



SHORT COMMUNICATION

Epidemiological Characteristics of Road Traffic Injury in an Accident-Prone Area

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ABSTRACT

Introduction: Road traffic accidents (RTAs) are one of the top five causes of morbidity and mortality in South-East Asian countries, including Iran. The aim of this study was to assess the epidemiology of road traffic accidents in Khash, Sistan and Baluchestan Province, Iran

Materials and Methods: This cross-sectional study was conducted on 3,508 individuals injured in road traffic accidents who were transferred to the emergency department of Ali-Ibn Abitaleb Hospital in Khash between March 21, 2023, and February 18, 2024. Data were extracted from medical records using a structured checklist and were analyzed using descriptive statistics in SPSS version 22.

Results: The study found that road traffic injuries mainly affect young males, drivers, and urban residents, with cars and motorcycles being the most commonly involved vehicles. Nearly half of the patients required extended hospital stays, indicating a significant healthcare burden. These findings highlight the need for targeted preventive measures, including improved traffic safety, public education, and stricter law enforcement.

Conclusion: Road traffic accidents primarily affect young males and urban drivers, posing a significant public health and healthcare burden. Targeted preventive strategies, including enhanced traffic safety measures, public awareness, and stricter law enforcement, are urgently needed to reduce their occurrence and impact.

Keywords: Epidemiology, Hospitalization, Traffic accident, Injury Characteristics

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Introduction

Road traffic injuries are one of the most important causes of death and human casualties in the world (1,2). Most road accidents and resulting deaths occur in low-income countries, which contribute to about 65% of mortality and 90% disabilities in these countries (3). Moreover, in low-income countries, road traffic collisions (RTCs) are a major cause of fractures, and survivors as well as their families—often endure serious social, physical, and psychological difficulties. These families frequently face continuous medical expenses and the financial strain of caring for disabled members. In addition, such injuries can result in temporary job loss or premature

retirement, placing further pressure on insurance systems and society as a whole (4). It is predicted that if effective measures are not implemented, the number of casualties and deaths due to road traffic accidents will increase significantly by 2030 (5).

Road accidents are the second leading cause of death in Iran; however, the trend of traffic accident-related deaths in Iran has shown a noticeable decline between 2006 and 2020. The mortality rate fell from 39 to 18.3 per 100,000 people, with men making up most of the victims (1).

Human, road, and vehicle-related factors contribute to the occurrence of road accidents (6,

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7). In addition, environmental and geographical conditions play a key role in these accidents, and the related data often include local and spatial information (8, 9).

Considering the high prevalence of road accidents and their impact on public health, this study aimed to describe the characteristics of individuals injured in an accident-prone area of the country and examine the distribution of key variables such as age, sex, vehicle type, and place of residence.

Materials and Methods

This cross-sectional study was conducted in Khash, a city located in Sistan and Baluchestan Province in southeastern Iran. The study was carried out at the emergency department (ED) of Ali-Ibn Abitaleb Hospital, the main referral trauma center in the region. The study population included all individuals who sustained injuries due to road traffic accidents and were transferred to the ED of Ali-Ibn Abitaleb Hospital, which is the only hospital in this city, between March 21, 2023, and February 18, 2024. Patients with incomplete medical records were excluded from the analysis. Data were retrospectively extracted from hospital medical records using a structured data collection checklist. Then, the checklist was completed by trained emergency technicians based on documented clinical information. Collected variables included: age, sex, nationality, marital

status, place of residence (urban/rural), type of vehicle involved (car, motorcycle, pedestrian), road user type (driver or passenger), and length of hospital stay. The collected data were analyzed by SPSS software, version 22.0. The authors also described data variables by frequency, percentage, mean, and standard deviation (SD).

Results

A total of 3,508 individuals were included in this descriptive study. The mean age was 24.3 (SD = 15.9), with 61.6% (n = 2,162) aged 24 or younger and 38.3% (n = 1,344) older than 24. The majority of participants were male (80.2%, n = 2,815), while females accounted for 19.7% (n = 691). Most cases had Iranian nationality (84.8%, n = 2,976), and 14.2% (n = 730) were non-Iranian. Regarding the type of vehicle involved, cars accounted for 60.1% (n = 2,111) of incidents, motorcycles for 27.4% (n = 963), and pedestrians for 12.3% (n = 434). The mean length of hospital stay was 4.3 days (SD = 12.1); 51.8% (n = 1,819) were hospitalized for 4 days or less, whereas 48.1% (n = 1,689) stayed more than 4 days. In terms of occupant status, 63.3% (n = 2,224) were drivers and 36.7% (n = 1,284) were passengers. Most participants resided in urban areas (75.5%, n = 2,649), while 24.4% (n = 859) lived in rural areas. Additionally, 66.1% (n = 2,321) were married and 33.8% (n = 1,187) were unmarried.

Table 1. Distribution of road traffic injuries by demographic characteristics

Variables	Overall (N=3508) Frequency	Percentage
Age		
mean ± SD	24.3 ± 15.9	
≤ 24	2162	61.6
> 24	1344	38.3
Sex		
Male	2815	80.2
Female	691	19.7
Nationality		
Iranian	2976	84.8
Non-Iranian	730	14.2
Type of vehicle		
Car	2111	60.1
Motorcycle	963	27.4
Pedestrian	434	12.3

Variables	Overall (N=3508) Frequency	Percentage
Length of hospital stay		
mean ± SD	4.3 ± 12.1	
≤ 4	1819	51.8
> 4	1689	48.1
Vehicle occupant		
Driver	2224	63.3
Passenger	1284	36.7
Place of residence		
urban	2649	75.5
rural	859	24.4
Marital status		
Married	2321	66.1
Unmarried	1187	33.8

Discussion

The mortality rate from traffic accidents in low- and middle-income countries (27.5%) is nearly three times higher than in high-income countries (8.3%), highlighting the significant impact of traffic accidents, particularly in low-income settings (10). According to the present study, all the 3,508 road traffic accidents occurred in the city of Khash, Sistan and Baluchestan Province , between March 21, 2023, and February 18, 2024; This high number highlights the significant impact of road traffic accidents in the region.

The findings of previous study showed that human factors were the leading cause of road accidents in Sistan and Baluchestan, followed by vehicle, road, and environmental factors. Among human factors, poor decision-making ranked first, with vision, hearing, haste, speeding, and tire/air conditions following (11). According to the WHO, global annual road traffic deaths have decreased slightly to about 1.19 million per year (12). A 2021 study in Iran reported about 1.15 million cases of traffic injuries, with an age-standardized incidence rate of 1,341.9 per 100,000 people. Compared with 1990, the rates of prevalence, incidence, deaths, and DALYs decreased by more than 50%, showing significant improvement over time. However, large regional differences remain — Tehran had the lowest DALY rate, while Sistan and Baluchestan had the highest. The burden was greater among men, young adults (20–24), and in provinces with

lower socioeconomic development, suggesting the need for targeted prevention programs for these high-risk groups (13).

Lower economic status is strongly linked to higher rates of road traffic accidents and related deaths. Studies show that poorer regions often experience slower declines in traffic fatalities due to limited resources, weaker infrastructure, and fewer safety and prevention programs compared to wealthier areas (14).

The studies by Sadeghi-Bazargani et al. in East Azerbaijan Province (among bus and minibus users over 12) and by Mahdian in Kashan demonstrated a declining trend in fatal road accidents in Iran (15, 16).

The downward trend may be partly attributed to factors such as the reform of traffic regulations, the enforcement of heavier fines for violating drivers—particularly in urban areas—the installation of additional surveillance cameras on roads and within cities, and increased emphasis on helmet use (1).

Similar to previous research, in this study, road traffic injuries (RTIs) imposed a greater burden on males than females. This is partly because men generally drive more often and engage in higher-risk behaviors (17-19). Other studies have also linked the higher death and DALY rates in men to factors such as travel distance, mode of transport, road types, and violations of traffic laws (20).

In the present study, the highest number of accidents occurred among drivers. Furthermore, a study conducted in Brazil showed that drivers had the highest involvement in road traffic accidents. According to the findings, 10.6% of drivers had been involved in an accident during the past 12 months, and 4.3% of them sustained physical injuries (21).

Previous study found that both males and females in the 15–24 age groups had the highest DALY rates. This aligns with previous research showing that road traffic injuries are more common among economically active individuals. The elevated risk in adolescents may be linked to growing independence and a greater tendency toward risk-taking behaviors (22, 23). This study showed that the highest rates of accidents occurred among individuals under the age of 24.

This study had several limitations. It was conducted on patients who were transferred to the emergency department of Ali-Ibn Abitaleb Hospital in Khash, and therefore does not include individuals who died at the accident scene or those with minor injuries not requiring hospital care. As a result, pre-hospital fatalities and minor cases are not represented, and the study cannot provide information on death-related risk factors. In addition, because the study was cross-sectional and relied on medical records, some information may be incomplete, and reporting bias cannot be excluded. Finally, the descriptive design does not allow for establishing causal relationships between the variables. Caution should be exercised when generalizing these findings to other regions or populations.

Conclusion

RTIs predominantly affect young individuals, particularly males, and are more common among drivers and urban residents. Cars and motorcycles were the main vehicles involved, highlighting the need for targeted preventive strategies focusing on these groups and vehicle types. The relatively long hospital stays observed in nearly half of the cases also reflect the substantial burden imposed on the

healthcare system. These results emphasize the importance of implementing comprehensive interventions, including stricter traffic law enforcement, public education programs, and improved road and vehicle safety measures, in order to reduce the incidence and consequences of road traffic accidents.

Ethical considerations

The study was approved by the Ethics Committee of Zahedan University of Medical Sciences (Ethics code: IR.ZAUMS.REC.1402.105). As the study was based on retrospective medical record review, informed consent was not required.

Acknowledgments

Not applicable.

Conflict of interests

The authors declared no conflicts of interest.

Authors' contributions

Study design was done by S. K., data collection by A. A. and H. D., data analysis by S. K.; and manuscript preparation by S. K. The authors have read and verified the final manuscript.

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