








Original Article

## A descriptive study of the admitted patients for injuries in a large teaching hospital in 2016

Elham Nazari<sup>1</sup> , Mehran Aghemiri<sup>2</sup>, Zahra Ebnehoseini<sup>3</sup> , Reza Akhavan<sup>4</sup> , Azam Kheirdoust<sup>5</sup>,  
Mehri Momeni<sup>5</sup>, Hamed Tabesh<sup>6</sup>  

<sup>1</sup> Ph.D. Candidate of Medical Informatics, Department of Medical Informatics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>2</sup> MSc Student of Medical Informatics, Department of Medical Informatics, Tarbiat Modares University of Medical Science, Tehran, Iran

<sup>3</sup> Ph.D. in Medical Informatics, Psychiatry and Behavioral Sciences Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>4</sup> Assistant Professor of Emergency Medicine, Department of Emergency Medicine, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>5</sup> MSc Student of Medical Informatics, Department of Medical Informatics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>6</sup> Associate Professor of Biostatistics, Department of Medical Informatics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

### Corresponding Author:

Tel: +989166118368

Email: [TabeshH@mums.ac.ir](mailto:TabeshH@mums.ac.ir)

## Abstract

**Introduction:** Injuries are the causes of irreparable damages and costs in urban and rural settings. Preventive procedures are effective if correct related information is gathered and provided. Therefore, this study aimed to investigate the injury patterns and related factors in a large teaching hospital.

**Methods:** The current cross-sectional study was conducted at Edalatian Emergency Center, Mashhad, Iran, in 2016. All study subjects were extracted from the Hospital Information System (HIS). The demographic characteristics and injuries-related factors of 6,350 patients were extracted from the HIS. The extracted variables were emergency severity index (ESI), type of referral, referral reason, insurance organizations, age, anatomic site of injuries, and month of referral. The data were analyzed in SPSS software (version-21) using the descriptive statistics method (frequency and percentage).

**Results:** The majority of the study population was composed of males (%76.4). In total, 98.3% of the patients were classified into the semi-urgent and non-urgent levels, and 75.6% of the cases were affected in the right upper extremity. The most common age group was between 10-20 (69.4%) years, and the majority of the cases were admitted in June, July, and August.

**Conclusion:** The current study determined the pattern and most important reasons for injuries' referral to an emergency department. Accordingly, the injuries were more frequent in the young people and active human force in our community. Furthermore, there was a significant difference among the frequencies of injury incidence in the summer holidays. It seems necessary to develop preventive procedures for injuries.

**Keywords:** Emergency Treatment, Hemorrhage, Wounds and Injuries

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## Introduction

Accidents, shocks, choking, poisoning, falling, burning, attack, and violence may be the causes of injuries that can be intentional or accidental(1). The intentional injuries usually targeted adults, and accidental injuries are the results of child negligence. The rate of injury is growing increasingly and commonly occurs at the age of 1-40 years (2-3). More than 5 million people are damaged around the world that accounts for 9% of the death rate per year. It can be considered a big threat to the health of any country. Some injuries have temporary complications; however, a number of severe injuries can lead to disability. In addition, children are more vulnerable to injuries. As a result of injury and violence, 950,000 children under the age of 18 years die annually, and 90% of their injuries are accidental (4-5). Injuries and accidents are responsible for 40% of deaths in children aged 1-14 years (6). Moreover, they are more critical in developing countries and account for 98% of all incidents (7). Millions of injured people require intensive care, and the injuries sometimes cause disability (1-4). Therefore, it is important to manage and prevent injuries, especially in developing countries, because it is targeting young people and imposing costs on them, their families, and the healthcare system of their country (8). It can be helpful to identify and recognize injury patterns and their target population to properly plan, manage, and prevent the occurrence. The present study aimed to investigate the injured patients referred to Imam Reza Hospital, Mashhad, Iran; moreover, it was attempted to examine the epidemiology of injuries.

## Methods

This descriptive and cross-sectional study included all injured patients who were referred to a large teaching emergency center (Edalatian Emergency Department affiliated to Imam Reza Hospital, Mashhad, Iran). This hospital is located in Mashhad and is the largest hospital in eastern Iran; in addition, with a capacity of 70 and 82 intensive care unit and inpatient beds, respectively,

and approximately 12,000 square meters, it was built in four floors on the latest international construction standards. It is worth mentioning that all clinical and para-clinical units are embedded at the emergency department.

The patient's information has been extracted from the hospital information system (HIS). Information that violated patient privacy and confidentiality was not included in this study. Moreover, the authors did not apply any age and gender filtering. This study was extracted from a research project approved by the Deputy of Research in Mashhad University of Medical Sciences, Mashhad, Iran (99/270431).

Noisy and missing data were excluded from the study. The extracted variables from the HIS included the emergency severity index (ESI), type of referral, referral reason, insurance organizations, age, anatomic site of injuries, and month of referral. Triage is the foundation of primary care determining the patients' treatment priority process based on the severity of their health level conditions as soon as possible. According to ESI, the triage scale consists of five levels, including resuscitation, emergent, urgent, less urgent, and non-urgent. In this study, resuscitation and emergent levels were marked as 0 (urgent), and the rest of them were marked as 1 (non-urgent) (9). The data were analyzed in SPSS software (version 21) using descriptive statistics. A p-value less than 0.05 were considered statistically significant.

## Results

The most common age group was between 10-20 years, and the majority of the patients were referred by companions. Most of the referral causes were right upper limb injuries, and most referrals had no insurance coverage. Furthermore, the majority of the patients had non-immediate triage levels that were referred to the emergency center in August. Table 1 tabulates the patients' demographic characteristics. The results showed that the most commonly referred cases were males who had upper right extremity-related injuries at a non-urgent level. According to Table 2, the most

frequent injury is observed at the right upper limb in both male and female groups. Regarding the age groups, the most frequency of injuries is found in the right upper extremity (Table 3). The majority

of the patients were admitted in June, July, and August (Table 4).

Figure 1 illustrates the frequency of injuries according to anatomic sites.

**Table 1:** Patients' demographic characteristics

Variables	Levels	N (%)
Emergency Severity Index	Urgent	105 (1.6)
	Non-urgent	6,245 (98.3)
Gender	Male	4,852 (76.4)
	Female	1,498 (23.6)
Type of referral	Companion	6,055 (95.4)
	Pre-hospital emergency	295 (4.6)
Referral causes	Right upper limb injury	4,802 (75.6)
	Right lower limb injury	941 (14.8)
	Left upper limb injury	378 (6.0)
	Left lower limb injury	97 (1.5)
	Other injuries, including facial, abdomen, and chest	132 (2.1)
Insurance organizations	Voluntary	4,316 (68.0)
	Health services	896 (14.1)
	Armed forces	127 (2.0)
	Social security	936 (14.7)
	Others	75 (1.2)
Age (year)	0-10	864 (13.61)
	10-20	403 (6.35)
	20-30	4407 (69.40)
	30-40	674 (10.61)
	>40	2 (0.03)
Month of referral	April	474 (7.5)
	May	565 (8.9)
	June	604 (9.5)
	July	611 (9.6)
	August	667 (10.5)
	September	665 (10.5)
	October	545 (8.6)
	November	484 (7.6)
	December	449 (7.1)
	January	445 (7.0)
	February	376 (5.9)
	March	465 (7.3)

**Table 2:** Frequency of injuries by gender

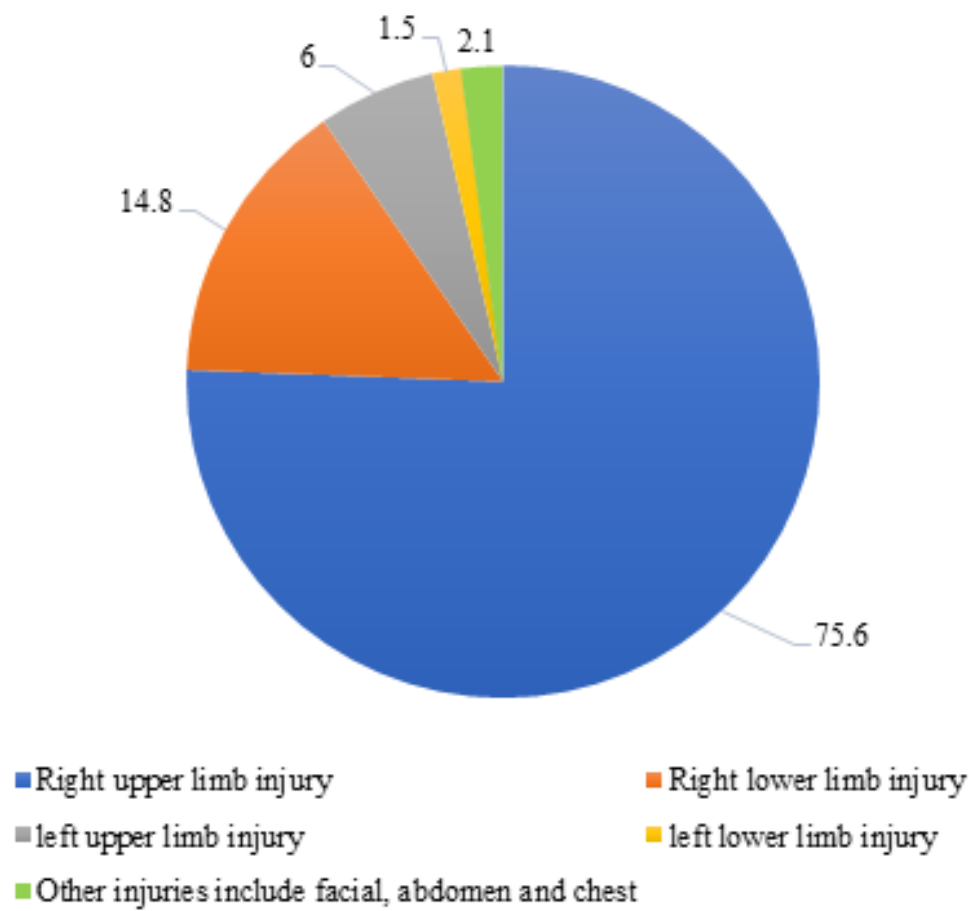
Anatomic sites of injuries	Gender		Total
	Male N (%)	Female N (%)	
Right upper limb injury	3,716 (76.6)	1,086 (72.5)	4,802 (75.6)
Right lower limb injury	659 (13.6)	282 (18.8)	941 (14.8)
Left upper limb injury	308 (6.3)	70 (4.7)	378 (6.0)
Left lower limb injury	59 (1.2)	38 (2.5)	97 (1.5)
Facial, abdomen, and chest	110 (2.3)	22 (1.5)	132 (2.1)
Total	4,852 (100.0)	4,852 (100.0)	1,498 (100.0)

**Table 3:** Frequency of injuries by age

Referral cause	Age (year)					Total
	N(%)					
	0-10	10-20	20-30	30-40	>40	
Right upper limb injury	676 (78.2)	295 (73.2)	3347 (75.9)	482 (71.5)	2 (100.0)	4,802 (75.6)
Right lower limb injury	95 (11.0)	70 (17.4)	648 (14.7)	128 (19.0)	0 (0. 0)	941 (14.8)
Left upper limb injury	31 (3.6)	17 (4.2)	290 (6.6)	40 (5.9)	0 (0.0)	378 (6.0)
Left lower limb injury	17 (2.0)	6 (1.5)	61 (1.4)	13 (1.9)	0 (.0)	97 (1.5)
Facial, abdomen, and chest	45 (5.2)	15 (3.7)	61 (1.4 )	11 (1.6)	0 (0.0)	132 (2.1)
Total	864 (13.61)	403 (6.35)	4407 (69.40)	674 (10.61)	2 (0.03)	6,350 (100.0)

**Table 4:** Frequency of injuries by month

Months of referral	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Referral reason	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Right upper limb injury	420 (88.6)	481 (85.1)	493 (81.6)	509 (83.3)	559 (83.8)	537 (80.8)	452 (82.9)	215 (44.4)	131 (29.2)	286 (64.3)	315 (83.8)	404 (86.9)	4802 (75.6)
Right lower limb injury	54 (11.4)	84 (14.9)	111 (18.4)	102 (16.7)	108 (16.2)	128 (19.2)	93 (17.1)	53 (11.0)	37 (8.2)	49 (11.0)	61 (16.2)	61 (13.1)	941 (14.8)
Left upper limb injury	0	0	0	0	0	0	0	160 (33.1)	162 (36.1)	56 (12.6)	0	0	378 (6.0)
Left lower limb injury	0	0	0	0	0	0	0	56 (11.6)	25 (5.6)	16 (3.6)	0	0	97 (1.5)
Facial, abdomen, and chest	0	0	0	0	0	0	0	0	94 (20.9)	38 (8.5)	0	0	132 (2.1)
Total	474 (100.0)	565 (100.0)	604 (100.0)	611 (100.0)	667 (100.0)	665 (100.0)	545 (100.0)	484 (100.0)	449 (100.0)	445 (100)	376 (100.0)	465 (100.0)	6350 (100.0)



**Figure 1.** Frequency of injuries according to anatomic sites

## Discussion

This study investigated the pattern of injuries and related factors in the emergency department of a large teaching hospital. In line with our findings, the results of a study by Prosser et al. showed a positive significant relationship between injuries and age groups (9). In our study; the most frequent injuries belonged to the age group of 20-30 years. The most commonly referred cases were injured at the upper right extremity. It seems that the right side has more possibility to be affected since most people are right-handed. Furthermore, people's culture can affect the type of injury (10). It seems that the majority of the injured population includes men since they do more outdoor activities in Iranian culture, and basically, the injury incidence on driving and occupational accidents, street strife, and sports are more common among males in Iran. There is a significant relationship between gender and accidental injuries. In addition, there is a significant relationship between age groups and injuries (at the age of 19-24) according to (11). On the other hand, a significant difference was observed between the four months in the spring and summer (i.e., June, July, August, and September) and the rest of the months regarding the frequency of injury incidence due to the summer school holidays (12). Young people are the largest victim of injuries, and given the fact that young people are much more active and effective than others and the possibility of disability, infection, and beauty complications, correct injury treatment is of utmost importance. Due to having too much culture-related and education-related injury incidence, the revision and improvement of the cultural level of the people to decrease occupational accidents and street strife should be considered. Registration of traumatized people is another important step in this regard.

Regarding the limitations of this study, one can refer to the lack of possibility to interview patients due to the research environment and patients' conditions in this study. The results can be more valuable if the causes of injuries and the patient situations are examined at the point of incidence.

Patients with head and facial injuries are not admitted at Imam Reza Hospital because of lacking neurosurgery specialists. To apply an accurate plan, it is recommended to use a multi-center study.

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## Conflict of interest

There is no conflict of interest.

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