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Original Article

Traffic accident injuries in a referral Orthopedic Hospital in North West of Iran during summer 2009

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Abstract

Introduction: Road traffic injuries are a major public health problem, requiring huge efforts for effective and sustainable prevention. Because of the high occurrence of traffic accidents in Iran, basic data acquisition is highly needed to implement prevention plans. The present research is conducted as an epidemiological study of the traffic accident victims referred to a referral orthopedic center in North West of Iran.

Methods: A cross-sectional study was conducted during a 3 months period from June to September 2009 in Tabriz, Iran. A total of 16681 patients were admitted to the emergency ward, and 3246 patients (19.5%) were hospitalized during this period because of traffic related injuries. After randomization, 630 cases were selected to be enrolled in the study. The location of an accident, position of road users, type of crashed vehicle, cause of accident, type of injury, time interval from accident to hospitalization and treatment outcome were recorded. Statistical analyses were carried out using SPSS software.

Results: The mean age of the patients was 31 years (range, 6 months to 98 years) and 77.0% of patients (468 cases) were men. A total of 193 (36.6%) patients sustained traffic accident in open roads and 335 (63.4%) in urban corridors. In 67 (12.9%) of accidents, there was only a single occupant in the vehicle. The time interval between the accident and admission was 6.6 ± 3.2 hours. Of the 608 cases, 45.7% were drivers, 30.3% passengers, and 24.0% pedestrians. Most cases of the car accident happened in urban areas, and the male victims were largely in the driver group. The most frequent type of injury was knee, leg and head trauma.

Conclusion: The large number of traffic-related injuries admitted to our emergency ward that comprise mostly young adults should be considered as an alarming signal to policy makers and health providers in our province. Strict control on drivers' behavior should be taken into account if increasing human loss and injury on the roads are to be averted.

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Introduction

Road traffic injuries are a major but neglected global public health problem and a major cause of morbidity and mortality.[1] Traffic accidents impose enormous direct and indirect costs to health services and allocate a major share of the national budget.[2,3] Of all the systems that people have to deal with on a daily basis, road transport is the most complex and the most dangerous. Road traffic crashes take the lives of nearly 1.3 million people every year, and injure 20-50 million more and have become the leading cause of death for people aged 15-29 years.[4]

About 85.0% of deaths and 90.0% disabilities caused by traffic accidents occur in low-income and middle-income countries,[5] while only 40.0% of vehicles exist in those countries.[6] In recent years, the number of road traffic accidents in the Middle East countries has showed a significant increase, and it has become one of the major health and social problems in these countries.[7-11] Traffic accidents are the main cause of injury and the second

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most common cause of death in people under 40 years in Iran.[12,13]

Soori and Naghavi study showed that traffic accidents are the leading cause of death in children in the rural areas.[14] Iran has one of the highest numbers of life loss resulted from traffic accidents comparing with other countries.[15] In one study comparing the prevalence of traffic accidents in 10 provinces of Iran, West Azerbaijan, Iran, had the highest road traffic death toll.[16] Rational decision-making in public policy is dependent on impartial research and information. Without extensive research capacity, there exist few means to overcome misconceptions and prejudices about road crash injuries. Developing research capacity nationally is a central feature of the new model of road safety.[17] Accordingly, this study has been planned and conducted to investigate the epidemiology of traffic accidents injury in patients admitted to the emergency ward of Tabriz Shohada Hospital, Iran, which is the largest orthopedic referral center in northwestern of Iran.

Methods

This analytic cross-sectional study has been conducted during a 3 months period between June and September 2009 in Tabriz. A total of 16681 patients were admitted to the emergency ward of Tabriz Shohada Hospital during this time. 42.0% percent (7092 cases) of these admissions were related to traffic injuries. A sum of 3246 patients (19.5%) was hospitalized during this period because of traffic-related injuries and 630 cases of these patients were randomly selected using convenience sampling to be enrolled in the study. Informed consent was obtained, and ethical considerations including confidentiality were followed in this study.

Exclusion criteria included the unavailability of data about the accident and the patients' disagreement to participate in the study. According to exclusion criteria, 22 cases were excluded, and 608 entered our study. To collect the data a checklist consisting of two parts was prepared. The first part included demographic data and the second part consisted of information regarding the location of accident, position of road users (drivers, passengers, motorcyclists, pedestrians, cyclists, children, others), type of crashed vehicle, cause of accident (according to traffic police's report contained in patient records), type of injury (based on clinical history, physical examination and imaging findings), time interval from accident to hospitalization and treatment outcome (discharge or death). The data were collected according to interview with the patients and companions, patient's medical records, and police reports. The data were expressed by descriptive statistics (frequency, percentage, mean and standard deviation) and analyzed using t-test and chi-square test [SPSS software (version 16, SPSS Inc., Chicago, IL, USA)]. Significance was set at $P < 0.050$.

Results

During a 3 months period between June and September 2009, 3246 (19.5%) out of 16681 patients admitted to the emergency ward, were hospitalized because of traffic related injuries. A total of 608 patients were selected and enrolled in our study. Seventy-seven percent of patients (468 cases) were male. The mean age of the patients was 31.7 ± 17.9 years (range, 6 months to 98 years). The mean age of male patients was 30.5 ± 16.4, and the mean age of female cases was 35.5 ± 21.7 years. The women being in average 5 years older than men, the difference was statistically significant ($P < 0.010$). The age group between 21 and 30 years comprised the largest proportion (29.1%) of the patients. Of the 608 cases enrolled, 193 (36.6%) sustained traffic accident in open roads and 335 (63.4%) in urban corridors. In 67 (12.9%) of cases, there was only a single occupant in the vehicle; in 10 (2.0%) cases, the number of occupants exceeded five. The time interval between the accident and admission to the emergency department was 6.6 ± 3.2 hours. In 500 cases, the main contributing factor of an accident was mentioned in the records and is shown in table 1.

Table 1. Percentage of contributing factors of traffic accidents (n = 500)

Causes of the accident	n (%)
In attention to road	175 (35.6)
Violating the right of way	72 (14.7)
Left shift	66 (13.4)
Speeding	60 (13.3)
Motorcycle rollover	21 (4.3)
Moving in the opposite direction	20 (4.1)
Sudden change of direction	17 (3.5)
Illegal overtaking	13 (2.6)
Vehicle rollover	8 (1.6)
Unskilled driver	6 (1.2)
Failure to observe safety precautions	5 (1.0)
Tire bursting, careless door opening	5 (1.0)
Tailgating	5 (1.0)
Others	13 (2.6)

Of the 608 cases, 240 (45.7%) were drivers, 159 (30.3%) passengers (occupants other than driver) and 126 (24.0%) pedestrians. The relative frequency of different vehicle type involved in traffic accidents is presented in figure 1. In table 2, the relative frequency of different injuries of hospitalized patients is shown.

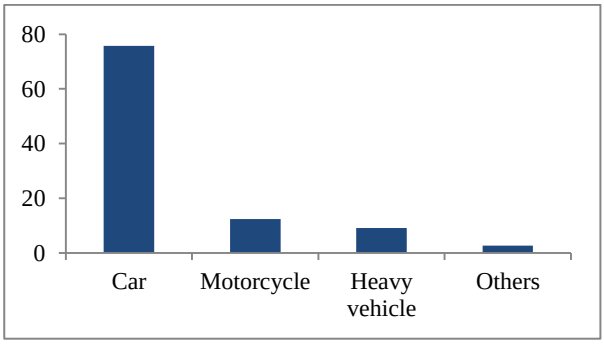

Figure 1. Relative frequency (percentage) of different vehicles involved in traffic injuries referred to Tabriz Shohada Hospital

Table 2. Relative frequency of different injuries of hospitalized patients (n = 608)

Type of injury	Number (%)
Knee and leg	86 (16.5)
Head	61 (11.7)
Foot and Ankle	55 (10.6)
Thigh	53 (10.2)
Elbow and forearm	53 (10.2)
Skin laceration	50 (9.6)
pelvic girdle	37 (7.1)
Spine	29 (5.6)
Wrist and hand	27 (5.2)
Shoulder girdle	23 (4.4)
Others	134 (22)

A total of 601 patients (99.0%) were discharged after receiving in hospital care, and 7 patients (1.0%) died. There was a significant relation between genders and speeding as a contributing factor of accident. Accordingly male drivers had greater tendency to be involved in traffic accidents while speeding. There was a significant statistical correlation between the patients' group (driver, passenger and pedestrian) and the type of damaged vehicle ($P < 0.001$). In most cases, the drivers were involved in car accidents. A significant statistical correlation was found between the location of the accident (urban area versus open road) and the type of vehicle (car, heavy vehicle, motorcycle and other vehicles) ($P < 0.001$). Accordingly, most cases of car accident happened in urban areas. There was a significant correlation between the sex of victims and their group (driver, passenger, pedestrian) at the time of accident ($P < 0.001$) and the male victims were largely in the driver group.

Discussion

There is a growing global, regional and country demand for improved road safety. Meeting this demand will require accelerated data collection and transfer. Research and development concern the systematic and ongoing creation and application on knowledge that contributes to the improved effectiveness of the road safety management system.[17]

The results of the present study showed that 42.0% (7092 cases) of admissions to the emergency ward were related to traffic

injuries, and 19.5% (3246 cases) were hospitalized due to traffic related injuries. The mortality rate following hospitalization was 1.0%. Obviously many patients in our study were referred from other centers and the critical post-injury phase was handled before admission to our ward. The lengthy time interval between the accident and admission to the emergency department (6.6 ± 3.2 h) could represent this fact.

In the present study, male to female ratio was 3.34-1 (77.0%). This proportion varies in different countries. In a study conducted in Spain, this ratio was 1.63-1.[18] In India, 71.5%[19] and in Turkey 64.7% of traffic accidents occur in men.[20] In the United States, men are affected by traffic accidents twice as women.[21] In Thailand, men die in traffic accidents 4-5 times more than women.[22] In different studies conducted in Iran, similar results were obtained.[23-26] This could be due to the most frequent involvement of men in transportation and the social and cultural limitations to the usage of motorcycles and bicycles by women in Iran.

The present study revealed that most of the victims in traffic accidents were in their third decade of life followed by people in the second decade. These findings indicate the high rate of traffic accidents among young people. Similarly, studies conducted in Qatar,[9] Spain,[18] India,[19] Turkey[20] and China[27] showed higher rate of traffic accidents among young people. Studies conducted in Iran have demonstrated similar results.[28-30] According to WHO (World Health Organization), over 50% of deaths related to traffic accident are among young adults in the age range of 15-44 years.[4] These findings unveil the huge impact of traffic-related injuries brought by the loss of people in their productive years of life.

Our study showed that most of the traffic accidents have occurred in the urban area, and the main cause of accident was inattention to road and violation the right of way. In the study conducted by Moafian et al., negligence of regulations and lack of attention to the road were stated as the two main contributing factors in crashes.[28] Accordingly, implementation of controlling plans and strict law enforcement for these violations should be considered as a measure to reduce the number of traffic accidents.

In the present study, cars were the main cause of traffic accidents. . In similar studies conducted mainly in low-income countries, motorcycles were stated as the most common causes of traffic accidents.[31-35] In a study conducted by Javouhey et al.,[36] in France, motorcycles were the most common vehicles involved in traumatic brain injuries. The relative high frequency of car accident in our study may reflect the most frequent use of cars in transportation and the relative paucity of motorcycles in this region.

In the present study, the relative frequency of drivers, passengers, and pedestrians were 45.7% 30.3% and 24.0% respectively. In a study conducted in Oman, Al-Maniri et al.[37] showed that most of the injured were drivers. In a similar study by Abdulrazzaq et al.,[38] in Qatar, the majority of victims were pedestrians. In two separate studies conducted in Nepal, most of the injured in traffic accidents were passengers.[39] In our study, 64.0% of the involved cars were single occupancy vehicle that could explain this difference.

In the present study, the most frequent type of injury was knee, leg and head trauma. In other studies, head trauma was the most common pattern of injury and the leading cause of mortality in traffic accidents.[23,38] This difference could be due to the fact that head trauma cases were mostly referred to other hospitals in the region and our data were collected in an orthopedic referral hospital. Patients with chest and abdominal trauma are usually referred to other general hospitals in the region.

The most notable limitation of this study was the fact that it was conducted in an orthopedic referral hospital and was limited to the hospitalized cases that could be a source of probable selection bias.

Conclusion

The large number of traffic-related injuries admitted to our emergency ward that comprise

mostly young adults should be considered as an alarming signal to policy makers and health providers in our province. Strict control on drivers' behavior and decreasing the time delay from injury to hospital admission should be taken into account and road traffic injury prevention should be given the same attention and scale of resources that is currently paid to other prominent health issues if increasing human loss and injury on the roads are to be prevented.

Conflict of Interests

Authors have no conflict of interest.

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