December 2016 to December 2017, by means of an instrument with the variables that compose the standard form previously used in the institution. The variables that compose the instrument are divided into four groups. The first group is to identify the patient, with the variables: name, bed, medical records, age and gender. The second group refers to the characteristics of the incident, which includes the date, time, place and type of fall and the triggering factors for both the patient and the environment. The third group is the patient's condition before the fall, and some of the variables are: disorientation, drowsiness, previous fall, hy-

potension, visual difficulty, among other. The latter group indicates the severity of the damage (grade 0: no damage, up to grade 4: death).

The data were analyzed by means of descriptive and analytical statistics, being the continuous variables described by the mean and standard deviation, and the categorical variables described by the absolute and relative frequency. The Pearson Chi-Square test for adherence was used to evaluate if the distribution of falls between shifts occurred homogeneously, adopting a significance level of 5% ($p < 0.005$). The factorial analysis of the patient's conditions before the fall was performed using the *Varimax* rotation, in which the criterion to determine the factors was the high (*Eigenvalues*) above 1. Factor analysis is defined as "a multivariate statistical method that seeks to identify, from the observation of a set of observed variables, a smaller set of dimensions or structures of variability that would explain, in a significant proportion, the variations of observed variables"⁽¹³⁾. All tests were used with the aid of the *software* SPSS, version 18.0. The project respected all the ethical precepts and was approved by the Ethics Committee of the institution, under number 14-0478 (CAEE: 35069714.7.0000.5327). The norms of Resolution No. 466 from 2012 of the National Health Council were met for research projects involving human beings.

■ RESULTS

The incidence rate of falls in the study period was 1.61 falls/1000 patients/day in 2011, 2.03 in 2012, 1.83 in 2013 and 1.62 in 2014, with a small variation. 1,112 reports of falls have been identified in clinical and surgical adult inpatient units between January 2011 and December 2014. It was verified that in the year of 2012 occurred the largest number of reports of falls, 372 (33.5%).

The predominant age group was 60 to 69 years, with 251 (23.5%) reports, followed by 70 to 79 with 220 (20.6%) reports, and 50 to 59, with 217 (20.4%) reports. Female patients showed a higher number of fall reports, 629 (54.9%). The number of falls reported on the night shift was 423 (43.9%), significantly higher when compared to the other shifts ($p < 0.001$). The severity of the predominant harm was "undamaged", with a frequency of 771 (69.4%) reports, and no grade four (death) notification was reported, as informed in Table 1.

The site with the highest number of occurrences of falls was the patient's room, with 765 (68.8%) notifications. The most prevalent type of fall was of the height itself, with 523 (47%) reports, according to Table 2.

The triggering factors related to the patient and the environment were multiple choice variables, so that more than one option could be selected. The patient related triggering factors that most occurred were slipping, with 281 (25.3%) reports; decreased strength, with 264 (23.8%); and dizziness, with 214 (19.3%). The main triggering factors related to the environment were equipment failures, with 127 (11.6%); wet floor, with 99 (9%) notifications; and absence of grids in the bed, 96 (8.8%), as reported in Table 3.

Table 1 – Distribution of falls notifications according to age, gender, shift, and severity of harm. Porto Alegre/RS, Brazil, 2011 to 2014

Characteristics of falls	n=1112	%
Age group		
18 to 29	44	4.2
30 to 39	108	10.1
40 to 49	135	12.7
50 to 59	217	20.4
60 to 69	251	23.5
70 to 79	220	20.6
>80	90	8.4
Gender		
Female	629	56.6
Male	483	43.4
Shift[†]		
Morning	344	35.7
Afternoon	196	20.4
Evening	423	43.9
No information	149	13.4
Severity of damage		
Grade 0 – No damage	771	69.4
Grade 1 – Contusion without intervention	303	27.3
Grade 2 – Distension, intervention	33	3.0
Grade 3 – Fracture, major intervention	4	0.4
Grade 4 – Death	0	0

Source: Research data, 2017.

[†] Pearson Chi-Square for adhesion ($p < 0.001$).

Table 2 – Distribution of falls reports according to location and type of fall. Porto Alegre/RS, Brazil, 2011 to 2014

Characteristics of falls	n=1112	%
Place		
Bedroom	765	68.8
Bathroom	264	23.7
Aisle	58	5.2
Circulation area	5	0.4
Recreation	4	0.4
Stairs	2	0.2
Others	15	1.3
Types of fall		
From the height itself	523	47.0
Of the bed	340	30.5
From the chair	148	13.3
From the stretcher	17	1.5
Other	87	7.8

Source: Research data, 2017.

Table 3 – Distribution of notifications according to related triggering factors of patient and environment. Porto Alegre/RS, Brazil, 2011 to 2014

Triggering factors	N	%
Patient's triggering factors (n=1111)*		
Slipping	281	25.3
Decreased strength	264	23.8
Dizziness	214	19.3
Confusion	131	11.8
Stumbling	51	4.6
Fainting	35	3.2
Convulsion	12	1.1
Others	252	22.7
Environment related triggering factors (n=1096)*		
Equipment failure	127	11.6
Wet floor	99	9
absence of grids in the bed	96	8.8
Low light	70	6.4
Obstacle	45	4.1
Newly waxed floor	1	0.1
Does not apply	436	43.9

Source: Research data, 2017.

* considering lost records

By analyzing alone the patient's 21 conditions preceded by the fall, the most prevalent factor was the fact that he was unaccompanied, with 723 (65.9%) reports, followed by a limitation to walk, with 601 (54.3%), use of anticoagulant, with 399 (36%) and use of sedatives, with 288 (25.9%) reports. The least reported conditions were: unconscious, with four (0.4%) reports, and hypoglycemia, with eight (0.7%) reports. This variable was also multiple choice, and more than one

patient condition might have been reported before the fall.

The maximum number of conditions reported for the same patient was 12 conditions, and it was found that 784 (71.5%) reports had three or more conditions reported for the same patient. In Table 4, the other 20 conditions of the patient before the fall are described, according to the grouping obtained through the factorial analysis using the *Varimax* rotation.

Table 4 – Distribution of fall notifications according to patient's conditions before fall. Porto Alegre/RS, Brazil, 2011 to 2014

Groups	Conditions	%	Frequency	Factorial Loads**
Group 1	Agitated	12.5	139	.709
	Mechanical containment	3.7	41	.672
	Disoriented	25.8	286	.670
	Bedridden	22.5	250	.590
	Insomnia	10.3	114	.547
Group 2	Canes	10.8	120	.688
	Lower limb prosthetics	1.9	21	.604
	Limitation to walk	54.3	601	.522
	Visual impairment	11.1	123	.444
Group 3	Hypotension	5.8	64	.807
	Dizziness	22.7	252	.711
Group 4	Sedatives	25.9	288	.749
	Sleepy	16.1	179	.669
Group 5	Intravenous Infusion	19.7	218	.712
	Urinary urgency	13.4	149	.435
Group 6	Previous fall	21.9	244	-.704
	Postoperative	2.4	26	.688
Group 7	Hypoglycemia	0.7	8	.727
	Unconscious	0.4	4	.843
Group 8	Anticoagulant	36	399	-.409

Source: Research data, 2017.

** Factor analysis using Varimax rotation, Eigenvalues above 1.

■ DISCUSSION

The fall indicator has been followed within the institution systematically since 2007, being initially described as “incidence of falling from bed”. Over the years, the indicator was adjusted to the way it stands today, in order to meet international goals of patient safety and to align with the recommendations of the Ministry of Health⁽⁶⁾.

During the study period, in 2012 occurred the highest incidence of falls rate (2.03/1000 patients/day), and this was the only period in which the indicator was above the

recommended annual institutional target (<2 falls/1000 patients/day). Although the rate found is above the target established by the hospital, it can be described as within the parameters presented in the national and international literature⁽⁸⁻⁹⁾.

The highest incidence rate in 2012 may be related to movements for quality and hospital accreditation, where there were initiatives to encourage staff to report adverse events, including falls. Several institutional measures were adopted in this period, as the use of Morse Scale to evaluate the risk of falls and the use of a yellow bracelet to sig-

nal those patients with scores above 45 points. Along with this initiative were adopted falls prevention protocols and guidelines for patients and families⁽⁶⁾.

The mean age of patients reporting falls was 58.93 years (SD 15.87), with a minimum age of 18 years and a maximum of 94 years. Adding the age groups from the age of 60, it can be observed that 52.5% (n = 561) of the sample represented elderly people. Changes such as loss of physical mobility and functional capacity associated with the use of several classes of medicines are some of the factors cited in the literature as predictors of falls for this age group⁽⁸⁾. Therefore, the results of the present study corroborate with findings in the literature that point to elderly individuals as one of the groups most susceptible to falls.

The number of reports of falls during the night shift was significantly higher than expected ($p < 0.001$) and confirmed the findings of another study⁽¹⁴⁾. It is noteworthy that the night shift is 12 hours long, compared to the day shifts of six hours, this factor may have influenced the greater incidence of falls in this period, being considered a limitation of the study.

Historically, practical experience in hospital admission units allows us to point out a reduction in nursing staff during the night shift, which may be a factor related to lower vigilance and monitoring of patients in the beds, which could be associated with the greater number of falls at night. This argument can be supported by a study conducted in a hospital of high complexity in Chile, in which it was pointed out that during the day shift nurse gets 20.5 to 24.5 patients and one nursing assistant gets 6.2 to 7.6 patients, already in the night shift, this number ranges from 48 to 57.3 patients per nurse and 7.2 to 9.7 patients per nursing assistant⁽¹⁵⁾.

The female gender was predominant in the sample with 629 (56.6%) notifications. Data that converges with the findings of another study carried out in a hospital of high complexity in the south of Brazil, in the period of January 2011 and June 2012, in which there was a 50.3% occurrence of falls among women⁽⁸⁾. Diverging from the results of the present investigation, two other national studies indicate males as suffering more falls^(9,16).

When evaluating the damage suffered by the patient, the most prevalent in the notifications was "grade zero", with 771 (69.4%) notifications, that is, the patient did not suffer any damage due to the fall suffered. However, 340 (30.7%) reports of falls pointed to the occurrence of some type of damage, between grades 1 and 3.

The patient's room was the place where there were more occurrences of falls, with 765 (68.8%) notifications, corroborating with the findings of another study⁽⁹⁾. The fall

from height itself was reported in 523 (47%) reports of this study, converging with the findings of other studies^(8,16).

The patient related triggering factor most commonly reported in falls reports was slipping, with 281 (25.3%) reports. Decreased strength (23.8%) and dizziness (19.3%) were, respectively, the second and third most prevalent factors in our sample. These findings are in line with results from other studies, which point to dizziness⁽¹⁶⁾ and decreased muscle strength⁽¹⁷⁾ among the most prevalent factors for triggering falls.

Analyzing the environmental related triggering factors, a significant number of notifications characterized as "not applicable" were identified, 436 (43.9%) in this category of variable, which suggests that professionals, in reporting the fall, did not understand that these extrinsic factors could be determinant for the occurrence of the event. Nevertheless, 11.6% of the notifications indicate that there were equipment failures. Even though less prevalent as triggering factors among falls reports, the importance of new studies on environmental factors that may contribute to the occurrence of this adverse event is considered, seeking to identify preventive actions and the education of professionals.

The patient's previous conditions before the most recent fall reports was the fact that the patient was unaccompanied at the time of the fall, with 723 (65.9%) notifications. In the hospital under study, it is the patient's right to have a companion 24 hours⁽⁶⁾. The presence of a companion is important because the nursing staff is not always present, so the companion has the freedom to assist the patient in their mobility.

Isolating the fact of being unaccompanied, it was possible to analyze the patient's previous conditions by means of the factorial analysis, grouping them according to the high correlation between them⁽¹³⁾.

The first group of the study correlated the conditions of agitation, mechanical restraint, disorientation, bed rest and insomnia. This set of conditions find a certain similarity when considered in the hospital practice, since the altered mental state of the patients can be considered a risk factor for the occurrence of the fall⁽⁹⁾. A US study reveals that patients in a state of confusion or disorientation are 2.05 times more likely to suffer a fall⁽¹⁰⁾. Therefore, the literature findings and the results of clinical teaching point to the need to assist the nursing staff to deal with fall risks, thus reinforcing preventive measures.

The second grouping resulting from the factorial analysis adds the conditions of use of walking sticks, use of prostheses in the lower limbs, limitation to walk and visual impairment. The physical alteration of the patient before

the fall is one of the most mentioned conditions in the literature as a predictor of fall⁽⁹⁾.

The literature findings corroborate with those found in this study, since the limitation to walk, with 601 (54.3%) notifications, was the patient's second condition before the most recent fall in the reports of occurrence of this incident. The change in gait and the need for walking aid are conditions present in the Morse scale, which is used to evaluate the risk of falling of inpatients⁽¹⁷⁾. In this sense, it is also reinforced the need for an accurate evaluation of the mobility conditions of patients, as well as the application of risk scales to implement preventive measures for patients with these conditions.

The third group associates hypotension and dizziness. Patients taking antihypertensives may experience symptoms such as dizziness and even loss of consciousness, resulting in the occurrence of fall⁽¹⁶⁾. In addition, postural hypotension is one of the factors that can also cause dizziness and cause this patient to suffer a fall⁽⁹⁾.

The fourth group from the factorial analysis bundles the conditions of use of sedatives and drowsiness. When evaluating pharmacological factors predisposing to the risk of falls among hospitalized patients, a study in a university hospital in the interior of Parana indicates that the use of benzodiazepine medications used for sedation has the adverse effects of somnolence⁽¹⁸⁾.

The fifth group correlated the conditions of intravenous infusion and urinary urgency. It can be inferred that these conditions together represent a difficulty for the patient, since he needs to get up from the bed quickly to move to the bathroom and still deal with equipment connected in peripheral or central accesses.

The sixth group aggregates the conditions of previous and postoperative fall. Patients who had a history of falls are 2.98 times more likely to suffer again a new event⁽¹⁰⁾. Another study indicates that the occurrence of falls before hospital admission may be one of the risk factors for a new fall⁽⁸⁾. Post-operative patients are more vulnerable to the risk of falls due to the surgery performed, besides using various hospital equipment, such as probes or drains, leading to difficulty in walking and self-care⁽¹⁹⁾.

The seventh group correlated by factorial analysis brings the conditions by hypoglycemia and unconsciousness associated. The use of oral hypoglycemic agents may lead to a reduction in glycemic levels which, when not detected early, can progress to loss of consciousness⁽¹⁸⁾.

The last grouping of the factorial analysis resulted in a single condition, the use of anticoagulant. It should be emphasized that the protocol for the use of prophylactic anticoagulants is a measure adopted by the institution, which

determines that most of the medical prescriptions contain this drug, whether or not patients have suffered a fall. It is considered that the use of anticoagulant can be an important factor, which can lead to aggravation of the damage, if the patient suffers a fall⁽²⁰⁾.

As can be seen from the data presented in the research and literature mentioned, the fall is a multifactorial event of great complexity, which can cause temporary or irreversible damages to the patient. The importance of periodic evaluation of the patient's risk factors during hospitalization is important so that the prevention of this adverse event can be performed. It is the commitment of the nursing staff to identify and signal these risk factors, since the nursing staff is the team that spends more time with the patient, constituting an important source for proposing barriers, such as protective measures for hospitalized patients.

These considerations denote the need to invest in training and to encourage health professionals about the importance of reporting incidents, as a management tool and form of learning for continuous improvement of care processes and patient safety.

■ CONCLUSION

The incidence rate of falls assessed by the study remained within the standards presented by national and international literature. It can be noticed that, after the implementation of preventive measures in the year 2012, the rate of incidence of falls has decreased gradually compared to the previous year, but the event still happens inside the institution.

The characterization of reports of falls in adult inpatients points to a group of patients with predominance of females, elderly and who did not present damage as a result of the incident. The night shift, the fall from the height itself and the patient's room were, respectively, the time, type and location of the most frequent falls.

The triggering factors for the patient, which were most marked in the reports, were slipping and decreased strength, however, most of the factors related to the environment was not decisive for the occurrence of falls. Patient conditions before the time of the fall that were most present in the reports were being unaccompanied and having some kind of limitation to walk.

The findings of the study contributed to the knowledge of the profile of patients prone to falls, thus leading to an improvement of the necessary preventive measures and an encouragement to the professionals to carry out the notification of this adverse event, guaranteeing patient safety and qualifying the care provided. Besides contribut-

ing to the engagement of professionals in the prevention and safety of patients, the findings collaborated with the advancement of scientific knowledge for the teaching and training of new nurses, as well as for the expansion of new research on the subject.

Despite contributions to the knowledge about the incidents of falls in hospital institutions, it is important to point out some limitations of the present investigation. The transversal design in a single institution does not allow generalizations. The collection in a database already existing in the institution retrospectively generated difficulties in the identification of information due to incorrect completion by the care team, leading to loss of data.

Finally, it is important to emphasize the emotional exhaustion of the professional when he/she realizes the patient's fall, as well as the damage that such occurrence causes to the image of the organization. These findings reinforce the importance of awareness and permanent concern with the development of studies that subsidize preventive measures that are available to all that relate to inpatient care.

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