Research Paper
Epidemiological Study of Fatal Road Accidents in Eastern Iran in a Five-year Period

Hojjat Zare[1], Mahbubeh Abdollahi[2] , Mohsen Poursadeghiyan[3] , Nayereh Kasiri[4, 5*]

1. Student Research Committee, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.
2. Department of Biostatistics and Epidemiology, School of Health, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.
3. Department of Occupational Health and Safety Engineering, School of Health, Ardabil University of Medical Sciences, Ardabil, Iran.
4. Department of Public Health, School of Health, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.
5. Student Research Committee, School of Management and Medical Information Sciences, Isfahan University of Medical Sciences, Isfahan, Iran.

ABSTRACT

Background: Road accidents are regarded as one of the most critical global health issues. In Iran, road accidents are the second cause of death, followed by cardiovascular diseases. The present study was conducted with the aim of the epidemiological evaluation of deaths caused by road accidents in Torbat Heydariyeh City, Iran, between 2013 and 2017.

Materials and Methods: This is a cross-sectional study in which information on fatal road accidents recorded in the Forensic Medicine Organization of Torbat Heydariyeh City was collected from 2013 to 2017. Excel software was used to analyze the data. A total of 311 fatal accidents have been reported in Torbat Heydariyeh from 2013 to 2017.

Results: The Mean±SD age of the deceased was 39.55±22.71. Men accounted for 69% of deaths. Most road accidents occurred in 2016 with a percentage of 24%, most of which happened in the sixth month with a percentage of 13%. Head injury in road accidents was reported as the main cause of death (48%). 130 of the dead were passengers (42%). The type of vehicle used by victims of road accidents was motorcycles (25%), and pedestrians (18%).

Conclusion: Since fatal road accidents impose direct and indirect costs on society, intervention measures, such as repairing the roads on accident-prone roads, installing warning signs, defined fines, etc., should be taken to improve public health and prevent the increasing trend of accidents in Iran.

* **Corresponding Author:**
Nayereh Kasiri
Address: Department of Public Health, School of Health, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran.
E-mail: nkasiri386@gmail.com

1. Introduction

Traffic accident is one of the most critical global health issues considered the ninth cause of death in the world [1, 2]. Traffic accident is the main cause of death for people aged 5-29 worldwide and also 1.35 million people die due to traffic accidents in the world each year [3]. According to the World Health Organization (WHO) report, low- and middle-income countries accounted for 93% of deaths due to the traffic road [3]. In Iran, traffic accident is the second cause of death, followed by cardiovascular diseases [4]. The rate of traffic accidents in Iran is high about 17.7% of all deaths. Among the Eastern Mediterranean countries, Iran has the highest car per capita (one car per 4 people) [5]. According to research, road accidents impose direct costs on society [6]. It is estimated that traffic accidents impose a financial burden of more than $ 518 billion on countries around the world, accounting for an average of 1% to 5%of the gross domestic product [7]. The young and the middle-aged people are mostly exposed to traffic accidents that lead to the loss of the active labor force; therefore, it imposes costs on society indirectly [6, 8, 9]. On the other hand, it has been reported that men are the most victims of the road accident which negatively affects the family economy [8, 10].

The total length of roads in Iran is 570,000 km [8] and most accidents occur on the main and suburban roads [8, 11] then considering the importance of prevention at the primary level, the United Nations General Assembly focuses on the maximum reduction in injury and mortality due to road accidents in the world by 2030 [3]. Therefore, the causes and effective factors in the occurrence of accidents can be identified and it is possible to reduce the number of road accidents by implementing preventive policies, and it is necessary to identify the factors leading to traffic accidents. No comprehensive and reliable information is available about road accidents in Torbat Heydariyeh City. Since Torbat Heydariyeh City is located on the road to Mashhad City, Iran, the traffic in this city is high. Therefore, this study was conducted with the aim of the epidemiological assessment of deaths caused by road accidents in Torbat Heydariyeh between 2013 and 2017.

2. Materials and Methods

This cross-sectional study was conducted with the aim of the epidemiological evaluation of deaths caused by road accidents in Torbat Heydariyeh City between 2013 and 2017.

The code of ethics (IR.THUMS.REC.1397.031) was obtained from Torbat Heydariyeh University of Medical Sciences. Then, the information on fatal accidents recorded between 2013 and 2017 was collected by Forensic Medicine Organization. Variables included exact time of accident and death (hour, day, month, and year), gender, age, marital status, place of residence, occupation, education, road lighting, the scene of the accident, injured body parts, the final cause of death, place of death, condition of the deceased at the time of the accident, how the accident occurred, type of vehicle used by road accident victims, type of vehicle collided with road accident victims. The data were available in an Excel file so this software was used to analyze the data. To describe qualitative and quantitative variables, the frequency and Mean±SD were used, respectively.

3. Results

A total of 311 fatal accidents have been reported from Torbat Heydariyeh between 2013 and 2017. Table 1 presents demographic information. The number of deaths recorded in the Forensic Medicine Organization of Torbat Heydariyeh and Mashhad was 214 (69%) and 97 (31%), respectively. The scenes of the accident were suburban, urban, and rural roads and also unknown with the frequency of 134 (43%), 54 (17%), 9 (3%), and 114 (37%), respectively. The highest percentage of urban accidents occurred on the main street with 19% (60 cases) and the highest percentage of suburban accidents occurred on the main road with 50% (154 cases).

The highest and the lowest percentages of road accidents accounted for 24% (76 cases) in 2016 and 17% (52 cases) in 2013, respectively. In addition, the highest number of accidents was in August with 40 cases (13%) and the lowest number of accidents was in February with 17 cases (6%) (Figures 1 and 2). In terms of road lighting, 186 (60%) of road accidents occurred during daylight hours, 93 (30%) accidents occurred at night, and 32(10%) accidents occurred at sunrise or sunset. By dividing a day into four parts, most fatal accidents occurred in the third six hours between 12 PM and 6 PM (Table 2).

48

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54
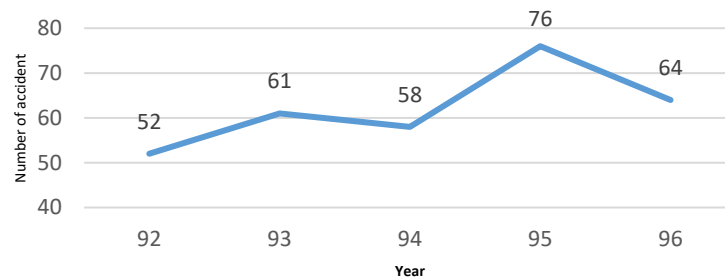
Figure 1. Number of accidents between 2013 and 2016

The most injuries were related to the head and face at 48% (148 cases), then to the head, face, chest and abdomen, hands and arms with 8% (24 cases), and finally to the chest and abdomen with 7% (22 cases). The final cause of death was due to head injury with 41% (128 cases), multiple fractures with 33% (103 cases), and bleeding with 9% (26 cases). A total of 151 individuals (49%) died at the hospital, 138 individuals (44%) at the scene of the accident, and 22 individuals (7%) on the way to the hospital.

The majority of those who died in the accident were passengers with 42% (130 cases), then drivers with 41% (126 cases), and pedestrians with 17% (55 cases).

The number of vehicles collided with each other, vehicles collided with a pedestrian, vehicles overturned, and those collided with a fixed object was 148 (48%), 57 (18%), 85 (27%), and 21 (7%), respectively.

Motorcycles with 25% (77 cases), then pedestrians with 18% (55 cases), Pride car with 16% (51 cases), Peugeot 405 car with 11% (33 cases) allocated the highest percentage.

The percentages of vehicles that collided with the victims were Pride cars with 10% (30 cases), road construction vehicles with 10% (31 cases), Mercedes-

Benz trucks with 8% (25 cases), as well as 71 cases of overturning of the victims' car (23%).

The results of the chi-square test indicated a significant relationship between the place of death and injured body parts such as the head, face, chest, abdomen, hands, and arms (P=0.049). Most deaths occurred at the hospital. In other cases, most deaths occurred at the scene of the accident (Table 3). No statistically significant relationship was observed between the place of death and the type of vehicle (P=0.956), gender (P=0.811), and distance from the city (P=0.395).

4. Discussion

In the present study, the epidemiology of deaths caused by accidents in Torbat Heydariyeh between 2013 and 2017 was examined. During this period, 311 fatal accidents were reported. The Mean±SD age of the deceased was 39.55±22.71, the highest frequency (37%) was in the age group of 20-40 years. The most common cause of death was due to a head injury (41%) and the majority (42%) of those who died in the accident were passengers. And motorcycles were reported to be the most accident-prone (25%). The results of the present study show that deaths due to road accidents had a decreasing-increasing trend and most of the deaths occurred in 2016, especially between
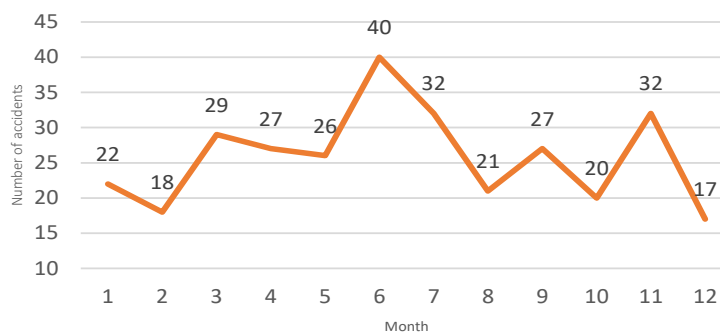

Figure 2. Number of accidents based on months between 2013 and 2016

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54

49

Table 1. Demographic characteristics of road accidents victims in Torbat Heydariyeh City from 2013 to 2016

Variables	Category	Value No. (%)
Age	Less than 20	60(19)
	20-40	114(37)
	40-60	70(23)
	60-80	46(15)
	Above 80	21(6)
Gender	Female	98(31)
	male	213(69)
Marital status	Single	107(34)
	Married	204(66)
Place of residency	City	189(61)
	Village	122(39)
Level of education	Illiterate	62(20)
	Diploma or less	219(70)
	Academic	30(10)
Occupation	High school student	28(9)
	University student	10(3)
	Housewife	68(22)
	Employee	12(4)
	manual worker	63(20)
	Self-employed	78(25)
	Soldier	5(2)
	Military	2(1)
	Professional driver	7(2)
	Retired	10(3)
	Unemployed	9(3)
	Other	19(6)

March and August. Rezazadeh et al conducted a study that showed a declining trend in road accidents from 2009 to 2019 [12]. Japan and Turkey also indicated a declining trend in road accidents in recent years [13, 14]. A reduction in accidents can be attributed to the increase in road control, including speed control.

Based on the findings of the present study, the highest mortality occurred in the age group of 20-40 years and the Mean±SD age of the deceased was 39.55±22.71 years. Abedini conducted a study that reported that the majority of road accidents occurred in the 19-36 age groups [9]. In addition, a study conducted by khorami indicated that most fatal road accidents occurred be-

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54

Table 2. Statistics of accidents and deaths based on six hours over the years

Hours	No. (%)	
	Accident	**Death**
The first six hours	33 (10)	42 (14)
The second six hours	84 (27)	68 (22)
The third six hours	113 (36)	84 (27)
The fourth six hours	64 (21)	69 (22)
Unknown	17 (5)	48 (15)
Total	311 (100)	311 (100)

Health in Emergencies and Disasters Quarterly

Table 3. Injured body parts

The place of the Death	No. (%)				P*
	Head and Face	**Chest and Abdomen**	**Head and Face, Chest and Abdomen, Hands and Arms**	**Others**	
At the scene of the accident	60 (40)	6(27)	9(38)	63(54)	
On the way to the hospital	7(5)	3(14)	3(12)	9(8)	0.049
Hospital	81(55)	13(59)	12(50)	45(38)	
Total	148(100)	22(100)	24(100)	117(100)	

* P in Chi-square test.

Health in Emergencies and Disasters Quarterly

tween young and middle-aged people [15]. However, in another study by Nasiri, the highest number of deaths due to road accidents was reported in the age group of 19-30 years, which is inconsistent with our results [16]. This age group is at risk of road accidents due to risky and emotional behaviors as well as higher speed. On the other hand, this group is of working age; therefore most road accidents threaten them. If they have an accidents, it can impose an economic burden on society.

In the present study, most of the deceased were self-employed and had a diploma or lower level of education and even 20% of them were illiterate. In other words, the higher the level of education, the fewer fatal road accidents. The results of a study by Khorami in Fars Province, Iran, were consistent with our study [15].

In studies conducted in Turkey and China, fatal accidents have also decreased by increasing the education level [17]. In a study conducted in India, nearly a quarter of the victims were illiterate, which is consistent with the results of the present study [18]. It can be explained that drivers with higher levels of education have more respect for driving regulations. Therefore, the low level of education among the victims of road accident is considerable.

In the present study, married people had the highest percentage of deaths, but in another study by Rakhshani, single had the highest percentage of deaths, which is inconsistent with our results [19]. Reducing fatal road accidents should be considered because most deceased were the breadwinners whose death can lead to economic issues for their families.

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54

51

The highest percentage of deaths were males (69%). In this study, the death ratio of men to women was approximately 2.1. In another study by Abedini, the rate of male mortality was also higher than the other gender [9]; in two other types of research by Rahmani and Rezazadeh, the ratios were 4.1 and 3.5, respectively [12, 20]. Men are more likely to be out of the house than women, and since the self-employed had the highest mortality rate (25%) in this study, this death ratio was justifiable. In Ethiopia, the death caused by road accidents was much higher for men (82.5%) [21].

The results of the present study showed that about 45% of fatal road accidents occurred on suburban roads (43%) and only 3% of fatal road accidents occurred on rural roads. A study by Khorammi indicated that around 27% of fatal road accidents occurred on suburban roads which were 3.5 times more than fatal road accidents on rural roads [15]. In two other studies by Shahbazi and Entezami, this difference was also significant and the reason can be attributed to the high traffic on suburban roads [22, 23].

In the present study, most fatal road accidents (60%) occurred during daylight hours; our results are consistent with Khorami's study [15]. In the present study, 24 hours of a day were divided into 4 parts. The most fatal road accidents occurred between 12 PM and 6 PM. In a study conducted in Kermanshah, the most fatal road accidents were reported from 7 AM to 7 PM [24]. This can be due to the rush to get home and take an afternoon nap. However, a study conducted in India indicated 7 PM as the time with the most fatal road accidents [18].

Nasiri's study showed the early hours of the night as the time with the most fatal road accidents [16]. A study in Fars City, Iran, showed fatal road accidents mostly occurred between 4 AM and 6 AM that was inconsistent with our results [15].

Head and face injuries were the most common cause of death in road accidents in this study, and the other studies were consistent with the present study [15, 16, 19, 23, 25, 26]. This study showed multiple fractures as the second cause of death, but Khorami reported bleeding as the second cause of death [15].

According to the results of this study, most of the deaths occurred after transfer and at the hospital; the reason can be the small size of the city and the proximity of the scene of the accident to the hospital. Two other studies by Abedini and Rakhshani showed that most deaths occurred at the scene which was inconsistent with our results [9, 19].

According to the findings of this study, passengers and then drivers had the highest number of fatalities, while in the study carried out in Fars, Kerman, and Khuzestan drivers had the highest number of deaths [15, 16, 27].

In the present study, the collision of two cars was the highest accident pattern of fatal accidents. The results of a study in East Azerbaijan were consistent with the present study [28]. This collision can be attributed to failure to observe the safe following distance, unauthorized speed, or driver drowsiness.

In this study, motorcyclists had the greatest number of deaths. In the study by Khorami [15], motorcyclists had the highest number of deaths, while in another study by Nasiri, motorcyclists were the second group with high fatal accidents [16]. Riders are mostly at risk of injury due to imbalance caused by collision [29]. Pride and Peugeot cars have the most fatal accidents, followed by motorcycles and pedestrians. The results of other studies are consistent with our study [19, 23]. Some studies in Iran have proven some fatal accidents related to this result [30-33].

5. Conclusion

Since road accidents impose direct and indirect costs on society, intervention measures should be considered to improve public health and prevent the increasing trend of road accidents. One of the most crucial intervention measures can be the coordination between relevant officials. One of the limitations of the present study is the lack of access to all fatal accidents; hence access to registration systems should be possible in each city. Therefore, necessary measures should be taken to integrate the death registration system of the country for easy access to information.

Ethical Considerations

Compliance with ethical guidelines

This article was derived from a research project approved by Torbat Heydariyeh University of Medical Sciences (Code: IR.THUMS.REC.1397.031).

52

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54

Authors' contributions

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

References

[1] Mobaleghi J, Yaghoobi Notash A, Yaghoobi Notash A, Ahmadi Amoli H, Borna L, Yaghoobi Notash A. [Evaluation of trauma patterns and their related factors in Besat hospital in Sanandaj in 2012 (Persian)]. Scientific Journal of Kurdistan University of Medical Sciences. 2014; 19(1):99-107. [DOI:10.22102/19.1.99]

[2] Fallah Karkan M, Behboudi H, Taeefe N, Soltani Moghaddam R, Khoshbakht Pishkhani M. [Visual disorders in drivers causing accidents (Persian)]. Journal of Guilan University of Medical Sciences. 2013; 22(85):48-53. [Link]

[3] World Health Organization (WHO). Road traffic injuries 2021. Geneva: World Health Organization; 2022. [Link]

[4] Khosravi A, Chaman R. [Epidemiological and health change (Persian)]. Paper presented at: Sixth Iranian Epidemiological Congress. 13-15 July 2010; Shahrood, Iran. [Link]

[5] Naghavi M, Abolhassani F, Pourmalek F, Lakeh M, Jafari N, Vaseghi S, et al. The burden of disease and injury in Iran 2003. Population Health Metrics. 2009; 7:9. [DOI:10.1186/1478-7954-7-9] [PMID] [PMCID]

[6] Ghadirzadeh M, Shojaei A, Khademi A, Khodadoost M, Kandi M, Alaeddini F, et al. [Status and trend of deaths due to traffic accidents from 2001 to 2010 in Iran (Persian)]. Iranian Journal of Epidemiology. 2015; 11(2):13-22. [Link]

[7] Murray CJL, Lopez AD, Lopez AD. The global burden of disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020: Summary. Boston: Harvard School of Public Health; 1996. [Link]

[8] Rezaei A, Gholamzadeh S, Zarenejad M, Ayoubi Y, Abdolahifard G. [Demographic investigation of mortality due to accidents referring to legal medicine organization in Fars province during 2004-2014 (Persian)]. Iranian Journal of Forensic Medicine. 2018; 24(1):17-25. [Link]

[9] Abedini Z, Tavanania M. [Epidemiological study of road traffic accidents in Qom (Persian)]. Qom University of Medical Sciences Journal. 2011; 5(2):90-5. [Link]

[10] Khorshah H, Eri M, Honarvar MR, Mirkarimi SK, Abbasi M, Badiei F, et al. Epidemiological study of road traffic accidents and detection of accident hot spot in Golestan province, northern Iran. Journal of Clinical and Basic Research. 2018; 2(4):15-22. [DOI:10.29252/jcbr.2.4.15]

[11] Afkhaminia F, Yazdani Charati J, Rahimi E, Mousavi Nasab N. Epidemiological study of the suburban accident mortalities recorded in Golestan, Iran in 2015. Jorjani Biomedicine Journal. 2018; 6(1):67-73. [DOI:10.29252/jorjanibiomedj.6.1.67]

[12] Rezazadeh Z, Askarishahi M, Vakili M. [Trend of fetal traffic injuries in Iran from 2009 to 2018 (Persian)]. The Journal of Toloo-e-behdasht. 2021; 19(6):50-62. [DOI:10.18502/tbj.v19i6.5709]

[13] Murat Ö. Trends in road traffic crashes in Turkey, 1980-2016. Niğde Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi. 2018; 7(2):732-40. [DOI:10.28948/ngumuh.444765]

[14] Oguchi T. Achieving safe road traffic-the experience in Japan. IATSS Research. 2016; 39(2):110-6. [DOI:10.1016/j.iatssr.2016.01.003]

[15] Khorrami Z, Hashemi Nazari SS, Ghadirzadeh MR. [An epidemiology study of deaths from road traffic accidents (Persian)]. Journal of Safety Promotion and Injury Prevention. 2016; 4(4):217-24.

[16] Nasiri N, Vazirinejad R, Rezaeian M, Sharifi H, Sanji Rafsanjani M. Epidemiology of mortality among road accident victims in the south of Kerman province, Iran, from 2012 to 2015. Journal of Occupational Health and Epidemiology. 2017; 6(3):136-43. [DOI:10.29252/johe.6.3.136]

[17] Oralhan B, Göktolga ZG. Determination of the risk factors that influence occurrence time of traffic accidents with survival analysis. Iranian Journal of Public Health. 2018; 47(8):1181-91. [Link]

[18] Farooqui JM, Chavan KD, Bangal RS, Syed MA, Thacker PJ, Alam S, et al. Pattern of injury in fatal road traffic accidents in a rural area of western Maharashtra, India. The Australasian Medical Journal. 2013; 6(9):476-82. [DOI:10.21767/AMJ.2013.1839] [PMID] [PMCID]

[19] Rakhshani T, Kashfi M, Amirian I, Ebrahimi MR, Hashemi Nazari SS. Epidemiology of fatal road traffic accidents in Iran, Yasouj, 2014-2015. Journal of Health Sciences & Surveillance System. 2018; 6(1):29-35. [Link]

[20] Rahmani K, Hashemi Nazari SS, Ghadirzadeh MR. [Trend analysis of traffic accidents deaths in Iran during 2006-2012: Hospital or pre-hospital occurred deaths (Persian)]. Journal of Rafsanjan University of Medical Sciences. 2016; 15(2):115-28. [Link]

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54

53

[21] Abegaz T, Gebremedhin S. Magnitude of road traffic accident-related injuries and fatalities in Ethiopia. Plos One. 2019; 14(1):e0202240. [DOI:10.1371/journal.pone.0202240] [PMID] [PMCID]

[22] Shahbazi F, Soori H, Khodakarim S, Ghadirzadeh MR, Hashemi Nazari SS. Analysis of mortality rate of road traffic accidents and its trend in 11 years in Iran. Archives of Trauma Research. 2019; 8(1):17-22. [DOI:10.4103/atr.atr_72_18]

[23] 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 (Persian)]. Safety Promotion and Injury Prevention. 2015; 3(1):1-8. [Link]

[24] Malekifar A, Hashemi Nazari SS, Ghadirzadeh MR. [Epidemiology of deaths due to traffic accidents in Kermanshah province (2012) (Persian)]. Journal of Kermanshah University of Medical Sciences. 2016; 19(6):327-333. [Link]

[25] Jalilian MM, Safarpour H, Bazyar J, Safi-Keykaleh M, Farahi-Ashtiani I, Khorshidi A. Epidemiology of road traffic crashes in Ilam province, Iran, 2009-2013. BMC Research Notes. 2020; 13(1):1-6. [DOI:10.1186/s13104-020-05366-x] [PMID] [PMCID]

[26] Monsef V, Asadi P, Ziabari SMM. [Mortality due to road traffic injuries in Guilan province in 2011-2012 (Persian)]. Journal of Safety Promotion and Injury Prevention. 2015; 3(2):97-102. [Link]

[27] Rajaei Behbahani N, Mohammadi MJ, Hashemi Nazari SS, Ghadirzadeh M, Hassanipour S. Studying the epidemiology of fatal traffic accidents in the Khuzestan province. Jundishapur Journal of Health Sciences. 2016; 8(2):e32114. [DOI:10.17795/jjhs-32114]

[28] Sadeghi-Bazargani H, Samadirad B, Shahedifar N, Golestani M. Epidemiology of road traffic injury fatalities among car users; A study based on forensic medicine data in East Azerbaijan of Iran. Bulletin of Emergency & Trauma. 2018; 6(2):146-54. [DOI:10.29252/beat-060209] [PMID] [PMCID]

[29] Khalagi K MR, Eshraghian MR, Motevalian A, Holakouei NK. [Risk factors for road traffic injuries on Qazvin-Loshan road, 2005 (Persian)]. Iranian Journal of Epidemiology. 2006; 2(1&2):11-9. [Link]

[30] Nasrollah Nejhad Tasouj S, Ilaghinezhad Bardsiri T, Feiz Arefi M, Babaei Poya A, Rahimi S, Mazloumi E, et al. Analyses and anticipating the future trend of accidents in an electricity distribution company of Iran: A time series analysis. Work. 2021; 68(4):1273-8. [DOI:10.3233/WOR-213456] [PMID]

[31] Khammar A, Hosseinighosheh S, Abdolshahi A, Hosseini Ahagh M, Poursadeqiyan M. Forecast of the future trend of accidents in an electricity distribution company of Iran: A time series analysis. Iranian Journal of Public Health. 2019; 48(12):2315-7. [DOI:10.18502/ijph.v48i12.3572]

[32] Poursadeghiyan M, Omidi L, Hami M, Raei M, Biglari H. Epidemiology of fatal and non-fatal industrial accidents in Khorasan Razavi province, Iran. International Journal of Tropical Medicine. 2016; 11(5):170-4. [DOI:10.36478/ijtmed.2016.170.174]

[33] Khammar A, Khandan M, Veisi R, Hosseinighosheh SN, Alimohammadi M, Poursadeghiyan M, et al. An epidemiological study of fatal and non-fatal industrial accidents in Semnan, Iran. Health in Emergencies and Disasters Quarterly. 2019; 4(2):93-100. [DOI:10.32598/hdq.4.2.93]

54

Zare et al. Fatal Road Accidents in a Five-year Period. HDQ. 2022; 8(1):47-54