



## Anatomical Prevalence of Fractures among Admitted Patients in a Tertiary Care Hospital: A Retrospective Study

Authors

Dr Nusrat Jabeen<sup>1</sup>, Dr Irfan Ul Ashraf<sup>2</sup>, Dr Aamir Hakak<sup>3</sup>, Dr Malik Naseer Ahmad<sup>4</sup>,  
Dr Sakib Arfee<sup>5</sup>

<sup>1</sup>Associate Professor Anatomy Government Medical College Jammu, India

<sup>2,4,5</sup>Resident Orthopaedics Government Medical College Jammu, India

<sup>3</sup>Senior Resident Orthopaedics Government Medical College Jammu, India

### Abstract

**Introduction:** *The aim of this study is to determine the anatomical distribution of fractures among admitted patients in a tertiary care hospital.*

**Methods:** *This is a retrospective study of patients admitted in Government Medical college Jammu for a period of one year showing relevant clinical information like age, gender distribution, bone fractured, site of bone fractured and anatomical location of fractures. The results obtained were analyzed in frequencies.*

**Results:** *In our study 1788 cases of admitted patients with fractures were studied from may 2017 to June 2018. Fractures were seen more in males than female. Around 66% of patients belonged to age group of 21-60 years. Appendicular skeleton (92.78%) was involved more than axial skeleton (7.21%). Femur being most common fractured bone (24.60%).*

**Conclusion:** *Our study concluded that in admitted patients with fractures has male predominance with lower limbs affected more than upper limbs. The anatomical location of fractures study provided an overview of fracture distribution in the population catered by our hospital. Multiple strategies for fracture prevention, basic treatment, training, formation of protocols and infrastructure are needed for better health care delivery.*

### Introduction

Fractures are an important though not fully quantified part of work load of a tertiary level hospital. Fracture has been defined as break in continuity of bone (Frey and Lutwick, 2009). The causes of skeletal fractures are multiple. In majority of cases, a bone fracture is either due to a high impact trauma or a medical condition such as osteoporosis that causes the bone to be too weak to withstand even minimal stress. Road traffic accidents (RTA) are responsible for a substantial

proportion of deaths & skeletal injuries and are responsible for more years of life lost than most human diseases (Marshall and Browner, 2012). Road traffic accidents in worldwide accounts for around 1.2 million deaths and over 50 million injuries annually (World Health Organization, 2004). Other causes include Fall from Height, Gunshot injuries, assault and sports injuries. Most fractures are associated with other injuries particularly head injury. Trivial trauma can lead to pathological fractures associated with

osteoporosis, primary bone tumours, metastases. Fracture incidence increases with increase in age in both sexes. Fractures can occur in any bone in the body and may range from a hairline fracture, which is hard to detect and may heal with no medical interference, to more serious formats such as compound fractures that damage the surrounding skin or tissue. The type and anatomical location of fracture is determined by the mechanism of injury, age of the patient, associated medical problems.

The systematic collection and analysis of data is the essence of fracture epidemiology. Its application to clinical practice allows clinicians to compare affected with unaffected patient groups, determine definable and preventable characteristics that predispose to skeletal fracture, and ensure the provision of appropriate treatment strategies.

Cummings, P et al. in their review of the methodological challenges facing all injury epidemiologists, identified several key areas including the definition and classification of injuries and the importance of defining the population at risk.

### Materials and Methods

Ours is a one year retrospective study of 1788 patients which involved records of all patients admitted under department of orthopedics in GMC Jammu from May 2017 to June 2018. Relevant clinical information like Age, gender, Bone involved, anatomical location of fracture and associated injuries were studied. The study was undertaken to determine anatomical distribution of fractures so that strategies can be developed to provide basic treatment & referral pathways, to design better protocols for investigations & treatment of these fractures, to know the need of developing specialized orthopedic clinics and to have a better planning in health care delivery.

Data generated was analyzed in frequencies.

### Results

The results of our study are depicted in table 1-10

**Table 1** Age of patients with fracture

Age group	No. of patients	%
0-20	380	21.25 %
21-40	698	39.03%
41-60	489	27.85 %
>60	221	12.36 %

**Table 2** Gender Distribution.

Sex	No.of patients	%
Male	1201	67.17 %
Female	587	32.82 %

**Table 3** Anatomical location

Skelton	No.of patients	%
Axial	129	7.21%
appendicular	1659	92.78 %

**Table 4** Location in axial skelton.

Spine	No. of patients	%
Cervical	42	32.55 %
Dorsal	38	29.45 %
Lumbosacral	49	37.98 %

**Table 5** Bones involved in upper limb

Bones	No. of patients	%
Scapula	18	1.0%
Clavicle	28	1.5%
Humerus	146	8.1%
Radius	86	4.8%
Ulna	48	2.6%
Radio ulnar	116	6.4%
Hand	42	2.3%

**Table 6** Bones involved in lower limb.

Bones	No. of patients	%
Pelvis	52	2.90%
Femur	440	24.60%
Patella	52	2.90%
Tibia	262	14.65%
Fibula	67	3.74%
Tibia fibular	259	14.48%
Foot	43	2.40%

**Table 7** Antomical Location of fractures.

Bone	Proximal	Middle	Distal
Clavicle	3 (10.71%)	16 (57.14%)	09 (32.14%)
Humerus	38(26.02 %)	46(31.05%)	62( 42.46 %)
Radius	24 (27.90%)	47(54.65%)	15(17.44%)
Ulna	26( 54.16%)	13(27.08%)	09( 18.75%)
Radio ulnar	13( 11.20%)	82(70.68%)	21(18.10%)
Femur	202(45.90%)	166(37.72%)	72(16.36%)
Tibia	82(31.29%)	105(40.07%)	75(28.62%)
Fibula	09(13.43%)	16(23.88%)	42(62.68%)
Tibio fibular	63(24.13%)	152(58.23%)	46(17.62%)

**Table 8** Location of Hip Fractures

Fracture	No. of patients	%
Intertrochanteric	96	50.52 %
Neck Femur	56	29.47 %
Subtrochanteric	38	20 %

**Table 9** Location of foot fractures.

Bones	No. of patients	%
Tarsal	22	51 %
Metatarsal	15	34 %
Phalanges	06	13%

**Table 10** Location of Hand Fractures.

Bones	No. of Patients	%
Carpals	10	23.80 %
Metacarpal	24	57.14 %
Phalanges	08	19.04 %

## Discussion

Our study recorded 1788 cases of admitted patients of fractures over a period of 1 year. Fractures were seen more in males (67.17 %) than females (32.82%) signifying men being more exposed to risk factors and more active on account of occupation. Around 66% of patients belonged to age group of 21-60 years, as this constitutes the most active and productive age group. Fractures were seen more in lower extremity with femur (24.60%) being the most single bone fractured. In upper limb humerus (8.1%) being the most common fractured bone. The results are similar to a study in which the humerus was found to be most common fractured bone in upper extremity (Admasie et al., 2009).

The anatomical location of fracture is determined by various factors. Mechanism of injury being a significant factor which determines anatomical location of a fracture. Fall from height being the most common cause of spine fractures followed by RTA. Cervical spine fractures are particularly associated with head injury. In our study most spine fractures were caused by fall from height. The similar study by Leucht P, et al 2009 also showed same results. Long bone fractures were more commonly seen in RTA with femur being most common single bone fractured followed by tibia. Similar observations were reported by several authors (Admasie et al., 2009; Okoro and Ohadugha 2006; Olaitan, 2003).

Age of patient is factor determining the anatomical location of fractures. With age osteoporosis becomes evident so a trivial trauma can cause fractures. There is exponential increase in hip fracture prevalence with age (Samelson EJ, et al, 2002). Fractures around hip were seen more in adults and elderly patients with intertrochanteric fracture of femur being most common fracture. In elderly it occurs due to osteoporotic bone associated with a trivial trauma [Parkkkari J, et al 1999]. In our study intertrochanteric fracture (50.52%) was most common fracture around hip followed by fracture neck of femur (29.47%) and subtrochanteric fractures (20.0%). Similar results were reported in study from north India in 2013 (Dhanwal DK, et al, 2013).

Osteoporosis being the most common cause of fracture in trivial trauma and pathological fractures. [Scott JC, 1990]. In our study osteoporotic fractures predominantly occurred around hip.

Pelvic fractures are mostly caused by high velocity trauma and are associated with intraabdominal injuries [G.V Poole and E.F Ward, 1994]. In our study acetabulum (46.42%) was most fractured part in pelvis followed by rami fractures (36.53%).

In hand metacarpals were most common fractures bones (57.14%). Nearly 76% of fractures were seen in metacarpals and phalanges. Carpal bones were involved in only 10% of cases.

In foot around 50% fractures were seen in tarsals with calcaneum (68.18%) being most common bone fractured. Metatarsals and phalanges were seen in around 47% of patients.

## Conclusion

In our study we concluded that in patients admitted with fractures have male predominance with lower limbs affected more than upper limbs. Appendicular skeleton involved more than axial skeleton. Anatomical location of fracture within body is determined by the mechanism of injury, age of patients, osteoporosis etc. The location of

fracture within a bone varies from different bones. The anatomical location of a fracture within body and in a single bone were studied. This provided an overview of fractures occurring in the population catered by our institution. Multiple strategies for prevention of fractures due to various causes are required. Better protocols and development of specialized orthopedic skills and appropriate interventions and infrastructure are needed for better health care delivery.

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