

## Characteristics of falls with damage to hospitalized patients

*Características das quedas com dano em pacientes hospitalizados*

*Características de las caídas con daños en pacientes internados*



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### ABSTRACT

**Objective:** Describe the characteristics of falls in patients with damage, their risk factors and injuries.

**Method:** Retrospective and longitudinal study of 260 records of falls with damage of adult patients in clinical and surgical units of a general hospital, from September 2012 to June 2017. Data were collected in May 2018 from the electronic fall and electronic record research instrument, and the statistical analysis was described.

**Results:** There were 260 falls with damage, mostly in the elderly (78%), female (55%), in clinical treatment (68%) and unaccompanied (59.4%). The falls occurred at the same height (63.4%) and in the patient's room (67.3%). The severity of the damage was mild in 80.8% of cases, severe in 11.9% and moderate in 7.3%.

**Conclusion:** Improving understanding of falls and their consequences can assist professionals in identifying and assessing risks and in establishing preventive measures.

**Keywords:** Accidental falls. Inpatients. Patient safety. Patient harm.

### RESUMO

**Objetivo:** Descrever as características das quedas com dano de pacientes, seus fatores de risco e lesões decorrentes.

**Métodos:** Estudo longitudinal e retrospectivo de 260 registros de quedas com dano de pacientes adultos em unidades clínicas e cirúrgicas de um hospital geral, de setembro de 2012 a junho de 2017. Os dados foram coletados em maio de 2018 a partir do instrumento de investigação de quedas e prontuário eletrônico, sendo a análise estatística descritiva.

**Resultados:** A maioria dos pacientes que sofreram queda com dano eram idosos (78%), do sexo feminino (55%), em tratamento clínico (68%) e desacompanhados (59,4%). As quedas ocorreram da própria altura (63,4%) e no quarto do paciente (67,3%). A gravidade dos danos foi leve em 80,8% dos casos, grave em 11,9% e moderado, 7,3%.

**Conclusões:** Melhorar a compreensão sobre as quedas e suas consequências pode subsidiar os profissionais na avaliação dos riscos e no estabelecimento de medidas preventivas.

**Palavras-chave:** Acidentes por quedas. Pacientes internados. Segurança do paciente. Dano ao paciente.

### RESUMEN

**Objetivo:** Describir las características de las caídas de pacientes con daño, sus factores de riesgo y las lesiones derivadas.

**Método:** Estudio longitudinal y retrospectivo de 260 registros de caídas con daño de pacientes adultos en unidades clínicas y quirúrgicas de un hospital general, de septiembre de 2012 a junio de 2017. Se recolectaron los datos en mayo de 2018 a partir del instrumento de investigación de caídas e informes electrónicos, siendo el análisis estadístico descrito.

**Resultados:** Se registraron 260 caídas con daño, en su mayoría en ancianos (78%), del sexo femenino (55%), en tratamiento clínico (68%), y desatendidos (59,4%). Las caídas ocurrieron por la propia altura (63,4%) y en la habitación del paciente (67,3%). La gravedad de los daños fue leve en el 80,8% de los casos, grave en 11,9%, y moderado en 7,3%.

**Conclusión:** Mejorar la comprensión sobre las caídas y sus consecuencias puede subsidiar a los profesionales para identificar y evaluar los riesgos y establecer medidas preventivas.

**Palabras clave:** Accidentes por caídas. Pacientes internados. Seguridad del paciente. Daño del paciente.

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## ■ INTRODUCTION

Fall is defined as the event in which the individual inadvertently comes to stay on the ground or at a lower level, excluding intentional position changes to rely on furniture, walls or other objects<sup>(1)</sup>. It represents one of the most reported and impacting safety incidents in the hospital setting, with rates varying from 1.4 to 13 falls per thousand patients/day, depending on the institution's health care practices and the patient population<sup>(2-6)</sup>.

The main problem related to falls is the occurrence of damage to the patient, which occurs in approximately 30 to 50% of the cases including bruises, bruises, bruises, femoral fractures, hip and skull trauma, and can lead the patient to death in the most severe<sup>(2,4,7)</sup>.

Damaged falls can worsen patients' clinical condition, cause physical limitations and disabilities, increase length of stay, hospital costs, and ethical and legal issues for the institution. The consequences of these events are not only physical, but also psychological and social, especially in the elderly, such as the fear of falling again, loss of confidence in the ability to walk safely, depression, higher rates of hospital readmission and discharge to homes geriatric<sup>(2,4,7-8)</sup>.

In view of the repercussions related to falls, it is imperative that interventions aimed at preventing the event be implemented in the scenario of hospitalization, as well as their monitoring and investigation, since the knowledge of the circumstances involved in the occurrence of falls can support preventive planning.

Studies have already been carried out with the aim of characterizing the falls in the hospital setting<sup>(3,5-6,9)</sup>, but few have specifically deepened the events that caused harm to patients, which is currently a major worldwide health concern, i.e. prevention of injury from falls<sup>(10-11)</sup>.

In view of the above, the guiding question defined for this study was: What are the characteristics of falls that caused damages to patients during hospitalization in a general Brazilian hospital?

Based on this questioning, the present study aimed to describe the characteristics of falls with hospitalized patient damage, risk factors and injuries.

The relevance of this study is to deepen the knowledge about falls with damage in the hospital environment, helping to better understand this event and its consequences for the patient, helping in the planning of preventive interventions. In parallel, by focusing attention on patients' falls, the manuscript also contributes to the strengthening of the ministerial policy expressed in the National Patient Safety Program, which is operationalized through the basic Fall Prevention protocol.

## ■ METHODS

Retrospective longitudinal study, performed in a general hospital of high complexity, private and philanthropic of the South of Brazil, which has 320 beds and accreditation by the National Accreditation Organization (ONA).

The study population consisted of adult patients hospitalized in six clinical and surgical units (IUs), which totaled 259 beds. Inclusion criteria were: adult patients (age equal to or greater than 18 years) hospitalized in the clinical-surgical IUs who suffered a fall during their hospitalization and had the event notified to the institution's Epidemiology and Risk Management Department (SEGER).

The sample consisted of 260 records of patients who suffered falls with damage reported by IUs in the period from September 2012 to June 2017. The data were collected in May 2018, retrospectively from the information obtained in the fall investigation instrument, prepared by the institution's Fall Prevention Group, and in the electronic medical record of the computerized system, using Excel spreadsheets containing data related to the event such as time/shift, location and type, patient information such as gender, age, type of hospitalization, risk factors and the damage suffered. The risk factors recorded in the fall investigation instrument included: age  $\geq$  65 years, altered consciousness level, impaired gait/physical mobility, altered vision, history of falls and use of risk medicines.

The classification adopted for the types of damage was<sup>(12)</sup>: **Mild** – Minor symptoms, loss of function or minimal or moderate damage, but with rapid duration, and only minimal interventions being necessary (e.g. extra observation, investigation, treatment review, mild treatment); **Moderate** – Symptomatic patient, requiring intervention (e.g. additional therapeutic procedure, additional treatment), with increased length of hospital stay, with permanent or long-term damage or loss of function; **Severe** – Symptomatic patient, need for intervention for life support, or large clinical/surgical intervention, causing a decrease in life expectancy, with great damage or loss of permanent or long term function, or associated death.

The descriptive statistical analysis was performed with the help of *Statistical Package for the Social Sciences* (SPSS), version 18.0. The research was approved by the Research Ethics Committee of the institution under CAAE: 94044018.8.0000.5304 and Opinion No: 2,784,568.

## ■ RESULTS

From September 2012 to June 2017, 597 falls were reported in clinical and surgical IUs. The annual incidence ranged

from 1.3 to 2.5 falls per thousand patients/day. Of the total falls, in 260 (43%), damage related to the event was evidenced.

Patients who presented a fall with damage were mostly women (55%), with a mean age of  $73 \pm 11.6$  years, hospitalized for clinical treatment (68%), and presenting risk factors for falls (85%).

The most prevalent risk factors were age  $\geq 65$  years (78%), altered gait/impaired physical mobility (68%), altered consciousness level (35%) and use of at least three risk medicines (31%).

The data regarding the type of fall and the location where they occurred are presented in table 1.

**Table 1** - Types of fall with damage and where they occurred in the clinical-surgical IUs from September 2012 to June 2017, Porto Alegre/RS, 2017. (N=260)

Falls with damage	N	%
<b>Type of fall</b>		
Own height	165	63.4
Bed	59	22.6
Chair/armchair	26	10.2
Toilet	10	
<b>Fall location</b>		
Bedroom	175	67.3
Bathroom	81	31.2
Circulation/corridor area	4	1.5

Source: Research data, 2017.

Most of the patients who presented a fall with damage were alone at the time of the event (59.4%). In 36.8% of the occurrences, they were accompanied by family members or companions, and in 3.8% of the nursing or physical therapy professionals.

Damage from falls was predominantly mild, 210

(80.8%), followed by severe, 31 (11.9%) and moderate, 19 (7.3%). Five deaths from falls (1.9%) were identified. In three cases, the death occurred between five and seven days after the event and, in two cases, in less than 24 hours. Table 2 shows the characteristics of the damages resulting from these falls.

**Table 2** – Characteristics of damages due to falls in clinical and surgical IUs from September 2012 to June 2017, Porto Alegre/RS, 2017. (N=260)

Degree/Type of damage	N	%
<b>Mild</b>	<b>210</b>	<b>80.8</b>
Excoriation	210	100
<b>Moderate*</b>	<b>19</b>	<b>7.3</b>
Cut blunt injury	16	84.2
Light CET	9	47.3
Dehiscence suture	1	5.2
Large laceration	1	5.2
<b>Severe</b>	<b>31</b>	<b>11.9</b>
Fractures	12	38.7
Fist	3	9.6
Femur	2	3.2
Nasal	3	6.45
Tibia	1	3.2

Malleolus	2	6.45
Ribs	1	3.2
Loss of consciousness and/or mental state change	10	32.2
Others <sup>a</sup>	9	29.0

Source: Research data, 2017.

\*Patients presented more than one type of lesion

<sup>a</sup>CET (Cranioencephalic trauma); SAH/SDH (Subarachnoid hematoma/Subdural hematoma); Stroke

The falls with severe and moderate damage involved specific medical and nursing interventions such as dress-

ings, sutures, imaging tests and surgical procedures, as presented in table 3.

**Table 3** - Main conducts after occurrence of falls with moderate and severe damage in clinical and surgical IUs from September 2012 to June 2017, Porto Alegre/RS, 2017. (N=260)

Main conducts after occurrence of damage	N	%
<b>Moderate damage* (n=19)</b>		
Suture	13	68.4
Dressing	17	89.5
Image exams	8	15.7
<b>SEVERE DAMAGE* (n=31)</b>		
Transfer to ICU	4	12.9
Surgical treatment/fracture correction	4	12.9
Conservative treatment/fracture correction	8	25.8
Image exams	26	32.2

Source: Research data, 2017.

\*Patients received more than one type of conduct

ICU - Intensive Care Unit

## DISCUSSION

The falls with damage in the clinical-surgical IUs reported from September 2012 to June 2017 mainly affected women, elderly, gait altered/impaired physical mobility, altered consciousness level and clinical treatment.

Although sex is not considered a risk factor for the event, research shows that men suffer more falls during hospitalization than women, with a prevalence of 53 to 63.7%<sup>(5-6,9,13-14)</sup>, different from the data found in the present study. It should be noted that, in these investigations, the data presented refer to falls in general, without differentiating those that caused damage or not.

Some factors may be associated with the occurrence of falls and injuries in women, such as the higher incidence of osteoporosis, postmenopausal hormone changes, which interfere with postural balance, as well as the reduction of muscle mass<sup>(15)</sup>.

Patients who fell and suffered damage were mostly elderly, like other studies that identified a mean age of 64 to 71 years among those who fall<sup>(5,9,13-14)</sup>.

Fall rates increase with age, considered one of the most important risk factors for the occurrence of the event due to changes related to the aging process such as impairment of functional and cognitive capacity, changes in physical mobility and the presence of chronic- degenerative<sup>(4-5,16)</sup>. In view of this, it is fundamental to establish preventive interventions for falls aimed at the specific needs of the geriatric population during hospitalization.

In addition to old age, other conditions have also been identified in patients who have suffered damage, such as gait difficulty and alteration in the level of consciousness that are intrinsic risk factors to the individual<sup>(4)</sup>.

The presence of weak or impaired gait was identified in 47% of the patients who had a fall in an American hospital, and of these 34% used ambulatory care devices<sup>(6)</sup>. In another study, it was found that 31% of patients who fell had any change in consciousness, disorientation, or agitation<sup>(5)</sup>.

The falls with damage occurred predominantly from the height itself, in the patient's room and in the absence of family member or companion. Falls from one's own height are usually related to the patient's commute to and from

the patient's room, where they spend most of their time in the hospital. This type of fall was also observed to be the most frequent in other investigations<sup>(5-6,9,14)</sup>.

The fact that most of the patients who suffered harm reduction were alone at the time of the event corroborates with the findings of an American study that identified a greater probability of unattended falls resulting in injury to patients when compared to assisted falls<sup>(17)</sup>.

Another characteristic identified was that most patients who fell and suffered damage were undergoing clinical treatment. This type of patient usually has more complexity, due to the presence of comorbidities, polypharmacy, as well as a longer hospital stay when compared to surgical patients, which may increase their susceptibility to falls. Other studies also observed that the clinical hospitalization units had a greater number of falls than the surgical units<sup>(5,13)</sup>.

In the present study, 43% of the total number of events were damaged, being mostly mild (80%), followed by severe (11.9%) and moderate (7.3%). The rate of damage due to falls found in other investigations carried out in the context of hospital admission was 26 to 38.6%<sup>(5-6,8,13-14,17)</sup>.

Hospitalization increases the risk of patients falling because of unfamiliar conditions, which may aggravate previous health conditions such as dementia and problems related to physical mobility (balance/walking) and vision. The unfavorable clinical status of the patient, their degree of fragility, acute illnesses and polypharmacy may also influence both the predisposition to fall occurrence and the severity of the resulting damage<sup>(4)</sup>.

The falls do not occur uniformly in the hospital environment and depend on the patient profile, the characteristics of the unit, the processes and practices adopted, being more prevalent in units with greater numbers of elderly people, in specific areas such as neurology and rehabilitation, or in those with lower nursing personnel size<sup>(8,18-19)</sup>.

It is inferred that the aspects, the multifactoriality of the event and the definition adopted for each degree of severity can be determinant for the variability of the data found in the studies on the occurrence of falls and the associated damages in the different institutions.

Regarding the degree of severity of damage, it was found that falls with mild damage were the most prevalent, like other studies<sup>(5-6,18,13-14)</sup>, where the bruises/abrasions and contusions were the most reported lesions.

The falls associated with severe damage accounted for 11.9% of the events, which included loss of consciousness and/or altered mental status and fractures, observed in 12 (38.7%) of the severe cases. The affected bone structures varied, including wrist and nose fractures as the most frequent ones, followed by femoral and malleolus, tibia and ribs. Among

the patients who suffered fractures, 4 (12.9%) required surgical treatment and 8 (25.8%) of conservative treatment.

The occurrence of fractures due to a fall ranged from 1 to 1.6% in other studies<sup>(5-6,17)</sup> and only one type of fracture was identified, that is, ribs, ankle, fibula and hip<sup>(6)</sup>.

Fractures due to falls, especially in elderly patients, represent an important issue of physical, psychological, economic and social order. The traumatic event may lead to a higher level of dependence due to the physical limitations imposed by the injury, increase hospital costs due to the need for imaging tests, additional therapeutic procedures such as surgeries, and increase hospitalization time, which may also affect the condition of the patient. Fear of falling again, depression and social isolation are some of the psychological repercussions related to falls<sup>(4,7,16)</sup>.

The fractures considered more serious are those of femur/hip, since they are associated with higher rates of morbidity and mortality. The trauma is generally of low energetic load like the one occasioned by the falls of the own height<sup>(16)</sup>.

Several conditions are related to the occurrence of fractures due to falls, such as advanced age, osteoporosis, sarcopenia, malnutrition, cognitive, mobility and balance alterations<sup>(16)</sup>.

The presence of moderate damage was observed in 7.3% of the events, with the occurrence of short-term injuries, mild cranioencephalic trauma, suture dehiscence and large skin laceration. These lesions involved interventions such as suture (5%) and dressings (6.5%). The presence of injuries requiring suture was observed in 1.6% of the falls analyzed in a public hospital in Spain. Falls that caused moderate damage to the patient were also identified in 6% of the events that occurred in a US hospital<sup>(13)</sup>.

It was found that in five cases the fall caused or accelerated the death of the patients due to complications related to severe traumatic brain injury (CET), subarachnoid/subdural hematoma and hemorrhagic stroke. The death rate associated with dropping in US hospitals in 2011 was 0.4%<sup>(17)</sup>.

The TBI is related to high morbidity and mortality rates, especially in the population over 65 years of age, where falls are a major cause. Mortality ranges from 30 to 70% in the most severe cases and sequelae are generally incapacitating and irreversible<sup>(20)</sup>.

It is important to consider that hospitalized patients, generally more fragile and with an unfavorable clinical condition, may present a greater risk of worsening of the injuries caused by falls, such as patients with advanced age, several comorbidities, anticoagulated or even thrombocytopenic. In view of this, a complete risk assessment of patients is essential, with the aid of validated predictive scales adequate to the institutional reality and the patient

profile. Factors related to the risk of bleeding, for example, are not included in the scales of risk assessment, however professionals should institute specific prevention measures aimed at both patients with greater susceptibility to occurrence of the event and lesions.

Since the risk of falls in hospitalized patients cannot be eliminated, due to the complex casuistry of the event that involves intrinsic, extrinsic and behavioral factors of the patient, actions must be performed to at least reduce their consequences, the occurrence of damages<sup>(6)</sup>.

## ■ CONCLUSIONS

The results of this study allowed us to identify the characteristics of falls with damage in hospitalized patients, which represented 43% of the events reported in the period studied. The most prevalent were those of the height and in the patient's room, mainly affecting women, elderly, impaired gait, impaired physical mobility, altered consciousness level and clinical treatment. Most of the lesions were classified as mild (80%) and the death rate was associated in 1.9% of the cases.

Improving the understanding of the occurrence of falls and their consequences in the hospital environment is fundamental in that it can subsidize professionals in the identification and evaluation of risks and in the establishment of more effective preventive measures. In teaching, since it contributes with the nursing knowledge base on the fall event, it can facilitate learning on this subject, as well as the approximation between theory and practice. The present study may also serve as a basis for other investigations focusing on the identification of the main risk factors (intrinsic, extrinsic and behavioral) associated with the occurrence of damage and which interventions may be more effective in their prevention in the hospital environment.

We consider as limitations of this study the retrospective analysis and the collection of data in a single institution, as well as the non-inclusion of other units, such as the emergency, special care unit and the intensive care center because they are units with processes and profile of patients very different from those selected.

Although the academic perspective points out limitations of the study, the managerial perspective has been guided by the results of the monitoring of the events, that is, from the knowledge of the characteristics of the falls with hospitalized patients' injuries, the risk factors and the resulting injuries, allowing the learning of the hospital institution and the establishment of safer care processes, as proposed in the fall prevention protocol.

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