A Demographic Study of Fractures in Patients Presenting to A Tertiary Care Hospital in Peshawar Pakistan: A 10-Year Retrospective Analysis

Mohammad Ahmed Arsalan Khan, Omer Nasim, Zainab Hussain

ABSTRACT

Objective: To determine the frequency, aetiology and age distribution of different fractures in patients presenting to a tertiary care centre in Peshawar.

Methods: This was a descriptive cross-sectional study, conducted at Rehman Medical Institute, Peshawar, Khyber Pakhtunkhwa in the months of March 2018 to September 2018. A total of 1829 records related to fractures were obtained from the hospital archives. All fractures from all causes were taken into consideration, with in-patient records from 2004 to 2014 period. Data obtained was entered into MS Excel 2013 and were analyzed through formulating pivot tables. Percentages of the site-based fractures with three sets of age brackets were determined.

Results: The total fractures were 1829 in 72.9% (n=1334) males and 27.1% (n=495) female patients. Individuals in the age group 15 to 64 years were in majority (67.3%, n=1230). The most common site of fracture was femur (38%, n=695) and least common scapula (0.3%, n=5). The most frequent (37.5%) cause of fracture was road traffic accident (RTA) and majority cases (29) were reported in 2013.

Conclusion: A general trend of lower limb fractures followed by upper limb and spine can be depicted from the data at hand. The most commonly occurring fracture was that of the femur with majority of the patients involved being in the 15 to 64 years age group. These fractures occurred mainly due to road traffic accidents.

Keywords: Fractures, Road Traffic Accidents, Trauma.

This article may be cited as: Khan MA, Nasim O Hussain Z. A Demographic Study of Fractures in Patients Presenting to A Tertiary Care Hospital in Peshawar Pakistan: A 10-Year Retrospective Analysis. J Pak Orthop. Assoc 2019;31(3):

INTRODUCTION

Injuries and trauma are significant contributors to mortality and morbidity in developing nations such as Pakistan, being within the top ten causes of disabilities and a factor for burden of disease.[1] Traumatic fractures on their own are a huge load on the health-care systems internationally. Studies done previously have pinpointed several risk factors for particular subpopulations or fractures. These include increased age, smoking, osteoporosis, alcohol intake, obesity, sleep disorders, and one's occupational and living environment.[2,3] Fractures related to age are predicted to increase based on the growth of the elderly fraction of the population which is at the highest risk.[4] Owing to this increase in aging populations, worldwide expenditure due to osteoporotic fractures are estimated to increase by 25% from 2010 to 2025.[5]

There were approximately 9 million osteoporotic fractures annually in the year 2000, out of which 1.6 million were at the hip, 1.7 million at the forearm and 1.4 million were clinical (symptomatic) vertebral fractures.[6] In 2004, the US Surgeon General's report[7], accordant with figures obtained from the United Kingdom,[8] suggested that an estimated one in five men and one in two women will experience a fracture after the age of 50 years.

In China, traumatic injury is the fifth-highest cause of death and results in more mortality than diabetes and infectious diseases.[9] Although injury-related fractures are a great load on health-care resources,[10,11] national epidemiological data for fracture incidence rates are scarce. Countries lacking this data have to deduce statistics that are based on the results of other territories, which leads to discrepancies due to significant variations in incidence rates. Up till now, the

Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan
Correspondence to: Omer Nasim
Email: omer.nasim-12@rmi.edu.pk

majority of studies conducted on fractures usually assess the information obtained from a single hospital or area, or are mainly focused on a certain population or body site often with contradictory results.[10-12]

There is considerable variation in global fracture incidence,[13] and studies have shown dissimilarities in fracture risk according to geographical location.[6,13-15]The exact frequency, aetiology and age distribution of fractures in our set up will help in formulating efficient preventive and treatment policies.

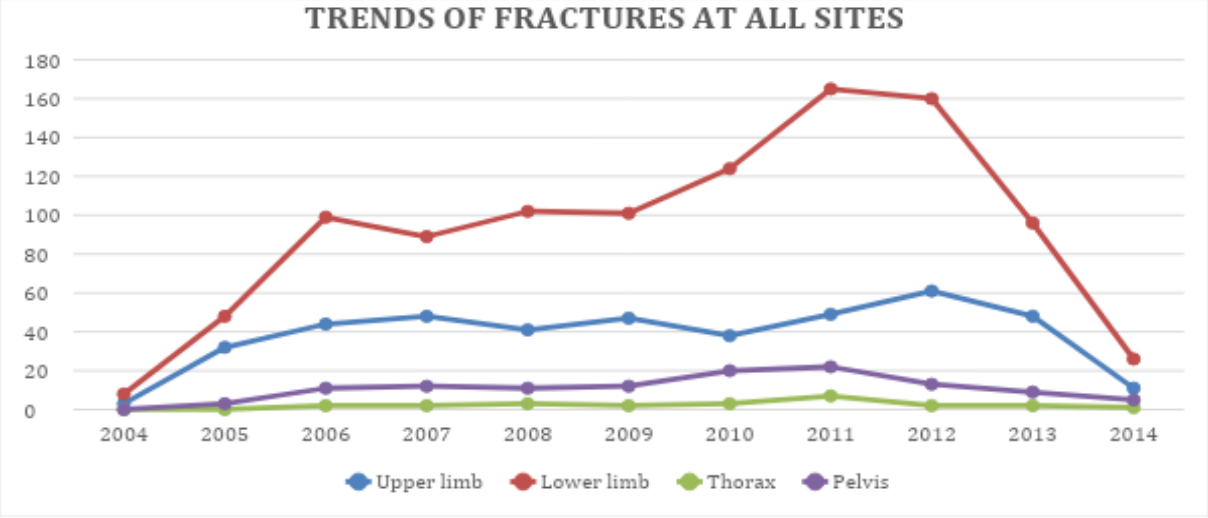
METHODS

This was a descriptive cross-sectional study, conducted at Rehman Medical Institute, Peshawar, KP in the months of March 2018 to September 2018. A total of 1829 records related to fractures were obtained from the hospital archives. All fractures from all causes were taken into consideration, with in-patient records from 2004 to 2014 period. The study was approved by the Ethical Review Board of the hospital. Data obtained was entered into MS Excel 2013 and were analyzed through formulating pivot tables. Percentages of the site-based fractures with three sets of age brackets were determined. Data presented in graphs and table where necessary.

RESULTS

Out of the 1829 patients in this study, 72.9% (n=1334) were male and 27.1% (n=495) were female. The results also show 400(21.8%) cases whose traumatic causal mechanism was known. The most frequent causes, in descending order were: road traffic accidents at 37.5% (n=150), other injuries 29.75% (n=119), bomb blast injuries 13.75% (n=55), crush injuries 11.25% (n=45), and injuries by slipping or falling at 7.75% (n=31).

Graph I depicts the trends of fractures region wise from the year 2004 to 2014. The lowest number of fractures was that of the thorax fractures while the highest number of fractures was that of the lower limb. The year 2012 recorded the highest number of fractures in upper limb (60) while the lowest were seen in 2004 and 2014 (0 and 10 respectively). The highest number of lower limb fractures were seen in 2011 (165) while the lowest were in 2004 (10).

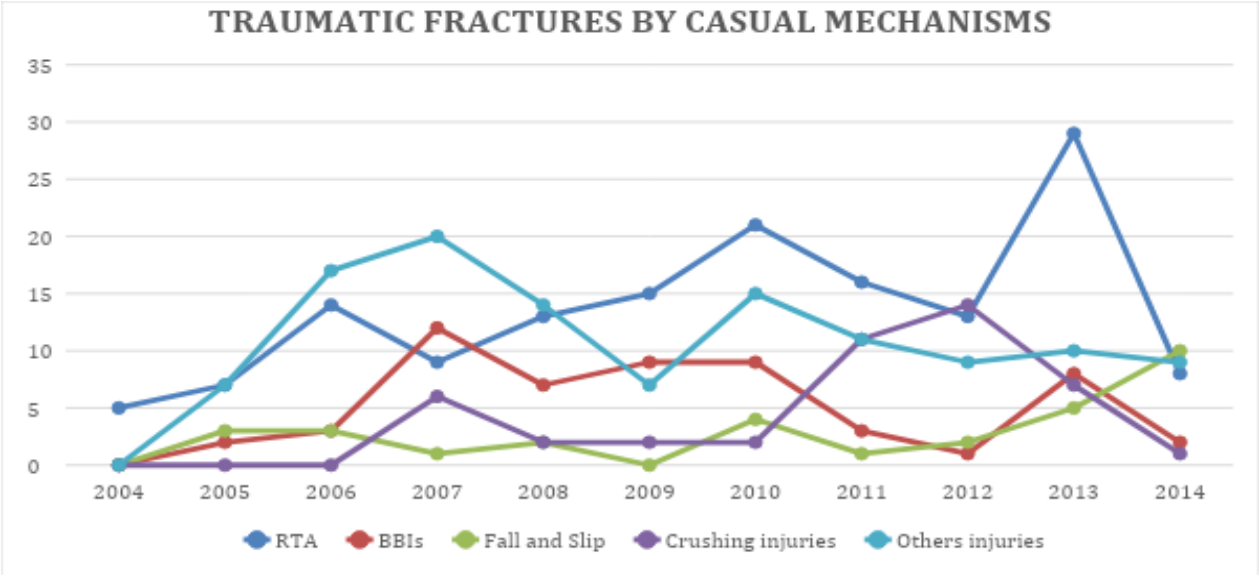


Graph I: Trends of fracture region wise.

Graph II illustrates the trend of fractures by casual mechanism from the year 2004 to 2014. The peak numbers of fractures were recorded in RTA cases while the least were in fall and Slip cases. The year 2013 recorded the highest number of fractures due to RTA (29).

The frequency of different fractures age wise and gender wise is shown in table Individuals under 15 years were 12.7% (n=232), the individuals in largest age group aged 15-64 years were 67.3% (n=1230), and patients aged above 65 years made up 20% (n=367) of the sample. The most common sites of fracture, in descending order, were as follows: femur 38% (n=695), tibia and fibula 18.3% (334), pelvic rim and acetabulum 11.9% (n= 218), humerus 11.1% (n=204), radius and ulna 9.5% (n=173), foot 4.9% (n=90), hand 2.5% (n=46), patella 1.5% (n=27), clavicle 1.3% (n=23), spine 0.8% (n=14), and scapula 0.3 % (n=5). The majority of all

fractures took place in the 15-64-year age group. [Numbers rounded off to nearest 1 decimal place.]



Graph II: Graph showing the mechanism of fractures in our study sample.

Table 1: Age wise and gender wise frequency of different fractures.*

	Children (0-14 years)		Young and middle-aged adults (15-64 years)		Older people (≥65 years)		Total
	Boys	Girls	Men	Women	Men	Women	
Humerus	33	14	105	29	10	13	204
Radius and Ulna	48	7	81	28	6	3	173
Femur	51	19	269	87	125	144	695
Tibia and Fibula	31	8	241	41	7	6	334
Spine	1	..	9	3	..	1	14
Pelvic rim and acetabulum	6	3	133	30	20	26	218
Hand	3	3	34	5	1	..	46
Foot	1	2	68	16	2	1	90
Scapula	..	..	4	1	..	..	5
Clavicle	2	..	17	4	..	..	23
Patella	..	..	25	..	1	1	27

*Double dots indicate no fracture cases in this subgroup.

DISCUSSION

The findings in this study showed that traumatic fractures were a major burden in this tertiary care hospital. We considered fractures at any site caused by various traumatic events. Out of 1829 patients, 72.9% (n=1334) were male and 27.1% (n=495) were female. The most commonly fractured bone in all age groups and genders in this study was the femur (n=695), which was almost double that of the second most common fracture site, the tibia and fibula (n=334). Even though the femur has the highest density of the bones in the human body, other studies have also shown the rise in incidence of femoral fractures,[16,17] most likely due to the changing etiology of the fracture. Fractures of the scapula were the least common at only 0.3% (n=5). This is probably due to the unnaturally large amount of force required to cause scapular injury, and they contribute only 0.4-1% of all fractures worldwide.[18]

Males predominated in the age groups below 65 for any site of fracture, while females were greater in number at age 65 and above. This in line with previous studies showing the same results,[19-21] with one article stating that between the ages of 15 and 49 years, males

had a 2.9 times greater possibility to undergo a fracture than females, while above the age of 60 years, females had a 2.3 times greater possibility to sustain a fracture than males.[22] The increased incidence of fractures in elderly women could be linked to a quicker decrease in bone mass after menopause, and related to associated hormonal changes,[23] though this may not be the only contributing factor. In the youngest population (<15 years), boys had a higher incidence of fractures.[24]Out of 27 patellar fractures, 26 were male, which was consistent with other findings reporting a higher incidence of patellar fractures in men.[25,26]

When the fractures were tabulated according to known causes, road traffic accidents (RTAs) were the most frequent cause. RTAs are common in developing countries like Pakistan where traffic rules are not strictly implemented.[27] According to a 2018 WHO report, the annual number of RTA deaths is around 1.35 million, and road traffic injuries are now the leading cause of death of people between the ages of 5-29 years.[28] Studies have shown that males are again significantly more prone to being victims of road traffic injuries,[29-31] and this was reflected in our findings where the male to female ratio was almost 4:1. The age group of 15-64 is significantly more susceptible to these types of accidents as well.[32]

Blast injuries are also a common cause for fractures since terrorist activities were prevalent in Pakistan during the period of the data that was used.[33] Under the classification of bomb blast injuries, fractures could be either secondary (caused by flying shrapnel and debris) or tertiary injuries (by collapsing buildings or body displacement). Crush injuries in this study were present mostly in the middle-aged group, which is most likely an indication of association with work-related injuries, particularly those professions involving heavy mechanical equipment.[34,35]

Fractures related to falls in older people can be linked to loss of weight and muscle strength, decreased mobility, and physical disability.[36] Combined with increased osteoporosis, this age group is already more susceptible to fractures even without these additional risk factors.

Our findings are mostly consistent with those of previous studies. The study provides information about the age and gender distribution of various sites of fracture incidence as well as cause of the fractures. Preventive measure for falls and other trauma needs to be emphasized, particularly in older people and those with a previous fracture history. Since causes such as RTAs, work-related injuries and falls in the elderly are all avoidable to some extent, this study adds further weight to the evidence linking fracture incidence to potentially preventable factors responsible for this major public health issue.

The study could be improved by taking a larger sample size from multiple hospitals in order to get more reliable feedback of the prevalence of fractures in the area. Further studies can, along with the site and cause of the fractures should focus on the type of fracture, profession and educational status of the patients in order to better streamline preventive and curative medical services.

CONCLUSION

A general higher trend of lower limb fractures followed by upper limb and spine can be depicted from the data. The most commonly occurring fracture was that of the femur with majority of the patients involved being the 15 to 64 years age group. These fractures occurred mainly due to road traffic accidents.

Conflict of Interests: None

Grants/Funding: No

REFERENCES

1. Hyder AA, Razzak JA. The challenges of injuries and trauma in Pakistan: An opportunity for concerted action. Public health. 2013;127(8):699-703.
2. Holmberg AH, Johnell O, Nilsson PM, Nilsson J, Berglund G, Akesson K. Risk factors for hip fractures in a middle-aged population: a study of 33,000 men and women. Osteoporos Int 2005; 16: 2185-94.
3. Stone KL, Ancoli-Israel S, Blackwell T, Ensrud KE, Cauley JA,Redline S et al. Actigraphy-measured sleep characteristics and risk of falls in older women. Arch Intern Med 2008; 168: 1768-7.
4. Burge R, Dawson-Hughes B, Solomon DH, Wong JB, King A, Tosteson A. Incidence and economic burden of osteoporosis-related fractures in the United States, 2005–2025. J Bone Miner Res 2007; 22:465-75.
5. Hernlund E, Svedbom A, Ivergård M, Compston J, Cooper C, Stenmark J et al. Osteoporosis in the European Union: medical management, epidemiology and economic burden. Archives of osteoporosis 2013 ;8(1-2):136.
6. Johnell O, Kanis JA. An estimate of the worldwide prevalence and disability associated with

osteoporotic fractures. Osteoporosis international 2006;17(12):1726-33.
7. US Department of Health and Human Services. Bone health and osteoporosis: A report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, Office of the Surgeon General 2004;87:15-25.
8. Van Staa TP, Dennison EM, Leufkens HG, Cooper C. Epidemiology of fractures in England and Wales. Bone 2001;29(6):517-22.
9. Center for Health Statistics and Information, the Ministry of Health of the People's Republic of China. China health statistics annual 2013. http://www.nhfpc.gov.cn/htmlfiles/zwgkzt/ptjnj/year2013/index2013.html
10. Boonen S, Reginster JY, Kaufman JM, Lippuner K, Zanchetta J, Langdahl B et al. Fracture risk and zoledronic acid therapy in men with osteoporosis. New England Journal of Medicine. 2012 ;367(18):1714-23.
11. Donaldson LJ, Reckless IP, Scholes S, Mindell JS, Shelton NJ. The epidemiology of fractures in England. Journal of Epidemiology & Community Health 2008 ;62(2):174-80.
12. Etxebarria-Foronda I, Arrospide A, Soto-Gordoa M, Caeiro JR, Abecia LC, Mar J. Regional variability in changes in the incidence of hip fracture in the Spanish population (2000–2012). Osteoporosis International 2015;26(5):1491-7.
13. Kanis JA, Oden A, McCloskey EV, Johansson H, Wahl DA, Cooper C. A systematic review of hip fracture incidence and probability of fracture worldwide. Osteoporosis international 2012;23(9):2239-56.
14. Cauley JA, Chalhoub D, Kassem AM, Fuleihan GE. Geographic and ethnic disparities in osteoporotic fractures. Nature Reviews Endocrinology 2014;10(6):338.
15. Boyce WJ, Vessey MP. Rising incidence of fracture of the proximal femur. The Lancet 1985;325(8421):150-1.
16. Lewis AF. Fracture of neck of the femur: changing incidence. Br Med J (Clin Res Ed) 1981;283(6301):1217-20.
17. Voleti PB, Namdari S, Mehta S. Fractures of the scapula. Advances in orthopedics. 2012;20-23.
18. Meling T, Harboe K, Soreide K. Incidence of traumatic long-bone fractures requiring in-hospital management: A prospective age-and gender-specific analysis of 4890 fractures. Injury 2009;40(11):1212-9.
19. Sanders KM, Seeman E, Ugoni AM, Pasco JA, Martin TJ, Skoric B et al. Age-and gender-specific rate of fractures in Australia: a population-based study. Osteoporosis International 1999;10(3):240-7.
20. Ahmed LA, Schirmer H, Bjornerem Å, Emaus N, Jorgensen L, Stormer J et al. The gender-and age-specific 10-year and lifetime absolute fracture risk in Tromso, Norway. European journal of epidemiology 2009;24(8):441-8.
21. Singer BR, McLauchlan GJ, Robinson CM, Christie J. Epidemiology of fractures in 15 000 adults: the influence of age and gender. J Bon Joint Surg Br 1998;80(2):243-8.
22. Donaldson LJ, Cook A, Thomson RG. Incidence of fractures in a geographically defined population. Journal of Epidemiology & Community Health 1990;44(3):241-5.
23. Cooper C, Dennison EM, Leufkens HG, Bishop N, van Staa TP. Epidemiology of childhood fractures in Britain: a study using the general practice research database. Journal of Bone and Mineral Research 2004 ;19(12):1976-81.
24. Gwinner C, Mardian S, Schwabe P, Schaser KD, Krapohl BD, Jung TM. Current concepts review: Fractures of the patella. GMS Interdisciplinary plastic and reconstructive surgery DGPW 2016;5-10.
25. Bostrom Å. Fracture of the patella: a study of 422 patellar fractures. Acta Orthopaedica Scandinavica 1972 ;43(sup143):1-80.
26. Sharma BR. Road traffic injuries: a major global public health crisis. Public Health 2008;122(12):1399-406.
27. World Health Organization. Global status report on road safety 2018.
28. Odero W, Garner P, Zwi A. Road traffic injuries in developing countries: a comprehensive review of epidemiological studies. Tropical Medicine & International Health 1997;2(5):445-60.
29. Singh A, Bhardwaj A, Pathak R, Ahluwalia SK. An epidemiological study of road traffic accident cases at a tertiary care hospital in rural Haryana. Indian Journal of Community Health 2011;23(2):53-5.
30. Chandran A,Hyder AA,Peek-Asa C.The Global Burden of Unintentional Injuries and an Agenda for Progress. Epidemiol Rev 2010; 32(1): 110-120.
31. Shamim S, Razzak JA, Jooma R, Khan U. Initial results of Pakistan's first road traffic injury surveillance project. International journal of injury control and safety promotion. 2011;18(3):213-7.

32. Roudsari BS, Sharzei K, Zargar M. Sex and age distribution in transport-related injuries in Tehran. Accident Analysis & Prevention 2004;36(3):391-8.
33. Mirza FH, Parhyar HA, Tirmizi SZ. Rising threat of terrorist bomb blasts in Karachi–a 5-year study. Journal of forensic and legal medicine 2013;20(6):747-51.
34. Trybus M, Lorkowski J, Brongel L, Hľadki W. Causes and consequences of hand injuries. The American journal of surgery 2006;192(1):52-7.
35. Sorock GS, Lombardi DA, Hauser RB, Eisen EA, Herrick RF, Mittleman MA. Acute traumatic occupational hand injuries: type, location, and severity. Journal of occupational and environmental medicine. 2002 ;44(4):345-51.
36. Wickham C, Cooper C, Margetts BM, Barker DJ. Muscle strength, activity, housing and the risk of falls in elderly people. Age and ageing 1989;18(1):47-51.

Authorship and contribution Declaration

- **Mohammad Ahmed Arsalan Khan**, acquisition of data, interpreted the data
- **Omer Nasim**, Conception and design of the study, Final approval of the version for publication, Revised the manuscript critically for important intellectual content,
- **Zainab Hussain,** Drafted the manuscript