

A study of pattern of orthopedic injuries among patients attending an emergency department of Civil Service Hospital, Kathmandu Nepal

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ABSTRACT

Introduction: Trauma is a common worldwide problem which has detrimental effect in the public health. It is one of the several prevailing causes of morbidity and mortality. The aim of this study is to reveal the existing nature of orthopedic injuries as seen in the emergency department and to identify potential areas for the enhancement of trauma care and research.

Method: This study has been conducted prospectively. All the physical trauma patients visiting the emergency department of a tertiary care hospital over the period of one year were included in study. The population of the study included patients with all kinds of orthopedic injuries. Data was entered in Statistical Package for the Social Sciences (SPSS 16) to analyze, and the result is obtained in terms of mean (percentage), appropriate plots, and chart where appropriate. The cases with pathological fracture, patients with end stage chronic diseases, and post-operative state were excluded from the study.

Result: Total of 2823 orthopedic injury patients visited the emergency in a year, which comprised 15.46% of total emergency Patients. The gender distribution was 68.4% males and 31.6% female. Only 9.8% of the patients arrived to hospital on ambulance. 34.4% of the cases arrived within one hour of trauma incident. Fall was the most common cause of injuries (40.1%) followed by road traffic accident (34.6%). The study revealed that the most common injury was fracture (33.7%), followed by sprain & strain (26.0%), laceration (19.2%), contusion with intact skin (10.0%) and dislocation (9.1%). Commonly associated visceral injury was the head injury in 12.4% cases, followed by thoracic injuries in 10.8%, abdominal injuries in 1.7 % cases. Emergency department team alone treated and discharged 54.1% patients, whereas the remaining 45.9 % patients required specialized evaluation and treatment by other departments. Total 18.2 % patients were referred to other centers for further specialized treatment like neurosurgery, CTVS consultation, for ICU facility, for vacant admission bed, and on their wish to go to other center for further treatment.

Conclusion: Fall injury and road traffic accident were the most common cause of trauma. Younger adults in their active period of life were found to be involved more in physical trauma incident. In addition to the healthcare improvement, road safety regulations should also be strengthened and enforced, which can save more lives and reduce the severity and duration of the illness.

Keywords: emergency department, orthopedic injuries, road traffic accidents.

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INTRODUCTION

Trauma is a common worldwide problem which has detrimental effect in the public health.¹ Fall injuries, road accidents; occupational injuries and physical assaults causes more than five million deaths per year, approximately 9% of the global mortality.²

More than 90% of world's injury-related deaths occur in low and middle-income countries.³ Injuries, violence and disabilities are a major public health problem in Nepal as well.⁴ Road traffic accidents are a growing problem worldwide accounting for around 1.2 million deaths and over 50 million injuries annually.⁵ It is expected that by the year 2020, RTA will rank third in the global burden of diseases.⁶ Road traffic accidents (RTAs) are most commonly responsible for multiple injuries.⁷

Epidemiological data on injury can provide estimates that can be useful for discussing the burden of the disease with the patients and for planning healthcare provisions.^{8,9} It is essential to have a good understanding of the intensity and nature of the trauma for injury prevention, resource allocation, and training strategies.¹⁰ The aim of this preliminary study is to reveal the existing nature of injuries and to identify potential areas of improvement for trauma care and research.

METHOD

This is a prospective study conducted at the Department of Family Medicine and Emergency Medicine of Civil Service Hospital, a tertiary care hospital situated in Kathmandu, Nepal. All the patients visiting the emergency department of civil service hospital from 5th May 2017 to 4th April 2018 (one year) with orthopedic injuries were included in the study. Data was entered in Statistical Package for the Social Sciences (SPSS 16) to analyze, and the result of is obtained in terms of mean (percentage), appropriate plots, and chart where appropriate. The cases with pathological fracture, patients with end stage chronic diseases, and post-operative state were excluded from study.

RESULT

A total of 2823 orthopedic Injuries patients visited the emergency department of Civil service hospital, which comprised 15.46% of the total (18,250) emergency Patients. The characteristics of the population are summarized in Table 1.

Pediatric (<18 years) trauma patients comprised 32.0% (n=903) while adults (>18 years) trauma patients comprises 68.0% (n=1920) of all the trauma cases. Out of all the injuries, 44.31% were seen in age group of 30-59 years, followed by 26.36 % in the age group of 18-29 years. In an average, 235 cases of trauma patients visited per month. The gender distribution was 68.4 % (n=1932) males and 31.6%

(n=891) females. Regarding the time of the day when the injury happened, more than 50% of the orthopedic injury occurred between 12pm to 6pm, followed by 21.5% injury between 6pm to 12am. Only 10.3% of orthopedic injury had occurred between 12am to 6am.

Table 1: Baseline characteristics of the population of the study

Category	Frequency(n)	Percentage (%)
Sex Distribution		
Male	1932	68.4
Female	891	31.6
Total	2823	100.0
Age Group		
Below 18 years	903	32.0
18 to 29 years	486	17.2
30 to 59 years	850	30.1
60 and above	584	20.7
Total	2823	100.0
Time of Injury		
12 am to 6 am	291	10.3
6 am to 12 pm	500	17.7
12 pm to 6 pm	1424	50.4
6 pm to 12 am	608	21.5
Total	2823	100.0
Time to arrive Emergency		
< 1 hour	972	34.4
1 to 6 hour	705	25.0
6 to 24 hours	519	18.4
>24 hours	627	22.2
Total	2823	100.0

The most common mode of transport used to carry the injured patients to emergency other than ambulance was four wheelers 34.0% (n=959), followed by the second most common mode pedestrian 29.3% (n=828) and the third most common mode two wheelers 25.1% (n=709). Only 9.8% (n=276) of the patients arrived by using ambulance.

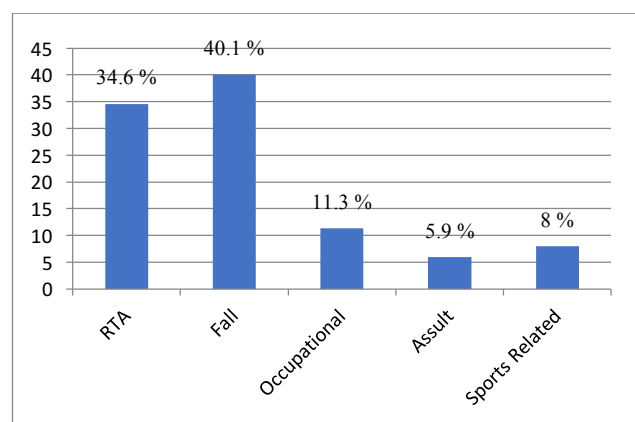


Figure 1: Etiology of Trauma

Regarding the time interval between the event of injury and arrival to emergency department, 34.4% of the cases arrived

within one hour of trauma incident, while 25.0% (n=705) arrived from 1 to 6 hours, 18.4% (n=519) arrived from 6 to 24 hours, and the remaining 22.2% (n=627) arrived after 24 hours of the incident.

As shown in Figure 1, fall was the most common cause of injuries, which was responsible for 40.1% (n=1132) of the total injuries. Second most common cause was road traffic accident 34.6% (n=977). In addition, there were 11.3% (n=320), 8.0% (n=227), 5.9% (n=167) injuries from occupational incidents, sports related incidents, and physical assault incidents, respectively in descending order. Among all fall injuries (n=1271), fall on the ground, fall from the stair, fall from the height, and fall from the bed are the most common (46.1%, n=586), second most common (24.4%, n=310), third most common (23.5%, n=299), and least common (6.0%, n=76) causes of injury, respectively. The duration of stay in the emergency department was less than one hour for 30.0% (n=848) of the cases, one to six hour for 58.7% (n=1658) of the cases, and more than six hour for 11.2% (n=317) of the cases.

The study revealed that the most common injury was fracture (33.7%, n=951), followed by sprain & strain (26.0%, n=735), laceration (19.2%, n=541), contusion with intact skin (10.0%, n=283) and dislocation (9.1%, n=258). Limb injury consisted of overall 85.1% (n=2339) of the cases of orthopedic injuries in emergency, followed by spine injury in 2.8% (n=80), pelvis in 2.1% (n=58), ribs in 1.4% (n=40) and others (multiple sites injury) in 8.6% (n=243).

Table 2: Distribution of Types & Number of fracture bone

Variables	Number	Percentage (%)
Simple fracture	953	94.5
Compound fracture	55	5.5
Total	1008	100.0
Number of Bone Fracture		
Single bone fracture	593	58.8
Two bone fracture	295	29.3
Multiple bone fracture	120	11.9
Total	1008	100.0

There were 94.5% cases (n=953) of simple fractures and 5.5% cases (n=55) of compound fractures. Single bone fracture was found in 58.8% cases (n=593), two bone fracture were present in 29.3% cases (n=295) and multiple fractures were seen in 11.9% (n=120).

Most commonly associated visceral injury with trauma was the head injury, which was found in 12.4% cases (n=349). Thoracic injuries were found in 10.8% (n=306) cases, abdominal injuries were present in 1.7% (n=48) cases, and no associated visceral injury were found in 71.9% cases

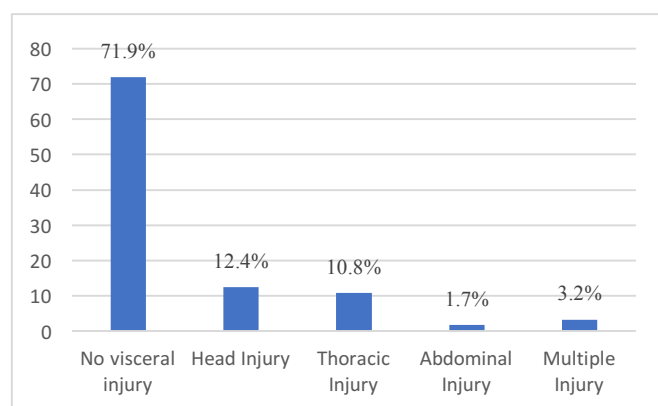


Figure 2: Associated visceral Injury

The Emergency department team alone treated and discharged 1528 out of total 2823, i.e., 54.1% patients, whereas the remaining 45.9% (n=1295) patients required specialized evaluation and treatment by the orthopedic and surgery team. After the emergency treatment 64.4% of cases were discharged from emergency department for the outpatient department follow-up and remaining 35.6% (n=1005) patients needed admission in ward or referral.

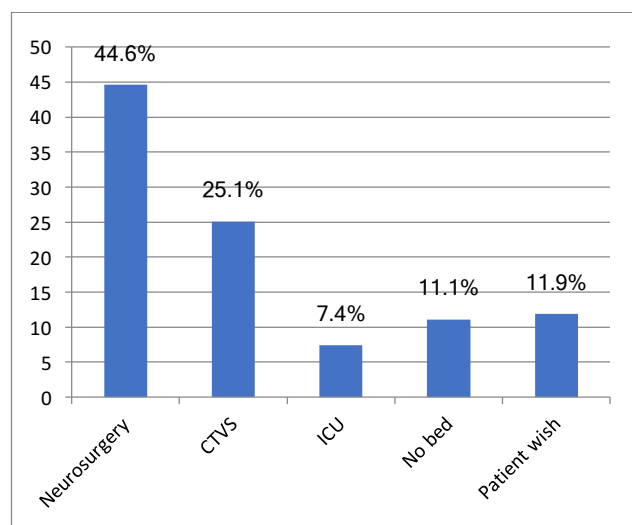


Figure 3: Causes of Referral for the Patients

Out of all the cases of orthopedic injury that visited emergency department of civil service hospital, total 18.2% (n=514) were referred to other centers for further specialized treatment. The most common cause of referral was for neurosurgery consultation, i.e., approximately 44.6% (n=229). The second largest number of patient needing specialized treatment, i.e., 25.1% (n=129), were referred for Cardiothoracic and vascular surgery consultation. Total 7.4% (n=38) patients were referred for ICU facility, 11.1% (n=57) referred due to no vacant bed for admission and remaining 11.9% (n=61) patients referred because of their wish to go to other center for further treatment.

DISCUSSION

Trauma is a major problem in Nepal with severe and wide-ranging consequences for the individuals and for the entire society. In the United States, traumatic injury accounts for 30% of life years lost.¹¹ In our Emergency department, 15.46% of the total patients arrive with orthopedic injuries, and this figure is comparable to the studies done in various tertiary care hospitals in India. Abhilash et al.¹² has reported 13% prevalence of the cases of orthopedic injury in emergency from their study carried out in a tertiary care hospital in south India. In a study carried out in 2011/2012 in several tertiary care hospitals in Nepal showed that 19.9% of all the patients in emergency departments suffered physical trauma.¹³

The gender distribution for patients suffering physical trauma was 68.4 % males and 31.6 % females in our study, which shows male are more than two times more prone to sustain orthopedic injuries in compare to female. In a meta-analysis of studies on the injuries in south Asia, Hyder et al. have concluded that majority (67 to 80%) of injuries occur in the males.¹⁴ This is explained using the fact that males are predominantly engaged in outdoor activities and operation of automobiles equipment and hence are exposed to more risky behavior than females. More than 50% of the cases of orthopedic injury occurred between 12pm to 6 pm, and the least number of the cases of the injury occurred between midnight and early morning. This can be explained using the fact that people have less movement and activities at the early morning compared to the day and the evening time. The most common mode of transportation used to carry patients to emergency other than the ambulance was four-wheelers (34.0%), followed by walking to the hospital (29.3%) and two wheelers (25.1%). Only 9.8% used ambulance to carry the orthopedic injury patients to emergency.

In our study, one third, i.e., 34.4%, of the cases arrived at the emergency within one hour of the incident causing trauma, whereas 25.0% came within 1 and 6 hours, 18.4% within 6 and 24 hours and the remaining 22.2% came after 24 hours. The time pattern of hospital arrival of the trauma patients is similar to that found in other tertiary care trauma centers in India.¹⁵ Our study shows that the fall is the most common (40.1%) cause of injury in our center followed by RTA (34.6%), occupational injuries (11.3%), sports related injuries (8.0%), and physical assault (5.9%). Most of the occupational injuries presented to us were caused during the operation of the machinery at the workplace, and they were predominantly hand injuries. Such injuries would cause major monetary loss for the patient and his/her family from time away from work. They may also lead to permanent deformities and dysfunctions of the hand if the patients do not receive prompt surgical intervention. In contrast to our observation, several studies conducted in India and Nigeria

show RTA as the most common cause of injury. Solagberu et al.¹⁶ has reported 62.3% prevalence of RTA in their trauma studies carried out in Nigeria. Gururaj G.¹⁷ conducted a study in 2004, where he found that RTA was responsible for 52% of the injuries and fall was responsible for 13% of the injuries. Occupational injuries and assaults constituted 4% and 3% of the total injuries, respectively. In the study by Huda N¹⁸, the most common mode of injury was roadside accident, seen in 48.13% cases, followed by fall, seen in 29.5% cases, followed by assault, seen in 5.4% cases, followed by occupational injuries, seen in 10.5%, followed by sports related in 4.17% and firearms in 2.08% cases.

The duration of the stay in emergency department was less than one hour for 30.0% of the cases, from one to six hours for 58.7% cases, and more than six hour for 11.2% cases. Since our emergency department does not have observation ward, the cases are discharged, admitted or referred after emergency investigation and treatment.

In the present study, soft tissue injuries (sprain, strain, laceration, contusion with intact skin) were the most frequently seen injuries accounting for 55.2% of all injuries. For the rest of the cases, fracture was seen in 33.7%, dislocation in 9.1%, and other multiple injuries in 1.9% cases.

Limb injury consisted of overall 85.1% of the cases of orthopedic injuries in emergency, followed by spine injury in 2.8%, pelvis injury in 2.1%, ribs injury in 1.4%, and other (multiple sites) injury in 8.6% of the cases. Recently, a cross-sectional study conducted in India has shown that the fracture was the most common injury in the patients experiencing non-fatal road traffic accidents.¹⁹ In china, an analysis of a data consisting of 2213 patients with traffic trauma showed that the fracture of extremities occurred the most often in 53.3% of the cases, and cranial-cerebral trauma, thoracic-abdominal visceral injury, spine fracture, fracture of ribs, and pelvic fracture occurred in 19.4%, 6.56%, 5.37%, 4.88%, and 4.18 % of the cases, respectively.²⁰ In Africa, a retrospective analysis of a data on nonfatal road traffic crush victims showed that the most common injuries were fractures (69.0 %) with the tibia/fibula being most fractured bones (30.3 %).²¹ Another hospital based study of 450 cases admitted for traffic accident conducted in India revealed that most common type of injury was the fracture (49.33 %) and the most common site of the fracture was that on one of the lower limbs (48.2 %).²² In our study, simple fractures were seen in 94.5% and compound fractures were seen in 5.5% cases. Single bone fracture was observed in 58.8% cases, and two bone fractures were observed in 29.3% cases. Moreover, multiple bone fractures were seen in 11.9% cases. The most common injury associated with limb injuries was head injury, observed in 12.4% cases, whereas thoracic injuries and abdominal injuries were observed in 10.8% and 1.7% cases, respectively. Total 71.9% cases of limb injuries

did not have other associated injury. Contrary results were observed in some studies. For instance, Chetna Malhotra and MM Singh²³ have found compound fractures occurring in 31.6 % cases, and Huda N²⁴ has found compound fractures and simple fractures occurring in 39.9 % and 66% cases, respectively.

The emergency department team alone treated and discharged 54.1% orthopedic injury patients while the remaining 45.9 % required specialized evaluation and treatment by the orthopedic and surgery team in emergency department. This showed that majority cases of orthopedic injury in emergency could be managed by the emergency department team alone. In the present study, 18.2 % cases were referred to other centers, and the most common cause of referral was for neurosurgery consultation. The second largest percentage of the cases were referred for cardiothoracic and vascular surgery consultation, the third largest percentage were referred for plastic surgery consultation, and the fourth largest percentage were referred for intensive care unit facility. Due to the unavailability of vacant bed for the admission, patients sometimes wish to go to another healthcare center.

In this study the fall and road traffic accidents (RTA) were demonstrated to be a leading cause of orthopedic injury. Younger adults in their active period of life are found to be involved more in physical trauma incidents. A need for the improvement of the emergency care service in the hospital is realized. This can save lives, and reduce the severity and duration of the illness. In addition to the healthcare improvement, road safety regulations should also be strengthened and enforced. Competent manpower should be developed, and vital infrastructures including diagnostic and therapeutic facilities should be provided and upgraded on a regular basis. Improved services will definitely pay the associated investment back in the long run.

RECOMMENDATION

This study recommends for similar multicenter study with necessary specialized services. It's high time to establish some super specialty services which are currently not available in the hospital. It is also necessary to expand the overall general and ICU bed capacity of the hospital in order to improve the quality of healthcare services offered to the patients. This will greatly help to save more lives of the patients arriving at the emergency department.

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