

Original Article

Disability and post-trauma stress in the population over 15 years old in Kashan, Iran: A population-based study

Zahra Sehat ^{a,*}, Esmaeil Fakharian ^{a,b}, Mojtaba Sehat ^a, Abdollah Omidi ^{a,c}^a Trauma Research Center, Kashan University of Medical Sciences, Kashan, Iran^b Department of Neurosurgery, Trauma Research Center, Kashan University of Medical Sciences, Iran^c Department of Clinical Psychology, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, Iran

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ABSTRACT

Purpose: One of the consequences of trauma-related injuries is disability. There are more than one billion people with disabilities worldwide. Disability in people reduces their quality of life. The goal of this study was to determine the rate of post-trauma stress and disability related to trauma in the population over 15 years old in Kashan during a solar year of 2018–2019.

Methods: This is a cross-sectional population-based study. A cluster sampling method was used in the city of Kashan, and 3880 persons were interviewed with individuals randomly selected in each household. If a person had trauma during one year ago, the World Health Organization Disability Assessment Schedule 2.0 and Post Trauma Stress Disorder (PTSD) Checklist were applied for further interview. Data were analyzed using Chi-square test or *t*-test.

Results: Among the 3880 participants residing in Kashan, 274 (7.1%) reported a history of traumatic injury during one year ago in 2018–2019. Incidence of all injuries was estimated to be 70.61 (62.60–78.70) per 1000 people. For the trauma population, 213 (77.7%) were male and 75.1% were married. About half of them (50.3%, 138/274) aged 21–39 years. The most common cause of injuries was related to traffic accidents: 140 (51.1%). Of the 274 trauma participants, 47 (17.2%) reported PTSD; 244 (89.1%) had a mild disability, and 30 (10.9%) reported moderate disability.

Conclusion: One of the main causes of disability in the human community is the traumatic injuries. According to the results of this study, 89.1% of trauma participants have sustained at last mild disability following trauma. These people require follow-up and post-treatment support. It should be noted that psychological complications such as PTSD are as significant as physical symptoms.

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Introduction

Young people made up a large part of Iran's population. This part of society is always exposed to various events, and trauma is one of the most important reasons for their visit to the emergency department.^{1,2} It is also the most common cause of disability and death in them. As a result, understanding the risk factors for trauma and taking effective preventive measures can reduce the incidence and improved the consequences of these events.^{3,4}

One of the notable consequences of trauma is disability. Disability is a general term as defined by the World Health Organization: defects, limitations of activity, and limitations of participation due to health conditions are used.^{4,5} Disability in the

International Classification of Functioning, Disability and Health (ICF) is recognized with three dimensions: structure and function of the body and its defects, activity restrictions, and participation. This classification also recognizes the role of environmental, physical, and social factors in the effects of disabilities on outcomes.^{6–8}

There are more than one billion people (15% of the total population) with disabilities worldwide. Disability in people reduces their quality of life and leads to disruptions in daily living & participation, depression, and social isolation.^{9,10} The prevalence of post trauma stress disorder (PTSD) was reported at 19.89%–30.49% in Iran.^{11,12} Risk factors and frequency of disabilities after trauma were different based on the type of damage causing disability, the type of disability (mental or physical disability), and patient follow-up time.^{9,10} PTSD is a disorder that results from exposure to a highly traumatic stressor.¹¹ Epidemiological studies indicate that not all people who are exposed to the same traumatic event will have PTSD^{11–14} and the prevalence rate was reported to be 6%–45%.¹³

* Corresponding author.

E-mail address: sehat.zahra426@gmail.com (Z. Sehat).

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Kashan is a city located in the central part of the Islamic Republic of Iran. The area of Kashan is 9647 km², with a population of about 448,063 and 132,101 families. It is among the most crowded cities in Iran.¹³ Kashan city functions as a transportation junction crossing from north to south and from east to west of Iran. Therefore, it has a high possibility of car accidents. Because more studies focus on the etiology of trauma, there is limited information about post-trauma.¹⁵ This study aims to investigate the disability and post-trauma stress in the population over 15 years of Kashan in 2018–2019.

Methods

Study design and population

This is a cross-sectional study on individuals over 15 years old residing in Kashan, and the cluster sampling method was used. The city of Kashan was divided into five districts according to the municipality districts, and based on the geographical map of the city, the clusters of each region were specified in the map. Thus, there were 32 clusters in each district, and the total number of clusters in the city was 160; in each cluster, 25 persons were randomly selected for the interview. Totally, 3880 persons were interviewed. The clusters of each region are numbered and marked on the map and then randomly selected. By referring the questioner to the designated homes in each cluster in each house, each member over the age of 15 was randomly selected for an interview, and after getting informed consent from them, the questionnaire was completed.⁶

Demographic information, health status and trauma information were filled for all randomly selected individuals in each household, and if the interviewed person has a history of trauma during the year 2018–2019, the disability and PTSD questionnaire were provided additionally to be completed. In this study, trauma is any intentional or unintentional physical injury following traumatic events and needs for medical care. To measure the disability after trauma, World Health Organization Disability Assessment Schedule 2.0 (WHODAS II) and PTSD Checklist questionnaires were adopted.

Sample size

Based on the annual incidence of all injuries (p), it is assumed to be about 25 per 1000 person-years in 2013,¹⁶ the following formula was used to estimate the minimum needed sample size. Considering $d = 1.3$.

$$n = \frac{Z_{1-\alpha/2}^2 \times p \times q}{d^2}$$

Due to that the frequency of trauma is 32.3%, the required sample size for the study was multiplied by 1.3 in the design effect, and a total of 3875 study samples were determined.¹⁷

Tools

PTSD checklist

This questionnaire is a self-report scale and consists of 17 items divided into three parts, i.e. 5 items relate to the signs and symptoms of an accident re-experience, 7 items on emotional and avoidance symptoms and symptoms, and 5 items for signs and symptoms of severe arousal.¹⁶ This list has been compiled (Weathers, Litz, Herman, Huska & Keane, 1994) based on the DSM Diagnostic Criteria for the US National Center for PTSD.

In Iran, the validity and reliability of this list was confirmed by Goodarzi in 2003 via using data from the implementation of this list for 117 subjects. Cronbach's alpha coefficient of this scale has been calculated. The sensitivity was 0.82, and the specificity was

0.83. The scoring method follows the IV-DSM criteria is a combination of two approaches, namely having at least one criterion for B (1–5), 3 form C (6–12), and 2 indication the criterion D (17–13) and the sum of these scores are used as the cut-off point in the population. In this study the cut-off point was set at 50 for this scale as the optimal point for predicting PTSD diagnoses.^{13,14}

Disability

To measure the post-traumatic disability during the past year, the trauma participants were asked to finish the WHODAS II: a 12-item questionnaire designed by the World Health Organization and ICF which is recommended to evaluate disability in adults. The questionnaire examines six areas including: 1- communication and understanding, 2- mobility and mobility, 3- selfcare, 4- adjustment, and 5- living with others, 6- tasks related to daily living, and community participation. The Cronbach's alpha coefficient was 0.97 for this test in Iran.^{1,7,8}

Data analysis

In this study, all data analysis was performed using SPSS 22.0 software. Chi-square test and *t*-test were used to examine the differences between the two unparametry variables. Logistic regression analysis was used to examine the variables significantly associated with trauma outcomes. The significance level was considered less than 0.05. Univariate analysis was used to investigate the relationship between variables and trauma outcomes.

Results

In this study 3880 persons were studied. Of the studied population, 274 (7.1%) reported a history of traumatic injury during the past year and 213 (77.7%) were male. Half of the trauma participants (50.3%, 138/274) were of the age 21–39 years; and 75.5% (207/274) were married. Traffic accidents was the dominant injury mechanism (51.1%, 140/274) with motorcycle accident being the most frequent cause (70.7%, 99/140). Fig. 1 shows the number (percent) regarding the mechanisms of trauma.

Most injuries were to the foot 88 (23.0%) and hand 47 (12.3%), followed by the head 40 (10.4%). Fig. 2 shows the number (percent) of the injured organs.

According to the PTSD Checklist result, 47 (17.2%) of the 274 trauma participants had PTSD. Risk of PTSD in trauma persons was 0.82. According to the results of this study, the incidence of PTSD in 100,000 was 1211. Also, according to the WHODAS II test, 244 trauma persons at the time of the interview had a mild disability, and 30 reported moderate disability. No case of severe disability was found. The risk of mild disability was 2.7 and moderate disability 0.64. Table 1 shows the detailed information of PTSD and disability in people with trauma in the study.

The majority of the participants with trauma were male (77.7%), but the females had a higher incidence (21.3%) in PTSD than in males (15.8%). There was a meaningful relationship between PTSD and gender ($p = 0.014$). Incidence of disability in males and females with trauma was similar, and there was a meaningful relationship between disability and gender ($p = 0.07$).

Table 1
Rate of PTSD and disability in people with trauma.

Variables	n (%)	Odds ratio	p value ^a
Disability (n = 274)			
Mild	244 (89.1)	2.73 (2.01–3.70)	0.00
Moderate	30 (10.9)	0.64 (0.56–0.72)	0.00
PTSD	47 (17.2)	0.82 (0.64–1.06)	0.12

PTSD: Post trauma stress disorder.

^a Logistic regression

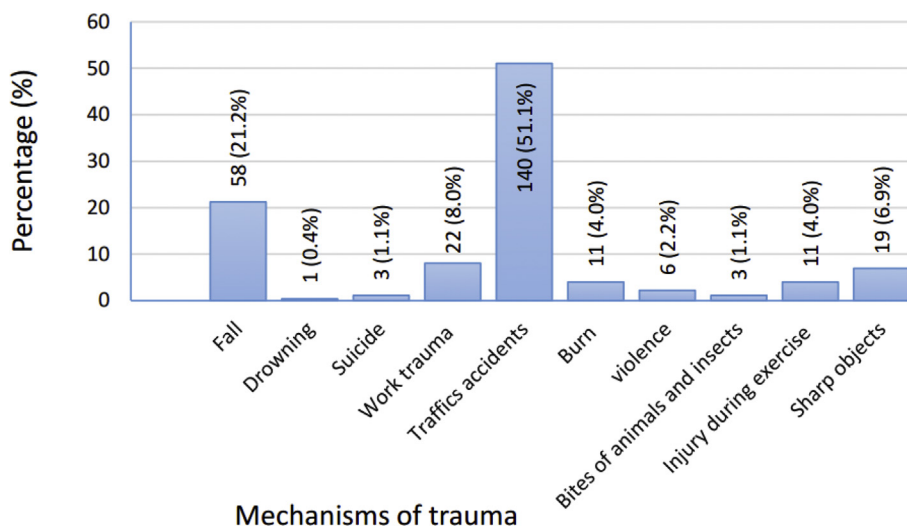


Fig. 1. Distribution of the mechanisms of trauma.

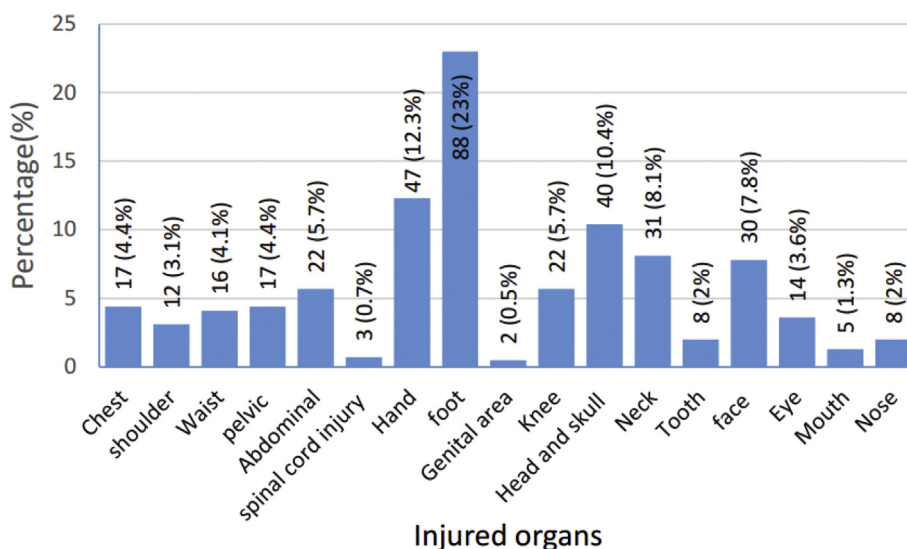


Fig. 2. Distribution of the injured organs.

Age had a significant relationship with both disability ($p = 0.05$) and PTSD ($p = 0.06$). Most incidences of mild disability occurred in 21–39 years (51.3%) while those of moderate disability occurred in 21–29 years (24.1%) and 40–49 years (31.1%). Table 2 shows the rate of disability and PTSD in different sex and ages.

Most incidences of disability (36.4%) and PTSD (27.4%) was related to injury from traffic accident especially motorcycle accident. The incidence of disability in people with fall injury was 20.7%, and the incidence of PTSD in these people was 25.5%. Table 3 shows the incidence of disability and PTSD-based mechanism of trauma.

In this study, no significant relationship between PTSD and disability was found ($p = 0.6$). Among the 47 PTSD patients, 16.8% had mild disabilities and 20.0% had moderate disabilities. Table 4 shows the Disability and PTSD in traumatic patients.

Discussion

The results of this study showed that 7.1% (274/3880) of the study population reported trauma during the last one year. Among the trauma persons, 213 (77.7%) were male, and 207 (75.5% were

Table 2
Disability and PTSD in different sex and age-group, n (%).

Sex and age	Total	Disability		PTSD
		Mild	Moderate	
Total	274 (100)	244 (89.2)	30 (10.7)	47 (17.2)
Sex				
Male	213 (77.7)	190 (89.2)	23 (10.7)	34 (16.0)
Female	61 (22.3)	54 (88.5)	7 (11.5)	13 (21.3)
X ² value		0.425		0.625
P value ^a		0.070		0.014
Age-group (years)				
15-20	21 (7.6)	20 (8.2)	1 (3.3)	4 (8.5)
21-29	64 (23.3)	56 (23.0)	8 (26.6)	13 (27.6)
30-39	74 (27.0)	70 (28.6)	4 (13.3)	10 (21.2)
40-49	41 (14.9)	32 (13.1)	9 (30.0)	8 (17.0)
50-59	38 (13.8)	33 (13.5)	5 (16.6)	7 (14.8)
60-69	29 (10.5)	28 (11.5)	1 (3.3)	4 (8.5)
>70	7 (2.5)	5 (2.0)	2 (6.6)	1 (2.1)
X ² value		1.72		1.25
P value ^b		0.051		0.060

PTSD: Post traumatic stress disorder.

^a Pearson Chi-square test.

^b Spearman correlation.

Table 3
Disability and PTSD in traumatic patients based mechanism of trauma, n (%).

Mechanism of trauma	Total (n = 274)	Disability		Post trauma stress disorder (n = 47)
		Mild (n = 244)	Moderate (n = 30)	
Fall	57 (20.8)	51 (20.9)	6 (20.0)	12 (25.5)
Drowning	1 (0.3)	0	1 (3.3)	0
Suicide	3 (1.0)	3 (1.2)	0	0
Work trauma	22 (8.0)	20 (8.2)	2 (6.6)	2 (4.2)
Traffic accidents	140 (51.1)			
Motorcycle	99 (36.1)	90 (36.8)	9 (30.0)	21 (44.6)
Car	32 (11.7)	30 (12.2)	2 (6.7)	5 (10.6)
Pedestrian	6 (2.1)	6 (2.4)	0	1 (2.1)
Bicycle	3 (1.0)	3 (1.2)	0	1 (2.1)
Burn	11 (4.0)	8 (3.2)	3 (10.0)	0
Street violence	4 (1.4)	3 (1.2)	1 (3.3)	2 (4.2)
Assault and violence	2 (0.7)	2 (0.8)	0	0
Bites of animals	3 (1.2)	3 (1.2)	0	0
Injury during exercise	11 (4.0)	7 (2.8)	4 (13.3)	0
Sharp objects	19 (6.9)	17 (6.9)	2 (6.6)	3 (6.3)
X ² value		23.52		12.75
P value ^a		0.053		0.09

PTSD: Post traumatic stress disorder.

^a Pearson Chi-square test.

married. Moreover 138 (50.3%) occurred among people aged 21–39 years. The main mechanism of trauma was traffic accidents 140 (51.1%), and among the traffic accidents, the highest cause was motorcycle, i.e. 99 cases, 70.7%). Our result revealed that the incidence of trauma in the investigated area was high and traffic accident was a threat to human, especially motorcycles.

In a study conducted in 2009 in Kermanshah, Iran, to evaluate the epidemiological damage caused by trauma, of the total study population, 7.8% died and the most common cause was head injury (78.7%).¹⁷

A study by Vles et al.¹⁸ in 2005 on 295 patients concluded that more than 50% of patients were engaged in daily activities one year after traumatic injury. Also, 74% (84) of the 127 patients returned to work. The number of people affected, the severity of injury (ISS) score ≥ 25 , and the female gender each can be independent predictors of a long-term disability.¹⁸ In another study conducted in 2013 by O'Donnell et al.,¹⁹ in the follow-up of patients 12 months after injury, 715 patients with disabilities were assessed using the WHODAS II. They found that the mean and standard deviation disability score was 21.6 ± 19.7 , and the disability at this time was four times higher than the general population.¹⁹

According to the results of various studies in this area, risk factors that can exacerbate post-traumatic disability included old age, female gender, prolonged hospital stay, ICU admission, low levels of education, cases of multiple and severe trauma, hospital complications, pre-traumatic health and quality of life, brain and spinal cord injury.^{16–19,23}

A population-based study was conducted to examine disability in young people after major trauma: 5-year follow-up of survivors in the United Kingdom in 2003.²⁰ In this study, 125 patients aged

Table 4
Disability and PTSD in traumatic patients, n (%).

Disability	Post trauma stress disorder	
	Without	With
	227 (100)	47 (100)
Mild level	203 (89.4)	41 (87.2)
Moderate level	24 (10.5)	6 (12.8)
X ² value	0.00	
p value ^b	0.6	

PTSD: Post traumatic stress disorder.

^b Pearson chi-square test.

11–24 years were identified at the time of injury. Of these, 109 (87%) were interviewed. Only 20% of the interviewed reported no disability. The mean disability score was 7.5. The reported disability was in the areas of behaviour (54%), intellectual functioning (39%), and locomotion (29%). Many respondents reported that their daily lives were adversely affected by the health problems. It is stated that 28% of the respondents, 51% of interviewees, would need extra help to cope with their injury and disability.²⁰

A study was conducted in 2015 to estimate the extent and distribution of disabilities due to road accident injuries.²¹ Findings from this study suggest that the prevalence was 2.1 in every 1000 cases, with no gender differences in disability due to traffic accidents. The highest risk was for people between 31 and 64 years of age, and the onset of disability at age 16 in both sexes was a major explosion point. The odds ratios were higher for those with secondary education than those with the lowest level of education, and for those with the highest household income, those with the lowest income were the least. And 24% of disabled participants were working and earning a living. Compared to other disability sources, traffic accidents increased disabilities in terms of displacement ($p < 0.001$), greater need for health/social services; ($p = 0.003$), and more problems with private transportation ($p < 0.001$), moving around outdoors ($p < 0.001$) and change in economic activity.²¹

Despite the common occurrence of trauma and its consequences, developing countries have poor control over prevention policies and programs. This lack of planning and policy-making about trauma-induced injuries in society is due to a lack of population estimates and the incidence of injury in developing countries.^{21–23} Hospital-based statistics and patient records are common sources of information for trauma in developing countries. However, these resources underestimate the complication of trauma.^{24,25} A different study, mainly from trauma-related mortality and morbidity statistics, suggests that the differences concerning the type of trauma and its resulting disabilities are significant.^{26,27} Another study examining gender inequalities in trauma-related deaths in the United States from 1981 to 2007 found that boys and men were more likely to die from trauma than women and girls. Men's risk of unintentional accidents and violence was two and three times higher than women, respectively. For some specific causes of death (suicide, traffic accidents), racial differences increased gender differences.²⁸

In conclusion, one of the main disability in human community is the post-traumatic disability. According to the result of this study, 89.3% of people post trauma have at last mild disability. These patients require follow-up and post-treatment support. It should be noted that psychological complications such as PTSD are as significant as physical symptoms.

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Ethical Statement

This study was supported by Kashan Medical science university. Code of Ethics of this study is 1397, 094, and the Research project code is 97148, affiliated to Kashan University of Medical Sciences.

Declaration of Competing Interest

The authors declared no competing interest.

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