Epidemiology of trauma in Shahid Bahonar hospital in Kerman

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Abstract
Objective: Trauma is one of the main causes of losing effective life among the populations. Knowing the pattern of trauma in each country can be considered as the first step in planning preventive programs to reduce trauma injuries. This study was conducted to evaluate the epidemiological status of trauma in Shahid Bahonar hospital in Kerman.
Methods: This retrospective, descriptive cross-sectional study was conducted in 2014. The study population consisted of all traumatic patients who referred to Shahid Bahonar hospital. All patients entered the study based on census sampling. In order to collect data, the medical record of each patient was scrutinized and the demographic information, causes of trauma, and the anatomical location of trauma were extracted. All data were entered into the SPSS version 20 software. For data analysis, we used descriptive tests (frequency and mean) as well as analytical tests (chi-square).
Results: 7803 (76.8%) traumatic patients were male and 2358 (23.2%) were female. Of all causes of trauma, accidents had the most frequency among women and men at 1208 (23.9%) and 3846 (76.1%) correspondingly. Other causes of trauma in both groups were related to falling (1538), violence (1720), occupation (1181), sports (663), and self-harm (5). The age group of 15-24 with 2576 patients had the highest amount of trauma (25.4%). In terms of location, limbs and thorax had the highest and the lowest amount of injury at 4527 (44.6%) and 653 (6.4%) respectively. We could observe a significant relationship between the cause of trauma with sex and the age variables ($P < 0.0001$).
Conclusion: Males are more susceptible to traumatic problems than females regarding the nature of their jobs . Moreover, accidents are the main cause of trauma. Improving the quality of vehicles, roads safety, and establishing driver training courses to follow the rules are highly recommended.
Keywords: Wounds and injuries, Epidemiology, Shahid Bahonar hospital, Kerman

Introduction

In today's world trauma is ranked as the main cause of death, hospitalization, and disability in all age groups (1). Any injury or damage, blunt or penetrating, caused by foreign agents intentionally or unintentionally is called trauma (2). Traumatic injuries can be classified as head, abdominal, etc. based on location; blunt and penetrating based on causative agent; or thermal and compressive trauma (3-5). Trauma remains the most important cause of death, hospitalization and lifelong disability for all ages at the present time. Thus, it is the most frequent cause of death and disability in people ages 1 to 44 (6). Everyone, regardless of gender, age, social class or geographical area encounter with this issue so that 97.9 cases per 100 thousand people around the world have died due to trauma (3,4). Trauma is recognized as the most common cause of death among young people and head injury accounts for the most frequent cause of death. On the other hand, the two least common causes are blows to the abdomen and chest (7). Due to the impact of economical and social affairs, trauma is the leading cause of loss for aggregate lifetime of the human population compared with other common causes of death such as cardiovascular diseases and cancers affecting the elders. Approximately,

annually 110 000 people die of unexpected events in the United States; with accident accounting for 40%. In 2004, of 167 000 trauma-related deaths, there were 29.6 million trauma patients treated in emergency departments in the United States. Moreover, trauma-related expenditures are estimated to be $117 billion each year. Interestingly, in the United States it is estimated that the whole lifetime cost for trauma patients is over $260 thousand billion (8). According to the World Health Organization (WHO), trauma in our country is the second leading cause of death, regardless of gender (9). In a study aimed at determining the trauma pattern in injured patients treated in Besat hospital in Sanandaj, the findings showed that the pattern was influential in 131 cases and blunt in 3885 ones. The study also showed that there was a significant relationship between the pattern of trauma and sex, age, and type of incident (10). In another study entitled epidemiology of trauma patients admitted to Neghavi hospital of Kashan, results showed that driving-related trauma accounted for 47.53% of all cases. This represented the highest rate and the most important factor affecting men and young people. The average cost of treatment per trauma patient was estimated at IRR 1 630 000 (2). With a better understanding of the epidemiology of trauma, appropriate plans and strategies including the use of preventive measures and organizing the delivery of health care services can be applied. This leads to the improvement and better quality of trauma-related surveillances. On the other hand, knowing the pattern of injuries in each country is the first step in the development of prevention programs to reduce trauma injuries. Based on the foregoing and the importance of trauma prevention in health and economics, as well as the fact that the epidemiology of traumatic events have not been evaluated yet, the aim of this study was to evaluate the epidemiological status of trauma in Shahid Bahonar hospital, the only trauma center in Kerman.

Methods

This retrospective, descriptive cross-sectional study was conducted in 2014 in Shahid Bahonar hospital in Kerman province. Since this hospital is the only trauma center in Kerman and the majority of trauma patients are referred to this hospital for inpatient, outpatient and emergency treatment, the research environment included the majority of trauma patients. Excluding the trauma victims, the study population consisted of inpatient, outpatient and emergency patients whose status was documented. Also, the records with incomplete information were not enrolled. During the study period 11 290 patients were admitted to the emergency department. Among them 10 161 were traumatic patients. Considering the inclusion and exclusion criteria, the eligible patients entered the study. In order to collect data, two of the researchers extracted patients' demographic data, causes of trauma, and anatomical location. The review of patients' records was allowed by relevant officials and all ethical issues related to the patients' confidentiality were taken into consideration. In order to comply with the accuracy of data collection, the researchers individually completed appropriate forms and in case of discrepancies in the data collection, inconsistent cases were double-checked. SPSS v. 20 was used for data analysis and data were reported applying descriptive statistics (relative frequency, absolute frequency, measures of central tendency and mean ± SD) and analytical tests (chi-square). $P < 0.05$ was considered as significant.

Results

Based on the findings of 10 161 trauma patients, 7803 patients (76.8%) were male and 2358 (23.2%) were female. The prevalence of accident was 76.1% (3846) in males and 23.9% (1208) in females. Self-harm was the least in the two groups of males and females, 4 vs. 1. Based on the findings, considering the 95% confidence interval, there was a significant correlation between the cause of trauma and sex variable ($P < 0.0001$, Table 1).

Among age groups, the age group 15-24 years (25.4%) allocated the highest level of trauma. Accident with a high proportion allocated the most rates in all age groups (except for the age group of less than 5 years) and self-harm was the least among all groups. Considering the 95% CI, there was a significant relationship between trauma and age groups ($P < 0.0001$). Frequency distribution of trauma by age group is shown in Table 2.

Among the affected organs, limb injury (44.6%) in 4527 patients was the highest and thorax (6.4%) in 653 patients was the least affected area, with accident accounted for the majority of injuries. Frequency distribution (%) of the affected organ in terms of the cause of trauma is shown in Table 3.

Discussion

Trauma is the most significant cause of disability and health-related economic losses in the countries. Trauma is the most common cause of death in the first three decades of life. Reports published by the WHO Eastern Mediterranean Regional Office indicate that in spite of problems such as infectious diseases and malnutrition, accidents and injuries are currently the most important problems and account for the three main causes of death in the populations (11). Given the foregoing, the aim of this study was to identify the epidemiological status of trauma in

Table 1. Frequency (%) of the cause of trauma in terms of gender in Shahid Bahonar hospital in 2014

Causes of Trauma	Sex		Total
	Male	**Female**	
Accident	3846 (76.1%)	1208 (23.9%)	5054 (100.0%)
Fall	1123 (73.0%)	415 (27.0%)	1538 (100.0%)
Violence	1289 (74.9%)	431 (25.1%)	1720 (100.0%)
Self-harm	4 (80.0%)	1 (20.0%)	5 (100.0%)
Occupation	1136 (96.1%)	46 (3.9%)	1181 (100.0%)
Sport	406 (61.2%)	257 (38.8%)	663 (100.0%)
Total	7803 (76.8%)	2358 (23.2%)	10161 (100.0%)

Table 2. Frequency distribution (%) of trauma in terms of age groups in Shahid Bahonar hospital in 2014

Causes of Trauma	Age Groups (year)							Total
	<5	5-14	15-24	25-34	35-44	55-54	≥55	
Accident	66 (1.3%)	503 (10.0%)	1655 (32.7%)	1410 (27.9%)	678 (13.4%)	266 (5.3%)	476 (9.4%)	5054 (100.0%)
Fall	672 (43.7%)	224 (14.6%)	88 (5.7%)	61 (4.0%)	259 (16.8%)	217 (14.1%)	17 (1.1%)	1538 (100.0%)
Violence	0 (0.0%)	17 (1.0%)	435 (25.3%)	471 (27.4%)	479 (27.8%)	306 (17.8%)	12 (0.7%)	1720 (100.0%)
Self-harm	0 (0.0%)	1 (20.0%)	2 (40.0%)	2 (40.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Occupation	0 (0.0%)	27 (2.3%)	251 (21.3%)	310 (26.2%)	273 (23.1%)	23 (1.9%)	297 (25.1%)	1181 (100.0%)
Sport	0 (0.0%)	33 (5.0%)	145 (21.9%)	222 (33.5%)	242 (36.5%)	17 (2.6%)	4 (0.6%)	663 (100.0%)
Total	738 (7.3%)	805 (7.9%)	2576 (25.4%)	2476 (24.4%)	1931 (19.0%)	829 (8.2%)	806 (7.9%)	10161 (100.0%)

Table 3. Frequency distribution (%) of the affected organ in terms of the cause of trauma in Shahid Bahonar hospital in 2014

Causes of Trauma	Damaged Organ					Total
	Head and Neck	Thorax	Abdomen	Limbs	Spine	
Accident	1391 (27.5%)	41 (0.8%)	464 (9.2%)	2277 (45.1%)	881 (17.4%)	5054 (100.0%)
Fall	67 (4.4%)	307 (20.0%)	109 (7.1%)	701 (45.6%)	354 (23.0%)	1538 (100.0%)
Violence	17 (1.0%)	8 (0.5%)	911 (53.0%)	784 (45.6%)	0 (0.0%)	1720 (100.0%)
Self-harm	0 (0.0%)	0 (0.0%)	4 (80.0%)	1 (20.0%)	0 (0.0%)	5 (100.0%)
Occupation	388 (32.9%)	273 (23.1%)	41 (3.5%)	477 (40.4%)	2 (2.0%)	1181 (100.0%)
Sport	44 (6.6%)	24 (3.6%)	307 (46.3%)	287 (43.3%)	1 (2.0%)	663 (100.0%)
Total	1907 (18.8%)	653 (6.4%)	1836 (18.1%)	4527 (44.6%)	1238 (12.2%)	10161 (100.0%)

Sahahid Bahonar hospital in Kerman. Our findings show that males have a higher risk for traumatic events. These results are consistent with the results of studies in Tehran, Baqiyatallah, and Kashan hospital (12-14). Perhaps, men working outside the home are more susceptible to the dangers of vehicles. However, Davis et al found an equal rate in two genders (15). Accidents remained the most common cause of trauma and self-harm the least in our study. The commonest cause of trauma in studies performed in Tehran and Baqiyatallah hospital was also accidents (12,13). These investigations show that traffic accidents are counted as a major cause of death. The factors contributing to the increase in accidents are the low quality of domestic vehicles, rough roads, and tired and sleepy drivers. These can be modified with training and reforming the infrastructures. Thus, it is expected that by applying interventions such as obliging drivers to use seat belts and securing roads and vehicles, the death rate from traffic accidents can be reduced. In an investigation regarding the epidemiology of head trauma in patients admitted to Poorsina hospital, results showed that traffic accidents (76.5%) were the most common cause of trauma (16). These findings are compatible with the results of the current study. Other results showed that the trauma pattern was significantly associated with sex, which these findings accord closely with the results of majority of studies (17-20). In our study the age group 15-24 (25.4%) accounted for the greatest amount of trauma. However, in a study conducted in Kashan, ages 21 to 30 had the highest frequency of injury and the age group of 10 to 20 years was in the second place (14). Perhaps, this difference was due to

dissimilar grouping method. Yet, more traumatic events in this age group may be related to high risk behavior in this age group. Keppel et al also reported the age group of 15-30 years as the highest group at-risk (21). In our study, of the damaged organs, limbs with 4527 patients (44.6%) were the highest and the thorax with 653 patients (6.4%) was the least damaged area. In a study conducted in Kashan also limbs were the most injured organs (14). Bruch et al (22) also reported limbs as the most commonly injured areas. The reason is likely due to the anatomical structure of the human body. The results of a study on the evaluation of trauma patterns and its associated factors in Besat hospital in Sanandaj demonstrated that limbs included 61.2% of the anatomical location of trauma (10). This finding is consistent with the results of our study. Conversely, in Memarzadeh et al (23) investigation, the most frequently associated injuries were head trauma (38.5%), multiple traumas (34.3%), and limbs (18.9%).

Limitations
One of the limitations of this study was the incomplete records of trauma patients. Another limitation was limited sample size i.e. patients referring to Shahid Bahonar hospital. Given the importance of the trauma, it is recommended that its epidemiological status in the country, with regard to references to the trauma hospitals, clinics, and health centers in rural and urban areas be determined, in order to adopt a national strategy to prevent trauma.

Conclusion
Males are more susceptible to traumatic problems than fe-

males regarding the nature of their jobs . Moreover, accidents are the main cause of trauma. Improving the quality of vehicles, roads safety, and establishing driver training courses to follow the rules are highly recommended.

Ethical issues
Not applicable.

Authors' contributions
All authors had standard writing criteria based on the recommendations of the International Committee of the Medical Journal Publishers (ICJME).

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