An Epidemiology Study of Deaths from Road Traffic Accidents, Iran, Ahvaz

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Abstract

Background: Deaths from traffic accidents (RTIs) are a major public health problem in all societies, especially in the low and middle-income countries; the present study was conducted to investigate the epidemiology of fatal road traffic accidents in Ahvaz city.

Methods: This is a cross-sectional study which included all deaths from RTIs in Ahvaz province (Southwest Iran) admitted to forensic medicine during 2015-2016. ICD-10 was used as diagnostic criteria. Demographic variables as well as injury circumstance (name, surname, phone number, age, sex, season, month, day, accident location, vehicle type, status of the injured person) were recorded by trained research team in forensic medicine. Descriptive data are reported. SPSS 20 software was used for analysis of data.

Results: During years 2015-2016, a total of 50 deaths occurred due to road accidents in Ahvaz province. The mean age was 34.99 ± 19.98 years. The mortality rate was higher in men (79.4%), married subjects (57.4%), illiterate ones (26.2%), self-employed subjects (34.6%) and residents of urban areas (78.8%). There were statistically significant relationships between the accident location and the place of death, and between the trauma spot and the cause of death ($P < 0.001$).

Conclusion: The results of this study showed that most of the deceased were male, married and young, so preventive measures such as precise traffic surveillance and enforcement of the regulations for safe driving are considered essential.

Introduction

Traffic accidents are one of the most important health problems that endanger human health. It is estimated that about two million people around the world die every year from traffic accidents and 50 million are injured.[1, 2] According to the World Health Organization (WHO), the rate of mortality from accidents which was around 999000 people in 1990 increased by 10% and reached 1.2 million in 2002.[3-5]

The results of some studies in Iran showed that the deaths from traffic accidents were 30 per 100,000 people,[6] while this rate was 22.6 in the world. On the other hand, 15 out of 100 people die in traffic accidents,[6] while this rate is about 2 per 100 in developed countries.[7]

Road accidents occur as the result of several factors such as individual characteristics (age and gender), vehicle type, weather conditions, road types, and other factors such as the type of collision during an incident. In a study conducted in the United States, the role of the human factor in accidents accounted for 57% of deaths and it was the most contributing factor.[8-10] Among the studies that investigated human

factors and those related to the type of vehicle, factors such as drowsiness during driving, gender, day, week, travel time, age, speed of travel, driving, etc. are known as the main risk factors for the incident.[11] In Iran, human factor has the highest part; they include a wide range of demographic factors and psycho-motor skills of drivers to their personal characteristics.[12] In forensic centers, the information of the deceased, such as demographic data, the location and time of the accident, type of vehicle used and involved, manner of the accident, the cause of death, etc. are accurately and completely recorded.[13]

Ahvaz province is one of the deprived provinces in terms of the safety of suburban roads and the ones inside cities, which have resulted in many deaths due to traffic accidents. The hot and humid weather in some months of the year and possibly the presence of dust, which reduces the drivers' and pedestrians' horizontal visibility, result in traffic accidents and consequently an increase in the mortality caused by road accidents. Therefore, based on the existing conditions and the lack of accurate statistics and information on traffic accidents in this province, the present study aimed to investigate the epidemiology of fatal traffic accidents in Ahvaz during 2015-2016.

Materials and Methods

Study Design

This is a cross-sectional descriptive study conducted within two years (2015-2016).

Study Population

The research population consisted of all the people who had died from traffic accidents.

Sample Size

The sampling in this study was done through census and 650 people who had died during these two years were included. To calculate the number of deaths caused by traffic accidents based on ICD-10 classification, we assigned the codes V01-V99 as the underlying causes of death. The inclusion criteria for entering the study included the people who had died from traffic accidents from April 2015 to the end of March 2017 in Ahvaz, and the exclusion criteria were the deceased fetuses.

Data Source

The data collection source was the Forensic Medicine Organization. Forensic centers record the information of the deceased on some forms. The forms consist of several sections including: 1. General information of the patient, such as the injured person's name, age, and gender, and nationality, place of residence, ID number, and phone number; and 2. Geographical location of the accident. In this section, the place and time of emergency occurrence are recorded; 3. Causes of accident including the accidents related to transportation and those not related to transportation. In the former part, the injured person's status and the type of vehicle are recorded; 4. Medical History. In this section, medical history as well as the history of using drugs by the injured person during the accident and the vital signs of the injured person is recorded.

Baseline Measurement

The data included the injured person's information such as name, surname, phone number, age, sex, season, month, day, accident location, vehicle type, status of the injured person, nationality, death.

Statistical Analysis

The data analysis was done using the SPSS 20 software. To describe the data, the mean, standard deviation and frequency were used. The Chi-square test was also used to analyze the data. 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 ethical code of IR.SUMS.REC.1395.5923.

Results

A total of 650 dead people from traffic accidents were studied during the years of the study, of which 79.4% (516) were male and 20.6% (134) were female. The mean age of the victims was 34.99±19.98 years and they were in the age range 1 to 94 years. The highest death rates were seen in the age groups 15- 24 years (33.1%). The majority of the dead people (57.4%) were married, 26.2% were illiterate, 34.6% were self-employed, 78.8% were residents of urban areas, and 98/9% were Iranian (Table 1).

The results of the descriptive analysis showed that the highest rates of transfer to hospital (95.1%) were done by ambulance. Most of the accidents had occurred in January (10%), February (9.8%) and March (9.5%). 362 accidents had happened during the day (55.7%) and 249 had occurred at night (38.3%). 374 (57.5%) occurred outside the city, 217 in main streets (33.4%), 18 (2.8%) in secondary streets (2.8%), 7 (1.1%) in the alley, and 36 (5.2%) in the intersection or underpass. Most of the deaths (40.5%) were observed among passengers (263 cases), 216 deaths among drivers (33.2%), 165 (25.4%) pedestrian and 6(0.9%) were unknown. The majority of the deceased (436 people) had died in a hospital (67.1%). The results

Table 1: Descriptive Results of the Deseased Status Based on Some Demographic Variables

Variable		Number	Percentage (%)
Age	Under 7 years old	38	5.8
	7-14 years old	46	7.1
	15-24 years old	215	33.1
	25-34 years old	160	24.6
	35-44 years old	95	14.6
	45-54 years old	4	7.4
	55-64 years old	39	6
	65 and over	9	1.4
Gender	Male	516	79.4
	Female	134	20.6
Job	Student	81	12.5
	Housewife	90	13.8
	Employee	28	4.3
	Worker	65	10
	Self-employed	225	34.6
	Retired	35	5.4
	Unemployed	32	4.9
	Other	91	14
Marital status	Single	275	42.3
	Married	373	57.4
	Unknown	2	0.3
Place of residence	Rural areas	512	78.8
	Urban areas	138	21.2
Education	Illiterate	170	26.2
	Elementary	142	21.8
	Secondary school	143	23
	High school/ diploma	157	24.1
	Academic	37	5.6
	unknown	2	0.1
Nationality	Iranian	643	98.9
	Afghan	5	0.8
	Unknown	2	0.3

of the descriptive analysis showed that the highest rates of trauma spot in the deceased were those of multiple traumas in various parts of the body (337 patients (51.82%)) and the head trauma (261 cases (40.2%)) (Table 2).

The results of this study showed that the most common causes of death among the people with traffic accidents were head trauma with a frequency of 383 (58.9%) and multiple fractures with a frequency of 130 (20.0%), respectively (Table 3).

The results of Chi-square test showed a statistically significant relationship between the accident location and place of death, and between the trauma spot and the cause of death (P<0.001). There was no statistically significant relationship between the accident location and place of death (P=0.37).

Table 2: Description of the frequency of accident-related data in the deceased by trauma spot

Trauma spot	Number	Percentage (%)
Head and face trauma	261	40.2
Upper limbs (neck, chest, abdomen, arms and hands)	41	6.3
Lower limbs (pelvis, posterior and legs)	11	1.7
Multiple trauma	337	51.8

Table 3: Frequency of the dead people based on the final cause of death

Final cause of death	Number	Percentage (%)
Head trauma	383	58.9
Bleeding	75	11.5
Multiple fractures	130	20
Burn	4	0.6
Choking	2	0.3
Multiple causes (head trauma, multiple fractures, bleeding, etc.)	56	8.7

Discussion

This study was carried out with the aim of investigating the epidemiology of fatal traffic accidents in Ahvaz, Iran, during 2015-2016. The findings showed that the frequency of death among men was higher than women. This finding is consistent with those of previous studies.[14, 15] In developed and developing countries, the male to female ratio is significantly different and high, which can be 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 commuting, and higher rate of men's travels than women. It can be also attributed to high-risk behaviors of men when driving and passing through streets, and women's job (housewife) and fewer activities outside home. Another reason for the higher rate of traffic accidents among men compared to women is that men are often quick and agile, and frequently turn left and right when driving. They use any empty space and constantly change their paths. Furthermore, men use safety belts less than women do. In contrast, women drive slowly and straightly. Caution and patience are the characteristics of women's driving. On the other hand, there is a higher prevalence of using permitted drugs among young people when driving. Young people are less likely to use seat belts and trust in their driving abilities too much. They do not pay attention to their own personal risk-making.[14]

The results of this study showed the most deceased in this study were young people; this indicated that most of the road accidents occurred in the age group of active young people and this is consistent with the results of other studies.[16-20] Having more emotional and high-risk behaviors while driving, less adherence to traffic rules and regulations, and having high speed can be the reasons for higher rates of death in this age group.

The finding of the present study indicated that most of the deceased were self-employed, illiterate and married; this finding is consistent with the results of the studies conducted in Iran and India.[21-24] In these studies, most of the deceased were self-employed and married.[21-24] Also, it was revealed that most of the deceased were residents of urban areas. This result is in agreement with those of other studies.[14]

The results of this study showed that most of the accidents had occurred in February, March, and April, respectively. Due to the cool weather in February and March in Ahvaz, and the holidays and a large number of travelers to this city in April, the rates of traffic accidents are high in there. These findings are consistent with a previous study in Iran.[25] This period is a vacation time of a year, and most accidents happen due to the increasing number of journeys and traveling.

Furthermore, the results of this study showed that the majority of fatal accidents had occurred outside the city, which is consistent with other studies.[26] Another study showed most of the fatal accidents had occurred on the roads outside the city.[26] Some reasons such as the lack of well constructed roads and parking outside of city should not be disregarded.

The results of the descriptive analysis showed that the highest death rates in terms of the trauma spot were due to multiple traumas in different parts of the body and head trauma, respectively. This finding was not consistent with the results of other studies.[15, 25] Unfortunately, due to the lack of fastening a seatbelt and the lack of airbags in cars, the head is the first area that is collided and causes irreparable damage to individuals and ultimately leads to their death.

The results of the present study also showed that the highest death rates among people with fatal traffic accidents were respectively those of passengers and drivers. These results are contrary to the results of other studies.[15, 21, 27] Another study was conducted in Iran in 2005, when passengers accounted for the most frequent deaths from accidents.[26]

The present study showed that the most common causes of death among people with fatal traffic accidents were head trauma and multiple fractures, respectively. These findings are consistent with the results of a previous study.[28]

The results of this study showed a statistically significant relationship between the accident location and the place of death, and between the trauma spot and the cause of death. There was no statistically significant relationship between accident location and death place (This finding is consistent with the results of the study conducted in Sistan and Baluchestan.[25]

Traffic accidents are a major public health problem, and its continuous and effective prevention requires coordinated and comprehensive efforts. Given that Ahvaz is one of the cities in Iran with a high mortality rate, comprehensive studies on epidemiology and factors affecting the outcomes of traffic accidents can be considered an important step towards controlling the risk factors and reducing the burden of these incidents in the country. In this regard, organizations such as the Ministry of Health and Iranian Traffic Police (NAJA) can help to strengthen the pre-hospital services and further control of drivers' behavior to reduce accidents with more severe consequences. According to the findings of this study, every year a relatively large number of people lose their lives in traffic accidents, and it is essential to completely and properly fulfill the regulations and, if necessary, modify them. It is also necessary to educate the general public, and particularly drivers, to reduce these statistics to zero by taking basic measures.

Limitation

The limitations of this study included data problems such as data defects and lost data.

Conclusion

In conclusion, the results of this study showed that the highest frequency of deaths from traffic accidents was among men, younger age groups, married ones, urban residents, people with elementary education, and illiterate ones. Also, the result showed most common causes of death were head trauma and multiple fractures, and the most location of death was outside the city. Therefore, it is necessary to adopt preventive policies that make these groups of people the focus of attention. It is recommended that some policies should be implemented and appropriate measures should be taken to improve the quality and accessibility of public services in Ahwaz, especially public services outside the city. Furthermore, it is necessary to consider the traumas caused by traffic accidents as a serious problem and take proper measures to prevent reduce and control it in the general public.

Acknowledgement

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References

1   Rakhshani T, Rakhshani F, Asadi ZS, Hadiabasi M, Khorramdel K, Zarenezhad M. Study of the pattern of mortality caused by Traffic Accidents (TAs) in the south of Iran. JPMA: Journal of the Pakistan Medical Association. 2016;66(6):644-9.

2   Akbarpour S, Jafari N, Mobasheri F, Pezeshkan P. Years of life lost due to intentional and unintentional injuries in Mazandaran province in 1387. Iranian Journal of Epidemiology. 2012;7(4):29-34.

3   Soori H, Royanian M, Zali AR, Movahedinejad A. Study of changes on Road Traffic Injury Rates, before and after of Four Interventions by Iran Traffic Police. pajoohande. 2009; 14 (1) :15-20

4   Ditsuwan V, Veerman LJ, Barendregt JJ, Bertram M, Vos T. The national burden of road traffic injuries in Thailand. Population health metrics. 2011;9(1):2.

5   Rezapur-Shahkolai F, Ebrahimikhah M, Hazavehei SMM, Moghimbeigi A .Using health belief model on preventive behaviors related to road traffic injuries among primary school students. Journal of Research & Health. 2017;7(4):908-14.

6   Azami-Aghdash S, Sadeghi-Bazargani H, Shabaninejad

7   Kopits E, Cropper M. Traffic fatalities and economic growth. Accident Analysis & Prevention. 2005;37(1):169-78.

8   Azami-Aghdash S, Gorji HA, Shabaninejad H, Sadeghi-Bazargani H. Policy analysis of road traffic injury prevention in Iran. Electronic physician. 2017;9(1):3630.

9   Quitian-Reyes H, Gómez-Restrepo C, Gómez MJ, Naranjo S, Heredia P, Villegas J. Latin American Clinical Epidemiology Network Series–Paper 5: Years of life lost due to premature death in traffic accidents in Bogota, Colombia. Journal of clinical epidemiology. 2017;86(2):101-5.

10   Zadeh K. H., Sadegh R, Daliri S. Estimating the burden of road traffic accidents. Journal of Safety Promotion and Injury Prevention. 2017; 4 (4): 253-60.

11   Zadeh KH, Sadegh R, Daliri S. Estimation of burden and caused by traffic accidents. Safety Promotion and Injury Prevention. 2017;4(4):253-60.

12   Yazdani Cherati J, Ahmadi Baseri E, Ghadami M. Mapping of mortality rate in suburban accidents, Mazandaran Province, 2007-2010. Journal of Mazandaran University of Medical Sciences. 2013;22(97):50-8.

13   Rad EH, Karyani AK, Zandian H. Access and necessity for road emergency sites. Trauma monthly. 2017;22,(2):1-5.

14   Izadi N, Najafi Farid F, Khosravi A, Hashemi Nazari S, Salari A, Soori H. Estimation of mortality and calculated years of lost life from road traffic injuries. Journal Of Mazandaran University Of Medical Sciences. 2014;24(112):51-8.

15   Hashemi NSS, Kazemian M, Hosseini F. *Trend Of Five Years Traffic Accident Mortality In Khuzestan Province (2006-2010)*. Scientific Journal Of Forensic Medicine. 2011;17(2(62)):123-9.

16   Yazdani-Charati J, Ahmadi-Basiri E, Mousavi S J. Effective factors on the risk of death caused by road accidents in Mazandaran province, Iran . J Mazandaran Univ Med Sci. 2014; 23 (108) :24-28.

17   Jha N, Srinivasa DK, Roy G, Jagdish S. Injury pattern among road traffic accident cases: A study from South India. Indian J Community Med. 2003;28(2):84-90.

18   Reddy NB, Hanumantha PM, Reddy NN, Reddy CS. An epidemiological study on pattern of thoraco-abdominal injuries sustained in fatal road traffic accidents of Bangalore: Autopsy-based study. Journal of emergencies, trauma, and shock. 2014;7(2):116.

19   Pamela L, Ramage M. Motor vehicle accident deaths, 1979 to 2004. Component of Statistical Canada Catalogue. ealth Rep. 2008;19(3):45-51.

20   Wong ZH, Chong CK, Tai BC, Lau G. A review of fatal road traffic accidents in Singapore from 2000 to 2004. Annals Academy of Medicine Singapore. 2009;38(7):594.

21 Izadi N, Soori H, Najafi F, Hashemi nazari SS, Khosravi A, Salari A. Epidemiological Pattern of Road Traffic Injuries in Kermanshah District in 2010. Hakim Health Sys Res 2014; 17(3): 177- 183.

22 Ayatollahi S, Hassanzadeh J, Ramezani A. The burden of traffic accidents in South Khorasan province, Iran in 2005. Iran J Epidemiol 2009.4(3):51-7.

23 Barrimah I, Midhet F, Sharaf F. Epidemiology of road traffic injuries in qassim region, saudi arabia: consistency of police and health data. International journal of health sciences. 2012;6(1):31-40.

24 Nantulya VM, Muli-Musiime F. Kenya: Uncovering the social determinants of road traffic accidents. Challenging inequities in health: from ethics to action. Public Health Ethics. 2010; 3(2): 115–127.

25 Taravatmanesh S, Hasheminazari S, Ghadirzadeh M, Taravatmanesh L. Epidemiology of fatal traffic injuries in the Sistan and Baluchestan province in 2011, Journal to promote safety and prevent injuries.2015;3(3): 161-168.

26 Hatam abadi H, Soori H, Vafaiee R, Ainy E, Asnaashari H. Epidemiological pattern of road traffic injuries Abali Tehran: a prospective study. Payesh 2011;11(1):29-37.

27 Shahraz S, Bartels D, Puthenpurakal JA, Motlagh ME. Adverse health outcomes of road traffic injuries in Iran after rapid motorization. Archives of Iranian medicine. 2009;12(3):284-94.

28 Entezami N, Hashemi-Nazari SS, Soori H, Khosravi A, Ghadirzadeh MR. Epidemiology of fatal road traffic accidents in Northern provinces of Iran during 2009 to 2010. Safety Promotion and Injury Prevention. 2015;3(1):1-8.