J Anal Res Clin Med, 2018, 6(3), 134-8.
doi: 10.15171/jarcm.2018.021, *http://journals.tbzmed.ac.ir/JARCM*

Original Article

Epidemiology of road traffic accidents in Tabriz municipality: A cross sectional study

Alireza Ala*[1], Alireza Aghili[1], Sahand Ghorbani[1], Seyyed Sina Hejazian[1], Arash Nahvi[1], Seyyed Ali Mousavi-Aghdas[1]

[1] *Emergency Medicine Research Team, Tabriz University of Medical Sciences, Tabriz, Iran*

Article info
Article History:
Received: 22 July 2018
Accepted: 25 July 2018
ePublished: 31 Aug. 2018

Keywords:
Trauma,
Traffic Accident,
Iran

Abstract

Introduction: Traffic accidents are of the most common causes for emergency ward admissions with variable outcomes ranging from full recovery to death. In order to have an accurate policy setting, the information regarding the accidents should be unraveled. The present study was carried out aiming to describe traffic accidents causing trauma in one of Iran's major municipalities.

Methods: In this cross-sectional study, 757 patients admitted to the emergency wards with the background of traffic accidents were included in the study. All patients had signed informed consent before participating in the study. Data regarding these patients were extracted from the hospital information system (HIS) and then analyzed.

Results: The mean age of the patients was 33.09 ± 17.19. Most of the patients (70.7%) were men. Almost two third of the patients were injured inside the cities. Accidents happening on the inter-city roads were significantly related to the car collisions. Emergency medical services (EMS) were the most common route of admission and referral. The head trauma had the highest incidence rate among all traumas based on location. Accidents on the inter-city roads were related to the injury to the neck, thorax, and upper limbs.

Conclusion: Based on various factors effecting trauma caused in traffic accidents, the clinical picture was variable. It is important to have an understanding of the situation regarding traffic accidents in order to further enhance the quality of care for these patients.

Citation: Ala A, Aghili A, Ghorbani S, Hejazian SS, Nahvi A, Mousavi-Aghdas SA. **Epidemiology of road traffic accidents in Tabriz municipality: A cross sectional study.** J Anal Res Clin Med 2018; 6(3): 134-8. Doi: 10.15171/jarcm.2018.021

Introduction

Traffic accidents are of the major causes of disability and death in developing countries, and a major economic burden on the health systems. It is estimated that over half a million individuals are involved in traffic accidents (directly or indirectly) in Iran annually, most of them aging between 20-50 years old. This is the second most common cause for the lost years of life after the cardiovascular diseases (CVDs). It is estimated that over 11 billion dollars are lost annually because of traffic accidents in Iran.[1] Traffic accidents happen due to variety of reasons, including lacking infrastructures, weak regulation, technical problems of vehicles, unsafe roads, and human errors.[2] Different countries have different patterns of traffic accidents, which are in accordance with their socio-economic background.[3-5]

Understanding these patterns is essential in order to make policies to control traffic accidents. Various policy doctrines have been issued in this regard, however many of them are irrelevant to different contexts. Policies aiming to diminish the traffic accident rate should target the most important cause of life lost in each administrative entity.[6] To gain

* Corresponding Author: Alireza Ala, Email: ala.alireza@gmail.com

knowledge in this regard, local research has to be fulfilled to assess the needs of specific settings. Knowledge on these sets of data are missing in many locations in Iran and other developing countries. Much capital is wasted due to the lack of knowledge regarding the predisposing factors of the major life threatening accidents. In addition, with the emergence of new facilitates like helicopters, it is essential to understand the characteristics of traffic accidents in order to utilize these assets in a more productive manner.[7] The present cross sectional study was accomplished aiming to investigate the epidemiology of traffic accidents in Tabriz, one of Iran's major metropolitan areas. Moreover, another objective in this study was to determine factors effecting various locations of trauma and arrival of patients to the emergency department.

Methods

Ethical considerations: The present cross sectional study was conducted after its approval in the ethical board of Tabriz University of medical Sciences.

Patients: All patients affected by trauma caused by traffic accidents in the municipality of Tabriz between January 2017 and January 2018 were included in the study. The patients affected by any type of trauma after the accident and those with incomplete documents were excluded from the study. The profiles of the selected patients were reviewed in the health information system (HIS) to determine their final outcome and whether they underwent surgery or not. A set of predesigned questioners were used to incorporate all of the data gathered.

Statistical analysis was performed by SPSS software (version 21, IBM Corporation, Armonk, NY, USA). The chi-square and t-test statistical tests were used for analysis. P value less than 0.05 was deemed significant, and the power of the study was set at 80%.

Results

In total, data on 757 trauma emergencies were extracted from the registry of the affiliated hospital. The demographic data have been presented in the table 1.

Table 1. Characteristics of the accidents by type of accident

Characteristics	n (%)	Cumulative percentage
Pedestrian with bicycle	21 (2.8)	2.8
Pedestrian with car	177 (23.4)	26.2
Car crash	242 (32.0)	58.1
Tilting of car	140 (18.5)	76.6
Tilting of motorcycle	118 (15.6)	92.2
Motor-cycle with car	58 (7.7)	99.9
Bicycle-to-bicycle crash	1 (0.1)	100
Total	757 (100)	100

The minimum and maximum age of the patients was about 1 year and 85 years (33.09 ± 17.19), respectively. The men accounted for the majority of the patients (70.7%). Almost two-third of the patients were injured in accidents inside the cities. Accidents outside the cities were significantly related to the car-to-car collisions, unlike the accidents inside the city which were mostly car to pedestrian accidents. Outside the cities, car to car accidents and car overturning were the most common mechanisms of accidents. The most and the least common routes of referral were emergency medical services (EMS) and aerial emergency, respectively. In general, head was the most common site of injury followed by the injury on the limbs and abdomen was the least common site of injury. The incidence of head trauma in both areas was very close and was not related to the location of the accident. Further information is summarized in table 2.

Table 2. Rate of damage to organ

Location of trauma	Number of patients injured
Head	329
Neck	69
Thorax	53
Abdomen	33
Pelvis	42
Lower limb	202
Upper limb	163

Accidents out of the cities were significantly related to neck trauma, thorax, and upper limbs. Only 0.4% of the patients

deceased and 67.8% of patients were discharged following the required investigations. 6.5% and 3.3% of the patients underwent emergency general surgery and neurosurgery. There was no significant relation between the location of accident and indication for emergency surgery or hospital outcomes.

Discussion

The results of the current study showed that traffic accidents were of the most common causes of emergency department admissions, which caused a significant burden on the health system. It was shown that in contrast to prior studies, the rate of deaths resulting from trauma was not significant, being less than 0.5%; this could be because of the conditions in which patients were hospitalized or referred to the emergency department.

In a study conducted by Fararoei et al. on the epidemiology of among patients with trauma in Yasuj, Iran, it was found that vehicle accidents comprised an important section; most of the subjects in this study (68%) were men, and most had been referred to the emergency department between 6 pm to 12 pm.[8] The results of this study were in accordance with the findings in the present study. In another study by Moafian et al. conducted on a broader level, it was found that most trauma accidents included 78.71% of the uninjured individuals who never visited any emergency department. They found a significant relation between socio-economical aspects and the severity of the traffic accidents. For example, they indicated that the relation between having a diploma degree, license type, and sex all had significant relations with the type of the accident. They also found that most accidents happened in the initial years of obtaining a driving license.[9] In another study carried out by Sadeghniiat-Haghighi et al., there was a significant relation between traffic accidents and the circadian rhythm of the driver, as drivers with inadequate sleep had a significantly higher rates of accidents.[10]

Another important observation found that there was even a relation between the seasons and traffic accidents as accidents happening in summer time had an increased chance of causing fatality.[11,12] These findings indicated that emergency physicians should have an altered focus on traffic accidents in times when the accidents have the highest chance of causing fatality or serious injury leading to a permanent dysfunction in body organs.

As mentioned earlier, one important part of traffic accidents arises from the pedestrians crossing the street or road, mainly in the urban districts. In a study by Sarikhani et al., it was found that the burden of accidents involving pedestrians had increased for women pedestrians, coupled with a higher mortality rate without regard to gender.[13] The authors suggested that extreme measure should be taken in order to reduce the amount of these injuries and the mortality caused by them. Hasani et al. studied the factors related to death in pedestrian accidents and found that the age group over 65 years old was the most common group involved with mortality, signaling a set of interventions focusing on the elderly, as these citizens have a reduced eye sight and have moderate moment disabilities, making them susceptible to fatal accidents.[13,14] Similar results were also demonstrated by Ghaem et al.[15]. Moradi et al.[16] found that the geographical position of the neighborhoods also had an important role in pedestrian accidents, as it was shown that areas near to financial centers and market and shopping malls of Tehran, Iran, had the most pedestrian accidents.[16] As mentioned previously, the social status had an important role in mortality of accidents leading to trauma in car crashes. Rezaei et al. showed that this relation was even seen in variables of macro-economy, like gross domestic production (GDP) per capita and degree of urbanization.[17] It was shown that traffic accidents accounted for at least 1.41% of Iran's GDP in 2009.[1]

Another important aspect of car injuries is head trauma. This particular injury has great

adverse outcomes like losing work time. In a study conducted by Ruffolo et al., it was stated that patients with jobs with higher salary and managerial positions and those with lower in bed times had a swift recovery compared to others.[18] In a study performed in 5 European countries, it was shown that the patients with a median age of 32.5 years had the most common cases of brain trauma. Moreover, pedestrians again had the most sever forms of brain injury compared to other groups involved.[19] Furthermore, it was shown that patients with a history of brain dysfunctions had an exacerbation after such brain injuries.[20]

One of the most important and rather new concepts among the patients with trauma has been their mental status and posttraumatic experiences. A qualitative study conducted by Yadav and Shrestha has demarcated the main themes of these patients, and has suggested extensive therapy after these experiences. Patients usually experienced feelings including guilt, shock, anger, sorrow, and fear after the trauma that would not been solved on their own.[21]

Conclusion

This study has described the picture of traffic accidents in Tabriz, one of Iran's major municipalities. It has been shown that most patients were men who had trauma affecting their heads, necks, and limbs in traffic accidents. Furthermore, significant relations were found between trauma incidence and factors like geographical locations and the degree of urbanization. The results of this study can help policy makers set new targets and better understand the factors affecting the rate of mortality and morbidity arising from trauma.

Acknowledgments

The Authors would like to appreciate Dr. Samad Shams Vahdati for his contribution and support in finalizing the manuscript.

Authors' Contribution

The study was designed by Alireza Ala and conducted by Alireza Aghili. Sahand Ghorbani was responsible for data gathering and data analysis was carried out by Arash Nahvi. Finally, Seyyed Ali Mousavi-Aghdas had the responsibility of writhing and criticizing the paper.

Funding

There was not any funding support for this study.

Conflict of Interest

Authors have no conflict of interest.

Ethical Approval

This study was approved by the Regional Medical Ethics Committee of Tabriz University of Medical Sciences under the number 57415.

References

1. Ahadi MR, Razi-Ardakani H. Estimating the cost of road traffic accidents in Iran using human capital method. International Journal of Transportation Engineering 2015; 2(3): 163-78. DOI: 10.22119/ijte.2015.9601
2. Gopalakrishnan S. A public health perspective of road traffic accidents. J Family Med Prim Care 2012; 1(2): 144-50. DOI: 10.4103/2249-4863.104987
3. Borkenstein RF. The Role of the drinking driver in traffic accidents: The Grand Rapids study. Hamburg, Germany: Steintor-Verlag; 1974. p. 1-132.
4. Backteman-Erlanson S, Jacobsson A, Oster I, Brulin C. Caring for traffic accident victims: The stories of nine male police officers. Int Emerg Nurs 2011; 19(2): 90-5. DOI: 10.1016/j.ienj.2010.06.001
5. Cercarelli LR, Rosman DL, Ryan GA. Comparison of accident and emergency with police road injury data. J Trauma 1996; 40(5): 805-9. DOI: 10.1097/00005373-199605000-00021
6. Ernstberger A, Joeris A, Daigl M, Kiss M, Angerpointner K, Nerlich M, et al. Decrease of morbidity in road traffic accidents in a high income country - an analysis of 24,405 accidents in a 21-year period. Injury 2015; 46(Suppl 4): S135-S143. DOI: 10.1016/S0020-1383(15)30033-4
7. Salari H, Motevalian SA, Arab M, Esfandiari A, Akbari SA. Exploring measures to control road traffic injuries in Iran: Key informants points of

view. Iran J Public Health 2017; 46(5): 671-6.
8. Fararoei M, Javad Sadat SJ, Zoladl M. Epidemiology of trauma in patients admitted to an emergency ward in Yasuj. Trauma Mon 2017; 22(3): e30572. DOI: 10.5812/traumamon.30572
9. Moafian G, Aghabeigi MR, Heydari ST, Hoseinzadeh A, Lankarani KB, Sarikhani Y. An epidemiologic survey of road traffic accidents in Iran: Analysis of driver-related factors. Chin J Traumatol 2013; 16(3): 140-4. DOI: 10.3760/cma.j.issn.1008-1275.2013.03.003
10. Sadeghniiat-Haghighi K, Yazdi Z, Moradinia M, Aminian O, Esmaili A. Traffic crash accidents in Tehran, Iran: Its relation with circadian rhythm of sleepiness. Chin J Traumatol 2015; 18(1): 13-7. DOI: 10.1016/j.cjtee.2014.09.001
11. Weast R. Temporal factors in motor-vehicle crash deaths: Ten years later. J Safety Res 2018; 65: 125-31. DOI: 10.1016/j.jsr.2018.02.011
12. Khorshidi A, Ainy E, Hashemi Nazari SS, Soori H. Temporal patterns of road traffic injuries in Iran. Arch Trauma Res 2016; 5(2): e27894. DOI: 10.5812/atr.27894
13. Sarikhani Y, Heydari ST, Gholamzadeh S, Mazloom M, Peymani P, Lankarani KB, et al. Burden of traffic accidents among pedestrians of Fars province, southern Iran; estimate of years of life lost in a sample of Iranian population from 2009 to 2013. Chin J Traumatol 2017; 20(5): 259-63. DOI: 10.1016/j.cjtee.2017.03.007
14. Hasani J, Hashemi Nazari SS, Khorshidi A, Shojaei A. Factors related to pedestrians' mortality following road traffic accidents in Tehran and Alborz Provinces, Iran. Int J Epidemiol Res 2016; 3(3): 204-13.
15. Ghaem H, Soltani M, Yadollahi M, ValadBeigi T, Fakherpour A. Epidemiology and outcome determinants of pedestrian injuries in a level I trauma center in southern Iran; a cross-sectional study. Bull Emerg Trauma 2017; 5(4): 273-9. DOI: 10.18869/acadpub.beat.5.4.508
16. Moradi A, Rahmani K, Kavousi A, Eshghabadi F, Nematollahi S, Zainni S, et al. Effective environmental factors on geographical distribution of traffic accidents on pedestrians, downtown of Tehran City. Int J Inj Contr Saf Promot 2018; 1-5. [Epub ahead of print]. DOI: 10.1080/17457300.2018.1431933
17. Rezaei S, Bagheri LK, Karami MB, Bazyar M, Hamzeh B, Najafi F. Determinant of road traffic crash fatalities in Iran: A longitudinal econometric analysis. J Res Health Sci 2015; 15(3): 163-7.
18. Ruffolo CF, Friedland JF, Dawson DR, Colantonio A, Lindsay PH. Mild traumatic brain injury from motor vehicle accidents: Factors associated with return to work. Arch Phys Med Rehabil 1999; 80(4): 392-8. DOI: 10.1016/S0003-9993(99)90275-7
19. Majdan M, Mauritz W, Wilbacher I, Janciak I, Brazinova A, Rusnak M, et al. Traumatic brain injuries caused by traffic accidents in five European countries: outcome and public health consequences. Eur J Public Health 2013; 23(4): 682-7. DOI: 10.1093/eurpub/cks074
20. Goetz CG, Stebbins GT. Effects of head trauma from motor vehicle accidents on Parkinson's disease. Ann Neurol 1991; 29(2): 191-3. DOI: 10.1002/ana.410290213
21. Yadav SK, Shrestha S. A study on posttraumatic experience of road traffic accident afflicted maxillofacial trauma patient at tertiary hospital. J Nat Sci Biol Med 2017; 8(1): 40-5. DOI: 10.4103/0976-9668.198358