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Original Article

Epidemiological Profile of Injury in Kermanshah in 2015-2016

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ABSTRACT

Introduction: injuries as one of the main concerns of public health and social problem affect a wide range of population particularly in countries with low and middle incomes. In the present study, we aimed to describe the epidemiology of different types of injuries occurring in Kermanshah province, Iran, with an enormous sample size in 2015-2016.
Methods: in this cross-sectional study we gathered the data from Health Vice-presidency of Kermanshah University of Medical Sciences. In order to widen the study, we incorporated the subjects with a wide spectrum of injury types including Road Traffic Injury (RTI), burns, poisoning, drowning, suicide, animal bite, trauma, and violence. The subjects were taken from 20 distinct hospitals of 12 cities of Kermanshah province.
Results: our data showed a total number of injuries to be 65,428 from March 2015 to March 2016 (65.4% male and 34.6% female). The average of total injured people was 29.20±18.9 (28.7±18.9 in men and 30±18.9 in women). We showed that individuals of 15-29 and 30-44 years old were the most vulnerable sectors in both male and female groups. The majority of injuries were due to road traffic and fall in men and female, respectively. The most and least frequent injuries occurred in Kermanshah and Gilan-e-Qarb cities, respectively.
Conclusion: it was demonstrated in our study that age, gender, culture, and city are the factors determining the injury patterns. Therefore, these items can be regarded as the high-risk factors which may be integrated into the plans for preventing the possible injuries in health policies.

Introduction:

For decades, injuries have been considered as one of the most critical causes of death and main concerns of public health and social problem influencing the global population especially the countries with low and middle-income rates(1). Irrespective of their underlying intent and causes, injuries affect the public health system which is responsible to provide general and intensive cares to support the victims (2). Injuries have been shown to occur most likely in the young people between 15 and 44 years of age (almost 50% of global mortality caused by injuries) who are the most economically productive members of the population (2, 3). It has been verified that injuries are the cause of 10% of mortality worldwide (3) with a highlight in low and middle-income countries comprising over 90% of injury-related death rates (4). Generally, it is estimated that 11.2% of disability-adjusted life years (DALYs) are due to the contributions of different types of injuries (5). Virtually, 6 million death cases were reported to be as a result of accidental injuries worldwide among which 3.8 million cases were unintentional, and 2.2 million intentional injuries (6).

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According to the GBD study report in 2000, Iran was globally ranked third regarding injury-associated mortality; with nearly 70.0-94.9 deaths per 100,000 populations which is a higher rate compared with high income nations in Eastern Mediterranean Region (EMR), in which the total mortality rate due to injuries equals 51.1 Deaths per 100,000 (7).

Although various efforts have been conducted to study the injuries in Iran (8-11), there were very little publications discussing the epidemiology of injuries which is crucial in this issue (2, 6, 12). Furthermore, a main defect of the previous studies was the low sample size which may reflect an unrealistic figure of the statistics. Therefore, to achieve clear and beneficial information for decision making we aimed to describe the epidemiology of all the injury types in Kermanshah province taking advantage of a large sample size in 2015-2016.

Method

Injuries selection process

In this cross-sectional study, we gathered the data from Health Vice-presidency of Kermanshah University of Medical Sciences. Our study included all the injured cases and their injury reasons were referred to private and public hospitals under the supervision of Health Vice-presidency of Kermanshah University of Medical Sciences, during 2015-2016, i.e. from March 2015 through March 2016. The total number of hospitals included in this study was 20 from 12 cities of Kermanshah Province. The methodology of collecting data for this study was primarily based on the data taken from nurses in A & E departments of hospitals responsible for registering the information of the injured people to the State Software for injury Registration and reporting it to Health Administration of Kermanshah at the end of each year. The injury classification was performed using the 10th revision (ICD-10-E) of the International Classification of Diseases (13). All the essential parameters related to the injuries were recorded including age, sex, injury type, region/zone where the injury happened, place where the injury happened, injury outcomes, season and month of injury(14). The resulting data was reported by descriptive statistics which were analyzed using SPSS 16.

Definition

Road traffic injury (RTI): By definition, an RTI is referred to an event leading to injury and/or property damage which involves a vehicle in transport, and occurring on a road or when a vehicle is still in motion after running off a public highway (11). In this survey, we used WHO International Classification of Diseases version 10 (ICD-10) codes for RTI classification which is as follows: pedestrian, bicycles, motorized two-wheeler, motorized three-wheeler, car/van, truck, bus, and other road users (7).

Burns: according to the ICD-10, in this study, regarding the etiology we classified the burns based on their cause such as by exposure to fire, flames and smoke (X00 - X09), contact with heat substances and hot liquid (X10 - X19), lightning (X33), exposure to corrosive substances (X46, X49), and exposure to electric current (W85 - 87). Therefore, they include the injuries due to hot liquids, flame, electrical heating appliances, electricity, chemical burns (both external and internal corrosions), hot gases, and lightning. It should be mentioned that sun-light burning and skin and subcutaneous tissue burning caused by radiation were not defined in this classification (7).

Fall: this type of injury include a wide spectrum of falls including those on the flat surface, from the upper level, and other unspecified falls. ICD-10 classification codes categorize the falls as follows: Fall on a same level involving ice and snow (W00), from slipping, tripping and stumbling (W01),involving ice-skates, skis, roller-skates or skateboards (W02),collision with, or pushing by, another person(W03),while being carried or supported by other persons(W04), involving wheelchair (W05), bed(W06), chair(W07), furniture(W08), playground equipment(W09),

Fall on and from stairs and steps (W10), ladder (W11), scaffolding (W12), Fall from out of or through building or structure (W13), Fall from tree (W14), cliff(W15),diving or jumping into water causing injury other than drowning or submersion (W16), Other fall from one level to another (W17), Other fall on same level (W18), Unspecified fall (W19). In This Study Was Excluded fall in/from the animal, burning building, into the fire, into the water with drowning or submersion, machinery, transport vehicle, intentional self-harm (15).

Poisoning: According to ICD-10, "poisoning" injuries include all the unintentional poisoning-related deaths and non-fatal consequences due to exposure to noxious substances. These may include the adverse effect or underdosing of systemic antibiotics (T36), other systemic anti-infectives and antiparasitics (T37), hormones and their synthetic substitutes and antagonists, not elsewhere classified(T38),nonopioid analgesics, antipyretics and ant rheumatics (T39), narcotics and psychodysleptics [hallucinogens](T40), anesthetics and therapeutic gases(T41), antiepileptic, sedative-hypnotic and ant parkinsonism drugs (T42), psychotropic drugs (T43), drugs mainly affecting the autonomic nervous system (T44), primarily systemic and hematological agents (T45), agents affecting the cardiovascular system (T46), the gastrointestinal system (T47), smooth and skeletal muscles and the respiratory system(T48), skin and mucous membrane and by ophthalmological, otorhinolaryngological and dental drugs (T49), adverse effect of and under dosing of diuretics and other and unspecified drugs, medicaments and biological substances (T50).(15)

Drowning: "drowning" is defined here as all the unintentional drowning and submersions. Based on ICD-10 classification, drowning includes drowning and submersion in bath-tub(W65), following fall into bath-tub (W66), in swimming pool (W67), fall into swimming-pool (W68),while in natural water (W69), following fall into natural water (W70), Other specified drowning and submersion (W73), Unspecified drowning and submersion (W74). This study, we excluded drowning and submersion due to Cataclysm, transport accidents, water transport accident (15).

Suicide: Suicide is defined as any type of intentional self-making injuries which cause adverse effects on any part of the body. According to ICD-10 classification the codes for suicide are as follows: Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics (x60), antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs(x61), narcotics and psychodysleptics [hallucinogens] (x62), other drugs acting on the autonomic nervous system (x63), unspecified drugs, medicaments and biological substances (x64), alcohol (x65), organic solvents and halogenated hydrocarbons and their vapours (x66), other gases and vapours (x67), pesticides (x68), unspecified chemicals and noxious substances (x69), intentional self-harm by hanging, strangulation and suffocation (x70), drowning and submersion (x71), handgun, discharge (x72),rifle, shotgun and larger firearm discharge (x73), other and unspecified firearm discharge (x74), explosive material (x75), smoke, fire and flames (x76), steam, hot vapours and hot objects (x77),sharp object (x78), blunt object (x79), jumping from a high place (x80), jumping or lying before moving object (x81),crashing of motor vehicle (x82),other specified means (x83),unspecified means (x84) (15).

Animal bite: ICD-10 classifies the animal bites as: bitten by rat (W53), dog (W54), other mammals (W55), contact with marine animal (W56), nonvenomous insect and other nonvenomous arthropods (W57), crocodile or alligator (W58), other reptiles (W59), contact with venomous snakes and lizards (X20), venomous spiders (X21), scorpions (X22), hornets, wasps and bees (X23), centipedes and venomous millipedes (X24), other specified venomous arthropods (X25),venomous marine animals and plants (X26),other specified venomous animals (X27),other specified

venomous plants (X28),unspecified venomous animal or plants (X29).

Trauma: In this study "trauma" was defined as any physical damage/injury/wound to the body caused unintentionally by contact with an object (i.e. accidental struck by an object or bumping into or against the object) excluding injury due to assault and transport vehicle (16).

Violence: we defined violence as injuries caused by another person purposefully to injure or kill, by any means. Based on the ICD-10 classification, the codes for violence are (X85-Y09) and hit, struck, kicked, twisted, bitten or scratched by another person (W50).

The achieved data were analyzed using Stata 11 (StataCorp, College Station, TX, USA). Descriptive statistics were evaluated to assess the frequency distribution of data. The incidence rate was obtained using the whole population of province and cities with a 95% confidence interval (CI). Figures were drawn using Microsoft Excel software.

Results

The total number of injuries in Kermanshah Province from March 2015 to March 2016 was 65,428 among which 42818 (65.4%) were male and 22,610 (34.6%) were female.

Totally, the majority of these injuries were due to fall 15513 (23.9%). The next most common injuries were road traffic crashes 15,633 (23.7%) and trauma 14,272 (21.8%). The majority of injuries in men were due to road traffic crashes (10697, 25%) and the next ones were fall (9975, 23.3%) and trauma (9281, 21.7%). Also, the most injuries occurred in women were fall (5658, 25%), trauma (4991, 22.1%), and road traffic crashes (5658, 21.3%) (Figure 1, 2, 3).

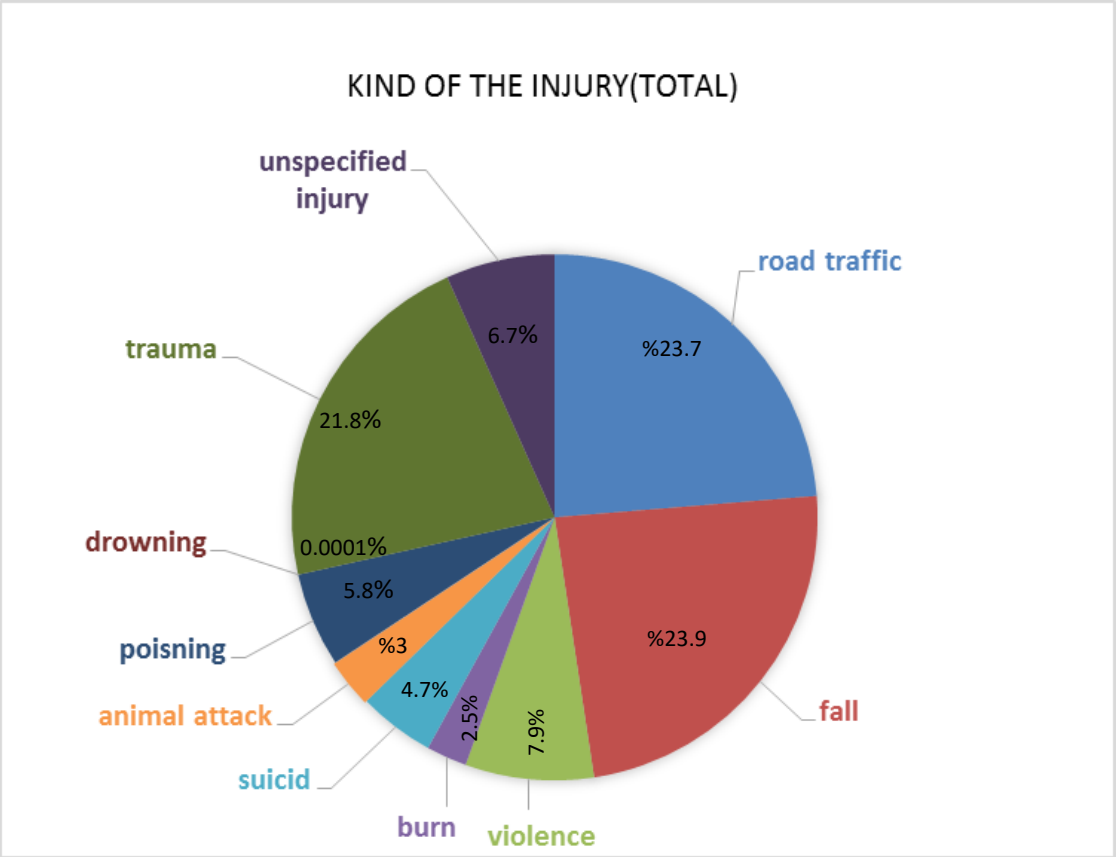

Figure 1. *Percent of kind of the injury (total) in all ages, Kermanshah province, 2015-2016*

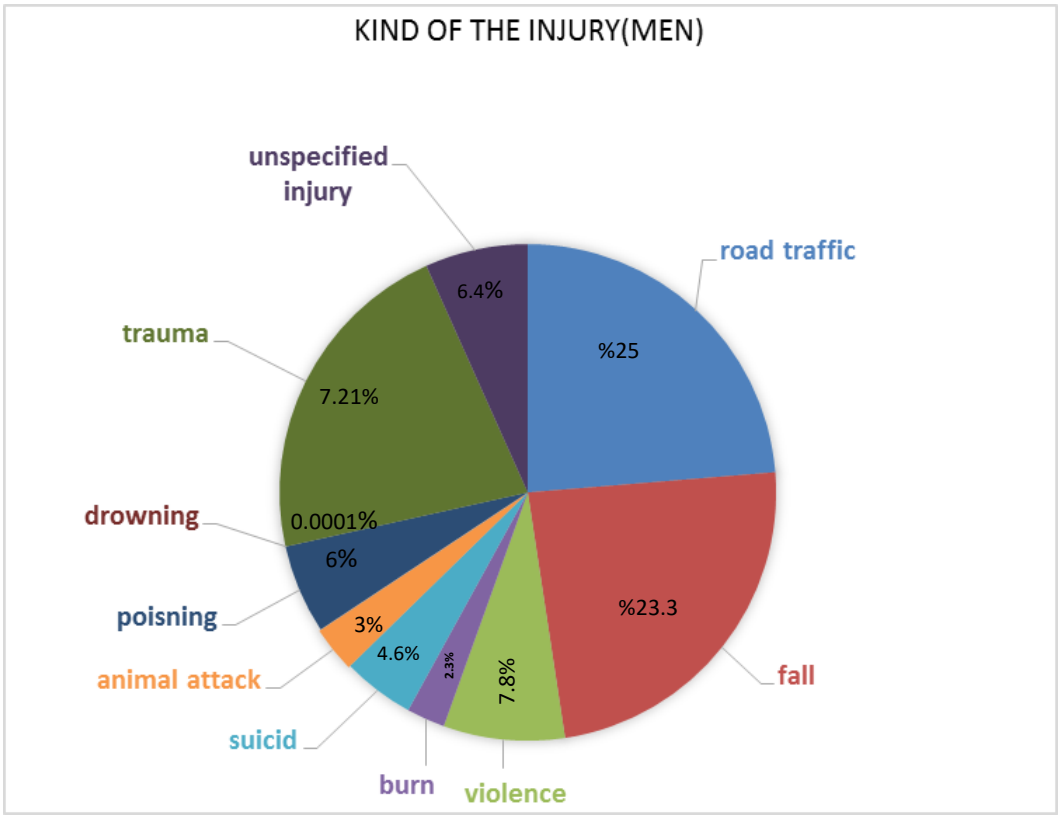

Figure 2. *Percent of kind of the injury (men) in all ages, Kermanshah province, 2015-2016*

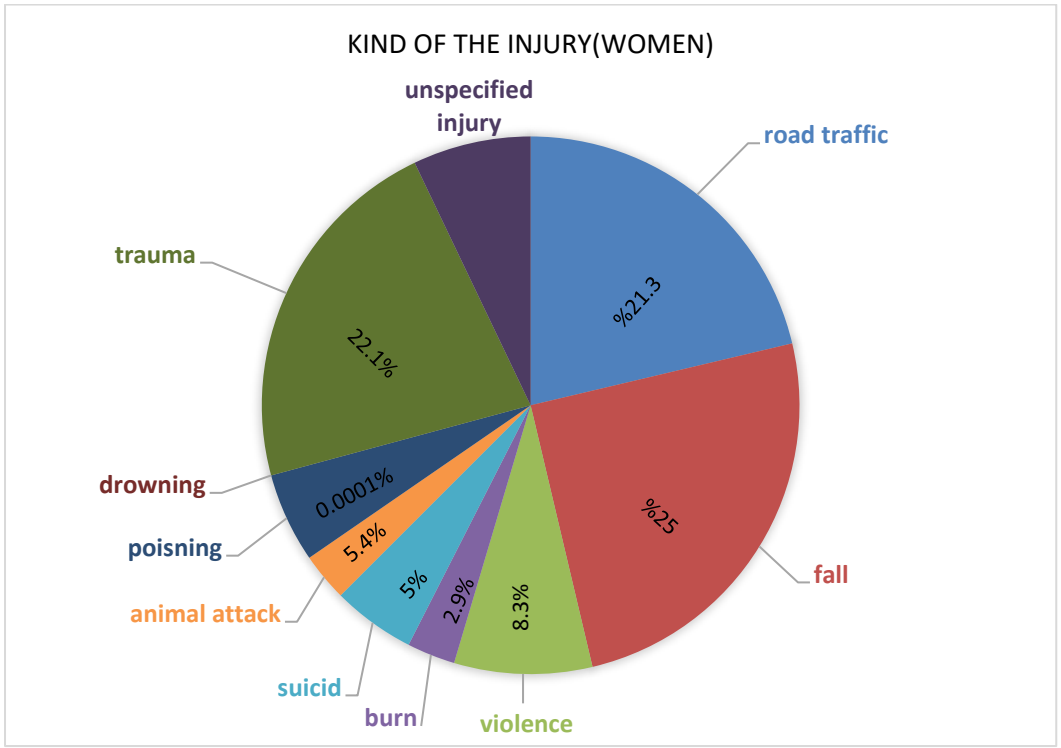

Figure 3*. Percent of kind of the injury (women) in all ages, Kermanshah province, 2015-2016.*

The mean age of the total injured population was 29.20±18.9 (28.7±18.9 in men and 30±18.9 in women). Aged group 15-29 and 30-44 were the most vulnerable group for injuries in both

male and female. Most of the injuries occurred ~~in home (51.2%),~~ street and Alley (20.12%). The prevalence of injuries was higher among the people living in urban areas (%89.2). Most of the total 65,428 occurred injuries were treated and only 0.2% of them died. Moreover, the frequency of injury in Kermanshah city was shown to be the highest among the province. The minimum injury was also reported to be in Gilan-e-Qarb city (table1). The highest and lowest injuries were reported in March and November, respectively (figure 4). The most frequent injury was also related to spring as well (figure5).

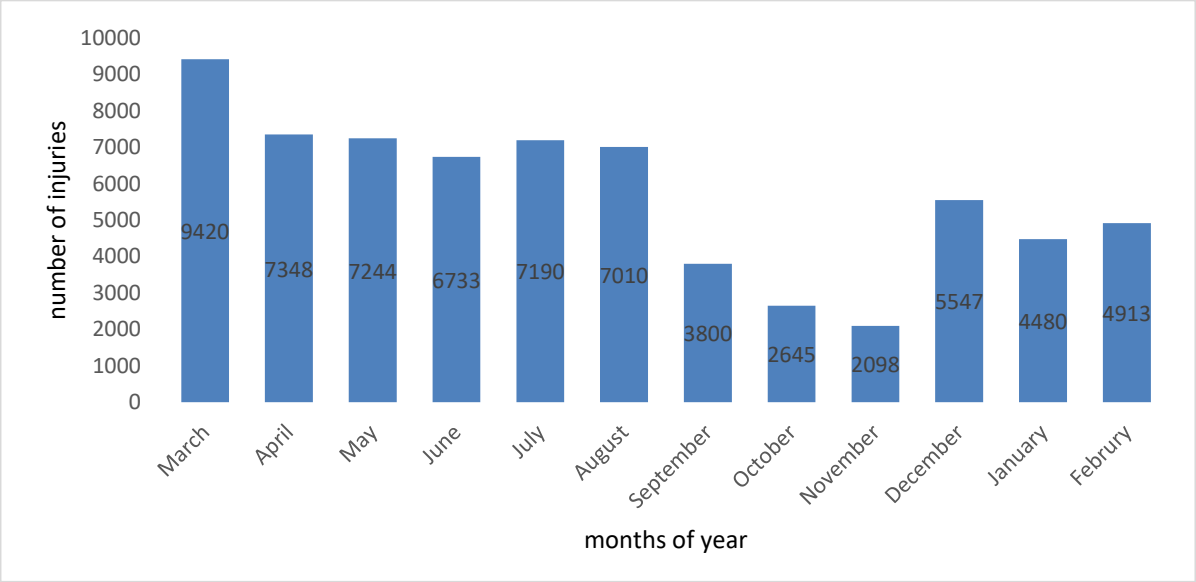

Figure 4. *Distribution of injury in all ages based on months of the year, Kermanshah Province, 2015-2016*

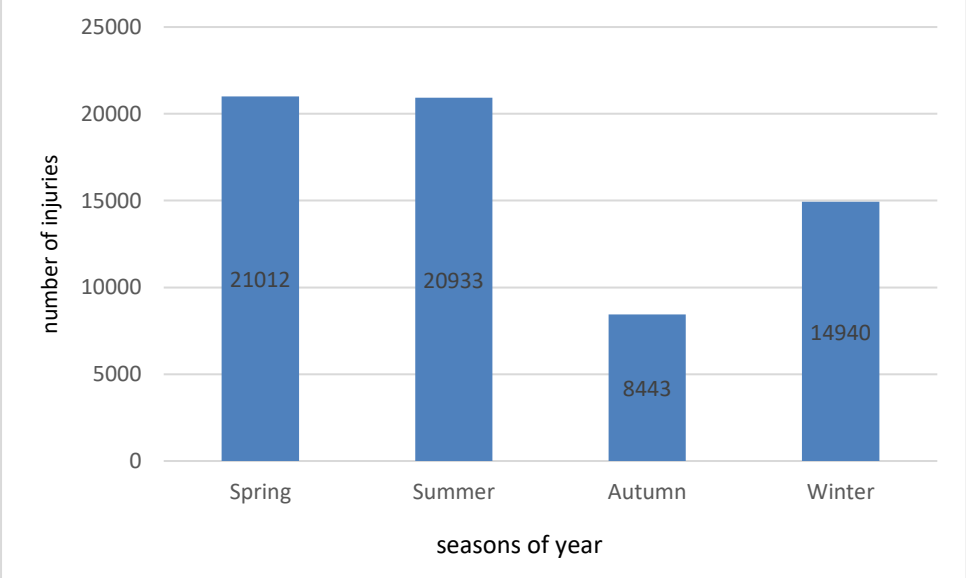

Figure 5. *Distribution of injury in all ages based on seasons of the year, Kermanshah Province, 2015-2016*

Table 1. *Distribution of injury based on age, place, region, and outcome, Kermanshah Province, 2015-2016*

Variable	Men		Female		Total	
	Frequency	**Percentage(95%CI)**	**Frequency**	**Percentage(95%CI)**	**Frequency**	**Percentage(95%CI)**
Age						
0-4	4590	10.71(10.41-11.01)	2067	9.1(8.76-9.52)	6657	10.17(9.94-10.40)
5-14	5022	11.72(11.42-12.03)	1977	8.74(8.37-9.11)	6999	10.69(10.46-10.93)
15-29	15136	35.34(34.89-35.80)	8696	38.46(37.82-39.09)	23832	36.42(36.05-36.79)
30-44	9740	22.74(22.35-23.14)	5168	22.85(22.31-23.41)	14908	22.78(22.46-23.10)
45-59	4886	11.41(11.11-11.71)	2667	11.79(11.37-12.22)	7553	11.54(11.30-11.79)
60-69	1867	4.36(4.16-4.55)	1072	4.74(4.46-5.02)	2939	4.49(4.33-4.65)
70-79	949	2.21(2.07-2.36)	531	2.34(2.15-2.55)	1480	2.26(2.14-2.37)
+80	628	1.46(1.35-1.58)	432	1.91(1.73-2.09)	1060	1.62(1.52-1.71)
Place of Injury						
Road & Highway	3689	8.61(8.35-8.88)	1649	7.29(6.95-7.63)	5338	8.15(7.94-8.37)
Home	21871	51.07(50.60-51.55)	11639	51.47(50.82-52.13)	3510	5.36(5.19-5.54)
Public & Recreational Places	2538	5.92(5.70-6.15)	1480	6.54(6.22-6.87)	4018	6.14(5.95-6.32)
Street & Alley	8783	20.51(20.13-20.89)	4384	19.38(18.87-19.91)	13167	20.12(19.81-20.43)
school	484	1.13(1.03-1.23)	231	1.02(0.89-1.16)	715	1.09(1.01-1.17)
Work Place	1207	2.81(2.66-2.98)	745	3.29(3.06-3.53)	1952	2.98(2.85-3.11)
Sports spot	491	1.14(1.04-1.25)	264	1.16(1.03-1.31)	755	1.15(1.07-1.23)
Other places	1949	4.55(4.35-4.75)	1130	4.99(4.71-5.28)	3079	4.70(4.54-4.87)
Unspecified	1806	4.21(4.02-4.41)	1088	4.81(4.53-5.09)	2894	4.42(4.26-4.58)
Region of Injury						
Urban	37812	88.30(88-88.61)	20559	90.92(90.54-91.30)	58371	89.21(88.97-89.45)
Rural	2488	5.81(5.59-6.03)	1213	5.36(5.07-5.66)	3701	5.65(5.48-5.83)
Out of rural and urban	2518	5.88(5.65-6.10)	838	3.70(3.46-3.96)	3356	5.12(4.96-5.30)
Outcome						
Treatment Received	42661	99.63(99.57-99.68)	22488	99.46(99.35-99.55)	65149	99.57(99.52-99.62)
Death	58	0.13(0.10-0.17)	55	0.24(0.18-0.31)	113	0.17(0.14-0.20)
Disability	99	0.23(0.18-0.28)	67	0.29(0.22-0.37)	166	0.25(0.21-0.29)
Cities						
Islamabad Qarb	3689	8.61(8.35-8.88)	1649	7.29(6.95-7.63)	5338	8.15(7.94-8.37)
Kermanshah	21871	51.07(50.60-51.55)	11639	51.47(50.82-52.13)	33510	51.21(50.83-51.60)
Paveh	2538	5.92(5.70-6.15)	1480	6.54(6.22-6.87)	4018	6.14(5.95-6.32)
Gilan-e-Qarb	8783	20.51(20.13-20.89)	4384	19.38(18.87-19.91)	13167	20.12(19.81-20.43)
Sarpol Zahab	484	1.13(1.03-1.23)	231	1.02(0.89-1.16)	715	1.09(1.01-1.17)
Dalahou	1207	2.81(2.66-2.98)	745	3.29(3.06-3.53)	1952	2.98(2.85-3.11)
Sahneh	491	1.14(1.04-1.25)	264	1.16(1.03-1.31)	755	1.15(1.07-1.23)
Qasr-e-Shirin	1949	4.55(4.35-4.75)	1130	4.99(4.71-5.28)	3079	4.70(4.54-4.87)
Salase-babajani	1806	4.21(4.02-4.41)	1088	4.81(4.53-5.09)	2894	4.42(4.26-4.58)
Total	**42818**	**100**	**22610**	**100**	**65428**	**100**

Discussion

For years, injuries are considered as the main cause of mortality in most countries. In addition to the burden of mortality, injuries increase healthcare costs in many countries, especially in developing countries. In Iran, injuries are the main cause of morbidity and

mortality in recent years which imposes heavy costs annually (17). Therefore, prevention of injuries could play an important role to reduce the burden of disease and costs. Epidemiological studies can play an important role in the detection of injuries patterns and identifying the main causes of them in order to design strategic plans. Thus, incorporating these elements in our study, our findings can be a great help to identify the pattern of injuries and the major cause of these injuries in Kermanshah province and Iran.

The patterns of injury occurrence may vary according to the study target population age, race, and gender (18). For Example in the current study, the majority of injuries in men were due to road traffic crashes and next ones were fall and trauma while in women most of the injuries were fall and road traffic crashes, respectively. Overall, the most prevalent injuries were due to fall and secondly were due to road traffic crashes and trauma. However, in a previous study by Haji Aghajani et al. (2017) in students, the road traffic crash (RTC) was reported to be the most common cause of injury, and the second cause was hit and fall (19). Other study conducted by Akbari et al. (2006) indicated that three common injuries for all age groups were transport accidents, burns, and scalds, and falls, respectively (6). Karbakhsh et al. (2009) have also shown that road traffic accidents, falls and interpersonal violence were the most common injuries (2). These findings suggest that the main cause of injuries may be different according to various target groups.

It has been demonstrated that young people are most prone to injuries (6, 20-23). Inconsistent with the previous surveys, our results show that the most prevalent injuries occur in 15-29 years old individuals in both male and females, and the mean age of the injured people was reported to be 29.2 years old. This finding was in agreement with the previous report published by Azami-Aghdash et al. (2016) (3). Furthermore, Golshan and colleagues showed that burns were more likely to occur among younger males and females (24). Generally, young people assumed to be more exposed to risk factors, which may explain the higher incidence and prevalence of injuries in this group.

The current study results show that the most injuries happened at home and on roads which were resembled Kobusingye et al. observations (25). It seems that the more prevalent injury at home and roads is due to high incidence injury in children and women's in the home (26) and adolescent and young people in roads (27). Our study also verified that the majority of injuries in men were due to road traffic crashes and in women were fall.

We have also shown that the patterns of injuries differ in urban and rural areas. In a study conducted in Tanzania, it was reported that the rural residents are at a higher overall injury risk than urban residents (28); which contradicted to our findings showing a higher risk in people living in urban areas, suggesting an international variance of injury distribution in addition to inter-province variance. Based on the achieved data, it can be deciphered that the pattern of injury may be different according to the countries, cultures and other effective factors.

Conclusion:

Taken together, our findings confirm that the patterns of injuries can be different according to various factors such as age, gender, culture, and province. Considering the high prevalence of injuries in Iran, these reports can be regarded for future planning of healthcare policies to help to prevent the injuries and thereby diminishing the morbidity and mortality caused by these detrimental events.

Conflict of interest

There is no conflict of interest.

Acknowledgments

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