

## ORIGINAL RESEARCH

## Treatment Costs of Traffic Accident Casualties in a Third-level Hospital in Iran; a Preliminary Study

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### Abstract

**Introduction:** The costs of traffic accidents in low- and middle-income countries are estimated to add up to \$65 billion annually, which is a little higher than the amount they receive as a final aid for development. The present retrospective study aims to evaluate the treatment costs of the hospitalized injured individuals in traffic accidents. **Methods:** The present study was carried out in Imam Hossein Hospital, Tehran, Iran. The study population consisted of all the individuals injured in traffic accidents, admitted to the hospital wards. Data were collected by a trained emergency physician. Demographic data, injury mechanism, the type of vehicle, the admission ward of the patient, and treatment costs were collected. **Results:** 200 patient files were evaluated (males: 89%). The results showed that 54% of the patients were in the 18-40-year age group and collisions between cars and motorcycles were the most frequent accidents (47%). The mean hospitalization cost for each patient was estimated to be \$1622.1. Statistical analyses showed that treatment costs in the neurosurgery ward was significantly higher than orthopedic and general surgery (df: 3; F=9.5, P=0.008). **Conclusion:** The results of the present study showed that the mean cost of each traffic accident victim in Tehran is approximately \$1622.1 and these patients sustain significantly higher costs in neurosurgery ward.

**Key words:** Health care costs; traffic accidents; hospitalization

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### Introduction:

Road traffic injuries (RTI) are one of the most important health care problems all over the world; in this context, such accidents result in the death of 1.2 million people and the injury of 50 million ones annually. Unfortunately, more than 90% of deaths due to road traffic accidents occur in low- and middle-income countries (1, 2). It is predicted that if such a trend continues, in the next five years road traffic accidents will result in the death of 6 million people and the injury of 60 million individuals only in developing countries. In 1990, road accidents ranked ninth in the list of the most important factors threatening the health of the community; but it is predicted that by 2020 they will rank the third cause of mortality and morbidity. Another bitter fact about these reports is that 50% of the killed are individuals aged between 15–43 years-old, who are the most important group in the economic development of societies (3). Social and economic costs of road accidents and their physical and psychological adverse effects on individuals and communities are the most important problems encountered by specialists,

authorities of transportation industry, and health systems. The number of road accidents rises in developing countries and the direct and indirect costs are higher compared to those in developed countries (4). Unfortunately, Iran has a high rate of road traffic accidents and the incidence of fatal RTIs in Iran is 33 in 100,000 of the population (5). This high incidence rate shows the importance of more research and adoption of efficacious preventive and therapeutic measures in the management of road traffic accidents. Based on estimations, the global costs of road traffic accidents is \$518 billion annually, with \$65 billion in low- and middle-income countries, which is a little higher than the financial aid they receive for development (6). Studies by the World Bank show that the number of people dying due to road traffic accidents in Iran has increased by 10%, which is higher than that in many developing countries and is very undesirable and worrying based on world standards (1). A correct estimate of the economic and social consequences of road traffic accidents is not available in low- and middle-income countries. Thus, based on World Health Organization (WHO) latest report, further research is necessary on the epidemiologic pattern of road traffic accidents in such countries to determine the extent of the problem and identify individuals susceptible to traffic accidents. In this regard, Iran is not an exception as a low- and middle-income country (2). Alt-

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though valuable efforts have been made in recent years in Iran to estimate the burden of such accidents and their consequences (7-9), there are still insufficient data in this respect. Therefore, the present retrospective study was undertaken to evaluate the therapeutic costs of road traffic accidents and injuries in individuals admitted into hospital wards in a third-level hospital in Iran.

#### Methods:

##### Study design

The present cross-sectional study was carried out in the third-level Imam Hossein Hospital in Tehran, Iran, retrospectively. Tehran is the capital and largest city in Iran with a population of approximately 13 million people. The study was carried out from August 2008 to August 2009. The study population consisted of all the road traffic victims hospitalized in Imam Hossein Hospital during the one-year period mentioned above, who had an accident with at least one vehicle. The exclusion criteria were the lack of access to the patient data on age, deficiencies in patient file, and pedestrians' falls without involvement of a vehicle. Selection of samples was carried out randomly from the files of hospitalized patients. To this end, the list of all the road accident victims were sorted based on hospitalization code and then randomization table was used to select 200 patient files, randomly.

##### Data collection

Data were collected using a checklist consisted of demographic data (age and gender), the mechanism of injury, the type of vehicle, the hospitalization ward, and the patient's treatment costs. Data were collected by a trained emergency physician. The instructions were given to the physician included the management of research tools (how to complete the checklist, registration of data), and summarization of medical data. The traffic accident victims, included in the study, were irrespective to the severity of injuries. Data were extracted from the files of hospitalized patients.

##### Statistical analysis

Data were analyzed with SPSS 20. Quantitative data were reported as means and standard deviations; qualitative data as frequencies and percentages. One-way ANOVA and Tukey post hoc were used to compare treatment costs separately in each ward. Statistical significance was defined as  $p < 0.05$ .

##### Results:

200 patient files were evaluated in the present study (male: 89%), with 54% of the victims in the 18–40- age group. Motorcycle accidents (47%) were the most frequent accidents (Figure 1), with 66% of the patients hospitalized in the orthopedic ward, 20% in the neurosurgery and 14% in the general surgery (Table 1). The mean hospitalization cost was estimated at \$1622.1, with the highest hospitalization costs in the neurosurgery ward (\$2192.1), followed by orthopedic (\$1487.4) and general surgery (\$1186.85) (Figure 2). The therapeutic costs of hospitalized patients in the neurosurgery ward were significantly higher than those in other wards (df: 3;  $F=9.5$ ;  $P=0.008$ ).

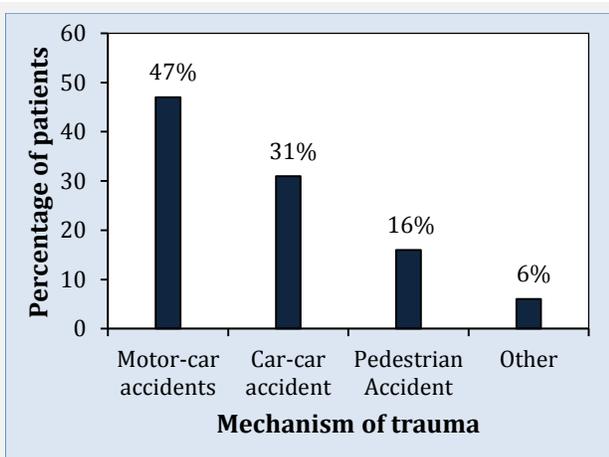
##### Discussion:

The results of the present study showed that the mean treatment cost for patients injured in road traffic accidents is \$1622.1 for each patient in a third-level educational hospital with 5000 admissions monthly in Tehran. The cost is significantly higher in the neurosurgery ward compared to other wards. In addition, motorcycle accidents were the most frequent events leading to hospitalization. In this context, a study by Razaeei et al. can be mentioned in which the mean hospital cost for traffic accident victims was reported to be \$1370 for each patient (9). In relation to patients' treatment costs it should be pointed out that even patients succumbing to death, inflict high hospital costs on health systems. The annual mortality rate of traffic accidents in Iran has been reported to be 44 in 100,000 of the population, which is higher than the death toll of an earthquake in Bam in 2003 (10, 11). Data available in Iran show that the treatment costs of an injured individual who finally succumbs to death is \$2410 on the average (9). Therefore, a high rate of mortality and treatment costs of the victims impose heavy financial burdens on health service systems. On the other hand, costs related to physiotherapy and rehabilitation of victims and incidence of persistent debilities result in direct and indirect financial burdens (9). However, since the health system in Iran should pay all the costs of traffic accident victims, the overall treatment costs of these patients are very high. For example, Rezaeei et al. showed that the treatment costs inflicted by traffic accident victims in Tehran is around \$336 million annually (9). In addition, a study in Barcelona showed that treatment costs of road traffic accidents are almost \$329 million annually (12). Therefore, programming and preparation of preventive strategies for road accidents should be pursued as fast as possible. Finally, it is suggested that a registry of road

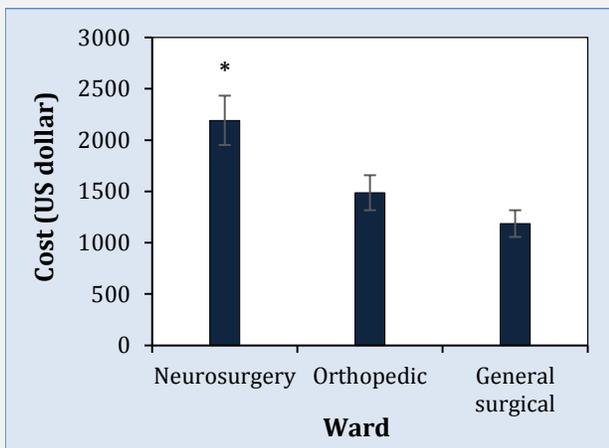
**Table 1:** The variables evaluated in the patients [↑](#)

Variable	Frequency (%)
<b>Age (year)</b>	
18≤	30 (15)
19-40	108 (54)
41-59	44 (22)
60≥	18 (9)
<b>Gender</b>	
Male	178 (89)
Female	22 (11)
<b>Hospitalization ward</b>	
Orthopedic	132 (66)
Neurosurgery	40 (20)
General surgery	28 (14)





**Figure 1:** Mechanisms of trauma in patients under study, consisting of vehicle turning over, mechanical and road faults, and driver fatigue. [↑](#)



**Figure 2:** Treatment costs separately for each ward. \* shows significant difference from other groups at  $P < 0.01$ . [↑](#)

traffic deaths and injuries should be devised and created to determine risk factors, conditions, and chain of events leading to accidents. Such comprehensive descriptions are seldom achievable with local reporting systems (13, 14). This will help determine the country's health system priorities.

#### Conclusion:

The results of the present study showed that the mean treatment cost of a traffic accident victim in a third-level hospital in Tehran is around \$1622.1, with the highest costs for patients in the neurosurgery ward.

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#### Conflict of interest:

None

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#### Authors' contributions:

Manouchehri M and Drakhshandeh N had contributed in all parts of study as designing, data gathering, data analysis, and development of the article.

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