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An Epidemiological Study of Accidents Presenting to the Emergency Department of Hazrat Rasool Akram Hospital in Ramshir: Iran

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Abstract

Background and Objective: Accidents and injuries represent one of the most pressing threats to human life across regions and nations, ranking as the third leading cause of mortality worldwide after cardiovascular diseases and cancer. As a major public health concern, their prevention and control require region-specific evidence. This study aimed to investigate the epidemiological profile of accidents presenting to the emergency department of Hazrat Rasool Akram Hospital in Ramshir, Iran.

Methods: A descriptive-analytical, cross-sectional study was conducted using data from the hospital's accident registration program covering January 2016 to December 2018. All recorded accident-related injury cases during this period were included. Descriptive and inferential statistical analyses were performed using STATA version 14 to explore distributions and associations across demographic and accident-related variables.

Findings: A total of 4,190 accident-related injuries were documented over three years. Adolescents accounted for the largest proportion of cases (47.2%), whereas children represented the smallest share (5.1%). Male victims clearly predominated (72.5%). Traffic accidents constituted the most common category (39.7%), while suicides were least frequent (2.3%). Nearly all incidents (99.8%) occurred within urban areas, with 49.8% taking place on highways or major transit routes near the city. A statistically significant association was found between accident type and both age group and gender ($P < 0.0001$).

Conclusion: Men of working age are disproportionately affected by accidents in Ramshir, creating both health and economic challenges. The high frequency of highway-related incidents highlights the urgent necessity for targeted safety interventions and strategic preventive planning, particularly along urban and peri-urban transport corridors

Keywords*:* Accidents, Epidemiology, Injuries, Emergency Service, Hospital, Iran .

Introduction

Accidents and injuries are among the most critical threats to human life worldwide (1). They are leading yet preventable causes of morbidity and mortality across many countries. By 2020, accidental injuries were projected to rank second as a cause of disability in developing nations and third as an overall cause of death and disability globally (2). Each year, more than five million people die from accident-related injuries—accounting for nearly one-tenth of all global deaths—while tens of millions seek emergency medical care, leading to substantial socioeconomic costs and potential temporary or permanent disabilities (3–5). Previous studies have reported that accident-related injuries rank among the top five causes of death across all age groups in developed countries (6, 7). Globally, accidents are the third leading cause of death after cardiovascular diseases and cancers (6, 7), with over half of accident-related deaths occurring in the productive age groups of society. Beyond health and life loss, accidents incur indirect costs such as long-term medical care, rehabilitation, loss of income and productivity, and adverse psychological effects (5, 8). In Iran, approximately nine million accidents occur annually, making them a major cause of hospitalization and death. These accidents result in an estimated loss of 6,000 years of life annually. Traffic collisions, falls, and blunt-force injuries are the most common causes of accidents (3, 9). One study (3) found that falls were the predominant cause of accidents, with the highest injury incidence in individuals aged 15–34 years (50.4%) and a 3% mortality rate. Accident type had a statistically significant relationship with the accident site, age group, and gender of victims (3). Prompt relief efforts following accidents are critical in reducing injury severity, fatalities, and economic losses P8). The first step toward effective prevention and control is to identify and assess accident-related problems and to develop accurate spatial and epidemiological maps to guide planning (10). While reliable nationwide statistics on accident-related casualties in Iran are lacking, reports indicate that approximately 3% of all patient visits to health centers are injury-related. Data from the Iranian Ministry of Health in 2003 identified accidents as the second leading cause of death and the foremost contributor to years of life lost (11). The significant health, social, and economic burden of accidents in Ramshir, southwest of Iran, and its unique geographical and infrastructural characteristics increase its vulnerability to incidents. Therefore, this study was conducted to investigate the epidemiological profile of accidents presenting to the emergency department of Hazrat Rasool Akram Hospital, Ramshir, Iran.

Methods

Study Design and Setting

This cross-sectional study was conducted at Hazrat Rasool Akram Hospital, the primary emergency referral center in Ramshir, Khuzestan Province, Iran. The hospital systematically records all accident-related injuries in its accident registry, which served as the data source for this study. The analysis included all registered cases from January 1, 2016, to December 31, 2018, covering a continuous three-year period. The study utilized the most current data available on the topic.

Eligibility Criteria

All patients—regardless of age or gender—presenting to the emergency department with injuries directly resulting from accidents and recorded in the hospital registry during the study period were included. Records with essential missing data that precluded reliable analysis were excluded to preserve data quality and validity.

Data Collection

From the registry, the following variables were extracted: patient age, gender, type of accident, accident site, geographical distribution, season of occurrence, and outcome (recovery, ongoing treatment, or death). Data extraction and verification were performed by trained hospital personnel in accordance with standardized registry protocols.

Rationale for Timeframe

A three-year period was chosen to ensure data completeness, capture seasonal and annual variations in accident patterns, and provide contemporary findings relevant to current prevention strategies.

Data Analysis

Descriptive statistics (frequencies, percentages, and measures of central tendency when applicable) summarized the data. Relationships between categorical variables such as accident type and demographic factors were assessed using Chi-square tests. A P-value < 0.05 was considered statistically significant. All analyses were performed using STATA version 14.

Results

Over the three-year period from 2016 to 2018, a total of 4,190 accident-related injuries were recorded at Hazrat Rasool Akram Hospital. The annual distribution of accidents demonstrates a gradual decline over the study period, indicating a downward trend in incident frequency (Table1). Analysis of age groups revealed that accidents occurred most frequently among adolescents, who accounted for 47.2% of all cases, whereas children had the lowest accident rate, representing only 5.1% of the total number of accidents.

In terms of gender, men were significantly more affected than women, comprising 72.5% of all recorded cases, a pattern largely attributable to the higher incidence of traffic accidents among male patients. The vast majority of incidents, approximately 99.8%, took place within the city limits. Among these urban cases, nearly half (49.8%) occurred on highways or within the main transit corridors bordering the city, while a substantial proportion also occurred in densely populated city centers.

As far as seasons were concerned, the highest concentration of accidents was recorded during the summer months (Fig.1), which accounted for 35.4% of the total number of accidents, and statistical testing confirmed a significant variation in accident types across different seasons ($P < 0.001$).

Considering the various types of accidents, traffic accidents emerged as the leading cause overall, representing 39.7% of all cases, whereas suicide-related injuries were the least frequent, comprising only 2.3% of the total number of accidents.

As presented in (Table 2), the distribution of accident types varied notably across different age groups. During childhood, traffic accidents and animal attacks or bites each accounted for the highest proportion of cases within this age category, each representing 1.9% of the total number of accidents. In adolescence, traffic accidents became more prevalent, comprising 8.3% of all reported incidents, and this trend continued into young adulthood, where the proportion increased markedly to 19.9%. Among middle-aged individuals, animal attacks and bites emerged as the most frequent cause of injury, accounting for 7.2% of the cases in this group. In contrast, among elderly patients, traffic accidents were the predominant type, representing 2.9% of cases. Statistical analysis revealed that the observed differences in accident type distribution across age groups were highly significant ($P < 0.0001$), indicating a strong association between age and the nature of accidents.

When stratified by gender, clear variations in accident patterns were observed. Among male patients, traffic accidents constituted the predominant cause of injury, accounting for 33.8% of all cases in this group. In contrast, among female patients, animal attacks and bites emerged as the most frequent type of injury, representing 13.6% of cases. Statistical analysis confirmed that the relationship between accident type and gender was highly significant ($P < 0.0001$), suggesting that both behavioral tendencies and differential exposure risks play a substantial role in shaping these gender-specific patterns.

Analysis of accident sites revealed distinct patterns in the distribution of accident types. At-home accidents were most frequently attributed to animal attacks and bites, which accounted for 67.8% of such cases. In educational settings, including schools, 33.3% of the reported incidents were recorded, whereas workplace-related accidents comprised 28.5% of the total. In contrast, the majority of traffic accidents occurred along main roads (49.9%) or within central urban areas (41.1%). Statistical evaluation demonstrated a significant association between accident type and site ($P < 0.001$). Furthermore, geographic comparisons indicated that traffic accidents were more prevalent in urban areas, representing 39.7% of cases, while animal attacks and bites occurred more commonly in rural areas. This urban–rural difference in accident type distribution was also statistically significant ($P < 0.001$). The analysis of accident outcomes demonstrated substantial variation based on the type of accident. Patients who experienced animal attacks or bites exhibited the highest proportion of complete recovery, accounting for 11.3% of all such cases. Conversely, injuries resulting from traffic accidents most frequently necessitated ongoing medical treatment, with 34.2% of patients in this category requiring continued care. Moreover, traffic accidents were associated with the highest fatality rate among all accident types. Statistical analysis confirmed that the relationship between accident type and outcome was significant ($P < 0.01$) (Table 3).

Table1: Frequency of all types of accidents from 2016-2018

Characteristic	Frequency(%)
Traffic accidents	1665(39.7)
Animal attacks and bites	1317(31.4)
Poisonings	73(1.7)
Suicide	97(2.3)
Violence	444(10.6)
Falling accidents	170(4.1)
Other cases	424(10.1)
Total	4190

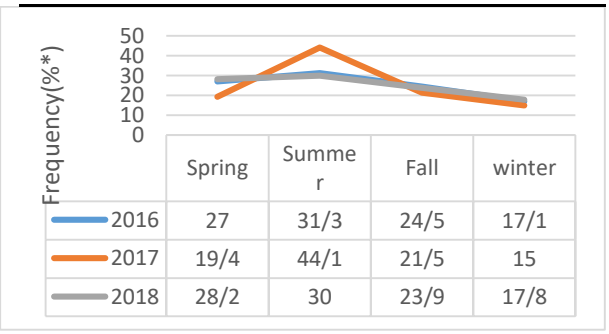

Figure 1: Seasonal Trend of Accident Frequency from 2016 to 2018

Table 2: Relationship between accident type, age groups, and gender

	Characteristic	Frequency(%)	Traffic accidents	Animal attacks and bites	Poisonings	Suicide	Violence	Falling accidents	Other cases	X^2	P-Value
Age	Childhood	214(5.1)	78(1.9)	78(1.9)	9(0.2)	0(0)	8(0.2)	13(0.3)	28(0.7)		
	Adolescence	806(19.2)	346(8.3)	268(6.4)	10(0.2)	12(0.3)	59(1.4)	35(0.8)	165(3.9)		
	Youth	1978(47.2)	834(19.9)	551(13.2)	43(1.0)	66(1.6)	240(5.7)	79(1.9)	165(3.9)	1.38	**0.0001**
	Middle age	852(20.3)	287(6.8)	303(7.2)	8(0.2)	15(0.4)	116(2.8)	32(0.8)	91(2.2)		
	Old age	340(8.1)	120(2.9)	117(2.8)	3(0.1)	4(0.1)	21(0.5)	11(0.3)	64(1.5)		
	Total	4190	1665(39.7)	1317(31.4)	73(1.7)	97(2.3)	444(10.6)	170(4.1)	424(10.1)		
Gender	Male	3037(72.5)	1415(33.8)	747(17.8)	46(1.1)	37(0.9)	376(9.0)	137(3.3)	279(6.7)		**0.001**
	Female	1153(27.5)	250(6.0)	570(13.6)	27(0.6)	60(1.4)	68(1.6)	33(0.8)	145(3.5)	4.03	
	Total	4190	1665(39.7)	1317(31.4)	73(1.7)	97(2.3)	444(10.6)	170(4.1)	424(10.1)		

Table 3: Relationship between accident type, accident site, geographical distribution, and accident outcome

Falling accidents	Violence	Suicide	Poisonings	Animal attacks and bites	Traffic accidents	(Frequency%)	Characteristic		P-Value
14(3.6)	13(3.4)	33(8.7)	16(4.2)	25(67.8)	8(2.1)	379(9.0)	At home	Accident site	
3(33.3)	0	0	0	2(2.2)	3(33.3)	9(0.2)	Schools and Educational Institutions		0.001
8(28.5)	0	1(3.5)	0	7(25.0)	7(25.0)	28(0.7)	Workplaces		
56(2.6)	258(12.3)	23(1.6)	26(1.2)	577(27.6)	1041(49.9)	2085(49.8)	Highways		
81(5.6)	171(11.9)	23(1.6)	30(2.1)	450(31.4)	588(41.1)	1429(34.1)	City Center		
8(3.0)	2(0.7)	3(1.1)	1(0.3)	24(9.2)	18(6.9)	260(6.2)	Other		
170(4.0)	444(10.6)	97(2.3)	73(1.7)	1310(31.2)	1665(39.7)	4182(99.8)	Urban	Geographical distribution	0.001
0	0	0	0	7(0.1)	0	7(0.2)	Rural		
0	0	0	0	0	0	1(0.02)	Out of urban and rural		
65(1.5)	71(1.6)	18(0.4)	20(0.4)	477(11.3)	213(5.0)	935(22.3)	Recovery	Accident outcome	0.01
104(2.4)	372(8.8)	75(1.7)	53(1.2)	838(20.0)	1434(34.2)	3217(76.8)	Under treatment		
1(0.02)	1(0.02)	4(0.1)	0	2(0.05)	18(0.4)	38(0.9)	Fatalities		

Discussion

This study examined the epidemiological patterns of accidents presenting to the emergency department of Hazrat Rasool Akram Hospital in Ramshir, Iran. The results revealed that the highest frequency of accidents occurred among adolescents (47.2%), whereas the lowest rate was observed in children (5.1%). There was a clear predominance of male cases (72.5%). Comparable findings reported in previous studies documented that 67.7% of injured individuals were male (3), while another study reported a markedly higher proportion (94.9%) (12). Similarly, Musazadeh et al. found that 71.7% of injuries involved men (13). Age-related patterns observed in our study are consistent with the literature. Abdolvand et al., for example, reported that individuals aged 15–24 and 25–34 years comprised 50.4% of accident cases (3). Merati et al. also identified the highest number of accidents among those aged 15–34 years, highlighting a substantial burden of years of life lost due to premature death or disability in the 15–44-year group (2). Musazadeh et al. noted that the majority of victims were aged 20–29 (34.6%) (13), and Soltani et al. reported the highest injury rate in the 21–35 age group was (54.2%) (12). Similarly, Aladelusi et al. found that the mostly affected individuals to be between 30–45 years old a14). In the present study, the most frequently affected group was aged 25–34 years (26.1%), suggesting that younger adults are at a greater risk of injury than older age groups—a finding likely attributable to higher levels of physical activity and active economic participation in this demographic (15).

In terms of geographical distribution, 99.8% of all accidents occurred in urban areas, which is consistent with the previous findings of (96.3%) (3) and (70.6%) (13). This predominance could be attributed to two main factors: the higher proportion of urban to rural populations—which increases traffic volume—and the necessity for rural residents to travel to urban areas for work, commerce, or services (9). Regarding accident type, traffic-related accidents accounted for 39.7% of cases, followed by animal attacks and bites (31.4%). In childhood, traffic accidents and animal bites each accounted for 1.9%, with these rates increasing to 8.3% in adolescence and 19.9% in youth. Among the elderly, traffic accidents represented 2.9% of cases. However, previous studies have reported differing patterns. One investigation, for example, found strokes to have the highest incidence, while traffic accidents predominated among young adults (20%), falls were most common in adolescents (15%), and burns were particularly prevalent in childhood (19%) (3). Similarly, some noted that falls accounted for 13.1% of injuries (16). Seasonal trends were also evident, with summer accounting for the highest proportion of accidents (35.4%). Other studies have reported that late summer and early autumn are periods of increased accident frequency (9), and national statistics indicate that approximately 31% of all accidental deaths occur during summer (2). This seasonal peak may reflect increased travel, outdoor activities, and recreational exposure e17). Suicide is recognized as one of the top priorities in global public health, requiring urgent action and coordinated prevention strategies (18) Since suicidal thoughts may signal future self-harming behaviors, early assessment is crucial. Evidence shows a negative correlation between meaning in life and suicidal ideation, yet protective factors must be addressed comprehensively to improve youth mental health (19). The overrepresentation of males and younger individuals among accident victims underscores the significant economic burden of injuries on the working-age population. These findings suggest that this demographic group remains particularly vulnerable to accidental injuries, reinforcing the need for targeted public health strategies aimed at prevention, risk reduction, and mitigation of long-term socioeconomic impacts.

Data collection in this was limited to a single hospital registry, which may not fully represent accident patterns in the wider community and could introduce selection bias. Also, Incomplete or missing records may have affected the accuracy and completeness of the dataset. Finally, the cross-sectional design of the study and use of descriptive and Chi-square analyses restrict causal inferences and adjustment for potential confounders .

Conclusion

The prevention of accidents in Ramshir necessitates the development and implementation of targeted, multi-sectoral strategies that address the identified high-risk demographics and the specific sites where accidents are most likely to occur. There is an urgent need for significant safety enhancements and redesign initiatives on highways that traverse or are adjacent to urban areas, as these routes represent a major locus of severe injuries and fatalities. Furthermore, preventive education programs must be comprehensive, effectively addressing both the prevalent risks associated with traffic incidents and the equally significant dangers posed by animal-related encounters. A coordinated approach involving healthcare providers, local government, law enforcement, and community organizations will be critical to fostering a safer environment for all residents of Ramshir, Iran.

Footnotes

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Authors' Contribution: Narges Nazari Hermoshi conceived and designed the study, supervised data collection, and drafted the initial manuscript. Fatemeh Piroo assisted with data acquisition, data entry, and preliminary analysis. Dr. Khodabakhsh Karami provided senior supervision, performed advanced statistical modeling, guided interpretation of findings, and critically revised all manuscript drafts. All authors reviewed and approved the final version of the paper.

Conflict of Interests Statement: The authors declare that they have no actual or potential conflicts of interest related to this research. None of the authors have financial, personal, or professional relationships with any commercial entity or institution that could influence the design, analysis, or interpretation of the results.

Ethical Approval: This research was conducted in accordance with national and institutional ethical standards and received formal approval from the Vice-Chancellor for Research and Technology, Ahvaz Jundishapur University of Medical Sciences (Ethics Code: IR.AJUMS.REC.1399.959).

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