

Epidemiology of Fatal Road Traffic Accidents in Iran, Yasouj, 2014-2015

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Abstract

Background: Traffic accidents are considered a major public health problem in many parts of the world. The present study aimed to investigate the epidemiology of fatal traffic accidents in Yasouj city during the years 2014-2015.

Methods: This descriptive-analytical study was carried out through a cross-sectional method and the study population included all individuals who had died in traffic accidents in Yasouj city during 2014-2015. The source of data collection was the Legal Medicine Organization. The data were analyzed through SPSS 16, using descriptive statistics and Chi-square test.

Results: The mean age of the deceased was 35.44±20.99 years. The highest death rate was observed in the age groups over 25-34 years old (21.3%), 15-24 years (17.6%) and 35-44 years (17%), respectively. Most of the deceased were male (75%), single (55.4%), illiterate (44%), self-employed (29.3%) and residents of rural areas (52.3%). The ultimate cause of death of more than half of the deceased was head trauma (30.7%) and most of the deceased had died at the accident site (55.4%). 52.7% had died of collision with a passenger car. There was a significant association between the location of death and location of accident (outside/inside)($P=0.004$); also, the result showed no significant relationship between the cause of death and location of accident ($P<0.001$) and type of vehicle ($P<0.001$).

Conclusion: In conclusion, findings of this study showed that the highest mortality rate was seen among the youth age group and the male. Therefore, awareness of the laws and regulations, especially in young males, is the most important factor to reduce accidents and mortality.

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Introduction

Traffic accidents are a major public health problem in many parts of the world. Over 1.27 million people die annually from road accidents and more than 50 million people get injured.^{1,2} In Iran, traffic accidents are the second cause of death (rate; 32 per 100,000), as well as the first cause of losing years of life, and the most common cause of injury.³⁻⁵ A national study on the burden of diseases in the Iran in 2003 demonstrated that 15% of all years of life lost were due to traffic accidents, and more than 80% of years of life lost along with disabilities were

observed among men. Furthermore, 57% of the total years of life lost (684210 years) occurred in the age group of 15-29 years.⁶ In total, 2.5% of the world's car accidents occur in Iran, and this means that the rate of traffic accidents in Iran is twenty times more than other areas.⁷ The number of people who have died in traffic accidents worldwide has been 3 per 10000 vehicles, while in Iran, it has been 33 per 10000 vehicles, and unfortunately the casualties have been rising in recent decades.³ A study showed that traffic incidents accounted for 37.5% of the unintentional injuries and were the first cause of children's death in rural areas in Iran.⁸ A research

conducted in Iran estimated the total cost of traffic accidents to be 7.2 million USD, i.e. equivalent to 2.19% of our country's gross national product.⁹ According to the study of the burden of diseases, the rank of traffic accidents in Iran reached from sixth in 1990 (60% change) to second in 2010.¹⁰ In legal medicine centers, the information of the deceased, including demographic data, location and time of accident, type of vehicle used and involved, type of accident, cause of death, etc. are accurately recorded. It is essential to have information and evidence for the prevention of traffic accidents; this is of considerable concern for many individuals, groups and organizations.¹¹ Different people have their own specific ideas about constructing safer roads, but effective policy-making and decision-making for prevention of traffic accidents require reliable evidence and data. In general, having this information is intended to provide a description of the burden of road traffic injuries, determine risk factors, allocate resources, and decide on priorities to prevent traffic accidents, design and evaluate the interventions, provide information for policymakers and decision-makers, and increase effective information provision.¹² Yasouj is one of the southern cities of Iran and the capital of Kohgiluyeh and Boyer-Ahmad province. This city is located in the northeast of the province, and 52% of the population of the province lives in this city. The city is located in a cold climate region with moderate to cold weather.

The rate of road accidents in Yasouj city is high since Yasuj is the capital of Kohgiluyeh and Boyer-Ahmad province, and most of the industries in the province are located inside or around the city; also, many people from nearby cities travel there to find jobs and management positions. On the other hand, good weather of Yasouj has caused this city to be always flooded by Nowruz passengers from Fars and Isfahan provinces; therefore, Semirom-Yasouj highway has become one of the most dangerous highways in terms of traffic accidents. Therefore, the present study was carried out to investigate the epidemiology of fatal traffic accidents and injuries in Yasouj city during 2014-2015 in order to prevent traffic accidents as much as possible by identifying some of the factors affecting the occurrence of such accidents.

Materials and Methods

This descriptive-analytical study was carried out through a cross-sectional model and the study population consisted of all the individuals who had died in traffic accidents in Yasouj city during 2014-2015. The deceased individuals were entered into the study through census. The data collection source was the Legal Medicine Organization. In accordance with the law of the country, the burial permission must be issued by a legal medicine center in some specific cases of death. One of these cases is the death from traffic accidents (in any form and at

any time interval from the incidence of the accident). The legal medicine centers collect the information of the deceased on some forms including demographic information (age, sex, education), deceased status (driver, passenger, pedestrian), type of vehicle used, type of vehicle collided with a pedestrian or vehicle, spatial and temporal characteristics and type of the accident, the ultimate cause of death, etc. This study was approved by the Ethics Committee of the Faculty of Health, Shiraz University of Medical Sciences. The data were analyzed through SPSS 16, using descriptive statistics and chi-square test. The significance level in all the tests was considered 0.05.

Ethics Approval Code

The present study was approved by the Ethics Committee of Shiraz University of Medical Sciences with the code of IR.SUMS.REC.1396.5581.

Results

The results of our study showed that the mean age of the deceased was 35.4 ± 20.9 years and they were in the age range of 1 to 93 years old. Most of the deceased were in the age group of 25-34 years old with the frequency of 75 (21.3%) and the age group 15-24 years old with the frequency of 62 (17.6%), respectively. Based on the results, 264 people (75.0%) were male and single (195 people (55.4%)); Sex-specific death rates for male and female were 0.93 and 0.32 per 1000.

The highest frequency of the deceased was seen among residents of rural areas (184 people (52.3%)). Also, the results showed that the highest number of the deceased from traffic accidents in the city of Yasouj was that of illiterate people with a frequency of 155 (44%). Most of the deceased were wearing dark clothes (a frequency of 223 (63.4%)). According to the results of the study in terms of the subjects' jobs, most of them were self-employed (a frequency of 103 (29.3%)) and housewife (a frequency of 47 (13.4%)), respectively. The results of our study showed that the majority of those who had an accident were Iranian with a frequency of 99.1% (349 people) and only 0.9% (3 people) were Afghan. (Table 1).

The highest number of accidents had occurred in October with a frequency of 41 (11.6%), and the lowest in March with a frequency of 18 (5.1%). Regarding the seasons, the highest frequency of accidents was observed in autumn 98 (27.8%), spring 93 (26.4%), summer 88 (25%), and winter 73 (20.8%).

Based on the results, most of the deceased had died in the location of the accident (195 people (55.4%)) and 126 subjects had died in the hospital (35.8%), mostly due to the severity of the injuries. The results of the study showed that the highest rates of transfer to hospitals were by ambulance (249 cases (70.7%))

Table 1: Descriptive results of the deceased status in 2014 in terms of some demographic variables

Variable		Number	Percentage
Age	Under 7 years old	33	9.4
	7-14 years old	18	5.1
	15-24 years old	62	17.6
	25-34 years old	75	21.3
	35-44 years old	60	17.0
	45-54 years old	33	9.4
	55-64 years old	34	9.7
	65 and over	37	10.6
Sex	Male	264	75.0
	Female	88	25.0
Job	Student	65	18.4
	Housewife	47	13.4
	Employee	16	4.5
	Worker	30	8.5
	Self-employed	103	29.3
	Retired	13	3.7
	Unemployed	22	6.3
	Other jobs (farmer, army, soldier, etc.)	54	15.2
Marital status	Single	195	55.4
	Married	155	44
	unknown	2	0.6
Residence	Urban areas	164	46.6
	Rural areas	184	52.3
	unknown	4	1.2
Education	Illiterate	155	44.0
	Elementary	100	28.4
	Junior High School	27	7.7
	High school/ diploma	41	7.4
	Academic education	30	11.9
	unknown	2	0.6
Nationality	Iranian	349	99.1
	Afghan	3	0.9

and by passing vehicles (91 (25.9%)), respectively. Regarding the time of accidents, most of the traffic accidents had happened during the day with a frequency of 211 (59.9%).

According to the data displayed in Table 2, most of the vehicles involved in traffic accidents were passenger cars with a frequency of 185 (52.7%) and trucks (Benz, Volvo, Scania ...) with a frequency of 47 (13.6%). Regarding the traumas, most of the deceased had died of a head trauma with a frequency of 108 (30.7%), and the traumas to more than three organs with a frequency of 82 (20.7%). The results of the study also showed that the cause of death in most cases was multiple traumas with a frequency of 161 (45.8%) and head traumas with a frequency of 92 (26.1%), respectively. Table 2 shows some of the characteristics of the deceased based on the type of transfer, vehicle used, death location, mode of transfer, and time of accident.

The results of our study indicated that there was a significant relationship between the accident location and type of vehicle used ($P < 0.001$), the involved car ($P < 0.001$) and the cause of death ($P < 0.001$), but no significant relationship was found between the death status and their age ($P = 0.12$).

Discussion

The aim of this study was to investigate the epidemiology of fatal accidents and the factors affecting them in Yasouj, Iran, in 2014-2015.

Our study results indicated that 75% of the deceased were male. In this study, the rate of deaths in men was about two and a half time more than women, which is consistent with the findings of local and foreign studies. In a study in Ghana, this ratio was 2.16 to 1, and another study conducted in India reported a ratio of 6.58 to 1.¹³ In the studies conducted in our country, this ratio ranged from 5.8 to 1 and to 2.37 to 1.¹⁴⁻¹⁸ In a study carried out in Kermanshah, Izadi et al. showed that men were more likely to die in traffic accidents than women.¹⁴

Due to the existing cultural issues in the city of Yasouj, and as men are economic poles of families and most of the jobs are done by men, it would be natural that they spend more hours outside home than women, and they will be more likely to have accidents and get injured. In developed and developing countries, the gender ratio of male to female in road traffic accidents is significantly higher. The reason might be

Table 2: Some of the characteristics of the deceased based on the type of transfer, vehicle used, death location, mode of transfer and time of accident

Variable		Number	Percentage
Transfer mode	Ambulance	249	70.0
	Police car	1	0.3
	Passing vehicles	91	25.9
	Unknown	11	3.0
Death location	Accident site	195	55.4
	During the transfer to hospital	28	8.0
	In the hospital	126	35.8
	Home	1	0.3
	Unknown	2	0.6
Accident time	Day	211	59.9
	Night	103	29.3
	At sunrise or sunset	33	9.3
	Unknown	5	1.4
Type of accident	Vehicles collision	202	57.4
	collision of the vehicle with the deceased pedestrian	75	21.3
	Vehicle collision to a fixed object	19	5.4
	overturn of the vehicle carrying the deceased individual	44	12.5
	fall of the vehicle carrying the deceased individual	7	0.2
	Others (fire, collision with animal, ...)	5	1.5
Vehicle used	Passenger car	185	52.7
	Mini-bus / bus	35	10
	Camion	47	13.6
	Motorcycle / bike	21	0.6
	Other (hazardous materials tankers, road construction vehicles, military vehicles, pedestrians, ...)	64	18.2
Injured organ	Head	108	30.7
	Upper extremities (neck, chest, abdomen, arm and hand)	46	14.0
	Lower extremities (pelvis, posterior and legs)	3	0.9
	two organs	65	18.7
	three organs	48	15
	More than three organs	82	20.7
Cause of death	Head trauma	92	26.1
	Bleeding	10	2.8
	Multiple fractures	81	23
	Burn	8	2.3
	Multiple causes (head trauma, multiple fractures, bleeding, etc.)	161	45.8

attributed to the differences in attitudes, social status, daily activities and other cultural factors, behavioral and physical differences, differences in exposure to road traffic, and more commutes and travels of men compared to women. It can also be attributed to men's high-risk behaviors during driving and crossing the street, and fewer activities of women outside home due to being housewives. Another reason for higher accident rate in men than women is that men often drive quickly, agilely and meanderingly, and use any vacant space, while constantly changing their rout. Besides, men wear seat belts less than women do. In contrast, women drive slowly and straightly. Caution and patience are the characteristics of women's driving.

The present study showed that most of the individuals who had died from traffic accidents in Yasouj were the youth, which was consistent with the results of Hashemi's study in Khuzestan.¹⁹ In the study conducted by Hashemi, the 25-34 year-old age group

accounted for more than 44% of the cases.¹⁹ A study in India showed that half of the fatal road accidents had occurred in the age group 21-40 years old.²⁰ More emotional and high-risk behaviors while driving, less adherence to traffic rules and regulations, and high speed can be the reasons for higher rates of death in this age group.¹⁹

In this study, most of the deceased were illiterate and the lowest number of them had academic education. In a study by Rakhshani et al. with the aim of determining the pattern of mortality from road accidents and its related factors in southern Iran, the majority of the deceased were illiterate and the lowest percentage of them was that of the deceased with academic education, which was consistent with the results of this study.²¹ Another study conducted by Erfanpour et al. with the aim of determining the epidemiology of fatal traffic accidents in Razavi Khorasan province showed that most of the deceased

had average and low education levels, and the lowest frequency belonged to the subjects with academic education.²² The significant difference between the death rates of the subjects with academic education and the illiterate ones showed the impact of the education level and previous trainings on the severity and incidence of an accident.²²

In the present study, most of the deceased were self-employed. In the study carried out by Soori et al., the self-employed subjects had the highest chance of death in traffic accidents,²³ which is consistent with the results of the present study. One of the reasons for the high number of the deceased self-employed people could be attributed to the fact that they did not have specific work hours and could travel throughout the day.²¹

The results of this study showed that 59% of traffic accidents had occurred during days. This result was consistent with the findings of the study by Entezami et al.²⁴ In their study in Semnan, Hassani et al. showed that the highest rate of traffic accidents had occurred during daytime, which was consistent with the results of our study.²⁵ Also, in a study conducted by Taravatmanesh et al. in Sistan and Baluchistan province, the highest number of accidents had occurred during days.²⁶

Most of the vehicles involved in traffic accidents in Yasouj were passenger cars. This result was consistent with those of Entezami et al.'s study in western Iran.²⁴ In their study, Entezami et al. showed that most of the cars used by the deceased were passenger cars. Considering the economic status of the people in Yasouj, the majority of the cars used by the people are passenger cars such as Pride and Peugeot, and this has increased the frequency of accidents among the drivers of these cars.

Our findings showed that most of the subjects had died at the accident site, which was consistent with the results of the study by Sanaiezadeh et al. in Tehran, who stated that 20% of the subjects had died at the accident site and 72% had died while being transferred to the hospital.²⁷ This finding was also consistent with the results of the study done by Rostami et al.²⁸ In their study, it was shown that most of the deaths had occurred at the accident site some minutes after the accident.

Given that the majority of the fatal incidents occurred out of the city, and as the cities of Kohgiluyeh and Boyer-Ahmad province are at far distances from each other, the arrival of the police and the emergency medical services (EMS) at the accident site might be delayed. On the other hand, it is highly probable that ordinary people passing through would be the first group of people arriving at the accident sites, and since they have not been properly trained, their improper

functioning might play an important role in increasing the death rates.

The results of our study showed that the main cause of death was head trauma, which was consistent with the findings of the studies by Hashemi et al.,²¹ Sanaiezadeh et al.,²⁷ and Mohammad Fam et al. in Hamadan.²⁹ In their study, Mohammad Fam et al. showed that head trauma was the main cause of injuries and, consequently, deaths in the fatal traffic accidents. To justify this statement, not fastening seat belts can be pointed out, and the lack of air bags could also be mentioned.³⁰

Strengths and Limitation: One of the strengths of this study was the large number of variables affecting the accidents. The limitations of this study included data defects and loss.

Conclusion

The results of our study showed that middle-aged and male people accounted for the highest rates of accidents. However, given that various studies conducted in Iran indicated that the middle-aged people accounted for the highest rate of accidents and injuries, and considering the importance of this age group in the Iranian society, it is recommended that studies with a wider scope should be conducted on the causes of accidents among them and the related factors, by interviewing the individuals in this age group in order to identify the reasons for their high rate of accidents. Therefore, teaching young people traffic rules and regulations is among the important measures that can be taken in order to prevent road traffic accidents.

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