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Original Research Article

Epidemiology of fractures in indoor patients at a tertiary care centre in India: a study of 3000 cases

Mohan M. Desai, Deven R. Kuruwa*, Easwar Elango, Roshan Wade

Department of Orthopaedics, Seth GS Medical College, Mumbai, Maharashtra, India

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***Correspondence:**
Dr. Deven R Kuruwa,
E-mail: generalkuruwa@gmail.com

ABSTRACT

Background: Implementing appropriate fracture control measures and treatment protocols is crucial to maximizing health and development gains. This requires an in depth understanding of age-specific, sex-specific and cause-specific injury patterns at the national and subnational levels. No such study on fracture epidemiology has been undertaken in the Indian population.
Methods: Study was conducted in a tertiary care centre (KEM hospital, Mumbai) which is one of the highest volume trauma centres in the country. Data of 3000 patients was obtained from the medical records department for the year 2016-2019. Patients were segregated with respect to their genders and into three age groups. Etiology of fracture was noted, and fractures classified according to the anatomical area. Whether the patient received conservative or operative management was also recorded.
Results: 43.83% of the fractures occurred in 18-50 years age group. 41.33% in the above 50 group and only 14.73% in the below 18 age group. Overall male to female ratio was 1.4: 1. Vehicular accident was the most common mode of injury (47.07%) followed by fall from height (21.03%). Proximal femur fractures were the most common accounting for 19.57% of all fractures followed by forearm (10.53%), tibia diaphysis (8.10%). Talus was the least common. 81.07% cases were managed operatively and 18.93% conserved.
Conclusions: Our study highlights that Indian epidemiology is unique from our Western counterparts. Population affected is much younger, old age males are affected more than females. Lower limb fractures are more prevalent and road traffic accidents are responsible for almost half the fractures.

Keywords: Age distribution, Sex ratio, Most common, Road traffic accident, India

INTRODUCTION

Trauma is a major cause of morbidity and mortality across the globe. Apart from being a major economic burden it is also the leading cause of death and functional disability in young adults.[1] As fractures are secondary to trauma, studying its epidemiology will help in evaluation and formulation of public health decisions and implementing appropriate fracture control measures. This requires an in depth understanding of age-specific, sex-specific and cause-specific injury patterns at the national and subnational levels.

Since our institute is one of the highest volume trauma centre in this country, providing state of the art healthcare for almost a century with cases being referred to us from all over the country, we believe our database would be a representation of the epidemiology of our nation. No such study on fracture epidemiology has been undertaken in the Indian population.

METHODS

This retrospective, observational study was conducted after approval from the Ethics and Research Committee, data on all patients with fractures from 2016 to 2019 was obtained from the medical records department of the tertiary care center. Patients managed on OPD basis and skull, face, rib fractures were excluded from the study.

Age and sex of the patients was noted and divided into three age groups – below 18 years, 18-50 and above 50 years.

Etiology was classified as vehicular accident, industrial accident, sports injury, fall from height, trivial trauma, no trauma or others (weapon injuries/ assault/ crush).

Fractures were classified according to Anatomical areas commonly recognized by Orthopedic Surgeons (example- proximal humerus/ humerus diaphysis/ distal humerus/ clavicle/ scapula etc). Whether the patients were managed with conservative or operative methods was also noted. The data was cross checked with ward admission logbooks and operating room registers for accuracy. The statistical analysis was done by using Statistical package for social sciences (SPSS) version 24.0; SPSS Inc. Chicago, Illinois, USA.

RESULTS

3000 fracture cases admitted in the tertiary hospital meeting the inclusion criteria were evaluated in our study, and the following observations were made from the data collected.

Out of the 3000 cases, 43.83% of the fractures occurred in patients in the 18-50 years age group. 41.33 % in the older age group 50 years and only 14.73% in the below 18 age group (Figure 1)

1772 (59.07%) were males and 1228 (40.93%) were females (Figure 2). The ratio between males and females was 1.4: 1. Male to female ratio was found to be the maximum in 18-50 age group.

Vehicular accidents emerged as the mode common (M.C) mode of injury (Figure 3) causing 1412 fractures making up 47.07% of all the cases, 2nd most common was fall from height (21.03%). Low velocity injuries like fall from standing height, twisting injuries, slipping etc were included under Trivial trauma and made up for 19.53% of the fractures. 3.77% were due to sports injuries, 2.47 % due to industrial accidents.

Fractures occurring without any history of trauma accounted for 2.07% of the total. 4.07% of the fractures were attributed to other injuries. Fractures were classified based on their anatomical location and arranged in decreasing order of frequency (Figure 4). Proximal femur fractures were the most common accounting for 19.57 percentage of all fractures followed by forearm (10.53%), tibia diaphysis (8.10%).

Table 1: Overall fracture distribution.

Anatomical Site	No. of patients	Percentage
Proximal Femur	587	19.57
Forearm	316	10.53
Tibia Diaphysis	243	8.10
Distal Radius	208	6.93
Proximal Humerus	181	6.03
Proximal Tibia	160	5.33
Distal Humerus	144	4.80
Femur Diaphysis	141	4.70
Proximal Forearm	123	4.10
Distal Tibia	118	3.93
Humerus Diaphysis	116	3.87
Distal Femur	106	3.53
Ankle	102	3.40
Pelvis	74	2.47
Patella	66	2.20
Cervical Spine	57	1.90
Dorsal Spine	53	1.77
Calcaneum	51	1.70
Lumbar Spine	34	1.13
Clavicle	31	1.03
Scapula	21	0.70
Metatarsal	15	0.50
Carpal	14	0.47
Metacarpal	10	0.33
Phalanx	8	0.27
Sacrum	8	0.27
Toe Phalanx	6	0.20
Talus	4	0.13
Tarsal	3	0.10
Total	3000	100

Least common fractures seen were those of tarsal bones and talus – 3 and 4 cases respectively.

Spine fractures divided into cervical, lumbar, dorsal and sacrum accounted for 152 cases (5%). 2432 cases were operated (81.07%) and 568 (18.93%) were managed non operatively or conservatively (Table 1).

The ratio between the two being 4.3: 1.

DISCUSSION

Our study shows that vehicular accidents remains the major cause of fractures accounting for almost half the cases.

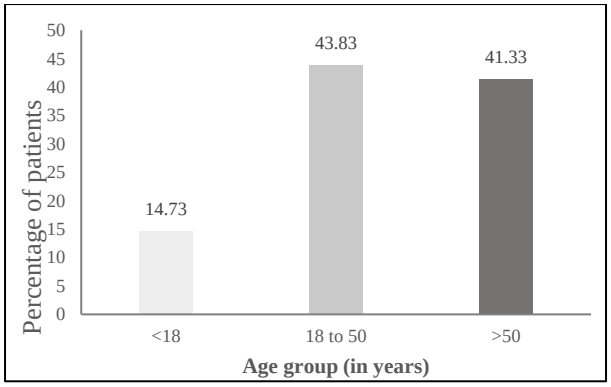

Figure 1: Age distribution.

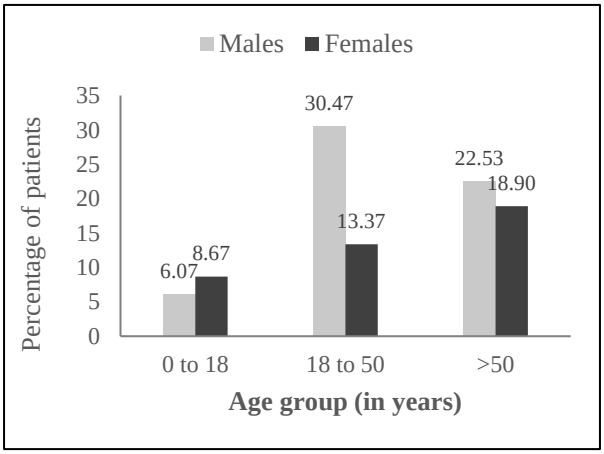

Figure 2: Gender distribution.

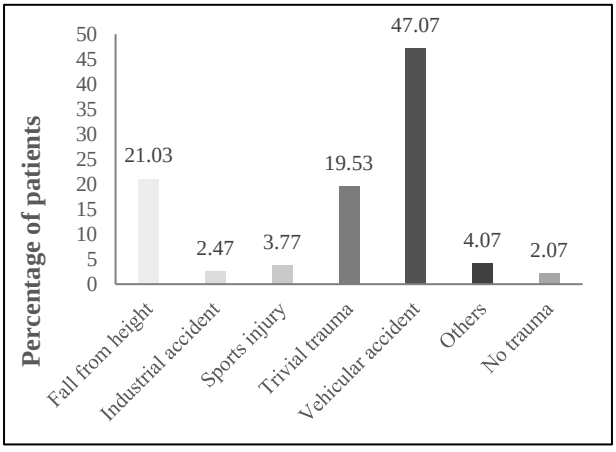

Figure 3: Mode of trauma.

The distribution of mode of trauma found in our study matches those of Indian studies but significantly differs from the Western data where vehicular accident was not the most common cause.[2,3] It is reported that 16 Indian citizens get killed and 53 get injured every hour on Indian roads.[4]

Data from national health portal of Indian government shows that drunken driving to be responsible for 70% of road fatalities and according to the Global status report on road safety 2013, India tops the global list of deaths due to road accidents.

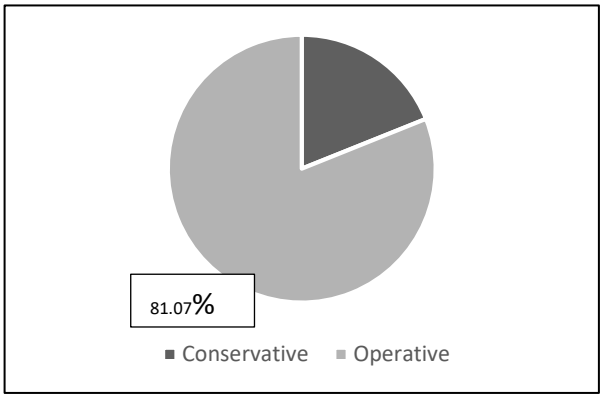

Figure 4: Management.

In our study, the peak incidence of fractures found in our study was between 18-50 years of age, which is younger than the average age reported in the western literature where the older population is more affected.[5] Vehicular accident was found to be the most common mode of injury in this age group, highlighting the dire need to control this preventable mode of injury.

Comparison with other studies show a similar male dominance in the 18-50 age group.[6] Though the incidence of females in our study increased dramatically in the above 50 age group, they were still outnumbered by males contrary to studies conducted in the western world.[3] This may be suggestive that osteoporosis may not only be associated with elderly females in our country.

Our findings on fracture patterns and mode of trauma agree with those of the other observers, but there are some differences.[7,8] Since our study only included indoor patients, fractures which are generally managed on an outpatient basis were found to have a lower prevalence in our study: clavicle, distal radius and ulna, carpals, metacarpals, finger phalanges, ankle, metatarsals and toe phalanges.[9-15] Consequently, fractures of the major bones like humerus, radius and ulna, spine, pelvis, femur, patella, tibia which require hospitalization were found to have a higher prevalence in our study.[16-22] The prevalence of scapula, tarsus and proximal humerus fractures paralleled the prevalence from Western studies.[23-25]

CONCLUSION

The distribution of fracture patterns in our study will help institutions in allocating resources in the emergency rooms like beds, splints, braces, surgical implants etc. The results of this study highlight the burden of road traffic accidents. Central and state governments have implemented measures against drunk driving, set speed limits, implemented fines, have worked for providing safer roads yet the expected results are not to be seen. 18-50 age group are the most common victims of accidents. Since this is the

working population, apart from the government expenditure on the treatment, economic output is also affected.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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