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Original Article

Epidemiology of Injuries among Trauma Patients Admitted to Jahrom Trauma Hospital in 2021: Result from a Trauma Registry

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Abstract

Background: This study aimed to determine the type and severity of injuries in trauma patients admitted to Peymaniyeh Jahrom Trauma Hospital in 2021.

Methods: This cross-sectional study was performed on 622 trauma patients based on the census method registered in National Trauma Registry System for 12 months from March 2021 to March 2022. Age, gender, marital status, level of education, mechanism of injury, Injury Severity Score (ISS), and GCS (Glasgow Coma Scale), as well as the Abbreviated Injury Scale, were included in a checklist developed following the aims of the research (AIS). The data were examined using the SPSS software (version 23).

Results: The most common types of trauma were road accidents 283(45.5%), falls191(30.7%), stabbings or cuts 89(14.3%), and blunt injuries 4(6.6%), respectively. The mean age of those who had fallen (53.69±24.95) was significantly higher than in road accident patients (32.47±18.94) and other injuries(p<0.0001). The mean ISS in patients with road accident trauma (6.24±8.44) and falls (5.48±3.07) was significantly higher compared to other mechanisms of trauma (p < 0.0001). The mean AIS in upper and lower extremity trauma in the patients who had fallen (2.00±0.35 vs. 2.41±0.70) and in road accidents (1.91±0.48 vs. 2.20±0.64) was higher compared to other mechanisms of trauma (p < 0.0001). Furthermore, the frequency of severe multiple trauma (AIS ≥3) was higher in the patients with road accidents(p=0.021).

Conclusion: The patients with falls were older than other trauma patients with more severe lower extremity injuries. On the other hand, road accident patients had more multiple trauma than patients with falls and other mechanisms of injury.

Keywords: Wound, Fall, Traffic Accident, Multiple Traumas, Iran.

Introduction

Trauma is one of the essential emergencies in medical centers, which is one of the leading life-threatening problems that cause the death of many people every year [1, 2].

About 20–50 million people have annually injured [2]. In the United States, 41 million people visit the medical center annually with trauma complaints, and 23 million are forced to be admitted to the ward, usually more than men [3].

Trauma damages cover a wide range of injuries, but the leading cause of death from trauma is head trauma, chest trauma, and vascular injury [4].

The costs of trauma involve various issues that have multiple effects on society. According to research done at Tehran's hospitals, the frequency of each damage mechanism is strongly correlated with trauma costs: traffic accidents account for 57.7% of trauma expenses, falls from heights account for 25.7%, and penetrating injuries account for 11%. [5]. Conversely, low

socioeconomic status increases the risk of traumatic injuries. Hence, patients at a lower socioeconomic level are more likely to have a traumatic injury than those with a higher socioeconomic status [5, 6].

An excellent way to prevent trauma injuries is to discover the patterns and causes of trauma injuries; in the next stage, a method may be found to avoid the formation of these injuries or even to improve the treatment process of patients using these patterns [7].

Numerous studies showed the beneficial effects of trauma registration programs on improving the injury surveillance system and patient outcomes [8, 9]. Thus, to reduce the load of injuries, trauma registration and data collection were established in many countries to understand typical patterns of injuries and develop preventive methods.

The National Trauma Registry of Iran (NTRI) program was launched in 2016, and in 2020, Peymaniyeh Jahrom Trauma hospital was added to this program.

The trauma registration program provides the trauma data from a patient who came to the medical center. Sharif al-Husseini et al. reported the completeness of the data of the trauma registration program was 98% in one study [10].

Some previous studies have evaluated and reported the demographic characteristics of some trauma patients using hospital records [11, 12].

Various age groups and body sections might have diverse injury patterns anywhere on the body. On the other hand, each location has injury patterns that might influence the kinds of injuries there. Along with demographic information, the clinical variable for all types of trauma is based on data from the trauma registry program, which will be utilized in place of hospital records of higher quality. This study was performed to determine the Mechanism and Severity of injuries in trauma patients admitted to Peymaniyeh Jahrom Trauma hospital in 2021.

Methods

Study Design

This cross-sectional study was performed on 622 trauma patients based on the census method registered in National Trauma Registry System for 12 months from March 2021 to March 2022 in Peymaniyeh Jahrom Trauma hospital. The inclusion criteria were all trauma patients referred to the emergency department of Peymaniyeh Hospital who were hospitalized for at least 24 hours, trauma patients who died in the emergency department who were hospitalized for less than 24 hours, and trauma patients transferred from the ICU of the previous hospital to the ICU current hospital who was hospitalized for less than 24 hours is registered.

National Trauma Registry

Sina Trauma and Surgery Research Center established the National Trauma Registry in Tehran, Iran, in 2015[10, 13]. The data collection tool is an eight-part questionnaire, including demographic information, injury information, pre-hospital information, emergency department information, information on practical measures in the hospital, diagnostic information, patient outcome information, and injury severity information. Interviews with the patient, the attending physician, and their replacement decision-makers will be used to gather the necessary data, together with the documentation of the diagnosis and treatment in the patient's file and the hospital information system (HIS).

In the next step, the data collected by trained registrars are entered into National Trauma Registry software. Finally, trained reviewers and independent controllers control the entered data for accuracy and completeness. Peymaniyeh Jahrom Trauma hospital was added to the National Trauma Registry Program in 2021. According to the National Trauma Registry protocol, this program is currently being implemented under the supervision of the Sina Trauma and Surgery Research Center.

Data Collection

The data collection tool was a questionnaire designed based on studied variables, including age, gender, marital status, level of education, occupation, BMI, type of transfer to hospital, drug and alcohol abuse, mechanism of injury, Pulse Rate, respiratory rate, intensive care unit (ICU) admission status, Severity of Injury Severity Score (ISS), consciousness Level (GCS, Glasgow Coma Scale), Abbreviated Injury Scale (AIS), and body region of injury.

Mechanism of injury

Road accidents, stabbings or cuts, blunt injuries, falls, gunshot injuries and other injuries are the six categories used to classify the causes of external injuries. A person, animal, or object strikes or harms impenetrable (blunt) forces. Falling by WHO means an accident in which a person fails to the ground or a lower level [14]. Mechanisms of injury that fall into the other category of damage include drowning, poisoning, animal injuries, explosions, burns injuries, and injuries for unknown reasons.

Severity of injury

The abbreviated Injury Scale (AIS) is used to score the Severity of injury in any body area. AIS gives a score from 1 to 6 for severe damage to any area of the body (minor AIS=1, moderate AIS=2, serious AIS=3, severe AIS=4, critical AIS=5, maximal trauma AIS=6); according to this scale, a score above three is considered severe injury [15, 16].

The injury severity score (ISS) is used to summarize the Severity of injuries in six predetermined areas. These six regions are called A, B, and C on both sides of the body. In patients with a single injury, the ISS is calculated using the power of two injury severity codes related to the same injury [17].

In patients with multiple injuries, it is calculated based on the following formula:

ISS = A2 + B2 + C2.

Each A, B, and C is AIS in the same region. ISS scale covers from 1 to 75. Only three of the highest Severity of injuries in different parts of the body, based on the division of Head or Neck, Face, Abdominal or Pelvic Contents, Extremities or pelvic girdle, and External, reach the power of two and are added together [18].

Glasgow Coma Scale (GCS) measures the depth and Severity of a loss of consciousness or coma in people over five years of age. This scale is commonly used in brain injuries, emergencies, and other cases of disturbance of consciousness. The score for the eye (ocular response) is from 1 to 4, verbal (oral response) GCS 1 to 5, motor (motoric response) from 1 to 6, and total GCS score is at least three and at most [15,19.]

Statistical analysis

The data were extracted from the trauma registry software as an Excel file, entered into IBM SPSS Statistics [23] software, and analyzed with descriptive statistics (mean ± SD or frequency and percentage). Then, the normality of the data was evaluated using the Kolmogorov-Smirnov test. Then, Chi-square, independent t-test, one-way ANOVA, and Tukey post hoc test were analyzed. A p-value less than 0.05 were considered statistically significant.

Result

A total of 622 trauma patients based on the inclusion criteria were extracted from Trauma Registry System during the study period. The mean age was 38.54±22.92 years; 482 (77.5%) and 140 (22.5%) were male and female, respectively(Fig.1). Regarding education, the highest frequency trauma patients, with intermediate188 (%30.2) and illiterate154 (%24.8). Of them, 357 (%57.4) were married, 137 (%22), and 99 (%15.9) were students and homemakers. 218 (%35) were transferred to the hospital by emergency medical services (EMS), and 27 (%4.3) used alcohol and drug before the trauma separately.

The most common types of trauma were road accidents 283 (45.5%), falls191 (30.7%), stabbings or cuts89 (14.3%), and blunt injuries 4 (6.6%), respectively (Table 1).

The mean age of those who had fallen (53.69±24.95) was significantly higher in road accidents patients (32.47±18.94), stabbings or cuts (31.19±15.93), blunt injuries (31.17±20.31), gun (29.50±4.79) and other injuries (25.71±17.67), respectively($p<0.0001$). The mean oxygen saturation in people with bullet injuries was significantly lower than in different mechanisms of trauma ($p < 0.0001$). Furthermore, road accident patients, more than any other type of mechanism of injuries, were admitted to the intensive care unit (ICU) ($p < 0.0001$) (Table 2).

Regarding the severity of injuries, the mean GCS in the people who had bullet injuries (7.50±8.66) was significantly lower compared to other mechanisms of trauma ($p< 0.0001$). The mean ISS in the patients with road accident trauma (6.24±8.44) and falls (5.48±3.07) was significantly higher compared to other mechanisms of trauma ($p < 0.0001$).

The mean AIS in upper extremity trauma in patients who had fallen (2.00±0.35) and in road accidents (1.91±0.48) was higher compared to other mechanisms of trauma ($p < 0.0001$). Moreover, the mean of AIS in

the lower extremity in bullet injuries was higher than in other injuries(p=0.001) (Table 3).

The frequency of severe extremities injuries was higher in the patients with road accidents and falls(P=0.001). Furthermore, the frequency of severe multiple injuries was higher in the patients with road accidents(p=0.021) (Table 4).

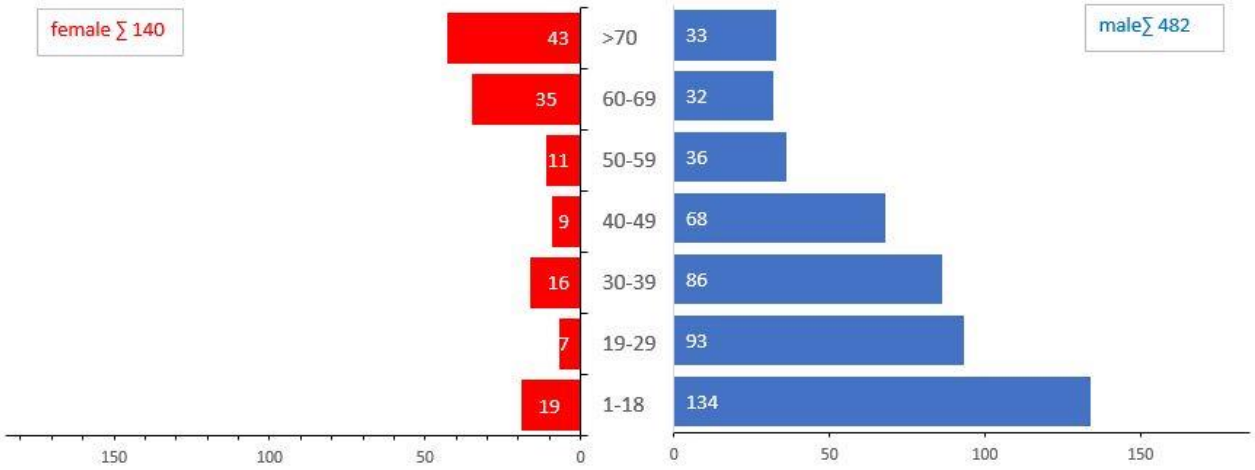

Figure 1: Age-sex pyramid distribution of trauma patients admitted to Jahrom Trauma hospital in 2021.

Table 1: Baseline characteristics of trauma patients admitted to Jahrom Trauma hospital in 2021.

Variable	Grouping	**Total** (n=622)	Sex		P-value
			Male (n=482)	**Female (n=140)**	
Age(yr), mean (SD)	-	38.54±22.92	34.12±20.39	53.78±24.64	<0.0001[a]
Nationality, frequency (percent)	Iranian	594(95.5)	456(94.6)	138(98.6)	0.133[b]
	Non-Iranian	30(4.5)	26(5.4)	2(1.4)	
Level of Education, frequency (percent)	Illiterate	154(24.8)	77(16)	77(55)	<0.0001[c]
	Primary	106(17)	83(17.2)	23(16.4)	
	Intermediate	188(30.2)	173(35.7)	16(11.5)	
	Diploma	146(23.5)	129(26.8)	17(12.1)	
	Associate Degree	8(1.3)	6(1.2)	2(1.4)	
	Bachelor and higher	20(3.2)	15(3.1)	5(3.6)	
BMI, frequency (percent)	<25	378(60.8)	296(61.4)	85(58.6)	0.201[c]
	25-29.9	184(29.6)	145(30.1)	39(27.9)	
	≥30	60(9.6)	41(8.5)	19(13.6)	
Marital status, frequency (percent)	Single	262(42.1)	236(49)	26(18.6)	<0.0001[c]
	Married	357(57.4)	245(50.8)	112(80)	
	Widow	2(0.3)	1(0.2)	1(0.7)	
	Divorced	1(0.2)	0(0)	1(0.7)	
Occupation, frequency (percent)	Employed	276(44.4)	274(56.8)	2(1.4)	<0.0001[c]
	Unemployed	15(2.4)	13(2.7)	2(1.4)	
	Student	137(22)	124(25.7)	13(9.3)	
	Retired	15(2.4)	14(2.9)	1(0.7)	
	Disabled	31(5)	19(3.9)	12(8.6)	
	housewife	99(15.9)	-	99(70.7)	
	Child under 6 years	21(3.4)	13(2.7)	8(5.7)	
	Unknown	28(4.5)	25(5.1)	3(2.1)	
Type of transfer to Hospital, frequency (percent)	EMS	218(35)	167(35.4)	47(33.6)	0.512[c]
	Personal	372(59.8)	284(58.9)	88(62.9)	
	Others	32(5.1)	27(5.6)	5(3.5)	
Alcohol consumption before trauma, frequency (percent)	Yes	27(4.3)	27(5.6)	0(0)	0.001[b]
	NO	595(95.7)	455(94.4)	140(100)	
Drug use before trauma, frequency (percent)	Yes	27(4.3)	27(5.6)	0(0)	0.001[b]
	NO	595(95.7)	455(94.4)	140(100)	
Mechanism of injury, frequency (percent)	Road accidents	283(45.5)	251(52.1)	32(22.9)	<0.0001[c]
	Stabbings or cuts	89(14.3)	82(17)	7(5)	
	Blunt injuries	41(6.6)	30(6.2)	11(7.9)	
	Falls	191(30.7)	107(22.2)	84(60)	
	Gun	4(0.6)	2(0.4)	2(1.4)	
	Other injuries	14(2.3)	10(2.1)	4(2.9)	

BMI: Body mass index,"- "Not applicable, SD: Standard Deviation, a: independent t-test, b: Fisher exact test, c: chi-squared test, significance level <0.05.

Table 2: Assessment of demographic and clinical characteristics of the mechanism of injuries in trauma patients admitted to Jahrom Trauma hospital, 2021

Variable	Mechanism of injuries						p-value	Tukey Test
	Road accidents	Stabbings or cuts	Blunt injuries	Falls	Gun	Other injuries		
Age(yr), mean ±SD	32.47±18.94	31.19±15.93	31.17±20.31	53.69±24.95	29.50±4.79	25.71±17.67	<0.0001[a]	F>R F>S F>B F>O
Systolic BP, mean ±SD	115.77±17.92	113.31±13.24	111.21±17.59	121.21±18.34	100.0±25.81	116.07±28.16	<0.0001[a]	F>R F>S F>B
Pulse Rate, mean ±SD	91.10±17.46	88.21±14.04	90.73±12.13	87.61±11.97	53.75±66.00	96.87±27.87	<0.0001[a]	R>G S>G B>G F>G O>G
Respiratory Rate, mean ±SD	19.61±2.03	19.46±1.85	19.92±1.97	19.38±1.43	18.75±4.85	17.57±3.95	0.003[a]	R>O S>O B>O F>O
O2Sat, mean ±SD	95.98±5.89	96.92±1.49	96.58±2.20	96.00±6.28	82.00±11.66	89.35±21.52	<0.0001[a]	R>G R>O S>G S>O B>G B>O F>G F>O
Admitted to the ICU, frequency (percent)	37(13.1%)	0(0)	1(2.4%)	3(1.6%)	1(25%)	4(28.6%)	<0.0001[b]	-

BP: Blood Pressure, O2Sat: Oxygen saturation, ICU: intensive care unit, "- "Not applicable, [a] one-way ANOVA, [b] Chi-squared test.

Table 3: Assessment Severity of injuries in trauma patients admitted to Jahrom Trauma hospital, 2021.

Variable	Mechanism of injuries						p- value*	Tukey Test
	Road accidents	Stabbings or cuts	Blunt injuries	Falls	Gun	Other injuries		
Admission Eye GCS	3.72±0.80	4.00±0.00	4.00±0.00	3.99±0.07	2.00±2.30	3.21±1.31	<0.0001	S>R, F>R, R>G, R>O, S>G, S>O, B>G, B>O, F>G, F>O, R>O
Admission Verbal GCS	4.60±1.14	5.00±0.00	5.00±0.00	4.99±0.07	2.50±2.88	3.85±1.87	<0.0001	S>R, F>R, R>G, R>O, S>G, S>O, B>G, B>O, F>G, F>O, O>G
Admission Motor GCS	5.66±1.08	5.00±0.00	5.97±0.15	5.99±0.07	3.00±3.46	4.71±2.12	<0.0001	S>R, F>R, R>G, R>O, S>G, S>O, B>G, B>O, F>G, F>O, S>G, O>G
GCS	13.98±2.86	15.00±0.00	14.60±2.34	14.90±1.10	7.50±8.66	11.78±5.29	<0.0001	F>R, R>G, R>O, S>G, S>O, B>G, B>O, F>G, F>O, O>G
ISS	6.24±8.44	1.96±2.13	2.56±2.20	5.48±3.07	3.00±4.00	5.64±6.54	<0.0001	R>S, F>S
AIS in Head	1.0 ± 0.0	1.0 ± 0.0	-	1.0 ± 0.0	1.0 ± 0.0	-	-	-
AIS in Face	1.0 ± 0.0	-	1.0 ± 0.0	1.0 ± 0.0	-	-	-	-
AIS in Neck	1.5±0.70	1.0 ± 0.0	1.0 ± 0.0	1.0 ± 0.0	1.0 ± 0.0	-	0.747	-
AIS in Thorax	2.61±1.70	2.00±1.09		1.0 ± 0.0		3.0 ± 0.0	0.611	-
AIS in Abdomen and Pelvic Contents	2.00±1.00	-	1.5±0.70	1.0 ± 0.0		1.0 ± 0.0	0.633	-
AIS in Spine (Cervical, Thoracic, and Lumbar)	1.60±0.54	-	-	2.00±0.63	-	3.0 ± 0.0	0.145	-
AIS in Upper extremity	1.91±0.48	1.06±0.24	1.38±0.55	2.00±0.35	-	1.0 ± 0.0	<0.0001	R>S, R>B, R>O, B>S, F>S, F>B, F>O
AIS in Lower extremity	2.20±0.64	1.80±0.67	2.33±0.57	2.41±0.70	3.0 ± 0.0	1.50±0.57	0.001	R>S, G>R, G>O, G>S, G>B, G>F, F>S, R>O, B>S
AIS in External (Skin) and Thermal Injuries	1.0 ± 0.0	1.0 ± 0.0	1.0 ± 0.0	1.0 ± 0.0	-	-	-	-

Table 4: Assessment of severe injury (AIS ≥3) based on mechanism of injuries in different Body segments in trauma patients admitted to Jahrom Trauma hospital, 2021.

Body segment	Mechanism of injuries						p-* value
	Road accidents	Stabbings or cuts	Blunt injuries	Falls	Gun	Other injuries	
Thoracic and Spine injury	6(30)	3(50)	-	1(16.7)	-	3(100)	0.316
Extremities	49(24.13)	2(13.3)	2(3.2)	64(36.78)	1(100)	-	0.001
Multiple trauma	117(41.3)	33(37.1)	13(31.7)	52(27.2)	1(25)	2(14.3)	0.021

Discussion

Age, sex, systolic blood pressure, pulse rate, respiration rate, oxygen saturation, ICU hospitalization, GCS, ISS, AIS in the upper and lower limbs, and multiple trauma were all associated with significant differences in the causes of damage, according to this research. Middle-aged men were more common among victims of trauma caused by road accidents. The injuries were more common among the illiterate and low levels of education, and a significant frequency of those injured had used alcohol or drugs before the trauma. Modarres et al., in their study in Babol, Iran, showed that most trauma victims were male, and about 33% of victims were illiterate20. Other studies confirmed this finding [11, 21, 22]. Swartz et al. reported in one survey that most trauma patients were illiterate, had low socioeconomic status, and most injured had used alcohol or drugs before the trauma [23]. Depending on the sort of employment and exposure to dangerous activities, men are more likely to experience traumatic incidents. Conversely, those with less literacy are more likely to have jobs with high levels of risk. They are more prone to high-risk behaviors and violence for cultural reasons and will pay less attention to safety and prevention.

Among the women with trauma, the average age of women was generally 19.66 years higher than men. To justify this difference, men at a young age are more exposed than women to specific traumas, such as car accidents, stabbings or cuts, and guns. On the other hand, in older generations, fall trauma has a higher share of traumatic events among both sexes. Considering the higher prevalence of osteoporosis among women than men [24], the women were more exposed to trauma caused by falls (60% vs. 22.2%).

Other results of the present study showed that road accidents and falls ranked first and second in terms of the mechanism of injury. Besides, the frequency of severe multiple trauma was higher in road accident patients. Saeednejad et al., in a study on 1817 trauma patients registered in the national trauma registry program of Iran from 2016 to 2018, showed the most common trauma mechanism was road traffic crashes (49.0%), followed by falls (25.5%) and penetrating trauma (16.5%) [25]. Based on the Global Burden of Disease Study in 2019, 214 337 [58%] deaths and 16·2 million [52%] DALYs of unintentional injuries were transport-related among adolescents aged [10–24]. From 1990 to 2019, in countries with low socio-demographic Index (SDI) countries, the absolute number of deaths from transport and unintentional injuries increased to 80·5% and 39·4%, respectively. In the high-SDI quintile in 2010–19, the rate of transport injury DALYs was reduced by 16·7%, from 838 in 2010 to 699 in 2019, per 100 00026. Furthermore, based on another study of the Global Burden of Disease in 2019 for older adults, mortality rates in terms of falls increased by 15.28% from 1990 to 2019, and globally the top five level 3 causes of death in people aged ≥70 in 201927. Saeednejad et al., in a study, showed that the mean score of AIS due to falling was higher than other injury mechanisms, and the frequency of AIS> 3 in fall trauma was higher than in car accidents [25].

Other findings of this study showed that road accident patients were admitted to the ICU more than other mechanisms of injury. In addition to the high severity of road accident injuries, this may be in terms of laws related to protecting trauma patients caused by road accidents.

The mean age of people with falls was higher than that of other injury mechanisms (53.69± 24.95), consistent with the results of other studies [25, 28, 29]. Aging may be

associated with an increase in ISS 30. On the other hand, some underlying diseases, such as osteoporosis and muscle weakness in older adults, can increase the chances of trauma resulting from the fall.

The present study showed that the severity of injury based on ISS was higher in road accident trauma than in other injury mechanisms. On the other hand, the highest severity of injury in traffic accidents was in the upper and lower extremities (24.13%). The severity of injuries in the lower extremities was more than in the upper extremities (2.2 vs. 1.91). In a study in northwestern Iran of 181 victims of the trauma of road accidents, lower extremity injuries, head and neck, abdomen, and spinal cord injuries were 39.2%, 36.5%, 8.8%, and 6.1%, respectively [31]; moreover, Bener et al. showed that the rate of head and neck injuries is higher than other regions [32].

Other findings from this research revealed a significant difference in the severity of damage based on AIS between upper and lower extremity injury mechanisms. In the upper extremities, the mean AIS score was more important for road accidents and falls, while in the lower extremity, the mean AIS score was more significant for bullet injuries. 41.3% of multiple trauma patients with AIS> 3 were related to road accidents. In the study of Saeednejad et al., 27.8% of multiple trauma patients with AIS> 3 belonged to the road accident group, and 12.9% belonged to the fall group. This indicates that road accidents have caused more severe injuries [25].

Regarding the level of consciousness, the mean GCS in bullet injuries was significantly lower than in other trauma mechanisms. Numerous studies in bullet injury patients showed that low GCS (especially <5) is associated with a high mortality rate [33, 34].

35% of trauma patients were transported to the hospital by emergency medical services (EMS). This frequency has increased in other studies conducted in Iran over time, so in the study of Zafar Gandhi et al. [35] in 1999, 2.7%, Mohammadfam et al. (36) In 2002, 5%, Zargar et al. [37].in 1997, 22%, Modaghegh et al. 38 in 2004, 39% and Jokar et al. [39] in 2018, 56.9. This increasing percentage indicates that EMS has improved over time and shows a relatively better status of services in Iran.

One of the benefits of the current research is the use of data from the trauma registry program and consideration of the clinical characteristics of all forms of trauma, which is superior to the use of hospital records, whose information is primarily documented for medical reasons. The data recorded in it is collected with reliable tools, and its completeness is about 98% of the report [10].

There were some limitations in our study. First, considering the start of the registration program in the past year, some mechanisms of injury in some categories needed to be higher, and it wasn't easy to compare. We placed some of them in other types of damages. Second, despite the efforts made, there still needs to be data for some variables that can affect the results, and it will be beneficial to improve the data collection.

Conclusion

In summary, there were significant differences among the mechanism of injury with age, sex, ICU admission, GCS, ISS, AIS in the upper and lower extremities, and multiple trauma. Road accidents and falls had the highest frequency among other mechanisms of injury in the study population. The people with falls were older than other trauma patients and had more severe lower extremity injuries. On the other hand, road accident patients had more multiple trauma than patients with falls and other mechanisms of injury.

At present, adult men are less considered in health programs, while this group is exposed to problems that can be mainly prevented by implementing individual empowerment and cultural programs. Besides, the factors that aggravate trauma in some injuries, such as falls, including underlying diseases, should be given more attention.

Abbreviations

NTRI: National Trauma Registry of Iran, BMI: Body mass index, GCS: Glasgow Coma Scale, AIS: Abbreviated Injury Scale, ISS: injury severity score, ICU: intensive care unit, WHO: World Health Organization, HIS: Hospital Information System, SDI: Socio-demographic Index, DALYs: Disability-adjusted life years.

Authors' contributions

VR and RA conceived and designed the study. ER and NK were responsible for the literature search and screening. MS and MA were responsible for data collection. VR participated in the statistical analysis. NSH and VR contributed to data interpretation. VR,

NSH, and RA drafted the manuscript, and KR critically revised the manuscript. All authors read and approved the final manuscript.

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Disclosure statement

The authors declare no competing interests.

Ethical Statement

The study protocol was consistent with the ethical principles of Helsinki Declaration. It was approved by Research Ethics Committee of Jahrom University of Medical Sciences with the Ethical ID IR.JUMS.REC.1400.080.

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