

# Epidemiology of Traumatic Injuries in the Elderly Patients: A Descriptive Study From a Developing Country

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**Abstract-** The epidemiology of traumatic injuries in elderly patient fractures varies widely among countries. There is quantitative information to determine the prevalence and gender/age distribution of traumatic injuries in the elderly patient. The aim of the current study was to reveal the prevalence and age and gender distribution of various traumatic injuries in an elderly patient refers to as a tertiary orthopedic hospital in Iran. In a prospective descriptive study, all elderly patients with traumatic injuries attending the Orthopedic Trauma Unit of our center in 2001-2011 were included. Demographic details, the cause of injury, injury classification was recorded. For each gender, we calculated the numbers with fractures, dislocations, soft tissue injuries, ligamentous injuries, and lacerations and derived average age and gender-specific prevalence. During a period of 10 years, a total of 1172 elderly patients were admitted, 588 (50.1%) males, and 584 (49.9%) females. 849 patients (72.4%) had fractures. 323 (27.5%) of the patient had other limb injuries were include soft tissue injuries, lacerations, ligamentous injuries, and dislocations. The three most common fracture sites were proximal femur (40.02%), distal radius/ulna (12.47%), and proximal humerus (6.53%). The most prevalent traumatic injury among the elderly was fractures with a higher rate in females. The most common fracture sites were proximal of the femur and distal of radius and ulna bones.

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## Introduction

Musculoskeletal traumatic injuries have been among the most common causes of morbidity and mortality in developing nations (1). These injuries have various culprits, for instance, taking part in combats (2), sport-related traumas, or motor vehicle accidents (3). However, the most important risk factor afflicting the elderly and making them prone to such injuries is considered osteoporosis. It is, by far, the most common metabolic bone disease, which was estimated to affect over 200 million people worldwide (4). Senile osteoporosis is typically seed in persons aged 70 years or older. Many individuals experience morbidity associated with the pain, disability, and diminished quality of life caused by osteoporosis-related fractures. According to a 2004 Surgeon General's report, osteoporosis and other bone diseases are responsible for about 1.5 million fractures per year in the United States of America (USA). Based on

the WHO assessment, the number of fractures caused by osteoporosis increase more than three-fold over the 50 next year as a result of the aging population (5). Osteoporosis-related fractures such as fragility fractures (due to decreased bone density) result in annual direct care expenditures of \$12.2 billion to \$17.9 billion in developed countries (6). The impact of osteoporosis fracture in developing countries is not clear. Therefore, we aimed to determine the prevalence and gender/age distribution of traumatic injuries in the elderly patient. The results of this report would be applicable to proper management and care in the geriatric ward.

## Materials and Methods

We began a prospective study of elderly patients ( $\geq 70$ -year-old) who had referred to the tertiary Orthopedic Trauma center in Tehran from 2001 to 2011. All the elderly patients with traumatic injuries of the

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musculoskeletal system were initially included. Demographic details, the cause of injury, injury classification, and treatment were recorded on a database, and subsequent statistical analysis was carried out with SPSS version 25 to calculate the frequencies, gender ratio, and significance of differences between both sexes. The number of different fractures in males and females was also added to the database. Distribution curves were used to illustrate the results. This study was approved by the medical ethics committee of the orthopedics department of Shariati hospital. Patients were informed and were taken related to written consent.

## Results

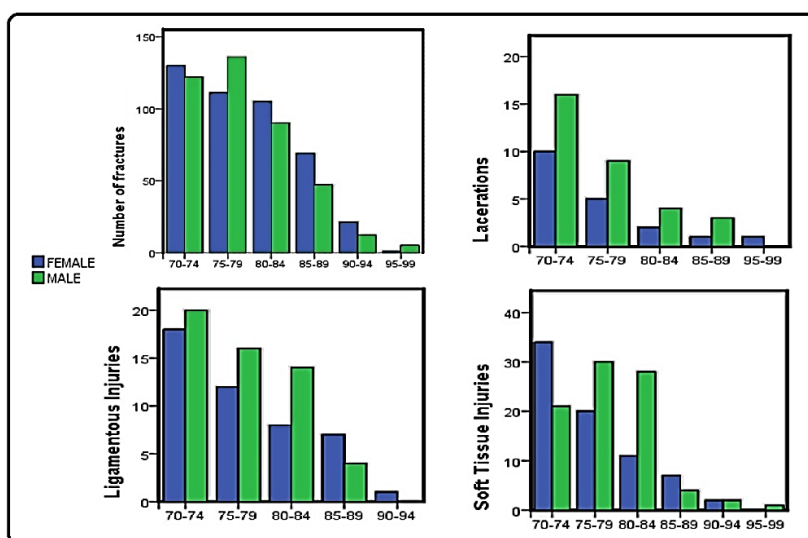
During a period of 10 years, a total of 1172 elderly patients were admitted, 588 (50.1%) males, and 584 (49.9%) females. Fractures were by far the most prevalent injury. 849 patients (72.4%) had fractures, 412 (48.5%) in males and 437 (51.5%) in females. The other 323 (27.5%) limb injuries were classified into four groups: soft tissue injuries, lacerations, ligamentous injuries, and dislocations (Table 1).

**Table 1. The Prevalence and Gender Ratio of Injuries**

Injury Classification	Number	Male	Female	Gender Ratio M/F	Prevalence (%)
Fractures	849	412	437	0.94	72.44%
Soft Tissue Injuries	160	86	74	1.16	13.65%
Ligamentous Injuries	100	54	46	1.17	8.53%
Lacerations	51	32	19	1.68	4.35%
Dislocations	12	4	8	0.50	1.02%
<b>Total</b>	<b>1172</b>	<b>588</b>	<b>584</b>	<b>1.01</b>	<b>100%</b>

Subgroups age and sex distribution. Related curves are presented in Figure 1. In all types of traumatic injuries, men outnumbered women (*i.e.*, gender ratio < 1)

except in fractures and dislocations. Trends and distributions of different types of injuries are illustrated in Figure 1.



**Figure 1.** Distribution of injuries in elderly

There are some interesting points that merit attention. Overall trends are the declining incidence of injuries. Additionally, the incidence of fractures in males reaches its peak between 70 and 79-year-old. Male patients suffered more from soft tissue injuries than females in 75-

79 and 80-84 age groups. The three most common fracture sites were proximal femur (40.02%), distal radius/ulna (12.47%), and proximal humerus (6.53%) (Table 2).

Table 2. The Prevalence and Gender Ratio of Fractures

Fracture Class	Male	Female	Total Number	Gender Ratio (M/F)	Prevalence (%)
Proximal Femur	154	183	337	0.84	40.02%
Distal Radius/Ulna	54	51	105	1.06	12.47%
Proximal Humerus	25	30	55	0.83	6.53%
Ankle	20	21	41	0.95	4.87%
Tibial Diaphysis	17	23	40	0.74	4.75%
Pelvis	15	15	30	1.00	3.56%
Metatarsal	11	13	24	0.85	2.85%
Metacarpal	11	9	20	1.22	2.38%
Finger Phalange	10	9	19	1.11	2.26%
Forearm	13	6	19	2.17	2.26%
Humeral Diaphysis	13	4	17	3.25	2.02%
Carpus	5	11	16	0.45	1.90%
Femoral Diaphysis	6	10	16	0.60	1.90%
Clavicle	6	8	14	0.75	1.66%
Proximal Tibia	5	9	14	0.56	1.66%
Distal Humerus	9	4	13	2.25	1.54%
Fibula	6	6	12	1.00	1.43%
Patella	9	3	12	3.00	1.43%
Distal Femur	3	3	6	1.00	0.71%
Spine	6	0	6		0.71%
Midfoot	2	4	6	0.50	0.71%
Calcaneus	2	3	5	0.67	0.59%
Acetabulum	1	4	5	0.25	0.59%
Toe Phalanges	1	3	4	0.33	0.48%
Proximal Forearm	1	1	2	1.00	0.24%
Distal Tibia	1	1	2	1.00	0.24%
Scapula	1	0	1		0.12%
Cesamoid	0	1	1	0.00	0.12%
<b>Total</b>	<b>407</b>	<b>435</b>	<b>842</b>	<b>0.94</b>	<b>100%</b>

## Discussion

This study is unique in such a way that it highlights important trends in the frequency of traumatic injuries, especially fractures, in elderly patients, over a 10-year period in a developing country. We report the prevalence of common traumatic injuries, specifically fractures, in patients admitted to a major referral hospital.

Osteoporosis is the major problem health mainly responsible for fragility fractures occurring in elderly adults (mostly older than 75-year-old). In previous research prevalence of hip fracture report as the most serious consequence of osteoporosis, but in this study, we also report other injuries may have associated with osteoporosis.

Because of the absence of a fracture registry in developing countries, the data available from these countries are limited. Memon *et al.*, shown hip fractures in Kuwait as a result of osteoporosis are higher than western Europe, North American countries, and developed countries in Asia (7).

The predominance of female fractures in this report is probably due to the greater effect of postmenopausal bone mass reduction (8). Interestingly, Cooper *et al.*,

discovered that in age group 50-74, an independent risk factor for hip fractures is the reduction in bone mass; however, in patients over 75-year-old, it plays a minor role and impairment of protective neuromuscular responses become more prominent (9).

We found out that proximal femur and distal radius/ulna are the most common fracture sites, as observed in previous studies (8,10,11). Nonetheless, always some differences exist in results owing to trauma patterns and predisposing factors.

Due to the lack of surveillance systems for fractures in developing countries, epidemiologic studies are relatively inaccurate. In spite of all the limitations on conducting an accurate study, we carried out research comparable to those done in standard orthopedic data collection systems. The shortcomings of our study would be that it only involved one center and, therefore, a specific population. Moreover, our focus was not on discussing related mechanisms of injuries, medical comorbidities, and other risk factors. Future works could pay attention to these aspects as well.

In conclusion, the fracture was the most prevalent traumatic injury among the elderly, with more prevalence in females and the most common fracture sites were

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proximal of the femur and distal of radius and ulna bones. The results of this study can be useful for more precise treatment and care of elderly patients, appropriate resource allocation, and thorough medical staff training in geriatrics wards.

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