

Epidemiology of Trauma Patients presented at Emergency Department of Trauma Center

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ABSTRACT

Background: Emergency Department of National Trauma Center Nepal Center is the only specialized trauma care hospital in Nepal, in operation since 2012. Traumatic injury is one of the major causes for mortality worldwide. This study aims to see the epidemiology, pattern of injuries and outcome of the patients presenting to the emergency room.

Methods: After getting ethical approval, we included all patients presenting to the Emergency Department with at least one injury, between Jan 2018 to Dec 2020. Informations on age, gender, mechanism of injury and outcome was abstracted for all patients presenting to the emergency department. Data were extracted from hospital database with the permission of hospital authority.

Results: Total of 49991 patients presented to emergency department with different types of injuries. Among them 7792 (14.0%) needed hospital admission. Fall and road crashes comprised almost 80% of admitted cases. Mortality was 2.1% of admitted patients, mostly with head injuries followed by multiple injuries.

Conclusions: Among the patient visiting the trauma center during the study period most common mechanism of the injury were fall and road crash with head and neck injury. Majority of the patients were only managed in the ward without surgery.

Keywords: Emergency care; triage; trauma care system; unintentional injury

INTRODUCTION

Time is the most important factor deciding the life and death of a trauma victim. Traumatic injuries are a leading cause of global disease burden causing 9% of all deaths worldwide with more than 90% of injury-related deaths occurring in low- and middle-income countries (LMIC). Majority of the victims are from productive age group. Traumatic incidence is increasing with increased in road traffic incident (RTI), fall injury, burns as well as occupational injury leading to increase in injury burden¹⁻⁵ Understanding the epidemiology of trauma helps to prevent trauma itself, identify risk factors, reduce disability, prevent mortality and develop treatment strategy and policy.

This study aims to see the epidemiology of trauma in Nepal through data from Trauma Center and to study the mechanism of injury, injury to bodily region and outcome of patients presenting to the emergency department.

METHODS

Study was started after ethical approval was obtained from Institutional Review Board (IRB) of NAMS, Bir Hospital (Ref No: 528-2077/78). Single center retrospective observational study was done at National Trauma Center during the period of three years from January 2018 to December 2020.

Data were collected from medical record department for all patients presenting to the hospital emergency through the internal software of trauma emergency module. All the patients received in emergency with minimal of one traumatic injury were included in the study. Patient with non-traumatic injury and brought death at ER as well as incomplete filled data were excluded from the study. Patients demographic details, types of injury, outcome from the emergency department as well as the mechanism of injury was extracted. The descriptive analysis was done through the statistical software R.

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RESULTS

A total of 49991 cases were received in the ED during the study period of three-years. Among them, 40052 records were complete and included in the study. The remaining 9939 records were excluded due to incompletely filled informations. Male patients were more in number (69%) as compared to female patients(31%). Physical trauma related to falls and RTI were the most common injury mechanisms. In addition, only 16% were admitted and rest were discharged from emergency.

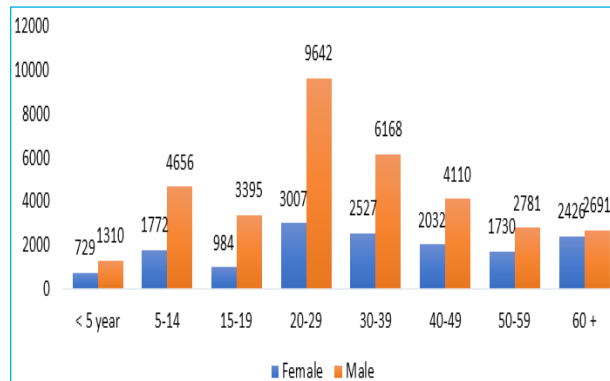


Figure 1. Distributions of trauma patients according to age and sex during 2018-2020 AD.

Table 1. Mechanism of injury during presentation at Emergency.

Injury	Year			Total
	2018	2019	2020	
Fall	5952	5930	4726	16608
RTI	3044	3649	2081	8774
Assault	912	1001	880	2793
Cut injury	796	897	815	2508
Occupational related	550	891	744	2185
Twist injury	308	354	179	841
Burn	96	117	68	281
Animal bite	84	56	84	224
Electric shock	61	29	17	107
Non-Traumatic	114	896	180	1190
Unknown trauma	1449	1818	1274	4541
Total	13366	15638	11048	40052

Table 2. Emergency outcome (Treatment results of trauma patients).

Emergency outcome	2018	2019	2020
Admitted at ICU	329	302	313
Admitted at ward	2300	2236	2312
Discharge from emergency	9782	11577	7224

Death	33	45	49
Referred to another center	121	114	117
Lama/Abscond	811	1364	1033

After being treated in ED 86% were discharged home, 14 % were admitted to ward and intensive care unit (ICU), 0.9% were transferred to other centers due to unavailability of ICU beds in the hospital. Overall, the hospital death rates of admitted patients were 2.1%. Traffic crashes, physical assaults were the most common causes of death (Table 3). In addition, there are only few cases referred to other centers.

Table 3. Address of patients.

	No	Percentage
Inside Valley	13395	27%
Outside Valley	36596	73%

Hospital has treated patients from all the 77 districts of the country. But vast majority of the patients were from Bagmati Province. The cases from province 2 were also significant. Large numbers of patients were from outside the valley.

Table 4. Site of Injury of patients treated in ward at Trauma Center during 3-year period.

Bodily Region [ICD 10 code]	Year (%)			Total (%)
	2018	2019	2020	
Head [S00-S09]	564 (21.5)	437 (17.2)	338 (12.9)	1339 (17.2)
Neck [S10-S19]	66 (2.5)	120 (4.7)	134 (5.1)	320 (4.11)
Thorax [S20-S29]	134 (5.1)	95 (3.7)	110 (4.2)	339 (4.35)
Lumbar spine and Pelvis[S30-S39]	215 (8.2)	185 (7.3)	182 (6.9)	582 (7.47)
Shoulder and Upper Arm [S40-S49]	240 (9.1)	238 (9.4)	193 (7.4)	671 (8.61)
Elbow & forearm [S50-S59]	248 (9.4)	247 (9.7)	217 (8.3)	712 (9.14)
Wrist and hand [S60-S69]	50 (1.9)	52 (2.0)	84 (3.2)	186 (2.39)
Hip & Thigh [S70-S79]	415 (15.8)	397 (15.6)	554 (21.1)	1366 (17.5)
Knee and lower leg [S80-S89]	591 (22.5)	667 (26.3)	708 (27.0)	1966 (25.2)
Ankle and foot [S90-S99]	58 (2.2)	56 (2.2)	63 (2.4)	177 (2.27)
Burn T31	48 (1.8)	44 (1.7)	42 (1.6)	134 (1.72)
Total	2629	2538	2625	7792

As shown in table 5 the majority of the cases were admitted for the treatment of lower extremity injuries followed by head injuries.

DISCUSSION

Injury is a major but preventable public health problem with respect to early age involved in mortality, morbidity and disability. Worldwide 8 million people die annually and there will be 30% increase in mortality by 2060.⁶ The Emergency Department in the hospital plays a vital role in managing all type of injuries.

This study used the retrospective injury information from a trauma module to provide an in-depth picture of the injury pattern of the country in which the conditions of traumatic patients are different from those of developed countries. The findings can be used as a basis for the injury prevention strategies. The most striking finding in this study is the large number of injuries found at a single institution. Most of the research papers focus on injury pattern of the country, are epidemiological study and are based on a community. To our knowledge, it is the first attempt in Nepal using of the hospital emergency injury data to know the overall picture of injury pattern at a center and definitely the findings can be used to see the epidemiological status as well as to formulate the policy regarding trauma care in hospital setting.

Overall, there was a significant difference in the incidence of injuries according to the sex as male represents almost two third of injury as compared to female. Our findings were similar to other epidemiological studies around south Asia, and most of the LMIC and also previous study done within Nepal.⁷⁻⁹

The common mechanism of injury is fall injury. We included fall from height, slip related injury in this category. Majority of the population according to the age group were either the old age or the children. Fall injury is the most commonly reported injury pattern in India and Pakistan, with commonest age group for this mechanism being below 15 years.¹⁰⁻¹³ Awareness of these groups about the seriousness of fall incidence should be taken as a preventive measure.

Road traffic injury ranked second as the leading cause of injury in our study. Similar to this study conducted by Choulagi et.al¹⁴ found RTI was the most common cause of the injury. They also found motorcycle accidents were the commonest mechanisms, occurred in the urban areas and age group affected were 15-40 years. But due to lack of data availability we could not analyze the type

of vehicle during RTI.

Work-related injury is also common in our setting. Common work-related injuries were cut injuries followed by crush injuries.

Physical assault like group fight, women and domestic violence accounted for 7% of total cases presenting to the Emergency Department. The scenes of assault were the home, work place, restaurants. Injuries from physical assault occurred in all age group. Similar to this study, A study conducted at regional hospital Pokhara Nepal, females were assaulted by spouse and known people but unspecified individuals in men.¹⁵

Very few injury cases (0.7%) attended the emergency with burn and flame related injury during the study period. In contrast study report published by Nepal health research council (NHRC) in 2009 shows reported that the incidence of burn was 3%. However, the study period and population was different and we do not have burn care facility that may cause the vast difference in result.^{10,16, 17}

In this study the 24 % of trauma patients arrived to ED by ambulances. The patients arriving by ambulances are more likely to be severely injured and were admitted in ward.

Majority were referred from outside the valley. Interestingly, 86% patient were discharged with appropriate management in the ED after 12 to 48 hours of arrival at hospital. Higher number of mild to moderate injury patients could delay the treatment of severely injured patients. Non-urgent patients could be treated in other health care settings in order to reduce the overburden of the emergency department.

Our study shows that extremity injuries followed by head and neck injuries were the most common sites of body injured. Similarly, study done by Shrestha R et al in Dhulikhel hospital shows same injury pattern.¹⁸ In addition, Gaurav et al and Shah et al found cervical spine injury was the most common type of injury in neck region. However, we did not include those details.^{19,20}

CONCLUSIONS

Patient visiting trauma center ER during the study period were male with most common mechanism of the injury were fall and road crash. In addition extremities were the most dominant site for injury. Majority of the patients were only managed in ED only.

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