

## Iranian road traffic injury project: assessment of road traffic injuries in Iran in 2012

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### Abstract

**Objective:** To assess the status of road traffic injuries in Iran.

**Methods:** The retrospective study was conducted in Iran and comprised all reported traffic accidents from March 2011 to March 2012 that were recorded in the national traffic accident database. The information collected included demographic data specific to road traffic accidents and injuries. The data was summarised and presented using frequencies and percentages.

**Results:** There were a total of 452192 road traffic accidents with 252246 victims in the one-year period. The highest number of accidents, 110348(47%), involved individuals in the 15-30 year age group. Among the gender-identified injured, 206171(78.4%) were male and 56639 (21.6%) were female. Besides, 298750(73.2%) accidents took place between 6am and 6pm. In terms of location, the province of Semnan had the highest rates of injury and death (913 per 100000 and 41 per 100000, respectively), while the lowest rate of injury was in Alborz (131 per 100000) and lowest rate of death was in Tehran (5 per 100000). The majority of accidents 301516(66.7%) occurred on inner city roads. Although the total number of victims in inner city roads (180893) was higher than outer the city roads (2.2:1), the number of deaths (8615) on outer roads was higher (3:1).

**Conclusion:** Road traffic injuries placed a heavy burden on the Iranian population, especially on young men. Comprehensive strategies and policies must be implemented for effective prevention of road accidents in Iran.

**Keywords:** Road traffic, Injuries, Inner and outer city roads. (JPMA 66: 517; 2016)

### Introduction

Road traffic injuries (RTIs) are the eighth leading cause of death globally, and are the most common cause of mortality in people aged 12-29 years, causing a major economic burden worldwide.<sup>1-3</sup> Each year, more than one million people die in traffic accidents, accounting for 2.2% deaths worldwide.<sup>4</sup> RTI deaths have been steadily increasing in low- and middle-income countries, where it is estimated that by 2030 it will rank as the second and third leading causes of death, respectively.<sup>5,6</sup>

RTIs are the leading cause of death in Iran. RTIs are the second largest cause of mortality in Iran after adjusting for the effect of disease as represented by the disability adjusted life years (DALYs).<sup>7</sup> The DALYs resulting from RTIs in Iran are higher than those estimated for the eastern Mediterranean region and worldwide.<sup>8,9</sup> In developing countries, such as Iran, RTIs are estimated to cost 6.46% of the gross national product (US\$39billion) per year.<sup>10</sup>

There is a lack of precise information to determine priorities for the prevention of RTIs by knowing the

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magnitude of the problem. As such, the current study was planned to identify the underlying components of road traffic accidents (RTAs) in Iran. This is the first national study on road traffic injuries and its findings form part of body of findings relating to RTAs.

### Materials and Methods

The retrospective study was conducted in Iran and comprised all RTAs from March 2011 to March 2012 that were recorded in the national traffic accident database. Iran is divided into 31 provinces and the provinces are further divided into counties. All police records for RTIs were investigated. In Iran, RTI data is collected daily by the police at accident scenes using an advanced data registry system developed at the request of the traffic police, rural police, Ministry of Road and Urban Development and as requested by municipalities. The forms are based on those in use in other countries and are adapted to meet the needs of the organisations.

The database collected data on the characteristics of the people involved in traffic accidents and the time, date and location of the accidents. The locations of the accidents were classified as occurring on inner or outer city roads based on municipal boundaries.

While collecting data, the serial numbers, dates and

locations of the accidents were precisely checked to remove duplicate records. Since data collected for different aspects of RTAs were registered in four separate datasets, it was therefore necessary to merge and link related data for each accident. The country accident data processing (CADP) software was designed to merge the data. This programme was designed to be compatible with other statistical software. Statistical analysis was performed using STATA 12.

## Results

A total of 452192 RTAs occurred in Iran during the study period. There were 10203(2.3%) fatal accidents and injury was caused in 220169 (49.8%). Besides, 301516 (66.7%) RTAs occurred on inner city roads. Of the 408198 RTAs for which the time of day was available, 298750 (73.2%) occurred between 6am and 6pm). There were 263781 RTA victims, 252246(95%) of whom were injured and 11535(4.3%) were killed. Of the 262810 victims in whom gender was identified, 206171(78.4%) were male and 56639(21.6%) were female. The male:female ratio for injury was 3.6:1, and for death it was 5.1:1. The mean age for all casualties was  $31.2 \pm 13.4$  years with only a slight

**Table-1:** Number of cases by gender and age.

Age group	male	female	Total	
			n	%
1 -4	4558	318	4876	2.1
5 -14	14203	538	14741	6.3
15 - 29	106709	3639	110348	47.0
30 -44	57088	2700	59788	25.4
45 - 59	27113	1764	28877	12.3
60 & older	15110	1198	16308	6.9
Total	224781	10157	234938	100.0

**Table-2:** Characteristics of road traffic accident victims by location.

	Location		Total
	Inner city	Outer city	
Outcome			
Injured	177970(93.4)	74276(89.6)	252246(95.6)
Dead	2923(6.6)	8615(10.4)	11538(4.4)
Subtotal	180893(100.0)	82891(100.0)	263784(100.0)
Gender			
Male	145069(78.9)	64928(77.7)	209997(78.6)
Female	38687(21.1)	18627(22.3)	57314(21.4)
Subtotal	183756(100.0)	83555(100.0)	267311(100.0)
Education			
Illiterate	5027(4.5)	2906(5.4)	7933(4.8)
Diploma & lower	104157(93.4)	49787(92.7)	153944(93.2)
Bachelor degree - Post graduate	2313(2.1)	997(1.9)	3310(2.0)
Subtotal	111497(100.0)	53690(100.0)	165187(100.0)

**Table-3:** Distribution of death and injury by province and inner/outer city roads.

Province	Inner city		Outer city		Per 100000Population	
	Injured	Dead	Injured	Dead	Injured	Dead
Alborz	2650	50	516	95	131	6
Isfahan	17178	399	6008	597	475	20
Fars	11444	178	5290	675	364	19
Khorasan Razavi	23804	234	3467	335	455	9
Kerman	8112	106	2413	359	358	16
Khuzestan	11989	231	1888	633	306	19
Sistan& Baluchestan	3265	71	2596	518	231	23
Hormozgan	1042	39	1260	261	146	19
Mazandaran	3761	96	2999	267	220	12
Gilan	5200	58	7575	270	515	13
Semnan	2500	24	3266	233	913	41
North Khorasan	1808	26	1720	157	407	21
South Khorasan	1758	34	1109	124	433	24
Ardabil	1445	8	608	133	164	11
Bushehr	1741	78	1049	201	270	27
Yazd	5617	50	1366	99	650	14
West Azerbaijan	4361	121	3243	387	247	16
East Azarbaijan	7966	98	6384	426	385	14
Kermanshah	3267	82	1214	193	230	14
Ilam	833	12	1001	81	329	17
Chaharmahal&Bakhtiari	1397	34	2036	148	383	20
Kohkiloye&Boir Ahmad	1126	16	561	93	256	17
Kurdistan	1370	41	1703	242	206	19
Lorestan	3331	59	2624	264	339	18
Markazi	1867	48	954	324	200	26
Hamedan	3125	75	1777	328	279	23
Zanjan	2739	21	1112	175	379	19
Qazvin	1472	43	2152	339	302	32
Qom	7626	39	776	146	730	16
Gholestan	4615	60	4727	357	526	23
Tehran	29560	489	882	155	250	5
Total	177969	2920	74276	8615	336	15

difference between men and women ( $p > 0.05$ ).

The highest number of RTIs occurred in the 15-29 year age group and the lowest occurred in the 1-4 year age group (Table-1).

The maximum number of injuries and deaths occurred in August (26383; 10.5% and 1289; 11.2%, respectively) and lowest number was observed in March for injuries (17876; 7.1%) and in December for deaths (660; 5.7%) (Figure).

Overall, 301516(66.7%) RTAs occurred on inner city roads. Although the total number of victims in inner city roads (180893) was higher than outer city roads (2.2:1), the number of deaths (8615) on outer the city roads was higher (3:1). The largest proportion of victims both inner and outer the city roads had completed 12 or fewer years of education (Table-2).

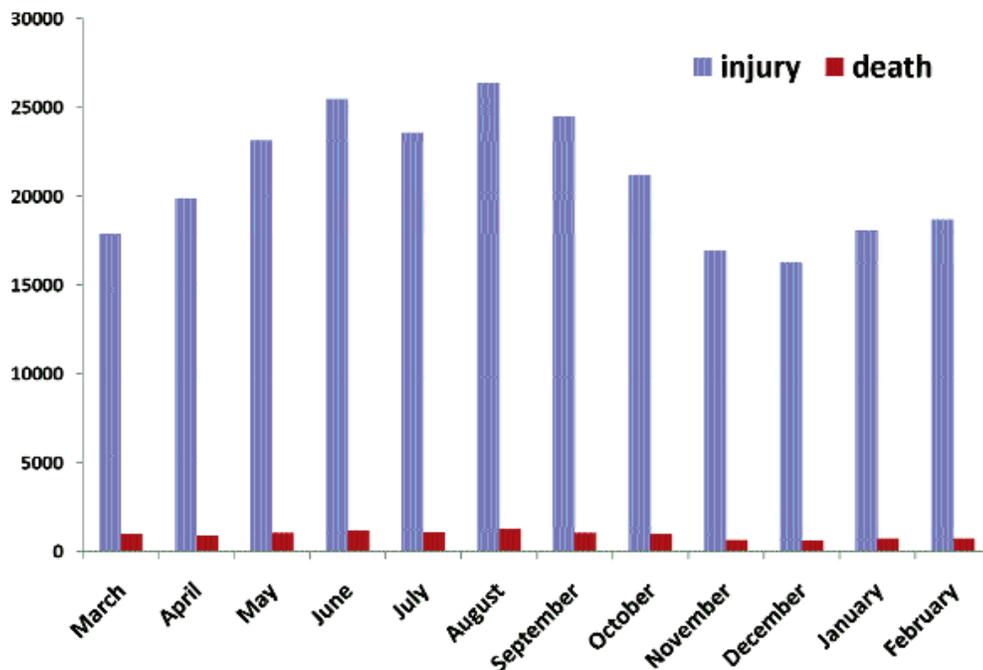


Figure: Distribution of monthly victims by death and injury.

In most provinces, the number of injured was higher on the inner city roads than the outer ones (Table-3). Conversely, in all provinces, mortality caused by RTAs was higher on the outer city roads than the inner ones. The Semnan province had the highest rates of injury and death (913 per 100000 and 41 per 100000, respectively). The lowest rate of injury was for Alborz (131 per 100000) and for death it was Tehran (5 per 100000).

### Discussion

The study used a recent dataset for one year of RTA results to highlight aspects of RTIs in Iran. It also compared the characteristics of RTIs on inner and outer city roads. The findings are in line with the results of previous studies. Our study showed that the majority of RTIs in Iran were males, and the finding agrees with those of previous studies.<sup>11-15</sup> While the distribution by gender in the Iranian population was almost equal, males were at greater risk of traffic injury probably because of their increased presence on the roads.

Our study revealed that the age group most greatly affected by RTIs was the most productive age group: 15-

44 years (n=170136; 72.4%). Prior studies in Iran and other countries have found similar results.<sup>13,16,17</sup> The reason may be that this is the most active period of life, which increases the chance of exposure to and risk of injury or death. Since this age group comprises the most economically active strata of society, traffic collisions are a source of great economic loss to communities.

There was a decrease in RTIs in people older and younger than the 15-44 age groups. This is probably because fewer children are present in vehicles during school hours and the safety of children who are passengers is controlled by the adults present. In addition, seniors over aged 60 tend to be less mobile than other age

groups. The number of RTIs was the highest among people who had completed 12 or fewer years of education. Previous studies have also shown that a higher proportion of RTI victims are less well-educated.<sup>13,18</sup>

In the present study, the highest number of RTIs occurred in the month of August followed by June. This may be because in Iran, the summer months of June, July and August are when many families travel on vacation; this is particularly true for the month of August. Moreover, as other researchers have found, seasonal factors for summer such as length of day and good weather conditions encourage increased use of motor vehicles and increased speed as well.<sup>19-21</sup>

The current study revealed that although the predominant proportion of RTAs occurred on inner city roads, but most fatal injuries occurred on outer city roads. This could be explained by the fact that the severity of collisions on outer city roads was greater than that on the inner city roads. The lack of rapid and timely access to emergency healthcare services may have contributed to the result.

More than 70% of traffic collisions took place during the daytime (6am to 6pm). Similar results have been reported elsewhere;<sup>13,22</sup> this is the time of day experiencing increased activity and mobility. The present study showed that the annual incidence of RTIs per 100000 people was the highest in Semnan province. It appears that because Semnan is located in central Iran, the roads in inner and outer city roads are more heavily used by road users.

The study relied on traffic police data collected at the sites of the collisions and does not include information about the fates of victims transferred to hospitals or after discharge from hospital. Considering this limitation, the mortality estimates reported in our study are likely underestimated. Other studies have also found under-reporting of RTI data by police.<sup>23</sup>

## Conclusion

The status of road traffic injuries in Iran is alarming. It requires comprehensive planning and coordination of sectors involved in road safety to prevent injury and death by RTAs, especially during the daytime and among urban drivers having 12 or fewer years of education.

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