Research Article

Socio-economic status and trauma outcome in Imam

Reza Hospital of Birjand in 2021

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Abstract:

Introduction: Socio-economic status (SES) is one of the indicators affecting health; while its association with trauma is not well studied in Iran. So, our aim was to determine the relationship between socioeconomic factors and trauma outcomes.

Methods: In this cross-sectional study, 1000 trauma patients referred to Imam Reza Birjand Hospital in 2021 were evaluated. Demographic information, type, pattern, and mechanism of trauma, along with the outcome and socio-economic factors were extracted from medical records. SES Irani territorialized questionary scores were compared between different trauma characteristics.

Results: Among one thousand trauma patients (mean age of 37.57 ± 14.07 years), most of the patients were male (70.5%); The groups with lower SES values include those with penetrating trauma (p=0.016), spine trauma, and falling down accidents. The severity of the trauma also had an impact on SES, with more severe injuries having lower SES values (p=0.002). the average score of SES in female patients compared to male patients, single compared to married patients, and renters compared to house-owning patients, was significantly higher (P<0.001). The average score of the SES was significantly higher in patients with conflict mechanism of trauma compared to other investigated causes and in patients with minor trauma, severity compared to other investigated severities (P<0.05).

Conclusion: We did not find a significant association between socioeconomic status and trauma outcome in Iran; but Patients with lower SES values were more likely to experience penetrating trauma, spine trauma, and falling down accidents. Additionally, more severe injuries were associated with lower SES values. These findings highlight the importance of addressing socio-economic disparities in trauma care to improve patient outcomes.

Keywords: Trauma, Accidents, Socio-economic, Road traffic injuries.

Introduction

Trauma is any type of penetrating or non-penetrating wound or injury by a foreign body that is beyond the body's physiological tolerance threshold, whether intentional such as violence, or unintentional such as burns or accidents (1). Among the many factors of trauma, traffic accidents have the largest share (2).

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Traumatic injuries can lead to irreversible injuries such as organ failure, psychological problems, and even death. The literature shows a significant and long-term decrease in the quality of life in patients after traumatic injury. Also, in addition to individual problems, trauma also brings many socio-economic www.uiemjournal.com



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Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/lic enses/by/4.0/). problems and is known as one of the serious problems of health and treatment systems around the world (3-4). In addition to adults, trauma is also common in children and adolescents (5). The advancement of technology in vehicles in the last century has led to an increase in the number and severity of accidents and the resulting trauma. According to the World Health Organization (WHO), about 8.5 million people worldwide die due to trauma every year (5). The main causes of death due to trauma are traumatic brain injury (TBI), multiorgan failure (MOF) and acute bleeding (2). Iran is among the countries with the highest number of accidents. Every year, about 21 thousand people are killed in road accidents in the country. For this reason, trauma caused by traffic accidents is the second cause of death and the main cause of hospitalization. Considering the high prevalence of trauma in the country, there is a need to know the effective factors in the occurrence of this problem and to control them (6-8).

Socio-economic status is one of the indicators affecting health. This index consists of various interrelated dimensions such as all aspects of the occupation, education, income and cost of living of a family or an individual. Various studies show that low socio-economic status is associated with a severe decrease in health status and the occurrence of chronic diseases, which is called the social gradient. The incidence of deaths caused by traffic accidents has a different distribution within countries, regions, and among groups with different socioeconomic statuses (9-10). Also, some studies show a higher incidence of trauma in populations with lower socioeconomic status compared to other social situations (11). The reason for this difference is influenced by several different factors, in which both the personal characteristics of the person and the surrounding environment are effective (5, 12-13). On the other hand, the existence of similar diseases in similar economic and social situations is probably related, but very few studies have investigated this issue (14-16). Traffic accidents and deaths caused by them are important health problems in Iran and need more attention to this issue. Therefore, considering the high number of traumatic events in the country and the few studies conducted regarding its relationship with socioeconomic factors. In this study we aimed to determine the relationship between socioeconomic factors and the incidence of trauma and mortality in hospitalized patients. In Imam Reza Birjand Hospital in 2021. It should be noted that the socio-economic status of the patients has no effect on the way of providing services in the hospital and this issue does not distort the study in any way.

Methods

In this present cross-sectional study, the number of 1000 trauma patients that were referred to Imam Reza Birjand Hospital in 2021 was examined. The study was started after being approved by the Ethics Committee of Birjand University of Medical Sciences. At first, the purpose of the study was fully explained to the patient or his legal guardian. All costs of accident trauma patients being referred to the hospital by emergency medical services are free at admission and discharge. The present study was approved by the ethics committee of Birjand University of Medical Sciences under number IR.BUMS.REC.1400.108.

Study population:

Inclusion criteria were trauma patients referred to Imam Reza Birjand Hospital who consented to participate in the study and exclusion criteria were: non-cooperation of the patient, non-complete records, and death of the patient due to a cause other than trauma.

Study variables:

The required demographic information includes age, gender, and marital status. Accident information included the type of trauma (head and neck, face, chest, abdomen, spine, upper and lower limbs and multiple trauma), the pattern of trauma (penetrating, blunt, and thermal), the mechanism of trauma (car accident, motorcycle accident, pedestrian accident, fight, fall, etc.), injury severity (according to the Abbreviated Injury Scale (AIS) scale), final outcome (death, recovery, and referral) and the duration of hospitalization.

Abbreviated Injury Scale (AIS) was used to measure the severity of the trauma. Based on this scale, according to the doctor's opinion, the severity of the injury was scored from 0 to 6:

- Score Zero score means no lesion
- Score 1 means minor damage such as surface damage
- Score 2 means moderate injuries such as sternum fracture
- Score 3 means serious injuries such as open bone fractures
- Score 4 means severe injuries such as the perforated trachea
- Score 5 means critical injuries such as liver rupture
- Score 6 means fatal lesions (Maximal)

The required socio-economic factors include average monthly income (in Rials), housing status (owner or renter) and education level (illiterate, cycle, diploma, bachelor's and higher education), which were asked and recorded from the patient or their relatives. In order to measure socio-economic status, the SES questionnaire (2014) was used, which has four components: income, economic class, education and housing status. The validity and reliability of this questionnaire have been confirmed for Iranian population in the study of Islami et al. and using Cronbach's alpha test, the reliability has been obtained as 0.83 (17). In this questionnaire, there were four components of income (1 question), economic class (1 question), education (1 question) and housing condition (2 questions), which in total have 5 questions with five options for evaluating the components. Each option is given a score between 1 and 5, so a score of 1 means the lowest and a score of 5 means the highest status in the component. A higher score means higher socio-economic status. Total score was from 5 to 25.

In case of death of the patient or inability to interview due to injuries, the questionnaire was completed by one of the first-degree relatives of the patient (father, mother, sister and brother) (18).

Data analysis:

After collecting the data, it was entered into SPSS version 19 software. Descriptive statistics using central indices and dispersion of the report, Kolmogorov Smirnov test was used to check the normal distribution of the data. In order to analyze variables with normal distribution, independent t-tests and ANOVA were used, and non-parametric Kruskal-wallis and Mann-Whitney tests were used for variables with non-normal distribution. Qualitative data analysis was done using chi-square and Fisher's exact test at a significance level of 0.05.

Results

The average age of the patients was 37.57 ± 14.07 years. The average length of hospital stays until the assignment of patients in the emergency room was 3.84 ± 1.37 hours. According to the results of the present study, most of the patients were male (70.5%), 32.2% had high school education and diploma, 46.3% were self-employed, 76% were married, and 70% were house owners. According to the results of the present study, most (43.9%) of the examined patients had upper extremity trauma, 52.1% due to a vehicle accident and 83.9% of the patients with blunt trauma had been referred to the hospital emergency room. According to Table 1, the frequency distribution of disease outcomes according to gender, marital status, and education level was not significantly different from each other (P>0.05).

		improved	died	referred	
	n	407	14	579	Р
gender	male	273(67.08%)	8(57.14%)	424(73.23%)	0.062
0	female	134(32.92%)	6(42.86%)	155(26.77%)	
marital status	Single	105(25.8%)	3(21.43%)	117(20.21%)	0.073
	married	302(74.2%)	11(78.57%)	462(79.79%)	
housing	the owner	271(66.58%)	13(92.86%)	416(71.85%)	0.035
	tenant	136(33.42%)	1(7.14%)	163(28.15%)	
occupation	self-employed	169(41.52%)	4(28.57%)	290(50.09%)	< 0.001
	student	37(9.09%)	0(0%)	51(8.81%)	
	housewife	51(12.53%)	6(42.86%)	65(11.23%)	
	Retired	10(2.46%)	4(28.57%)	17(2.94%)	
	farmer and rancher	62(15.23%)	0(0%)	78(13.47%)	
	employee	20(4.91%)	0(0%)	11(1.9%)	
	teacher	10(2.46%)	0(0%)	26(4.49%)	
	other	47(11.55%)	0(0%)	41(7.08%)	
	illiterate and primary school	53(13.02%)	8(57.14%)	111(19.17%)	
	secondary school	93(22.85%)	3(21.43%)	174(30.05%)	
educational	diploma	147(36.12%)	2(14.29%)	173(29.88%)	
status	associate and bachelor	93(22.85%)	1(7.14%)	107(18.48%)	
	masters and above	20(4.91%)	0(0%)	14(3.44%)	
SES score, m	ean±SD; median(Q1-Q3)	6.26 ± 2.06; 6 (5-8)	6.07 ± 2.3; 5 (5-9)	5.94 ± 1.99; 6 (5-7)	0.057
pattern	penetrating	40(9.83%)	0(0%)	71(12.26%)	< 0.001
	blunt	336(82.56%)	13(92.86%)	490(84.63%)	
	thermal	31(7.62%)	1(7.14%)	18(3.11%)	
type	head and neck	24(5.9%)	0(0%)	7(1.21%)	< 0.001
	face	12(2.95%)	1(7.14%)	4(0.69%)	
	chest	19(4.67%)	0(0%)	13(2.25%)	
	abdomen	29(7.13%)	0(0%)	11(1.9%)	
	spine	3(0.74%)	1(7.14%)	44(7.6%)	
	upper limb	189(46.44%)	0(0%)	251(43.35%)	
	lower limb	104(25.55%)	1(7.14%)	151(26.08%)	
	multiple trauma	28(6.88%)	10(71.42%)	98(16.93%)	
mechanism	vehicle accident	226(55.53%)	12(85.71%)	283(48.88%)	< 0.001
	pedestrian accidents with vehicles	55(13.51%)	0(0%)	135(23.32%)	
	quarrel	38(9.34%)	0(0%)	12(2.07%)	
	fall	19(4.67%)	1(7.14%)	54(9.33%)	
	cut wound	36(8.85%)	0(0%)	64(11.05%)	
	burn	20(4.91%)	1(7.14%)	15(2.59%)	
	other	0(0%)	0(0%)	16(2.76%)	
severity	absence of lesions	207(50.86%)	0(0%)	3(0.52%)	< 0.001
	minor	192(47.17%)	0(0%)	55(9.5%)	
	medium	6(1.47%)	0(0%)	336(58.03%)	
	serious	2(0.49%)	0(0%)	139(24.01%)	

Table 1. characteristics of included subjects stratified based on the outcome

intense	0(0%)	2(14.29%)	37(6.39%)	
critical	0(0%)	1(7.14%)	9(1.55%)	
deadly	0(0%)	11(78.57%)	0(0%)	

The frequency distribution of the final outcome according to the housing status and occupation of the examined patients had a significant difference from each other (P<0.05). According to Table 1, the frequency distribution of the final outcome of the disease in terms of the pattern, type, mechanism and severity of the final trauma of the examined patients were significantly different from each other based on the outcome (P<0.05). The SES scores were not having significant differences among the groups of improved, referred, or dead patients (P=0.057).

According to the results of the present study, which is shown in Table 2, the average score of socioeconomic status in female patients compared to male patients, single compared to married patients, renters compared to house-owning patients, was significantly higher (P<0.001). Also, based on the results, the average score of socio-economic status in students compared to other jobs and patients with master's education and above was higher than other patients (P<0.001).

Table 3 presents the average SES values based on different trauma characteristics. The results show that there are significant differences in SES values based on the pattern of injury (penetrating vs blunt and thermal), type of trauma, mechanism of injury, and severity of the trauma (absence of lesions vs other levels). The groups with lower SES values include those with penetrating trauma (p=0.016), spine trauma, and falling down accidents. The severity of the trauma also had an impact on SES, with more severe injuries having lower SES values (p=0.002).

Table 2.	Average SES	values based	on the demo	ographics
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parameters		mean±SD	median(Q1- Q3)	Р
gender	male	5.18±2.05	5 (4-7)	< 0.001
	female	6.7±1.48	7 (5 – 8)	
marital status	Single	6.19±2.91	7 (5-8)	< 0.001
	married	5.18±1.9	5 (5 – 7)	
housing	the owner	5.58±1.79	5 (5-7)	< 0.001
	tenant	6.95±2.7	4(4-8)	
occupation	self-employed	5.31±1.88	5 (4- 6)	< 0.001
	student	7.15±1.58	8(6-8)	
	housewife	6.15±1.75	7 (5-7)	
	Retired	6.38±1.64	7 (5 – 7)	
	Farmer and rancher	7.7±4.29	7 (5-9)	
	Employee	6.53±1.15	7 (5 – 7)	
	teacher	7±0.95	7 (7-7)	
	other	6.55±2.51	6 (5 – 8)	
Educational status	illiterate and primary school	5.73±9	5 (3.52 – 7)	< 0.001*
	secondary school	5.3±1.08	5 (4-7)	
	diploma	6.52±1.49	6 (5-8)	
	Associate and Bachelor	7.4±1.78	7 (5-8)	
	Masters and above	8.92±1.76	9 (7 – 9)	

* Kruskal-Wallis; other tests are independent T tests.

parameters		mean±SD	median(Q1-Q3)	Р
pattern	penetrating	5.71 ± 2.08	5 (4-7)	0.016
	blunt	6.1 ± 2.02	6 (5-7)	
	thermal	6.52 ± 1.85	7 (5-8)	
type	head and neck	6.48 ± 1.96	7 (5-8)	0.002
	face	7.82 ± 2.12	8 (6-9.5)	
	chest	6.06 ± 2.16	6 (2-7.25)	
	abdomen	6.65 ± 2.34	7 (5-8)	
	spine	5.45 ± 1.87	5 (4-7)	
	upper limb	5.98 ± 0.2	6 (5-7)	
	lower limb	6.2 ± 1.96	6 (5-7)	
	multiple trauma	5.88 ± 2.02	5 (5-7)	
mechanism	vehicle accident	5.97±1.98	5 (5-7)	0.002
	Pedestrian accidents with vehicles	6.51±2.16	7 (5-8)	
	quarrel	7±2.07	7 (6-8)	
	Falling down	5.35±1.72	5 (4-7)	
	cut wound	5.54±2.01	5 (4-7)	
	burn	6.58±1.84	7 (5-8)	
	other	6.65±1.67	7 (5.5-8)	
severity	Absence of lesions	6.2±2.01	6 (5-7)	0.002
	Minor	6.45±2.01	7 (5-8)	
	medium	5.98±2.05	5 (5-7)	
	serious	5.63±1.9	5 (5-7)	
	intense	5.56±2.07	5 (4-7)	
	critical	5.33±1.41	5 (4.5-7)	
	deadly	5.9±2.25	5 (5-9)	

Table 3. Average SES values based on the trauma characteristics

All tests are Kruskal-Wallis.

The average score of socioeconomic status in patients with facial trauma and thermal trauma was significantly higher than in other patients (P<0.05). The average score of the socio-economic status was significantly higher in patients with conflict mechanisms compared to other investigated causes and in patients with minor trauma, severity compared to other investigated severities (P<0.05).

Discussion

According to the results of the present study, the average age of the patients was 37.57 ± 14.07 years. In the study conducted by Moradi Lacke et al. (19), Bouillon B et al. (20), Leiboveci et al. (21) and AL-Naami et al. (22), the average age of trauma patients was about 30 years. It was matched by us. This issue plays a major role in trauma is high in terms of years of life lost and in terms of death and disability costs

(19). On the other hand, considering that the demographic composition of Iran is young, it can be said that the average age and the age group of young people in the study are affected by this issue. The average length of hospital stays until the assignment of patients in the emergency room was 3.84 ± 1.37 hours. In the study conducted by Hejinnejad et al., it stated that the average duration of was hospitalization of patients in the emergency room until the assignment of the patients was 3.52 ± 1.14 hours, which was consistent with the study conducted by us (23). Most of the patients were male. In the study conducted by Ghorbani et al. (6), Moradi Lakeh et al. (19), Champion H.R. et al. (24), Clark D.E. et al. (25), Kasmai et al. (26), Esmailnejad Ganji et al., Zohra Vandi et al. (28) and Bouillon B et al. (20) stated that most of the trauma patients examined were men, which was consistent with the study conducted by us.

According to the results of the present study and other studies mentioned above, trauma is mainly a problem for men, which is due to the greater number of male drivers and also the activities related to accidents (such as high-risk driving and hard jobs) by Iranian men (19). According to the results of the present study, 32.2% had high school and diploma education. Based on the results of the study conducted by Hejinnejad et al., it was stated that (14.5%) of patients had less than a diploma education, which was not consistent with the study conducted by us. Among the reasons for this inconsistency, we can mention the difference in the studied population and geographical area (23). According to the results of the present study, the most common job in the examined patients was self-employment with a percentage of 46.3%. In the study conducted by Hejinnejad et al., it was stated that the most common occupational group of the examined patients was 15.4% of students, which was not consistent with the study conducted by us. Among the reasons for this inconsistency, we can mention the difference in the data of the two studies (as according to the report made in the present study, the employment status (73.6% of the examined patients) was not clear) (23). According to the results of the present study, the most involved area in patients was 43.9% of patients with upper limb trauma and then lower limb. Based on the results of the study conducted by Ghorbani et al., it was stated that the most affected area in the examined patients was the face, which was not consistent with our study. Among the reasons for this inconsistency, we can mention the difference in the studied society and also the geographical region in the two studies. In this study, after the face, the lower limb was the most common area involved in patients, which was consistent with our study (6). Based on the results of the study conducted by Yousufzadeh et al., it was stated that the head was the most commonly affected area in the examined patients, which was not consistent with the study conducted by us. Among the reasons for this inconsistency, we can mention the difference in geographical the area under

investigation (29). In the study conducted by Davoodabadi et al., it was stated that the most common place of trauma in the examined patients were first the upper limb, then the lower limb, and the face, which was consistent with the study conducted by us (30). According to the results of the present study, 52.1% of the examined patients have visited the emergency room due to a vehicle accident. The results of the study by Hajininejad et al. (23), Davoodabadi et al. were consistent with our study (30). In the study conducted by Farozan et al., it was stated that the most common reason for patients to go to the emergency room in the studied study was falling from a height, which was not consistent with the study conducted by us. Among the reasons for this inconsistency, we can mention the difference in the studied society and also the geographical region (31). According to the results of the present study, 83.9% of the patients with blunt trauma had been referred to the emergency department of the hospital. The frequency distribution of patients with penetrating trauma referred to the emergency room was 11.1%, which is lower compared to other studies conducted in European countries. Fewer wounds are caused by penetrating trauma (bullets, knives, etc.) in Iran compared to other countries, in connection with the strict restrictions on the storage and carrying of firearms and cold weapons and sampling bias due to the transfer of patients and injured to other medical centers. Dunst (19). According to the results of the present study, 1.4% of patients died, 40.7% recovered patients and 57.8% of patients were referred from the emergency department to other relevant departments. According to the results of the study conducted by Hejininejad et al., the death rate in the examined patients was 0.4%(23), 2.3% by Ghorbani et al., and 2.5% in the study by Rezazadeh et al., which is consistent with our study (6, 32). According to the results, the average score of socio-economic status in students compared to other professions and patients with master's education and above was higher than other patients (P<0.011). In the study conducted by Yousefzadeh et al., it was stated that the level of

education and occupation of patients affects the outcome of traffic accidents, which was consistent with the study conducted by us (29).

The average score of socio-economic status was significantly higher in patients with conflict mechanisms compared to other investigated causes and in patients with minor trauma severity compared to other investigated severities (P<0.05). In the study conducted by Yousefzadeh et al., it was stated that the severity of the lesion affects the clinical outcome of traffic accidents, which was consistent with the study conducted by us (29). Dealing with accidents and incidents in Iran requires a review of the three levels of prevention programs. The first level of prevention is clearly the foundation of action to reduce mortality, morbidity, and costs of trauma and reduce incidence. Today, the most well-known and simplest prevention methods (such as the use of belts and helmets or occupational safety markets) are not widely used in our country. It seems that legal or executive shortcomings are the main problem in this field, and the three forces can play the best role in this field. The second level of prevention: the trauma care system in Iran is an incomplete and uncoordinated system without a rational design. In order to improve this system, our hospitals should become complete trauma centers. Another essential and important component is the systematic and classified collection of information related to injured patients. Although the university departments of surgery, neurosurgery, orthopedics, otolaryngology and ophthalmology have an important role in this field, they cannot replace a national program for such a purpose. In addition to helping to treat each patient, this work paves the way for research in the field of treating patients and controlling the quality of treatment. The third level of prevention: injured patients should not be left alone after being discharged from the hospital. They should be prevented, especially in terms of regaining previous occupational abilities, the usefulness of scoring methods in predicting disability related to accidents needs further investigation (19).

Limitations:

One limitation of this study is that the follow-up data for patients who were referred and sent to other hospitals for further care is not available. Therefore, the analysis of the socioeconomic status of trauma patients may not be fully representative of the entire population of trauma patients.

Conclusion

Socio-economic factors are related to the number of accidents, injuries and deaths caused by accidents and traffic accidents. It is necessary to consider socioeconomic factors as influencing factors in the severity of the injury and the rate of death caused by road traffic accidents in planning and policies related to road traffic accidents. Offers similar studies should be conducted in other centers in a multi-centered manner. Additional studies should be conducted to find other factors affecting the occurrence of trauma.

Declarations:

Funding:

Birjand University of Medical Sciences

Data availability:

Individual patient-level data would be provided in a reasonable request to the corresponding author.

Conflicts of interest:

None.

Author contributions:

All authors contributed to the conception and design of the study. Sadegh Shajari and Fatemeh Maleki collected the data. Gholamreza Sharifzadeh and Sadegh Shajari analyzed and interpreted the data. Moloud Foogerdi and Sadegh Shajari drafted the manuscript. All authors critically revised the manuscript for important intellectual content and approved the final version for publication. Acknowledgments: We would like to express our gratitude to the Faculty of Medicine and Research Vice-Chancellor of Birjand University of Medical Sciences for their financial and moral support of this thesis, as well as to the patients for their cooperation and participation in the study.

Ethical considerations: The present study was approved by the ethics committee of Birjand University of Medical Sciences under number IR.BUMS.REC.1400.108. At first, the procedures and objectives of the work were explained to the patients or the first-degree companion of the patient, and informed consent was obtained from all the participants in this research before entering the study. All information obtained was confidential; only anonymous information was used in the report results. Also, patients could withdraw from the study at any stage if they did not want to.

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