

## Epidemiological Study of the Suburban Accident Mortalities Recorded in Golestan, Iran in 2015

Farzaneh Afkhaminia<sup>1\*</sup>, Jamshid Yazdani Charati<sup>2</sup>, Elaheh Rahimi<sup>1</sup>,  
Nourodin Mousavi Nasab<sup>2</sup>

1. Student in Biostatistics, Student Research Committee, School of Health, Mazandaran University of Medical Sciences, Sari, Iran. (0000-0002-1751-7204)

2. Associate Professor, Department of Biostatistics, School of Health, Mazandaran University of Medical Sciences, Sari, Iran

### Abstract

**Background and objectives:** Road accidents are one of the most important causes of mortality and severe physical and psychological damage which may lead to adverse social, cultural and economic consequences in the human community. Frequency and severity of road accidents in developing countries are noticeably higher in comparison to developed countries. In Iran, 25% of casualties are due to the abnormal deaths caused by road accidents. It is estimated that more than 22,000 people die due to road accidents every year. The present study aimed to epidemiologically investigate the mortality rate of suburban accidents in Golestan province, Iran.

**Methods:** This cross-sectional study was conducted using a descriptive approach. Required data were obtained from the traffic police of Golestan province. In total, 2,922 cases of road accidents was investigated in Golestan province in 2015. The analyzed data included the demographic characteristics of the deceased and the environmental and geographical conditions of the accident. Data analysis was performed in SPSS version 20.

**Results:** Among 2,922 road accidents in Golestan province, 251 cases led to the death of 317 individuals. Most of the accidents leading to death were by automobiles (69.7%) and due to distraction from the road (33.1%), which occurred on main roads (47.8%). Moreover, 29.7% of guilty drivers had not fastened seatbelts. Motorcycle riders and car passengers accounted for the highest percentage of accident victims (30.6% and 25.5%, respectively).

**Conclusion:** Education and emphasis on the use of seatbelts and motorcycle helmets while driving seem essential to reducing the injuries caused by road traffic accidents. Considering that most road accidents occur due to the distraction of the driver from the road, changing traffic behaviors to improve discipline is of paramount importance.

**Keywords:** Epidemiological study, Mortality, Suburban traffic accidents, Golestan province

---

**Corresponding Author:** Farzaneh Afkhaminia

**Address:** Student Research Committee, School of Health, Mazandaran University of Medical Sciences, Sari, Iran

**E-mail:** afkhaminiafarzaneh@yahoo.com

## Introduction

Road accidents are one of the most important causes of mortality and severe injuries which lead to adverse social, cultural, and economic consequences in the human community (1). In developing countries, road accidents account for 65% of mortalities and 90% of disabilities (2). In addition, 25% of abnormal mortalities are caused by road accidents. It is estimated that 220,000 people pass away due to road accidents every year (3).

In Iran, 24 out of 100 injured individuals due to road accidents do not survive. Meanwhile, only one out of 100 individuals dies because of road accidents in the United Kingdom (4). Regarding the casualties, road accidents are the second cause of mortality in Iran (5) and the eighth cause of mortality in the world (6). Head traumas are the most important cause of death of the road accidents in Iran (7). Human factors, roads, vehicles and environment are among the other contributing factors to the occurrence of road accidents (8). Furthermore, environmental and geographical conditions play a key role in road accidents, and data on these accidents often include local and geographical information (9).

Recognition of factors such as temperature, wind, type of atmospheric falls and freezing in various areas of the country could improve road maintenance and transportation, thereby resulting in better road safety based on the limitations of the region (4). It is predicted that the number of casualties and deaths caused by road accidents may increase to 65% by 2020 in the absence of effective measures in this regard (10).

Considering the frequency of road traffic accidents and the associated fatal damages, it is critical to identify the problems in this regard and accurately illustrate the status quo in order to reduce the damage caused by road traffic accidents. The present study aimed to

epidemiologically assess the mortalities caused by suburban accidents in Golestan province, Iran in 2015.

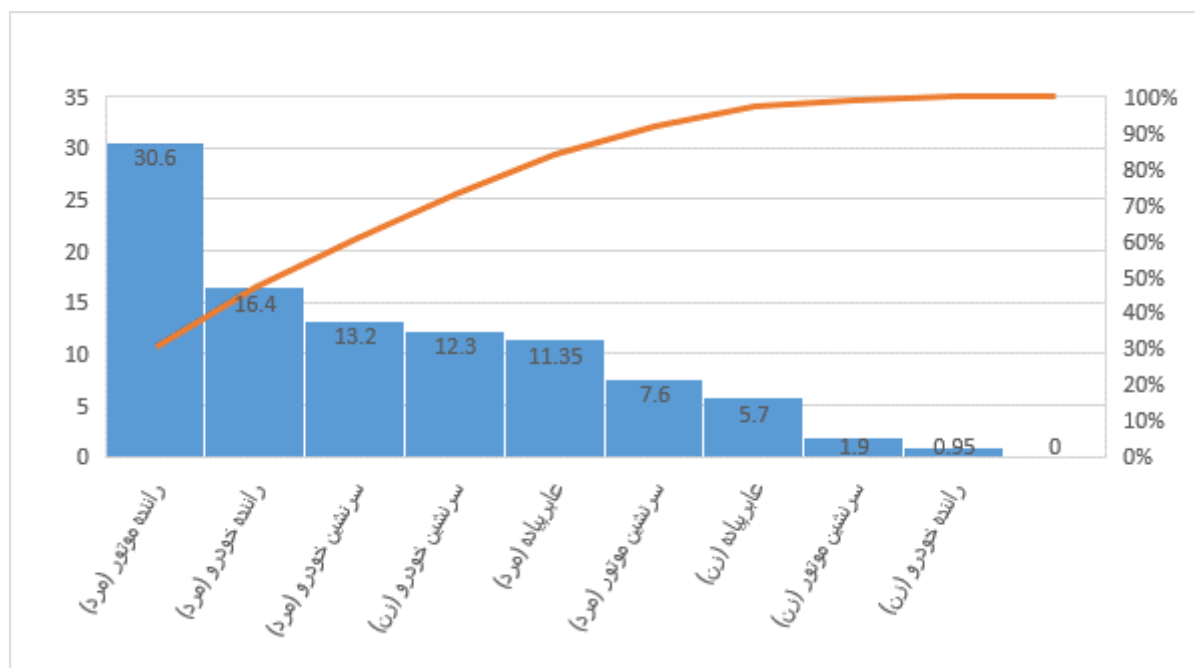
## Materials and Methods

This cross-sectional study was conducted using a descriptive approach. Required data were obtained from the records of traffic police of Golestan, Iran. In total, there were 251 recorded mortalities caused by road accidents in Golestan province in 2015. Collected data included the demographic characteristics of the deceased and the environmental and geographical conditions of the incidents.

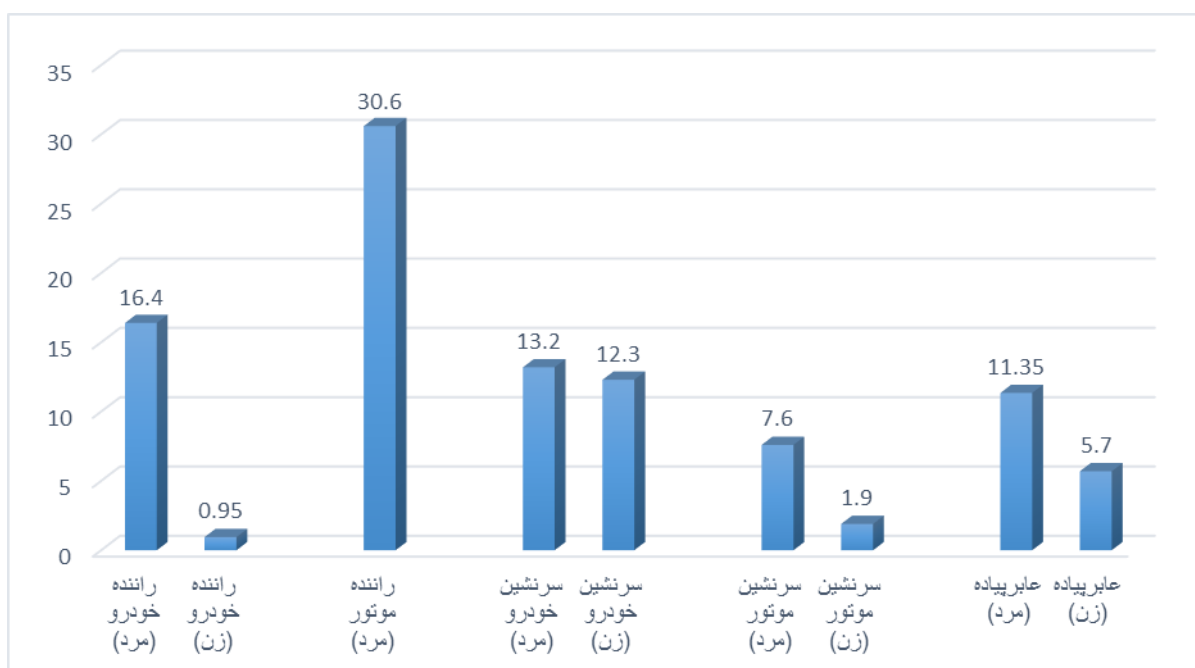
A checklist was used to collect the data on the age and gender of the drivers, time and place of the accidents, cause of death and climate. The sample population consisted of all the fatal suburban road accidents that occurred in 2015 which were recorded by the Law Enforcement Force of the Islamic Republic of Iran (Iranian Traffic Police) in Golestan province. Data analysis was performed in SPSS version 20.

## Results

In total, 2,922 road accidents were recorded in 10 suburban districts in Golestan in 2015. Among these cases, 251 accidents led to the death of 317 individuals, 79.4% of whom were male ( $n=351$ ), and 20.6% were female ( $n=66$ ). The age range of the at-fault and not-at-fault drivers was 20-25 years, and most of the fatal accidents were related to automobiles (69.7%;  $n=175$ ), followed by motorcycles (23.5%;  $n=59$ ). In terms of location, the majority of the accidents occurred on main roads (47.8%;  $n=120$  cases). Distribution frequency of the deceased individuals based on their conditions in the accidents demonstrated that motorcycle riders accounted for the highest percentage of road accident victims (30.6%;  $n=97$ ) (Figure 1).



**Figure 1.** Distribution Frequency of Fatal Suburban Road Accidents Based on Condition of Deceased Victims



**Figure 2.** Frequency Distribution of Road Accidents Based on Suburban Districts

According to the results, the highest rate of fatal road accidents in Golestan was reported in the districts of Now Kandeh (19.9%; n=50), Minudasht (18.7%; n=47), and Azadshahr (17.5%; n=44). In addition, the

most common cause of the road accidents was distracted driving (33.1%; n=83), speeding (16.7%; n=42), inattention to precedence (15.9%; n=40) (Table 2).

**Table 1.** Causes of Death in Fatal Road Accidents in Golestan, Iran in 2015

Cause of Death	%	Cause of Death	%
Distracted Driving	33.1	Improper Turns	1.6
Exceeding speed	16.7	<b>Tailgating</b>	1.2
Inattention to Precedence	15.9	Unsafe Lane Changes	1.2
Shift to Left	13.9	Fatigue/Drowsiness of Driver	1.2
Overtaking Left	6.4	Other	0.8
Shift to Left Due to Overtaking	2.8	Shift to Right	0.4
Failure to Control Vehicle	2	Technical Failure of Vehicle	0.4
Wrong-way Driving	2	Continuous Technical Failure of Vehicle	0.4

According to the reviews, 29.7% of at-fault drivers (n=52) and 22.4% of not-at-fault drivers (n=19) had no seatbelts on. Moreover, 95.8% of at-fault drivers (n=69) and 98.4% of not-at-fault drivers (n=60) of motorcycles had no safety helmets. Most of the fatal accidents occurred in September (13.1%; n=33), whereas the lowest rate was reported in March (4.4%; n=11). Most of the road accidents occurred in clear weather (77.7%; n=195), and the remaining were reported in cloudy weather (12.4%; n=31).

## Discussion

According to the results of the present study, 79.4% of the deceased individuals (n=251) in the road accidents were male. In the studies by Monsef et al. (11) and Birgani et al. (6), 82% of the deceased were reported to be male. Similarly, 91% of the deceased individuals in the research by Khosravi Shadmani et al. were male (12). The mortality rate among males was reported to be 77.8% in the study by Khorami et al. (13). Men are considered to be the active members of economic communities since they are the main source of livelihood for their families.

According to the reviewed records in the current research, most of the fatal road accidents occurred in main roads (47.8%; n=120), which is in congruence with the results obtained by Yazdani Cherati et al. (7). Due to the better conditions of main roads, people tend to drive at a higher speed without paying attention to the speed limit.

According to the current research, the majority of the road accident victims were motorcycle riders (30.6%; n=97). Consistently, in a research by Mohamadian, motorcycle riders constituted the highest proportion of road accident victims (14). The vulnerability of motorcycle riders could be due to the lower safety of motorcycles compared to other vehicles, which consequently increases the severity of accident injuries. Another cause of the high rate of injuries among these individuals could be the lack of using safety helmets by the majority of motorcycle riders.

According to the results of the present study, most of the fatal accidents occurred at 18:00-20:00. In this regard, Ghorbani et al. stated that the most crowded time for driving was 13:00-18:00 (15). Review of road traffic

records in the current research indicated that the most common traffic violations were distracted driving, exceeding allowed speed and inattention to precedence, respectively. In a research by Khorshidi, the most common causes of road accidents were reckless driving, inattention to precedence, and wrong-way driving (16).

According to the results of our study, the majority of the fatal road accidents occurred in September, whereas the lowest rate was reported in March. In the study by Khorshidi et al., most of the mortalities occurred in summer, especially in August (16). According to these findings, the majority of fatal road accidents occurred in clear weather. In a study in Australia and New Zealand in 2011, which was conducted to evaluate the features of road traffic accidents, most of the accidents occurred on sunny days and dry roads, which is consistent with the current research (17).

### **Conclusion**

Education and emphasis on using safety helmets by motorcycle riders and fastening seatbelts while driving cars could remarkably reduce the damages caused by road accidents. Despite traffic control, the highest risk of mortality caused by road accidents was observed in September in Golestan province. Therefore, precautionary monitoring of traffic rules by the police during autumn is strongly recommended. A major part of traffic accidents is due to distracted driving. Meanwhile, one of the principles of driving is the consideration of other road users. In order to increase discipline in drivers, it is essential to change their driving behaviors. Therefore, steps must be taken toward the use of safe vehicles, adopting stern policies toward the violations of traffic laws, and setting accurate traffic rules so as to reduce the casualties caused by road accidents.

### **Acknowledgements**

This article was extracted from a research project approved by Mazandaran University of Medical Sciences (code: 10228). Hereby, we extend our gratitude to the Research Deputy of Mazandaran University of Medical Sciences and Iranian Traffic Police for assisting us in this study.

## References

1. Helliard-Symons R, Lynam D. Accident reduction and prevention programmes in Highway Authorities-1987. 1989 0266-5247.
2. Wickramanayake I, Gunasena G, Wickramanayake H, Goonasekera C. The Prevalence of Known Risk Factors for Road Traffic Accidents (RTA) in Kandy Police Administrative Area. PERADENIYA UNIVERSITY RESEARCH SESSIONS PURSE 2007 Volume 12 Part I-Agricultural, Biological and Medical Sciences Editorial Board. 2007; 129.
3. Karami S, Farajzadeh M. Road Accident Analysis by A Climatic Approach Using Geographic Information Systems (Gis) Case Study: Firouz Koh-Sari Road. Modarres Human Sciences 2005; 9(1):151-68(Persian).
4. Farajzadeh AM, Gholizadeh M, Adabi FA. Spatial Analysis of Accidents with Climatic Hazards Approach Case Study: Karaj-Chalous Road. Physical Geography Research Quarterly. 2010; (73):37-52(Persian).
5. Shahla A, Charehsaz S. Injuries resulting from motorcycle-induced trauma during two years in Shahid Motahari Clinical Center of URMIA. Scientific Journal of Forensic Medicine 2006; 12(2):79-83.
6. Ghorbani BAR, Hakim AS, Zare K. Epidemiologic study of fatal traffic accidents in khuzestan province in 2010. Journal of Rescue & Relief. 2012; 4(2):28-35(Persian).
7. Yazdani-Charati J, Ahmadi-Basiri E, Mousavi SJ. Effective factors on the risk of death caused by road accidents in Mazandaran province, Iran. Journal of Mazandaran University of Medical Sciences. 2014; 23(108):24-8(Persian).
8. Monsef Kasmayi V, Assadi P, Maleki Ziabari SM. The Epidemiologic of the Traffic Accidents Helped by EMS, Guilan 2011-2013. IJFM. 2014; 20(2):55-60(Persian).
9. Aguero-Valverde J, Jovanis PP. Spatial analysis of fatal and injury crashes in Pennsylvania. Accident Analysis & Prevention. 2006; 38(3):618-25.
10. 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(Persian).
11. Monsef V, Asadi P. Mortality due to road traffic injuries in Guilan province in 2011-2012. Safety Promotion and Injury Prevention. 2015; 3(2):97-102(Persian).
12. Khosravi Shadmani F, Soori H, Ainy E, Zayeri F, Mehmandar M. Comparison of road traffic death occurrence within urban and metropolitan roads focusing on environmental factors. Hakim. 2012; 15(4):339-45(Persian).
13. Khorrami Z, Nazari SSH, Ghadirzadeh MR. An Epidemiology study of deaths from road traffic accidents. Safety Promotion and Injury Prevention. 2017; 4(4):217-24(Persian).
14. Mohammadian HA, Salehiniya H, Hajarei A, Khazaie S, Mohammadian M. Demography of traffic accidents victims in the Isfahan province: a cross-sectional study. Military Caring Sciences. 2015; 1(2(2)):81-7(Persian).
15. Ghorbani A, Rabiei MR, Charkazi A. Epidemiology of trauma due to collision in shahid motahari hospital of Gonbad-e-Kavous city. Scientific Journal of Forensic Medicine 2009; 15(1(53)):29-34(Persian).
16. Khorshidi A, Ainy E, Soori H. Epidemiological Pattern of Road Traffic Injuries among Iranian Motorcyclist in 2012. Safety Promotion and Injury Prevention. 2016; 4(1):47-54(Persian).
17. Jama HH, Grzebieta RH, Friswell R, McIntosh AS. Characteristics of fatal motorcycle crashes into roadside safety barriers in Australia and New Zealand. Accident Analysis & Prevention. 2011; 43(3):652-60.



## بررسی اپیدمیولوژیک موارد مرگ و میر ثبت شده ناشی از تصادفات برون شهری در استان گلستان در سال ۱۳۹۴

فرزانه افخمی نیا<sup>۱\*</sup>، جمشید یزدانی چراتی<sup>۲</sup>، الهه رحیمی<sup>۳</sup>، نورالدین موسوی نسب<sup>۴</sup>

۱. دانشجوی آمار زیستی، کمیته تحقیقات دانشجویی، دانشکده بهداشت، دانشگاه علوم پزشکی و خدمات بهداشتی درمانی مازندران، ساری، ایران
۲. دانشیار، گروه آمار زیستی، دانشکده بهداشت، دانشگاه علوم پزشکی و خدمات بهداشتی درمانی مازندران، ساری، ایران
۳. دانشجوی آمار زیستی، کمیته تحقیقات دانشجویی، دانشکده بهداشت، دانشگاه علوم پزشکی و خدمات بهداشتی درمانی مازندران، ساری، ایران
۴. دانشیار، گروه آمار زیستی، دانشکده بهداشت، دانشگاه علوم پزشکی و خدمات بهداشتی درمانی مازندران، ساری، ایران

### چکیده:

**زمینه و هدف:** تصادفات جاده ای یکی از عوامل مهم مرگ و میر و صدمات شدید جانی و مالی است که در جوامع بشری آثار و تبعات زیانبار اجتماعی، فرهنگی و اقتصادی به دنبال دارد. تعداد و شدت تصادفات در کشورهای در حال توسعه چندین برابر کشورهای توسعه یافته است. لذا مطالعه حاضر با هدف بررسی اپیدمیولوژیک موارد مرگ و میر ناشی از تصادفات برون شهری در استان گلستان انجام شد.

**روش بررسی:** این مطالعه از نوع مقطعی است که با رویکرد توصیفی انجام شد. اطلاعات موردنظر از پلیس راهور استان گلستان دریافت شد. ۲۹۲۲ مورد حوادث رانندگی در استان گلستان در طی سال ۱۳۹۴ مورد بررسی قرار گرفت. داده های به کار رفته در این تحلیل شامل ویژگی های دموگرافیک افراد متوفی و شرایط محیطی و جغرافیایی محل حادثه است. اطلاعات جمع آوری شده با استفاده از نرم افزار SPSS نسخه ۲۰ مورد تجزیه و تحلیل قرار گرفت.

**یافته ها:** از مجموع ۲۹۲۲ تصادف بررسی شده استان گلستان، ۲۵۱ مورد از تصادفات منجر به مرگ ۳۱۷ نفر بودند. بیشتر تصادفات منجر به مرگ ناشی از اتومبیل های سواری (۹۶/۷ درصد) و به علت تخلف عدم توجه به جلو (۳۳/۱ درصد) و در راه های اصلی

(۴۷/۸ درصد) رخ داده بود. ۲۹/۷ درصد رانندگان مقصر کمربند ایمنی نبسته بودند. رانندگان موتورسیکلت و سرنشینان اتومبیل های سواری، بیشترین درصد قربانیان تصادفات رانندگی به ترتیب با ۳۰/۶ درصد و ۲۵/۵ درصد بوده اند.

**نتیجه گیری:** آموزش و تاکید بر استفاده از کلاه ایمنی هنگام موتورسواری و بستن کمربند ایمنی هنگام رانندگی جهت کاهش صدمات ناشی از تصادفات ضروری به نظر می رسد. بخش اعظمی از تصادفات جاده ای به دلیل عدم توجه به جلو می باشد، تغییر رفتار ترافیکی رانندگان جهت افزایش نظم و انضباط اهمیت خواهد داشت.

**کلمات کلیدی:** بررسی اپیدمیولوژیک، مرگ و میر، تصادفات برون شهری، گلستان

**نویسنده مسئول:** فرزانه افخمی نیا

**آدرس:** کمیته تحقیقات دانشجویی، دانشکده بهداشت، دانشگاه علوم پزشکی و خدمات بهداشتی درمانی مازندران، ساری، ایران

ایمیل: afkhaminiafarzaneh@yahoo.com