

## Prevalence of hip and lower limb fracture in the city of Aracaju, Brazil

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**Objectives:** To analyse the prevalence of hip and lower limb fracture in the city of Aracaju (Sergipe) using data from the Fundação de Beneficência Hospital de Cirurgia from June 2008/2009 and comparing with results from studies of same nature developed by Komatsu (2004) in 1994/1995 in the city of Marília (São Paulo) and Muniz et al (2007) in 2003/2005 in Paraná. **Methods:** Fracture types, age and gender were analyzed from 1200 patient files and divided into two different groups according to age, 30 – 50 years old and over 60's. **Results:** It was verified that 343 of overall patients were female and 857 were male. The incidence of lower limb and hip fracture according to age average was higher for individual gender ( $p < 0.05$ ). The most frequent location for fractures on women over 50 years old was the femur (8.36/10,000 inhabitants,  $p < 0.05$ ). The tibia/fibula was the type of fracture most common in man (12.5/10,000 inhabitants,  $p < 0.05$ ) from 30 to 50 years old, followed by the femur (1.72/10,000 inhabitants,  $p < 0.05$ ). **Conclusions:** The incidence of lower limb and hip fractures was increased in male individuals from Aracaju-Brazil and the profile of fracture differs with age and body location.

**Key words:** bone fracture; inferior limb; incidence of fracture

**Objetivo:** Analisar a prevalência de fraturas no quadril e membros inferiores na cidade de Aracaju (Sergipe), utilizando dados fornecidos pela Fundação de Beneficência Hospital de Cirurgia no período de Junho 2008/2009, comparando com os resultados obtidos pelo estudo semelhante realizado por Komatsu (2004) em 1994/1995 na cidade de Marília Marília (São Paulo) e Muniz et al (2007) em 2003/2005 no Paraná. **Métodos:** Foram analisados os tipos de fratura, idade e gênero dos laudos de 1200 pacientes e divididos em dois grupos diferentes de acordo com a idade, 30 – 50 anos e acima de 50 anos de idade. **Resultados:** Verificou-se que, do total, 343 pacientes eram mulheres e 857 eram homens. De acordo com a média de idade, a incidência de fraturas no quadril e membros inferiores foi maior por gênero individual ( $p < 0.05$ ). O local de fratura mais frequente em mulheres acima de 50 anos de idade foi no fêmur (8.36/10,000 habitantes,  $p < 0.05$ ). A tibia/fíbula foi o tipo de fratura mais comum entre os homens (12.5/10,000 habitantes,  $p < 0.05$ ) de 30 a 50 anos de idade, seguida do fêmur (1.72/10,000 habitantes,  $p < 0.05$ ). **Conclusão:** Houve um aumento na incidência de fraturas no quadril e membros inferiores em indivíduos masculinos de Aracaju-Brasil e o perfil de fraturas.

**Palavras chave:** fratura óssea; membro inferior; incidência de fratura

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## 1. INTRODUCTION

Bone fractures are considered a major public health problem in Western society, not only for being related to a high mortality rate [1] but also for having a great impact onto the health system. According to the Brazilian Ministry of Health, over R\$81 million were spent on elderly hospitalization and medical supplies in 2009. Those fractures were usually associated to osteoporosis and the aging process [2, 3], although fractures in elderly individuals can also be related to loss of visual accuracy, muscle weakness, balance impairment, neurological and cardiovascular diseases [4].

Osteoporosis is a chronic progressive disease that frequently affects elderly women, although it can occur in both sexes and age groups. It is characterized by low bone mass and loss of bone tissue with consequent increase of bone fragility. It is one of the main causes of hip and femur fractures and can lead to the patient's permanent disability [4, 5]. This severe consequence could limit mobility and daily activities [6] and it also means large financial implications to the patient's family and Public Health Programs.

The incidence of hip fractures varies between different geographic regions around the world. There is a high prevalence of these fractures in European countries going from north to south with Norwegian, Sweden, Denmark showing the highest rates and lower rates in countries around the Mediterranean. In Brazil, there are only a couple of studies related to the incidence of hip fractures, all of which were developed in the countryside of the Southeast and Northeast regions.

This study aimed to analyse the prevalence of hip and lower limb fracture in the city of Aracaju (Sergipe) comparing with results from other two major studies of same nature developed by Komatsu and colleagues [7], and to Muniz and colleagues [8].

## 2. MATERIAL AND METHODS

A retrospective and descriptive epidemiological study was carried out in Aracaju using data base (medical records and surgery registry) from the Fundação de Beneficência Hospital de Cirurgia from June 2008/2009. This hospital is considered a reference in the city and attends around 4,800 fracture cases per year.

A total of 1,200 fracture cases that occurred during the 2008-2009 period were evaluated and classified according to age, gender, and type of fracture. In this study, it was only considered hip and inferior limb fractures such as femur, patella, tibia/fibula, calcaneus and tarsus/metatarsus. Exclusion criteria were fractures from pathologic primary bone tumors or metastatic disease.

In order to verify all different fracture locations (Metatarsus/Calcaneus, Tibia, Fibula, Tibia/Fibula, Femur, Patella, Ilium/Ischium/Pubis, Femur/Tibia/Fibula), in both genders, it was taken into consideration two different age groups such as 30 to 50 years old and over 50's.

The incidence rate of lower limb and hip fractures obtained was organized into groups according to patient's age band. It was adjusted for 10,000 inhabitants in order to obtain the fracture incidence, method usually adopted by other authors [7, 8].

The results obtained from both genders were presented as mean  $\pm$  S.E.M. and the data was analyzed using Student's t test and Qui-square test for two conditions when appropriated and then systematized by GraphPad Prism, version 4.00 for Windows (GraphPad Software, San Diego, CA, USA).

The research was registered at the University Hospital Ethics Committee for Human Experimentation under the number 0082.0.107.000-10.

## 3. RESULTS AND DISCUSSION

During the study period, 1,200 patient files from Aracaju City were evaluated according to incidence of lower limb and hip bone fracture. Overall, 343 female patients (28.6%) and 857 male patients (71.4%) files were analyzed. They represent an incidence rate of 0.93 and 2.35, female and male patients, respectively.

An increasing pattern was found from fractures number following male and female aging process (Figure 1). However, there was a higher preponderance of males age >50 with lower limb fractures, when compared to females of same age as shown on Figure 1. In addition, it was found that every 10 individuals from 10.000 inhabitants presented Tibia (9.4), Fibula (3.63), Tibia/Fibula (22.8) and Femur (15.5) fractures, whereby the appointed values are related to the male group only ( $p<0.05$ ) when compare to female group with the same age (30 – 50 years old) (Figure 2).

When analyzing man femur fractures from both age groups (over 50 years old), it was observed an diminished difference of over 9% for those over 60's ( $p<0.05$ ) as shown on Figure 3. Therefore, there was a discrepancy on femur incidence fracture among women aged 30-50 years old with women over 50's showing a higher number of fractures and a difference of 95% when compared to women's rates ( $p<0.05$ ), evident on Figure 4.

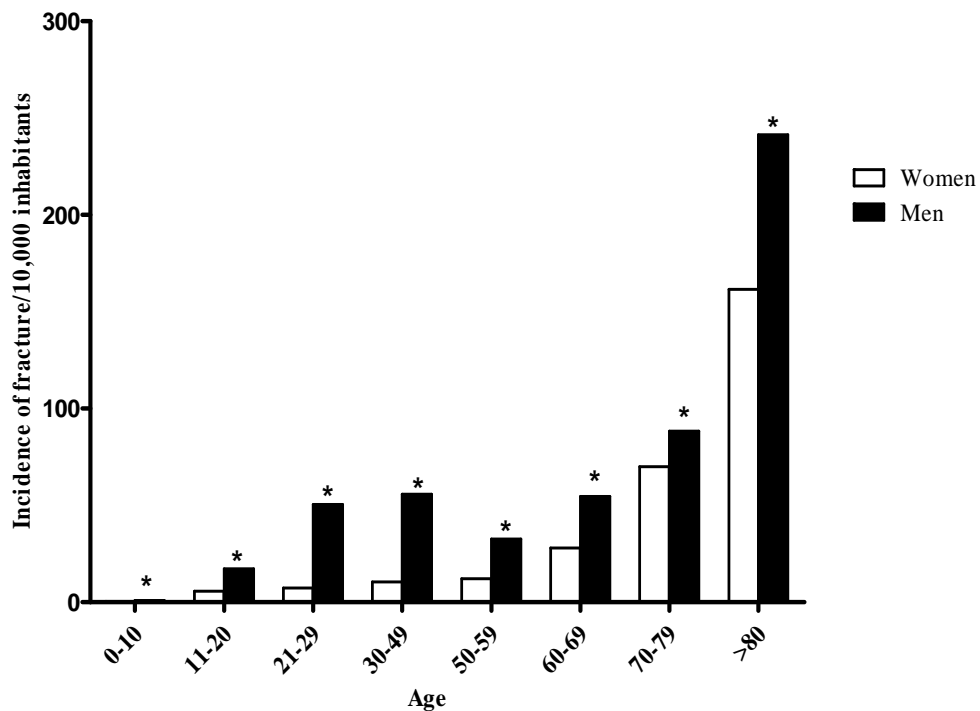


Figure1: Incidence of the fractures in the hip and the lower limbs of men and women with the different age in the city of Aracaju, Sergipe, Brazil. The data were collected from January of 2008 to January of 2009. The data represent the values of the fractures grouped by age groups of men and women living in the city Aracaju, Sergipe, Brazil. Qui-square was used to evaluate the data (\* $p<0.05$ ).

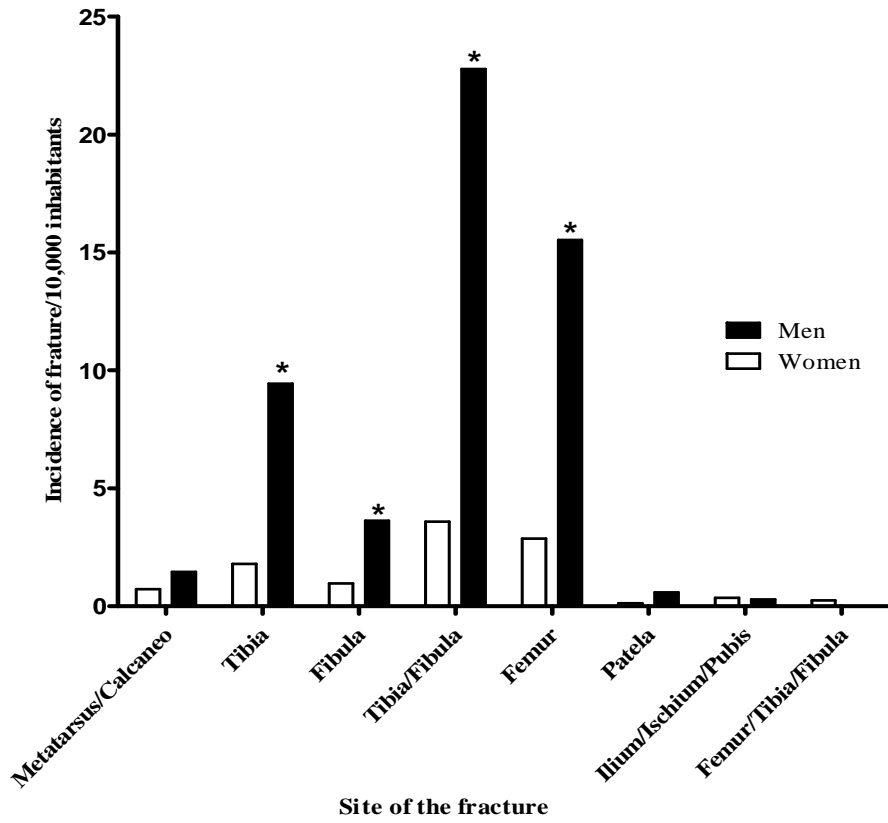


Figure 2: Incidence of femur fractures among men and women with 30 to 50 years old the population living in Aracaju, Sergipe, Brazil. Data were collected from January 2008 to January 2009. Qui-square was used to evaluate the data (\* $p < 0.05$ ).

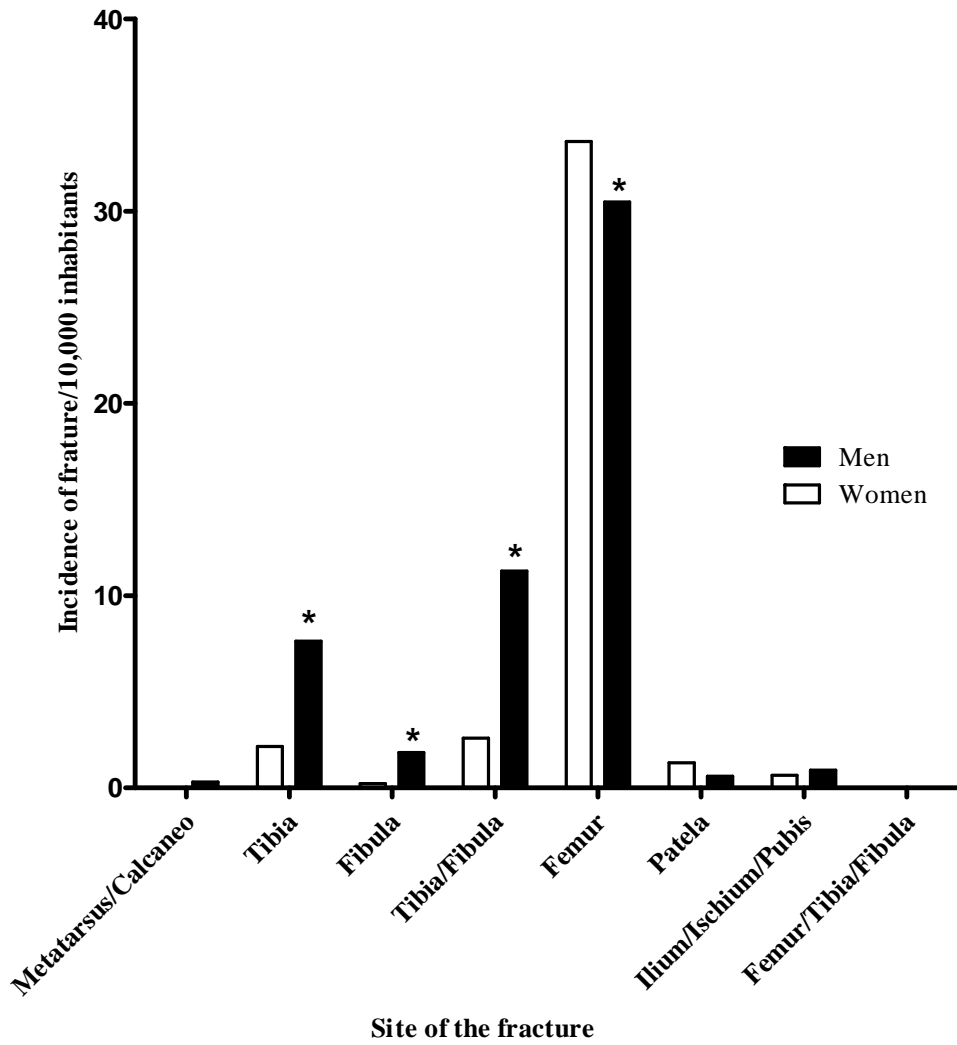


Figure 3: Incidence of femur fractures among men and women with >50 years old the population living in Aracaju, Sergipe, Brazil. Data were collected from January 2008 to January 2009. Qui-square was used to evaluate the data (\* $p < 0.05$ ).

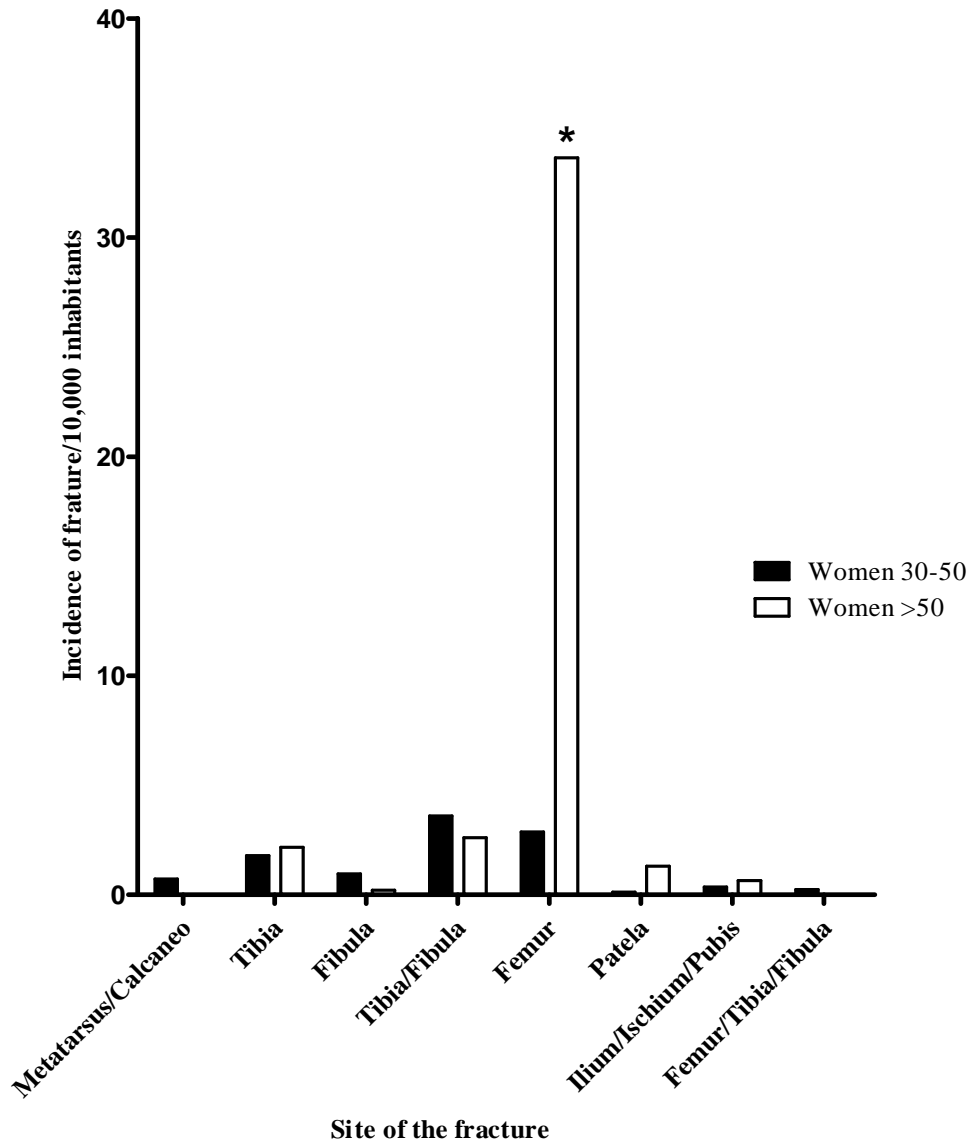


Figure 4: Incidence of femur fractures among women aged 30-50 years old and women aged over 50 years old the population living in Aracaju, Sergipe, Brazil. Data were collected from January 2008 to January 2009. Qui-square was used to evaluate the data (\* $p < 0.05$ ).

The incidence of hip and lower limb fracture demonstrates an increase in male's rate in comparison to female, as show for individual's age 30 - 50 years old. However, there was a higher incidence of femur fracture in women over 50 years old. This information is relevant since these factors contribute to a best assessment from the Public Health Committee and shows the same pattern as the one found by [7]. He analyzed the incidence of femur fractures from 1994-1995 in the town of Marilia, located in the middle east of São Paulo State (Brazil) and found significant increase number of femur fractures on male individuals from 20-49 years old (0,54 / 10.000 inhabitants in 1994 and 0,79 / 10.000 inhabitants in 1995). This could be related to a great impact force on bone structure occurred more frequently among young males.

According to Silveira et al (2005) [5], elderly females have an increased number of fractures due to osteoporosis, a disease that affects bone structure, making it more fragile and susceptible to falls. Moreover, women are more susceptible to develop osteoporosis than men. This data is similar to those found for individual's age 80 – 89 years old (40.45%) in a study developed by Muniz et al in a Public School Hospital in the North region of Paraná (Brazil) [8]. Others

authors shown an incidence rate of 36.64/10,000 inhabitants in his epidemiological study in 1996 and there was also a higher rate for females (27.99%) from 71 – 80 years old in the epidemiological study developed by [9].

A high mortality rate is described in the literature after a hip bone fracture, which varies from 11 – 23% at 6 months and 22 – 29% at 1 year from injury [1]. Some authors also suggest that the incidence of fractures may be related to climatic factors. This can be observed at Silveira et al (2005) [5] that reported a decrease in fractures in elderly population from Fortaleza (Ceará/Brazil) owing to high incidence of sunlight in this city. Moreover, sunlight act as an important factor for vitamin D bones absorption and mineral metabolism. This suggests that the influence of climate and other variables such as rain, food, genetic and socioeconomic factors can contribute to this framework. In Europe, for example, the incidence is decreased in countries near the Mediterranean [10].

The incidence of hip fractures in bones is not limited to the femur (a common reality in the elderly), since we have found a significant increase in the tibia or fibula bones, and tibia/fibula simultaneously in males. These results may be related to general workers of Aracaju city, which would also explain the higher fractures incidence in males compared to females. Further studies are needed to detect other variables that may influence the age band in individuals under 50 years old.

#### 4. CONCLUSION

In conclusion, the incidence of bone fractures of the lower limb was increased in males from Aracaju-Brazil. However, when analyzed the incidence of bone fractures in the femur correlated with age above 50 years old, the incidence was relatively higher in older women when compared to men. These data suggest that the profile of bone fractures of lower limb and hip bones differs when we use age and body location as variable factors in residents from Aracaju city.

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