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### Original Article

## Epidemiology of Orthopaedic Admissions at A Teaching Hospital of Eastern Nepal

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### Abstract

#### Background

There are many other reasons besides fracture for which a patient could potentially be admitted to orthopaedic inpatient care. The goal of this retrospective review was to analyze the spectrum of orthopaedic admissions to a tertiary level teaching hospital of Nepal.

#### Material & Methods

This retrospective descriptive epidemiological study was based on patients admitted for orthopaedic inpatient care at a tertiary level health care center of eastern Nepal. Registry data of 1 year was used to analyze the spectrum of orthopaedic admissions.

#### Results

Male admission outnumbered females with a ratio of 1.82:1. Trauma accounted to majority of Orthopaedic admissions (67.9%) and Infection lied second in order (12.4%). Upper and Lower limb fractures (with right sided dominance) contributed to highest numbers of trauma respectively. Incidence of closed to open fracture was 5.45:1. More than half of trauma and fractures involved the 10 – 39 years age group with predominance in 10-19 years. Fracture incidence was higher among men than women until 59 years of age after which the gender ratio reversed.

#### Conclusions:

Leading cause for orthopaedic admission was Trauma accounting more than 2/3 of the total. Biasness in gender admission reflects true picture of male dominated society. Upper limb injury, right side and closed fractures were dominating. Sexual dimorphism was apparent in fractures which may be due to higher rates of Osteoporotic fractures in elderly females.

**Key Words:** Admissions, epidemiology, fracture, infection, orthopaedics, trauma.

### Introduction

Although fractures make up the majority of the reason for which a person is admitted to Orthopaedics inpatient, there are also many other problems which may necessitate admission [1]. Orthopaedic admissions include both patients with

traumas and non-traumas like tumors, infections, deformities, etc. The pattern of inpatient admissions to any hospital for a fracture or any other orthopaedic injury is changing [1]. Trauma accounts for 9% of global mortality these days and are a threat to health worldwide [2]. Road Traffic

Accident (RTA) lies amongst top five causes of morbidity and mortality in South-East Asian countries [3]. In Nepal, "injury" contributes to 9% of total mortality annually and is the third leading cause of death [4]. Despite trauma, lots of patients with bone pain, bone infection, bone tumor, congenital or post-trauma deformity, post-burn contracture etc. also need inpatient care.

This study aims to give a snapshot of patterns of Orthopaedic injuries and admissions in the hope that it will aid all orthopaedic doctors and paramedical personnel involved in the care of these patients to maintain a standard treatment protocol along with proper planning for better care. This will also help the team to keep high index of suspicion with regards to the possibility of other associated fractures or system involvement so that these can be identified and treated promptly. Knowledge of the entire trauma workload at tertiary level teaching hospital will help not only to manage resources and plan training opportunities but also to predict areas where allocation of resources could improve patient care within the constraints of the current hospital budget.

### Material & Methods

This hospital based retrospective descriptive epidemiological study was conducted at Nobel Medical College Teaching Hospital, a tertiary level health care center located in eastern part of Nepal. It was of 1-year duration and was based on patients admitted to inpatient care of Orthopaedic department from 01/10/2014 till 30/09/2015. This retrospective survey was started only after ethical approval from institutional review committee. All patients admitted under direct care of Orthopaedic team were included, irrespective of what treatment they ultimately ended up having. Patients consulted on from other specialties or

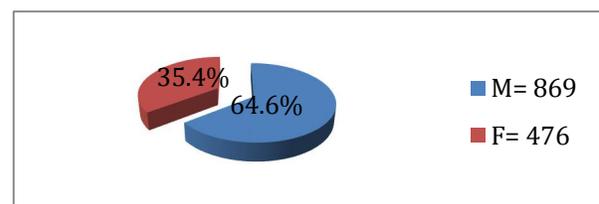
those reviewed in the Emergency Department but then subsequently discharged from hospital were excluded. Admissions with incomplete data in registry were also excluded to prevent the confounding of the result. Patients file were retrieved from the medical record section and demographic data, gender, diagnosis and treatment were recorded.

All diagnoses were grouped into 8 categories namely trauma, infection, tumor, implant removal, foreign body, post-trauma deformity, post-burn contracture and others (includes back pain, joints pain, bursitis, PIVD, CTEV etc). Trauma was further categorized into Upper limb fractures, Lower limb fractures, Spine injuries, Pelvis fracture, Multiple injuries, Poly trauma and Soft tissue injury (STI). Patients with two or more severe injuries in at least two areas of the body were categorized as "Poly trauma" and those with two or more severe injuries in one body area were categorized as "Multiple Injury" [8]. All these categories were reviewed and their epidemiologic trends were noted. Further analysis was done in Microsoft Excel.

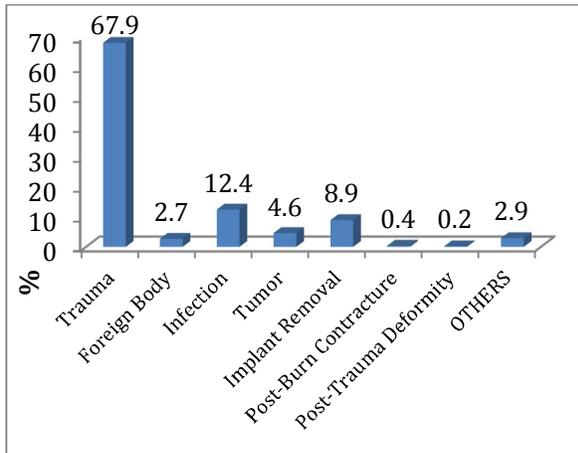
### Results

There were total 1359 admissions in this period out of which 1345 had complete data in the hospital-based registry and were included in this study for further analysis and calculation of various statistical results. The incidence of inpatient admission of males far outnumbered females with a ratio of 1.82:1 [Figure 1].

Figure 1. Gender distribution



In terms of diagnosis, trauma (913) occupied more than half of all admissions accounting more than 2/3 of total. Infection (167) was second in order. Patients admitted for implant removal (120) were also in significant number. Patients admitted with diagnoses of tumor (62), Foreign body granuloma (36), Post-burn Contracture (5) and Post-trauma Deformity (3) were next in order respectively. Remaining (39) was categorized as others [Figure 2].



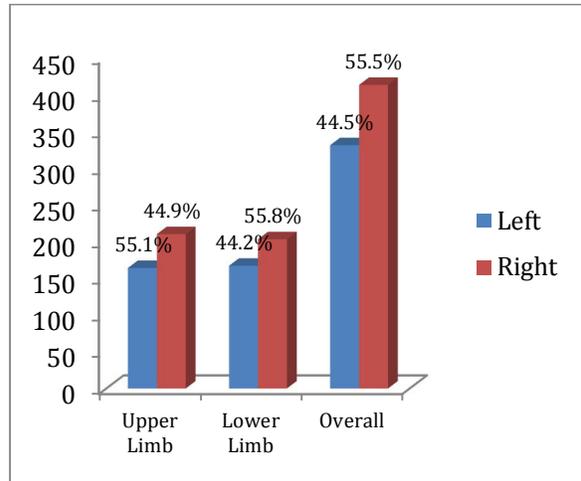
**Figure 2. Case distribution in percentage on basis of diagnosis**

Case distribution amongst trauma is shown in Table 1. Upper limb fractures (41.0%) predominated all but it made only a negligible difference with Lower limb fractures (40.5%) which stood second in order. Good numbers of Soft tissue injuries (8.1%) were also admitted for management of pain and swelling. Isolated Pelvis fractures were least in order.

**Table 1: Case distribution amongst Trauma**

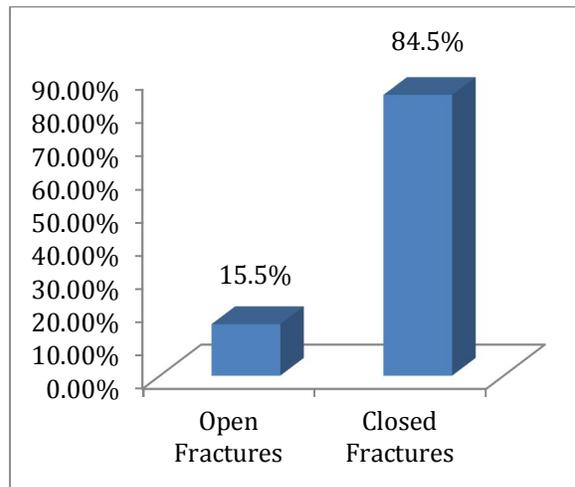
Trauma Diagnosis	Case No.	Percentage of Trauma	Percentage of Total
Upper Limb Fractures	374	41.0%	27.8%
Lower Limb	370	40.5%	27.5%

Fractures			
Spine Injuries	37	4.1%	2.7%
Pelvis Fracture	5	0.5%	0.4%
Multiple Injuries	14	1.5%	1.0%
Polytrauma	39	4.3%	2.9%
Soft tissue injury	74	8.1%	5.5%



**Figure 3. Left side Vs Right Side Injuries**

Upper and lower limb fractures were also analyzed for Right or Left sided incidence. Right sided injury was dominant to left one in both Upper and Lower limb fractures with an overall ratio of 1.25:1 [Figure 3].



**Figure 4. Open Vs Closed Injuries**

Admitted fracture cases were also categorized as Open and Closed Fractures. Considering the 839 patients of limbic injuries, multiple injuries and of poly trauma, Closed fractures far outnumbered Open fractures with a ratio of 5.45:1 [Figure 4].

Analyzing trauma in terms of dislocation, 3.8% (35) of trauma cases (2.6% of total admissions) had dislocation. These dislocations included both isolated dislocations and fracture dislocations.

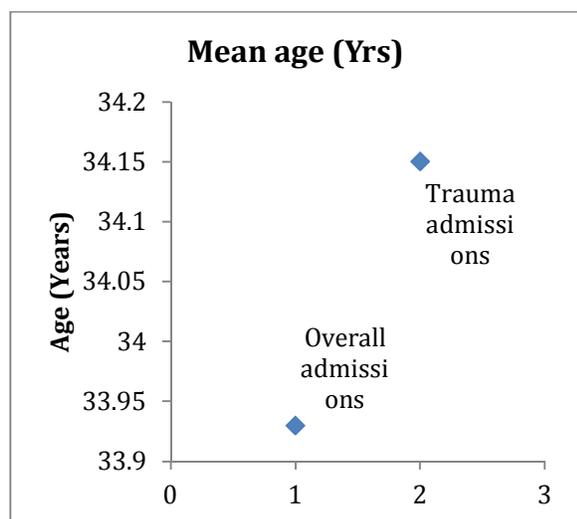


Figure 5. Mean age of admitted patients

Though the “Mean” age of Overall admissions (33.93 years) and Trauma admissions (34.91 years) lied between 30-39 years of age interval [Figure 5], the “Age specific incidence” of Overall and Trauma admission patients were highest in 10-19 years of age group [Figure 6]. After sudden surge in 10-19 years of age interval, there was gradual decrease in Age specific incidence in Overall, Trauma and Fracture admissions [Figure 6]. Highest numbers of trauma (19.4%) involved the 10-19 years age group, whereas more than half (50.3%) of it involved the 10 – 39 years age group [Figure 6].

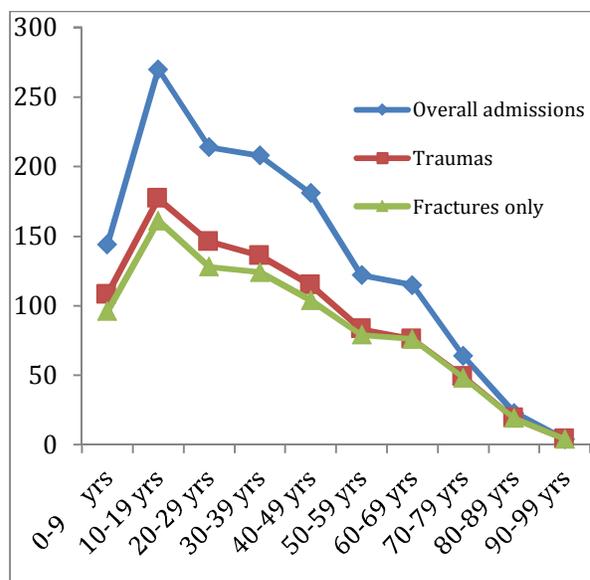


Figure 6. Age specific incidence of admitted patients

Age & Gender specific incidences were also evaluated accordingly in Overall, Trauma and Fracture admissions [Figures 7, 8 & 9]. Somehow same patterns were observed in all of them. Male admissions predominated female till 59 years after which it reversed but again became equal at 85 years and onwards.

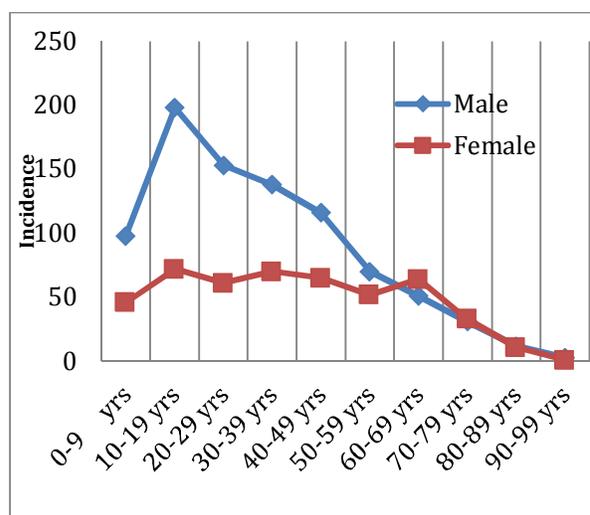
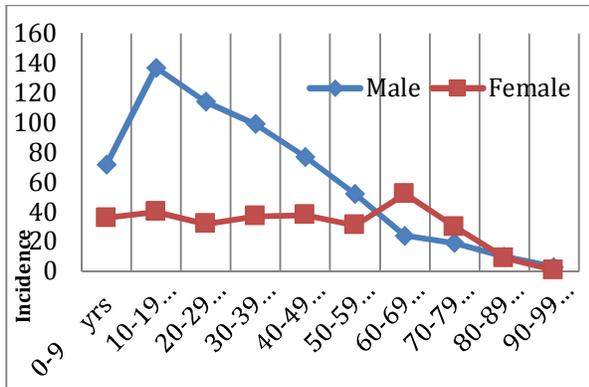
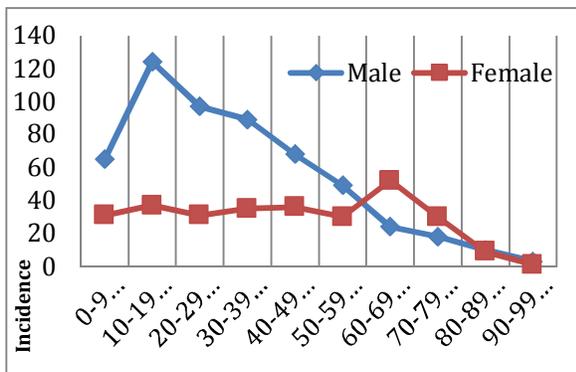


Figure7. Age & Gender specific incidence in overall admissions



**Figure 8. Age & Gender specific incidence in Trauma admissions**



**Figure 9. Age & Gender specific incidence in Fracture admissions**

**Discussion**

We found the average age of Overall admissions to be 33.93 years with a gender ratio of 1.82:1 Male to Female. This could be due to gender biasness persisting in male dominated developing countries like Nepal. In a similar study conducted in England, Taylor et al showed the average age of admissions to be 53.12 years with a gender ratio of 51:49 Male to Female [1]. This shows that we get relatively younger population for orthopaedic care and also that our Male admissions far outnumbers Female admissions. This may be because 67.9% of our admissions were “trauma cases” for which Road Traffic Accidents was the major culprit and men drives mostly both the public and private vehicles in Nepal.

Similarly, high male to Female ratio (6:1) was also found in a cross-sectional study conducted in India by Ganveer et al [10]. Wui et al also reported high Male to Female ratio of 2.25:1 in a trauma epidemiology study conducted in Singapore [2] and preponderance of males among injured was also reported by several other studies [11-15].

In our study, Upper limb fractures predominated trauma admissions with only a negligible difference with Lower limb fractures. Results reverse in order was shown by Taylor et al in a similar study conducted in England where Lower limb fractures predominated [1].

In our study both Upper and Lower limb fractures showed right sided dominance. Also, the incidence of closed fracture was much higher than open fracture. Relevant literature couldn’t be found for comparison. In our study Trauma and fractures were predominantly highest in 10-19 years of age group whereas 10 – 39 years of age group comprised more than half of trauma and fractures. In a similar study on injury pattern following road traffic accidents in central India, Ganveer et al reported that majority of the victims (75%) were in age group of 18-37 years [10]. But in a similar type of English study, Taylor et al reported a bimodal distribution of patient age following trauma admissions. Admission rates for children and young adults were higher up to 19 years of age, and also for those above 70 years [1]. It may be because of increasing elderly population in England with a resultant increase in the number of osteoporotic fractures. Bimodal incidence of fracture with peaks in youth and very elderly has been reported by many previous studies also [16].

In our study, we also evaluated the Age & Gender specific incidences of Trauma and Fractures. It showed Male predominance over Females till 59 years only and after that a reverse pattern of female

predomination over males was seen. In a similar study conducted in England and Wales on epidemiology of fractures, T. P. van Staa *et al.* reported the fracture incidence to be higher among men than women until 50 years of age after which the gender ratio reversed [17].

Our study has some limitations. First, results may not be generalized to other settings because the study was performed in only one tertiary care teaching hospital. Second, the time duration of this study is of only one year and patient number is only 1345. Lastly, we have not presented the types or outcome of treatment received. It would be really interesting to compare our current findings over time as we continue to develop our trauma care.

### Conclusion

Results showed the Orthopaedic inpatient admission of males to be significantly higher than females reflecting the real picture of male dominated society. "Trauma" accounted to majority of Orthopaedic admissions and Infection lied second in order. Upper Limb and Lower limb fractures contributed to highest number of trauma's respectively and their incidence nearly coincided with each other. Right sided injury was dominant to left one in both Upper and Lower limb fractures. Incidence of closed fracture was much higher in comparison to open fracture with a ratio of 5.45:1. Trauma and fractures were predominantly highest in 10-19 years of age group whereas more than half of them involved the 10 – 39 years age group. Age & Gender specific incidences of Trauma and Fractures showed Male predominance over Females till 59 years only and after this the pattern reversed making female predomination over males till 85 years. This may be due to higher rates of Osteoporotic fractures in elderly females.

The foregoing statistics will not only help us in planning for service delivery but also to suggest avenues by which inpatient care can be improvised. It will also provide an evidence based approach in counselling the patient and his/her family not only during course of long treatment but also from a medico legal standpoint.

### References

- [1]. A. Taylor, A. Young, *Epidemiology of Orthopaedic Trauma Admissions Over One Year in a District General Hospital in England*, *Open Orthop J.* 9 (2015) 191–193.
- [2]. Lim WoanWui, Goh E Shaun, Ganesh Ramalingam, Kenneth MakSeekWai, *Epidemiology of trauma in an acute care hospital in Singapore*, *JEmerg Trauma Shock.* 7:3 (2014) 174–179.
- [3]. Paden M, McGee K, Krug E, *Injury: A leading cause of the global burden of disease*, Geneva, Switzerland: World Health Organization. 2000–2002.
- [4]. Gururaj G, *Assignment Report for WHO, Regional Office for South-East Asia*, New Delhi 2000–2001.
- [5]. Spiegel DA, Shrestha OP, Rajbhandary T, Bijukachhe B, Sitoula P, Banskota B, BanskotaA, *Epidemiology of surgical admissions to a children's disability hospital in Nepal*, *World J Surg.* 34:5(2010) 954-62.
- [6]. Lim WoanWui, Goh E Shaun, Ganesh Ramalingam, Kenneth Mak Seek Wai, *Epidemiology of trauma in an acute care hospital in Singapore*, *J Emerg Trauma Shock.* 7:3 (2014) 174–179.
- [7]. WHO.int. World Health Organization. Available from: <http://www.who.int/topics/injuries/about/en/index.html> .
- [8]. Kroupa J, *Definition of "polytrauma" and "polytraumatism"*, *ActaChirOrthopTraumatolCech.* 57:4(1990) 347-60.
- [9]. K. Bhalla, M. Naghavi, S. Shahrzad, D. Bartels, C. J. L. Murray, *Building national estimates of the burden of road traffic injuries in developing countries from all available data sources: Iran*, *InjuryPrevention.* 15:3 (2009)150-6.
- [10]. G. B. Ganveer, R. R. Tiwari, *Injury pattern among nonfatal road-traffic accident cases: a cross-sectional study in central India*, *Indian J Med Sci.* 59:1(2005) 9-12.
- [11]. WHO.int. World Health Organization. Available from: <http://www.who.int/mediacentre/factsheets/fs358/en/index.html> .

- [12]. Laupland KB, Kortbeek JB, Findlay C, Hameed SM, A population-based assessment of major trauma in a large Canadian region, *Am J Surg.* 189(2005) 571–6.
- [13]. Moshiro C, Ivar H, Anne NA, Philip S, Yusuf H, Gunnar K, Injury morbidity in an urban and a rural area in Tanzania: An epidemiological survey, *BMC Public Health.* 5:11(2005)
- [14]. Olawale OA, Owoaje ET, Incidence and pattern of injuries among residents of a rural area in South-Western Nigeria: A community-based study, *BMC Public Health.* 7:246 (2007).
- [15]. Zargar M, Modaghegh MH, Rezaishiraz H, Urban injuries in Tehran: Demography of trauma patients and evaluation of trauma care, *Injury.* 32 (2001) 613–7.
- [16]. C. Cooper, Epidemiology and public health impact of osteoporosis, *Baillie`re’s Clin Rheumatol* 7 (1993) 459–477.
- [17]. T. P. Van Staa, E. M. Dennison, H. G. M. Leufkens, C. Cooper, Epidemiology of Fractures in England and Wales, *Bone.* 29:6 (2001) 517-22.