

## Research Article

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# Femoral Fracture due to Accidental Fall among the Elderly Admitted to a Teaching Hospital

Carlos Gorios<sup>1</sup>, Jéssica Vianna Starek<sup>2\*</sup>, Cintia Leci Rodrigues<sup>3</sup>, Jane Eston Armond<sup>4</sup>, Rodrigo Eston Armond<sup>5</sup>, Cleo Chinaia<sup>1</sup>, Valter Carabetta Júnior<sup>6</sup>, Samantha Valencio<sup>7</sup>, Ivan Brozoski

<sup>1</sup>Master in Public Health from the University of Santo Amaro Paulo, Brazil

<sup>2</sup>Master in Orthopaedics and Traumatology from the University of Santo Amaro Paulo, Brazil

<sup>3</sup>Academic of medicine from University of Santo Amaro, Brazil

<sup>4</sup>Coordinator of the Community Health Center and Mental Course of Medicine at the University of Santo Amaro, Brazil

<sup>5</sup>Master's degree in Health Sciences of the University Of Santo Amaro Brazil

<sup>6</sup>Doctor of Education from the University of Santo Amaro Paulo

<sup>7</sup>Municipal Health Department of the City of Santo Amaro Paulo

**\*Corresponding author:** Cintia Leci Rodrigues, Cândido Nogueira da Mota, University of Santo Amaro, Brazil, Tel: +55 11985195224. E-mail: [kikarodrigues@hotmail.com](mailto:kikarodrigues@hotmail.com)

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## Abstract

The fall is one of the leading causes of disability and dependence among the elders, and it's also the direct cause of fractures.

**Objective:** To characterize elderly patients over 60 years or above, that presented femoral fractures due to accidental fall, hospitalized in teaching hospital.

**Method:** This was a descriptive, retrospective, cross-sectional study. The sample was composed of all patients, aged over 60 years, submitted to hospitalization with a primary diagnosis of femoral fracture (S72) and admitted in the period of January to December of 2013, who suffered an accidental fall. During the study period, there were 75 hospitalizations of elderly patients with the diagnosis of femoral fracture, due to accidental fall.

**Results:** Femoral fractures were higher in females (68.0%), among elderly aged 80 years and above (41.3%). The length of stay in the hospital was over 7 days (45.3%). The procedures performed in elderly patients with femoral fractures due to accidental fall were: surgical treatment of transtrochanteric fracture (46.7%).

**Discussion:** The femoral fracture has been considered a common and important cause of functional loss among the elderly. The social cost is considered high, since the elderly often require intensive medical care and rehabilitation programs.

**Conclusion:** This work follows the epidemiological characteristics presented in the scientific literature, such as the femoral fracture due to accidental fall predominating in female elders aged 80 years and above while the place of occurrence is their residence.

## **Keywords:** Aged; Femoral Fractures; Accident Prevention

## **Introduction**

Although population ageing is recognized as a worldwide phenomenon, it occurs rapidly and abrupt, in developing countries such as Brazil [1].

In Brazil, it has been perceived an accelerated growth of the elderly in the age pyramid, this being a multifaceted social phenomenon that requires multidisciplinary confrontation [2,3]. Along with this demographic transition, the increase of the non-transmissible chronic diseases is one of the main characteristics of the epidemiologic transition process [4]. The process of epidemiological and demographic transition experienced by Brazil, in recent decades, brings a number of issues for managers and researchers of health care systems [5]. This means a greater demand of health care services, such as: medications, medical consultations and long term hospitalizations, resulting, therefore, in higher costs [6]. Among the diseases characterized by this new profile, the consequences caused by falls can be mentioned [6].

Frequent among the elderly, the accidental fall has a prevalence and incidence that vary according to the age group. The main consequences of the fall are the decline of cognition and physical conditions, with increased risk of further falls, in addition to the worsening of life quality related to health dimension and the fear of falling again. The fall is among the leading causes of disability and dependence in the elderly, and it's also the direct cause of fractures [7]. The causes of falls among elderly people can be grouped into intrinsic factors, those associated with the physiological changes resulting of the aging process, such as pathological conditions and use of medication, and extrinsic factors, which are connected to environmental hazards, due to architectural and furniture in adequacies, in which most elderly are exposed to [8,9]. Since falls are one the main problems, the most varied lesions may be mentioned, especially fractures, notably the femoral fractures [10]. Femoral fractures are among the most common traumatic injuries in the elderly population, it may occur in the proximal and distal region, or in the femoral diaphysis. According to Muniz et al (2007), this type of injury causes higher mortality (15%) in the first year after the fracture. This type of fracture represents a significant loss of functional capacity and requires surgical treatment and hospitalization. It is a serious consequence that influences the life quality of the elderly, since it is associated with high levels of functional disability, longer hospital stay and an increased need of companion after hospital discharge [10, 11].

The purpose of this study was to characterize the elderly patients aged 60 years and above, in which presented femoral fractures due to accidental fall, hospitalized at teaching hospitals in the southern region of São Paulo, in 2013.

## **Methods**

This is a quantitative, descriptive and retrospective approach, of a cross-sectional study. The sample consisted of all the patients aged over 60 years submitted to hospitalization, with the main diagnosis being femoral fracture (S72), according to the International Classification of Diseases (ICD-10), admitted in the period between January and December of 2013, who have suffered accidental fall.

The DATASUS database was used as a source of population data collection and those related to morbidity, while in the Hospital Information System, specifically in the Hospital Admissions Authorizations and in the Violence and Accident Surveillance System by means of suspected notification form and/or confirmed accidents and violence, we sought to identify the variables: primary diagnosis (femoral fracture), gender (male and female), age groups (age in years), type of accidental fall (the same level, from one level to another, from bed and unspecified falls), place of occurrence (home, asylum, public roads), time of occurrence (day and night), hospital length of stay (days), area of specialty, procedure performed and hospital expenses of people aged 60 years or older who had been interned by the Unified Health System (SUS), in a teaching hospital of the southern region of São Paulo.

During the study period, there were 75 admissions of elderly patients with a diagnosis of femoral fracture due to accidental fall. For analysis of results, the data were entered into a spreadsheet and analyzed using descriptive statistics, and the results are presented in absolute numbers and percentages in (Table-1) and (Figures).

Performed Procedure	Total AmountPaid
Diagnosis and/or urgent care in surgical clinic;	311.67
Conservative treatment of fracture / ligament injury / bone wrenching to level of the pelvis;	739.16
Arthroplasty for partial hip;	8,066.36
Surgical treatment of fractures / proximal physeal injury (neck) of the femur (synthesis);	773.04
Surgical treatment of fractures of the femoral diaphysis;	4,638.65
Surgical treatment of intercondylar fracture / of the femur condyles;	895.88
Surgical treatment of supracondylar fracture of the femur (distal metaphyseal);	1,022.67
Surgical treatment of transtrochanteric fracture.	28,410.74
Total:	44,877.23

**Table 1:** The amount spent (real currency) per procedure, performed in elderly with femoral fractures, due to accidental fall assisted in teaching hospital in the year of 2013



**Figure 1:** Local photos, the domicile of the resident population around the Teaching Hospital.

The research project does not need approval of the Ethics Committee in Research of the University and Hospital, as it comes to use of secondary data in the public domain database, as recommended by the National Council of Health (CNS) 466/12.

## Results

During the year of 2013, there were 249 admissions for accidental falls with the elderly, and 30.1% of these hospitalizations (75 cases) corresponded to femoral fractures. Among the accidental falls of elderly who had primary diagnosis of femoral fracture, these types of fall were: fall on the same level (14.7%), fall from bed (4.0%), fall from one level to another (14.7%) - mainly fall on steps and stairs, and fall without specification corresponded to 66.7% of the cases.

Regarding the location of occurrence of the fall, were: the residence of the elderly (81.3%); public administration (5.3%) and asylum (1.3%); being the time of occurrence during the day (7 am to 6:59 pm), corresponding to 49.3% of the cases.

The femoral fractures were higher in females (68.0%), among those aged 80 years and above (41.3%), and white (49.3%).

According to the specialty of where they were hospitalized: 72.0% in surgery and 28.0% in medical clinic.

The length of stay in the hospital was longer than 7 days (45.3%). It was observed in this study, that the higher the age of the elder, the higher the length of hospital stay. The elderly who remained more than 7 days in the hospital belong to the age group of 80 years and over (44.1%).

The procedures performed in elderly with femoral fractures due to accidental fall were: surgical treatment of transtrochanteric fracture (46.7%), conservative treatment of fracture / ligament injury / bone wrenching up to the level of the pelvis (12.0%), partial hip arthroplasty (9.3%) and surgical treatment of femoral shaft fractures (8.0%).

In the same period analyzed, the hospital expenses for accidental fall among the elderly were US\$ 74,116.07. The medical assistance for the elderly hospitalized with femoral fracture represented 60.5% of the annual expenditures by accidental fall in this teaching hospital (US\$ 44,877.23).

## Discussion

The present study showed recent data that allowed the evaluation of hospitalization behavior for femoral fractures in the elderly, due to accidental fall. Thus, describes that in the period between January and December of 2013, there were 249 hospital admissions for accidental falls in the elderly, femoral fracture corresponded 30.1% of these hospitalizations (75 cases).

The data presented are widely known in the literature, however, Brazil is going through a rapid growth of the elderly population, along with this demographic transition also occurs epidemiological transition, leading to several dilemmas for society and for the government [1]. The educational level is one of the indicators in the characterization of the socioeconomic profile of the population, and in relation to the elderly population. The literacy indicator is considered a barometer of Brazilian educational policies of the past. The education of the elderly is low, especially among women, thus, lower educational level, the lower the income, and subsequently lower the value of retirement.

Regarding the epidemiological transition there is a higher prevalence of chronic disease, requiring a different planning because of the serious consequences that can bring to society if not controlled. Poverty in areas of lower socioeconomic status, may have a negative impact on living conditions, creating inequities in access to health services [2].

The teaching hospital studied is located in a peripheral region of São Paulo. This region is located about 30 km from the center of São Paulo, it has an area of 92 km, and with a population of approximately 450,000 inhabitants. It is

the most populous district of the city of São Paulo. This area, due to its location in the suburbs, had an irregular occupation of territory, a part of this occupation is at risky areas, and 18% of the total population lives in slums.

## In Reference

If we observe the distribution of the user population, exclusively from the Public Health System maintained by the Brazilian government in the region where the Teaching Hospital is located, we can see that 65% is a user of this system only, having no private health plans and no access to private health services.

According to the literature, the femur fracture has been recognized as a common and important cause of mortality and functional loss among the elderly, especially proximal fractures. The social cost is high, since the elderly often require intensive medical care and rehabilitation programs for long periods [12-14].

There was a higher incidence among female patients (68.0%), aged 80 years and above (41.3%), and with white skin (49.3%). Although similar studies always show higher female incidence, the difference found between the genders is partly explained by the lower female bone density after menopause [15].

The femur fracture is the most feared consequence of osteoporosis, being associated with high morbidity and mortality [16]. Some authors point out that femoral fracture is more prevalent in women, for this group is more exposed to risk factors, for the greater prevalence of osteoporosis, greater susceptibility to fall, and also for having a life expectancy greater than men [16,17]. A limitation of this study did not make it possible to evaluate the osteoporosis, for these data were not submitted in the records of suspected/confirmed cases of accidents and violence, and not even in the hospitalization authorization form.

Femoral fractures due to accidental fall occur, predominantly, from someone's eighth decade and beyond. The increase in femur fracture percentage, related to older age and female gender, is in accordance with the literature. Great part of femoral fractures in elderly is secondary to falls, more common in older age groups, which present greater health complications [13,17].

The prevalence of falls in this population were: fall on the same level (14.7%), fall off the bed (4.0%), fall from one level to another (14.7%) - especially falling from steps and stairs, and fall without specification corresponded to 66.7% of the cases.

The data relative to accidental fall among the elderly 66.7% were unspecified, that is, it has not been possible to assess whether the elderly fell on the same or different levels.

Thus, it is evident the fragility of the data presented, which is a limitation of the study. These data feed into a National System of Hospitalization Information, which are contained in the form to authorize the hospitalizations.

The data must have a sufficient quality level, so that they can generate an indicator that allows knowledge of the reality. Therefore, it must give due importance to the correct completion

of documents, and to the standardization process, which can minimize the differences in the generation of information.

The causes of falls in the elderly can be varied and be associated. The factors responsible for them have been classified in the literature as intrinsic, due to physiological changes related to ageing, diseases and effects caused by use of medication, and as extrinsic factors that depend on social and environmental circumstances that create challenges for the elderly [9,18].

Most falls occurred in the actual residence of the elderly and during the day, probably when they perform their every day activity. Given the importance of falls as a health problem for the elderly, measures should be taken as basic safety care and prevention in the occurrence of falls, at least in the situations where they are connected to environmental factors [19].

In relation to the length of hospital stay, it was longer than 7 days (45.3%). It was observed in this study, that the higher the age of the elder, the higher the length of hospital stay. A study conducted by Campos et al (2007), showed

Average hospitalizations stay about six days. In a study performed by another author, he quoted that most elderly who have suffered a fall remained hospitalized in a period of one to ten days [20, 21].

Some factors are related between the lengths of hospitalization among the elderly. Some studies have shown that physical activity and the elder's autonomy tends to reduce their hospital stay. With age, the individual tends to decrease their physical activities, which can result in decreased functional capacity. Although, the length of hospital stay depends on many other variables [22].

The used treatment modality was surgical. The surgical treatment of transtrochanteric fractures (46.7%). Next, we have the conservative treatment of fracture / ligament injury / bone wrenching at the level of the pelvis (12.0%), partial hip arthroplasty (9.3%), and surgical treatment for femoral diaphyseal fractures (8.0%). This study is in agreement with other studies [23, 24].

Different proportions found in the types of surgical procedures reflect the differences in the incidence of fracture

Topography, since it will all depend upon the procedure, performed directly at the fracture location. For example, transtrochanteric fractures are usually treated with synthesis with plate and sliding screw, or with proximal femoral stem, while femoral neck fractures are more commonly treated with hip arthroplasty [24].

The growing global concern around the proximal femur fractures in the elderly is based, not only in co morbidities resulting from the fracture and its treatment, but also the economic impact

they represent to payers and society [24].

The hospital where the study was conducted receives directly the elderly patients after the fall. The patient suffers a fall, most often in their homes (81.3%) and is taken by ambulance or by their own means, to the Emergency Room of the Hospital, where receives the first medical care. Once diagnosed the fracture of the femur, the patient has on its behalf, an Hospitalization Authorization (AIH) issued, authorizing treatment and hospitalization. Begins then, the clinical staging process and schedule for surgery. After the surgery and care required afterwards, the patient receives a discharge.

In Brazil, the discharge occurs to the patient's home or to institutions for the elderly.

The percentage of elderly patients submitted to a conservative treatment for lack of surgical condition was 28%. This is also related to the time elapsed between trauma and surgery, as being longer according to studies conducted in Brazil, different from international studies that show precocity in this service.

Another limitation of this study it was not obtained the information about the time between the fall and the treatment provided, as well as the bad filling in the forms related to hospitalization, it was not possible to assess the presence of comorbidities in these patients. It is now known that many drugs used for the elderly, can cause discomfort and dizziness, providing the falls.

The resolution on the type of treatment (surgical or medical) and the time until surgery, directly influences in hospital costs, such as the value of the daily ward, materials and, physical therapy costs.

The duration of hospitalization of the elderly with hip fracture, is one to seven days in over half the cases, ally with the high percentage of hospital discharges, illustrate the deficiency in relation to the continuity of care for the elderly who suffered hip fractures.

Even if the hospital has resulted in successful surgery, it would be necessary to refer the patient to rehabilitation and clinical treatment of osteoporosis, in order to prevent the occurrence of new fractures. So, most likely, elderly patients who fractured the femur and sought care, left the hospital to go back to the house without guarantees of adequate assistance, that can ensure quality of life.

The high degree of morbidity and mortality associated with femoral fractures, with their need for hospitalization and surgical and intensive care in the immediate and late postoperative period, lead to significant costs for the different

Health systems this study showed that the expenditure by the

Unified Health System was R\$ 141,363.26 for the year of 2013, in the teaching hospital. However, this value does not include rehabilitation, post operative out patient care and medication [24,25]. Publications on the economic impact of femoral fracture caused by accidental fall in Brazil are scarce [26], and the costs do not end with the hospital discharge, for the cost of healthcare remains significant until the patient's rehabilitation [27].

The determination of femoral fracture incidence due to accidental fall in many countries, and even across multiple locations within the same country, has shown great variability of rates, leading to the suspect of several factors. The fall among the elderly is considered an event that could be avoided. Knowledge of these factors in each population could help managers of health policies to take preventive measures, in order to reduce a condition with large epidemiological and economic impact [28].

## Conclusion

This research reveals that the patients studied follow the epidemiological characteristics of other series presented in the scientific literature, such as femoral fractures due to accidental fall predominating in female elderly aged 80 years and above while the place of occurrence is their residence. Although, the fall of the elderly is a multidimensional event, current knowledge indicates that the occurrence of this condition is lead by a combination of factors. Many of them are easy to control, and the understandings of how these risk factors contribute to the fall, allows health professionals to develop appropriate intervention measures.

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