



## Patterns of Road Traffic Accidents in North West of Iran during 2013 New Year Holidays: Complications and Casualties

Samad Shams Vahdati<sup>1</sup>, Amir GhafarZad<sup>1</sup>, Farzad Rahmani<sup>1</sup>, Farid Panahi<sup>2\*</sup>, Amir Omrani Rad<sup>3</sup>

<sup>1</sup>Departments of Emergency Medicine, Imam Reza Teaching Hospital, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

<sup>2</sup>Research Development and Coordination Center (RDCC), Trauma Research Center, Neurosciences Research Center (NSRC), Tabriz University of Medical Sciences, Tabriz, Iran

<sup>3</sup>Medical Student, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

\*Corresponding author: Farid Panahi

Address: Research Development and Coordination Center (RDCC), Trauma Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.  
e-mail: farid.panahi@gmail.com

Received: December 22, 2013

Revised: March 2, 2014

Accepted: March 22, 2014

### ABSTRACT

**Objective:** To determine the patterns, complications and casualties of road traffic accidents in North West of Iran during 2013 New Year holidays.

**Methods:** One hundred and eighty one patients with trauma-related vehicle crashes were investigated in a cross sectional-descriptive study. We only included those road traffic accidents which were recorded during the 2013 Iranian New Year holidays. Severity of injury based on Glasgow Coma Scale (GCS) score, patient transmission type, damaged organ and the final diagnosis was determined. The mortality rate as well as complications were also recorded and reported. The pattern was analyzed and presented using descriptive statistics.

**Results:** Overall we included 181 patients who were victims of road traffic accidents during the study period. Most cases of multiple traumas were from two car accident (49.2%). Of 181 cases, 71 (39.2%), 66 (36.5%), 16 (8.8%) and 11 (6.1%) subjects had limb, head and neck, abdominal, and spinal cord injuries respectively, while 16 cases (8.8%) did not have any organ damage. In final diagnosis, a limb fracture was noticed in 32 cases (17.7%) and skull fractures in 5 subjects (2.8%) as the first and second causes.

**Conclusion:** As head and neck were the most damaged organs after the limbs in patients with multiple traumas, it seems that there is a necessity for these patients in transmission and examination of head traumas. So there is a need for a proper referral system.

**Keywords:** Road traffic accidents; Trauma complications; New Year holidays; Disability Adjusted Life Years (DALY).

Please cite this paper as:

Shams Vahdati S, GhafarZad A, Rahmani F, Panahi F, Omrani Rad A. Patterns of Road Traffic Accidents in North West of Iran during 2013 New Year Holidays: Complications and Casualties. *Bull Emerg Trauma*. 2014;2(2):82-85.

### Introduction

Road traffic accident (RTA) is considered as the second leading cause of death in Iran while trauma death rate per hundred thousand populations in the country is 58 in comparison to the rate of 99 in the

world [1-3]. Road traffic crashes were shown to be the third highest cause of mortality in Iran [4]. Due to lack of pre-hospital trauma care facilities distributed among the country provinces, a comprehensive comparison in terms of the rate of RTA and the Road Transport Management System (RTMs) especially in regions

with high rate of RTAs is not possible [5]. Due to high rate of RTA in Iran, having a national trauma system and establishing trauma teams and trauma training programs and an increase in levels of pre-hospital care in multi trauma patients seems necessary [1].

According to previous studies, the most common way of multi trauma is motor vehicle accidents especially motorcycles and based on World Health Organization Forecasts until 2020, road accident would be the second leading cause of Disability Adjusted Life Years (DALY) in all over the world [6]. Most researches show that in developing countries, trauma is the leading cause of death for young people [6] and is the most important cause of disability and health-related economic losses [7,8]. In Iran, the reports have revealed that 70 people have lost their lives due to daily road traffic accidents. The highest volume of vehicles, traveling on the road happens during the Nowruz holidays occurring on March 21 [2,9,10].

Most road accidents occur in officially approved holidays for students and governmental employees which shows the importance of these days to study on. In aspects of fatal road accidents, Iran is at the top of list when compared to other countries, so determination of the true economic costs due to road accidents has always been considered an important point by policymakers and transportation experts [11,12]. The purpose of this study was to evaluate the type and location of road traffic accidents and the side effects especially at the peak of traffic periods in North West of Iran.

## Materials and Methods

To evaluate the Road Traffic Injuries (RTIs) and its complications in across sectional-descriptive study, all information of traumatic patients who referred to Tabriz Imam Reza Teaching Hospital (a level 3 Trauma Center of North West of Iran) between March 17 and 24, 2013 was provided. Our study was done in Nowruz vacation from 17 to 24 of March 2013. Nowruz is the first day of spring and the beginning of the year in Iranian calendar and is celebrated on the day of the astronomical vernal equinox, occurring on March 21.

Data collection was conducted using forms in 7 parts including demographic information, type and location of accidents, severity of injury based on GCS criteria, patient transmission type, damaged organ(s) and final diagnosis of the patient. The questionnaires were completed in an interview with the patients and their

companions and also by using emergency records.

All patients who were admitted in the emergency room (ER), and their trauma causes were other than collisions with motor vehicles on the road (for example, falling on the road due to epilepsy) or damage to the stationary vehicle (for example, damage caused by a car load) or who had been brought to this center outside the time interval, were excluded from the study. In the present study, the mortality rates in trauma patients have only been evaluated in Emergency Ward of Imam Reza Hospital and patients who expired at the scene of accident, health departments, operating rooms and etc have not been enrolled in this study.

## Statistical Analysis

Obtained data were expressed as mean±standard deviation, frequency and percentage. Data were analyzed by SPSS™ software (Version 17, Chicago, IL, USA). Quantitative variables were compared using Student T-test and qualitative variables were compared using Chi-Square test. In all investigated cases, the results have been known statistically significant in case of  $p \leq 0.05$ .

## Results

In this study, 181 patients with trauma-related vehicle crashes from 2013/03/18 till 2013/03/25 were enrolled. The average age of patients was 34.92 years (minimum of 9 months and a maximum of 88 years) and 67.4% were male and 32.6% were female. Three patients were excluded from the study because of expiring before reaching to the hospital and lack of proper diagnosis. Regarding type of accident, patients were divided into 6 groups including roll over vehicles, two-car and car-pedestrian accidents, motorcycle accident with a car, overturning or motorcycle accident and motorcycle accident with a pedestrian. Most cases of multiple traumas (49.2%) were from two car accidents type. Car accident with a pedestrian and a motorcycle accident with a car were in the second place (12.2%). Other categories were rollover vehicles (13.3%), collision or overturning motorcycle (11%) and motorcycle accident with a pedestrian (2.2%), respectively (Table 1). Approximately 46.4% of accidents occurred in interurban routes and 53.6% were on routes of outside the city. The frequency of accident-prone routes was demonstrated in Table 1.

Upon arrival, GCS in the emergency ward in 3.9%

**Table 1.** Classification of accident types in all cases in this study.

Accident type	Frequency	Male	Female
Overturning car	24 (13.3%)	15 (12.3%)	9 (15.3%)
Two-car accident	89 (49.2%)	61 (50.0%)	28 (47.5%)
Car-pedestrian accident	22 (12.2%)	13 (10.7%)	9 (15.3%)
Motorcycle accident with a car	22 (12.2%)	18 (14.8%)	4 (6.8%)
Overturning motorcycle	20 (11.0%)	12 (9.8%)	8 (13.6%)
Motorcycle-pedestrian accident	4 (2.2%)	3 (2.5%)	1 (1.7%)

Data are presented as Frequency (Percentage)

of patients was less than 8h and in 2.8% between 8 and 13h and 91.7% were scored 14 or 15 from total GCS triple criteria, considering exclusion of 3 patients due to expiring before reaching emergency. From 181 patients, 111 subjects (61.3%) were transferred to hospital by EMS service, 36 patients (19.9%) were transferred as personal, and 34 cases (18.8%) were referred to the center due to lack of facilities for continuing treatment.

Damage to organs was classified to 5 groups of head and neck, spine, abdomen, limbs and non damage group. In 34 patients (18.8%), a second organ also showed damage. From 181 patients, 71 (39.2%), 66 (36.5%), 16 (8.8%) and 11 (6.1%) cases had limb, head and neck, abdominal, and spinal cord injuries respectively, while 16 subjects (8.8%) did not have any organ damage. From 34 cases with simultaneous damage to other organs, 17 (9.4%), 9 (5%), 7 (3.9%), and 1 case (0.6%) had limb, head and neck, abdominal and spinal cord injuries, respectively. Percentages of patients affected by organ

damage were shown in Figure 1.

The patients were divided into 21 groups according to diagnosis, while some patients had 2 simultaneous diagnoses. Analyzes of the data showed limb fractures (n=32, 17.7%), skull fractures (n=11, 6.1%), brain contusion (n=5, 2.8%), subdural hematoma (n=4, 2.2%), rib fractures (n=4, 2.2%), splenic rupture (n=3, 1.7%), hemopneumothorax (n=3, 1.7%), lumbosacral fracture (n=2, 1.1%), sternal fracture (n=2, 1.1%), neck fracture (n=1, 0.6%), traumatic brain injury (n=1, 0.6%), and rupture of the viscera (n=1, 17.7%) among enrolled patients. Eighty nine cases (49.2%) had no pathological diagnosis. Also, 22 patients (12.2%) were classified with the general title of "other diagnosis". From 12 patients who had simultaneously considered as second diagnosis, 1 case had rupture of spleen, 1 case was with rupture of liver, 4 cases had limb fracture and 6 cases were classified under the "other diagnosis" title. Final diagnoses of patients with multi-trauma were shown in Figure 2.

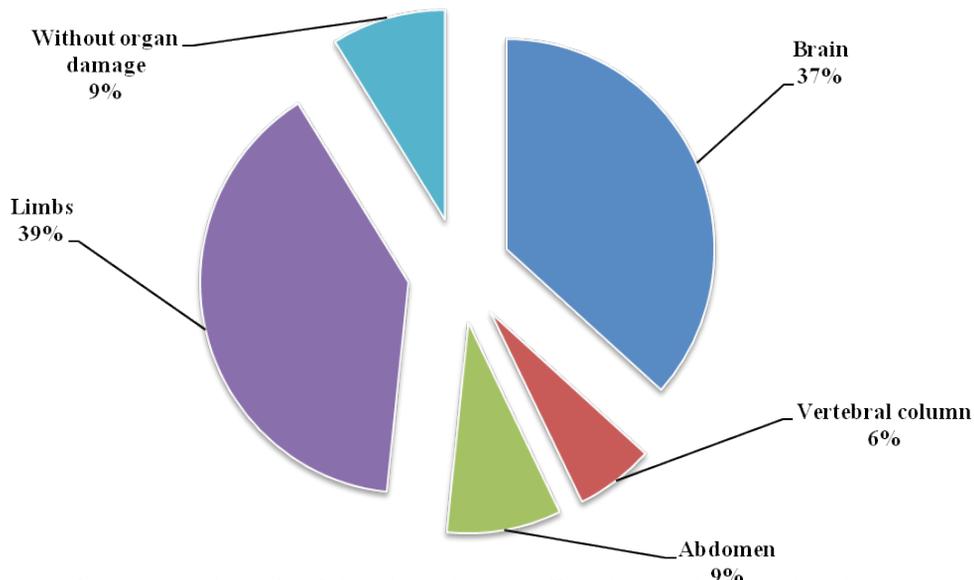


Fig. 1. Frequency of organ damage in a series of 181 patients with road traffic accidents during the 2013 Iranian New Year holidays.

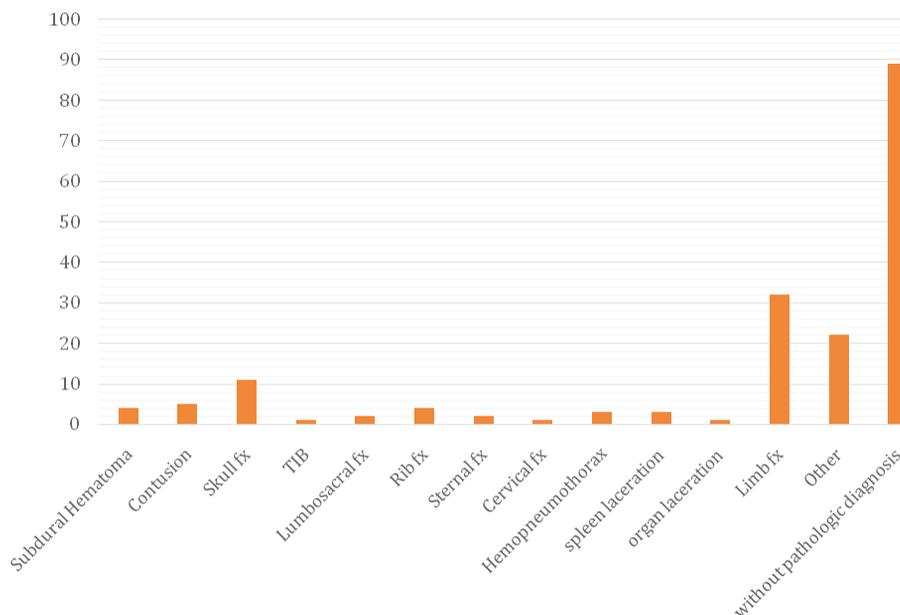


Fig. 2. Final diagnosis of 181 patients with road traffic accidents during the 2013 Iranian New Year holidays.

## Discussion

Trauma is one of the most common causes of patient admissions in the emergency wards, including a wide range of superficial to severe body damages. In a study conducted in Gonbad-e Kavus, most of victims of accidents were motorcycle vehicles (62.7%) and most of injuries were leg fractures. In other studies in 2004 in Kashan, motorcycle accidents had the highest rate, while, in our study, car accident (49.2%) was the highest rate [2,10,11].

In another study in Akdeniz Hospital in Turkey, age group of 15 to 25 years had the highest rate (32.7%) of accidents similar to our study [13]. A study in Tabriz showed an overall prevalence of multiple traumas to be 18.51% while fractures were the most common injuries. In the present study, the highest rate of injuries in multiple trauma patients was fractures especially in upper and lower limbs. A study in Baghiatollah Hospital in Tehran showed that young men were at the highest risk and the most common mechanism of trauma was car accident with the rate of 37% while the severity of injuries in 75.6% of cases was mild [2,9].

The present study showed that the prevalence of RTA in the age group above 50 years was less common and restriction of mobility in this age group was reported as the reason. In injuries caused by road accidents, people, vehicles and roads have important roles, so preventive measures are required for car manufacturers, road engineers, urban planners,

traffic polices, insurance and especially healthcare system. Actually health sector of the community endure all these pressure as a duty of treatment and care of the injured people in hospital [4,14-17].

Results of this study revealed accident and transfer types, GCS, damage to organs and diagnoses and overall demography of road accidents in Nowruz holidays. According to results of this study, most traffic accident victims were due to two-car accidents, indicating the lack of efficient laws or disobedience from laws. Applying special rules at the peak of traveling times and decreasing use of personal vehicles could be a good way to reduce crashes and accident traumas which can decrease attending of patients to emergency wards and increase the efficiency of these centers. According to high volume of patients admitted to the emergency wards and the fact that 49.2% of them had no pathologic findings, a good referral system can reduce the volume of patients with minor injuries to urban medical centers. As in this study, head and neck injury was the most damaged organ after the limbs in patients with multiple traumas, there is a necessity to care for transmission of these patients and also, to examine them in terms of head trauma.

## Acknowledgment

The authors wish to thank all patients and their families for their support and involvement in this study.

**Conflict of Interest:** None declared.

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