Epidemiological study of trauma patients referred from Imam Reza trauma center to Shohada orthopedic center in Tabriz, Iran, during 2015

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Abstract

Introduction: Traumas are one of the most common causes of morbidity and mortality all over the world, especially in developing countries. The economic and social burdens of the disease vastly affect both developed and developing countries in different ways. Although the importance of this issue is obvious, there are few documentations about the characteristics of trauma patients in Iran. This study aimed to evaluate the characteristics of trauma patients referred to orthopedic center in Tabriz, Iran during 2015.

Methods: Eight hundred twenty-one patients with trauma that needed orthopedic interventions were studied in this cross-sectional study during 2015 in Tabriz. Age, sex, trauma type and date were collected and analyzed by SPSS.

Results: From 821 patients, 70.9% were male. Most of the patients were referred in summer (33.6%) in June (11.6%). The mean age was 40.67 ± 20.4 with a tendency toward young ages (skewness = 0.28). The most common trauma types were car accidents (54.8%) and falling traumas (33.5%). Falling trauma was higher among females (42.31% vs 31.91%). Car accidents increased in cold seasons of the year. Most falling traumas were in spring and summer. Falling increased with increase in age while bicycle and motorcycle accidents decreased.

Conclusion: According to high incidence of traffic injuries, an integrated multidisciplinary intervention to reduce the rate of traumas and their burden is essential.


Introduction

Trauma is one of the major causes of morbidity and mortality all over the world.¹³ It is estimated that 5 × 10⁶ people lose their lives as a result of most preventable injury.¹ Based on reports by World Health Organization (WHO), almost 90% of deaths due to injuries occurred in developing countries and will increase up to 65% over 20 years.⁵,⁶

Musculoskeletal injuries are one of the most common types of trauma especially in developing countries due to high incidence of road accidents.⁷,⁸ It is known as the second cause of death in Iran following ischemic heart disease.⁹,¹⁰ Studies from the United States suggest that the lifetime risk of fracture is 50% in males and 33% in females.¹¹ In one study, 49.2% of traffic accidents lead to limb trauma in Tabriz, Iran.¹² One million two hundred thousand lives are lost and 50 × 10⁶ are injured in traffic accidents every year.¹³

In 2013, 973 million people were injured that warranted health care and 4.8 million people died from injuries.¹⁴

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It has a significant psychosocial and economic impact on involved individuals. The estimated burden of traffic accidents due to post-trauma disability was estimated approximately 1.4 billion USD in 2011 in Iran.\textsuperscript{15}

Total economic loss of world during 2014 was 848.205 billion USD. Disability-adjusted life years (DALY) burden of injuries was concentrated (almost 75\%) among low- and lower-middle-income countries, but economic burdens of injuries were concentrated (over 80\%) among higher-middle- and high-income countries. Iraq had lost almost 20\% of its GDP due to injuries and the USA had the highest amount of economic loss for injuries (169.136 billion USD).\textsuperscript{16,17}

The epidemiology and demographic characteristics of trauma are highly variable in different countries due to their cultural, educational, economical and geographical characteristics. Also, data documentation and health records are poor in developing countries and as a result, the impact of trauma is unknown on the population.\textsuperscript{18}

So, a good understanding of trauma types and patients’ characteristics can lead to a better preparation and care, and development of a better preventive strategy. This study was designed to identify the characteristics of the trauma patients who were referred from trauma center of Imam Reza hospital to Shohada hospital (orthopedic center) due to their fractures in Tabriz during 2015.

**Methods**

This retrospective cross-sectional study comprised of patients who were admitted to Imam Reza hospital and were referred to Shohada orthopedic center after initial treatments and procedures for complementary treatments and surgeries due to fractures in Tabriz, during March 2014 to March 2015. Patients with minor injuries and laceration that did not have any determinant fractures and patients with major head, chest and abdominal injuries and the ones whose lives were in danger and needed collateral wards attention before orthopedic treatments were excluded from the study. Also, patients with unsatisfactory data were excluded from the study. All the data were collected from Imam Reza hospital electronic archive, including age, sex, trauma type, admission month and season.

All data were analyzed by SPSS software (version 21, SPSS Inc., Chicago, IL, USA) and was described using frequency, percentage, mean ± standard deviation (SD), median, mode, range, Kolmogorov-Smirnov for age distribution, and Kruskal-Wallis. P-value < 0.05 was considered significant.

**Results**

From 821 referred patients, 582 (70.9\%) were male and 239 (29.1\%) were female (M:F ratio = 1:2.43).

Most of the patients were referred in summer (33.6\%), spring (24.6\%), winter (23\%) and autumn (18.8\%).

Most of the patients were referred in June (11.6\%), July (11.2\%), August (10.8\%) and months with less referral were November (6.1\%), October (6.2\%) and March (6.2\%).

The mean age of the subjects was 40.67 ± 20.4 (median = 39, mode = 21) with a 90 years range (min = 1, max = 91). The distribution of patients was skewed toward the left and was not normal according to Kolmogorov-Smirnov test (P < 0.01, skewness = 0.28) that represents the young age of trauma patients.

The most common trauma types were car accidents (54.8\%) and falling (33.5\%). Other types of trauma were motorcycle accidents (4.1\%), pedestrian accidents (3.8\%), assault (2.6\%), others (1\%) and bicycle accidents (0.2\%).

The most common trauma types were car accidents and falling in both sex groups. Also falling (42.31\% vs 31.91\%) and bicycle accidents (0.55\% vs 0.21\%) were higher among females.

The most falling traumas (36.3\%), car accidents (32.4\%) and motorcycle accidents (32.2\%) were in summer, while pedestrian accidents were common in winter (32.2\%), and assaults were more common in spring (42.8\%). Car accidents were high in all seasons and
increased in cold seasons of the year. Most falling traumas were in spring and summer.

The trauma types were statistically related to the age of the patients according to Kruskal-Wallis test ($P < 0.01$); falling increased with the patients’ age and bicycle and motorcycle accidents had inverse association with the patients’ age (Table 1).

**Table 1. Patients age in different trauma types**

<table>
<thead>
<tr>
<th>Trauma type</th>
<th>Mean ± SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling trauma</td>
<td>47.41 ± 18.61</td>
<td>4</td>
<td>91</td>
</tr>
<tr>
<td>Car accident</td>
<td>38.76 ± 20.38</td>
<td>1</td>
<td>91</td>
</tr>
<tr>
<td>Motorcycle accident</td>
<td>21.91 ± 3.53</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>Pedestrian accident</td>
<td>39.52 ± 20.65</td>
<td>8</td>
<td>78</td>
</tr>
<tr>
<td>Assault</td>
<td>27.10 ± 7.97</td>
<td>16</td>
<td>45</td>
</tr>
<tr>
<td>Bicycle accident</td>
<td>16.50 ± 3.53</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Other</td>
<td>42.50 ± 15.14</td>
<td>21</td>
<td>61</td>
</tr>
</tbody>
</table>

SD: Standard deviation

Discussion

Trauma is one of the most common causes of patient admissions in the emergency wards. Precise epidemiological study of traumas and their characteristics is difficult as there are no fracture and trauma surveillance systems in developing countries (including Iran). Our study is based on data from hospital coding systems. It is evident that there is a serious need for trauma national registry to provide records that can help to develop health service policies, and strategies.

Our study intended to record and analyze characteristics of trauma patients with fractures that needed an orthopedic intervention.

The sex ratio was statistically different; males were involved two to three times higher than females and our result is in line with previous reports from Iran and other countries. 19,22 The male sex was 3.5 fold higher in the study by Hemmati et al. in Guilan, Iran. 19 Jones et al. study from Texas 21 and Byun et al. 22 from Seoul had similar results. These results represent that males are more susceptible to trauma that can be due to tougher workplace environment and daily activities and a higher rate of vehicles, driven by men.

Most of our patients were referred in summer (33.6%) and spring (24.6%). The result of Abbasi and colleagues’ study in Shiraz, Iran, reported an increase in patients with trauma admission in warm and sunny seasons. 20

Kieffer et al. reported an increase in trauma cases during summer and weekends. 23

Falling traumas increased significantly in summer and spring due to harvesting crops and trees. Car accidents were the most common cause of referral in all seasons and increased in cold seasons as a result of roads and weather condition.

The mean age was 40.67 ± 20.4 with a tendency toward young ages (skewness = 0.28).

The average age of other studies such as Hemmati et al. 19 in Iran and Byun et al. 22 in Seoul were a bit lower (31.6 and 35.22 years respectively).

The higher average age of patients in our study can be explained by the high incidence of falling trauma among older patients. Another reason for this was inclusion of patients without fractures, which we had previously excluded in present study.

The most common types of trauma in our study were car accidents (54.8%) followed by falling (33.5%) and the results are consistent with other studies that took place in developing countries, 19,20 but were merely similar to developed countries. 22,24

The first cause of trauma in Seoul was falling as Byun et al. mentioned in their study. 22 Data from the Center for Disease Control and Prevention (CDC) also suggested the same results. Falling (26.3%) was the most common type of trauma during 2011 in the USA and motor-vehicle traffic accidents only comprised 8.9% of all injuries. 25

Falling traumas (42.31% vs 31.91%) were higher among females and increased with the patients’ age. This can be due to osteoporosis that involved women more than men and at younger ages, especially in developing countries. 26-28

Conclusion

Road traffic accidents are still the major cause of trauma and associated morbidity and mortality in Iran. This indicates a need for
multidisciplinary interventions and programs to reduce trauma incidence. The need for qualified trauma care services, public knowledge improvement to take safety and protective measurements and strict law observation besides producing safe vehicles and roads are obvious and essential to reduce the impact and burden of traumas.

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Authors’ Contribution
Mahboub Pouraghaei designed the study and analyzed the data, Mohammad Mehdi Bagheri-Asl gathered the data and prepared the first draft, Alireza Ala and Alireza Sadeghpour consulted and supervised the work, and critically revised the draft, and Payman Moharamzadeh has done the management and proofing.

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Conflict of Interest
Authors have no conflict of interest.

Ethical Approval
This study was approved by ethics committee of Tabriz University of Medical Sciences (5/D/81071).

References


