Moradi et al., J Trauma Stress Disor Treat 2017, 6:3
DOI: 10.4172/2324-8947.1000173

Journal of Traumatic Stress Disorders & Treatment

Research Article

A SCITECHNOL JOURNAL

Prevalence of Post-Traumatic Stress Disorder and Associated Factors in Children with Experience of Traffic Accident in Tehran

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Abstract

Introduction: Iran is one of the countries with the highest incidence of accident and mortality associated with road and traffic accidents. Studying the prevalence of acute post- traumatic stress disorder among the victims of traffic accidents, and also the causes and context of this type of disorder, especially in children, can help to clarify most dimensions of psychological complications of these types of accidents in the community.

Method: The current study is a cross-sectional type. The determined sample was divided into classes, based on sex and age groups, by the proportional allocation method. A random selection of samples was made among victims of traffic accidents, who were referred to the hospitals covered by Tehran University of Medical Sciences, during the year 2014. Data for measuring the acute post-traumatic stress disorder in children was collected using a standard questionnaire.

Results: A total of 450 participants, including 344 (76.4%) males and 106 (23.6%) females, were investigated. The mean and standard deviation of age of participants in the research were 10.90 and 4.04 years, respectively. Based on the results of principal components analysis, 121 (26.9%) and 76 (16.9%) of the studied children have had the symptoms of mild and severe post trauma-stress during the interviews, while 253 (56.2%) had no symptoms of post trauma- stress disorder. After removal of the effect of confounding variables, the relationship between the gender, maternal education level, and the location of accident, ethnicity and the elapsed time after the accident was evaluated with the post trauma-stress, using the logistic regression models. These results were statistically significant.

Conclusion: Given the importance of effect of environmental and socially-economic factors on the incidence of complications caused by injuries and accidents related to children, especially on acute post-trauma stress, it is therefore necessary to carry out further studies on elimination of the economic, environmental and social risk factors, in order to identify these factors in a more detailed manner.

Keywords

Accidents; Acute stress; Children

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Received: : April 10, 2017 **Accepted:** July 11, 2017 **Published:** July 18, 2017

Introduction

One of the most important and most notable risks which threaten human life today in different countries and regions of the world, is the increased rates of accidents and various associated injuries that lead to more than 6 million annual deaths in the world [1]. Road and traffic accidents, as one of the most common disasters, that affect the lives of many people in the world yearly, and owing to its increased rate, the World Health Organization (WHO) suggested the (Safe Roads) title for the World Health Day in 2004 and even had to mention the importance of reduction of accidents and associated disasters until 2020 in its 21 aims [2]. From a previous study, the global burden of disease has been estimated, such that traffic accidents came in the ninth class in terms of the number of lives lost by people to accident in 1991 worldwide, and it is anticipated that this number will move up to third place in 2020 [3]. Post-traumatic stress disorder specifically in children is one of the most problems that can result from traffic injuries.

According to the world health organization (WHO) in 2008, the mortality rate of children under 15 years caused by the traffic accidents highly varied among African countries, European countries with low and average per capita income and European countries with high per capita income. For example, the mortality rate caused by the traffic accidents in children aged 5 to 9 years in African countries, European countries with low and moderate per capita income and also European countries with high per capita income are 50, 5 and 1.2, respectively in one hundred thousand population, which indicates the unequal distribution of deaths caused by traffic accidents in the world [4]. Due to the lack of reduction of mortality caused by traffic accidents in the world, despite the decline of this type of accident in some countries, United Nations General Assembly passed a legislation in 2010, and named the current decade as the Decade of Action for Road Safety (2011 to 2020) and urged all member countries to implement prevention programs and help in the reduction of traffic accidents [5]. According to the WHO reports, in the middle and low income countries, in 2013, the highest incidence of mortality associated with traffic accidents was predominant among young people (age group between 15 and 30 years). In these countries, more than 30% of deaths occurred in the traffic accidents in the mentioned age group. One of the considerable points mentioned in the 2013 WHO reports was the proportion of world population covered by the regulations and rules for controlling the risk factors of traffic accidents, including unauthorized speeding. According to the reports, only 40% of the world's populations made provisions for speed control, with its implementation in only 28 countries, transcending to a population of about 449 million, which is estimated as 7% of the world population. In the meantime, Iran is unfortunately one of the countries in which the rules for controlling the risk factors of road traffic injuries, including unauthorized speeding, are not well implemented, and it is considered as a moderate country [6].

Despite this fact, and according to a national study on the burden of diseases and injuries, in recent years, traffic accidents have been number one in Iran in terms of the number of lives lost prematurely to traffic accidents [7]. The prevalence of Post-traumatic stress disorders in children with experience of traffic accident in Iran is unknown and after complete literature review, we did not found any information about prevalence of this disorder in Iran.

Based on the published statistics by the legal medicine organization, there were a total of 17,994 and 16,872 mortalities and also 315 719 and 304 485 people injured in the traffic accidents, during the 2013 and 2014 years, respectively. Additionally, due to the available statistics, during the last 10 years, about 17 to 28 thousand deaths occurred yearly in Iran through traffic accidents, while 250 to 320 thousand people sustained injuries [8]. According to these information, It seemed the prevalence of Post-traumatic stress disorder as one outcome of traffic injuries in Iran is also high and we need to estimate the precise value of this problem in order to designing and implementing appropriate interventions. Road traffic injuries and corresponding outcomes are public health problem in Iran. This problem is alarming for the relevant authorities, implying that many control measures, in form of research, education, monitoring and so on are required in different fields in order to reduce such risks. A number of organizations and institutions in Iran are related to the road accidents and the ways for preventing them, such as the police, legal medicine organization, Ministry of Health and Medical Education, Ministry of Transportation and Terminals Organization, etc. However, the extent of success achieved by these institutions is conducting their missions or whether the cross-sectional coordination has been primarily considered or not should be discussed, because it is one of the basic strategies for health promotion. However, it can be seen that despite all efforts made in this regard and the highest burden of responsibilities and activities in this field associated with police organization, the available statistics indicates an increase in traffic accident deaths in urban streets and highways which resulted in an increase in the direct costs, such as health care costs due to this type of accidents, care of the disabled people in the accident and also indirect costs like mental problems and depression in their families, the costs of losing constant or provisional active labor, while it has left the negative social, psychological, economic consequences and impaired the public health. Considering the mentioned points, it seems that studying the prevalence of post- trauma acute stress in the victims of traffic accidents and evaluation of the causes and context of this type of disorder, especially in children, can help to clarify more, the dimensions of psychological complications associated with these disasters in the society. The results of such studies can be considered and help sensitize the authorities responsible for health promotion in the country. Additionally, the necessary information has been provided for planning the practical solutions in order to reduce the psychological consequences of traffic accidents, especially in children for the relevant authorities. Therefore, the lack of such study in Iran and also the gaps presented in this context necessitated this study.

Materials and Methods

Research type

A cross-sectional method was adopted for this descriptive and analytic study.

Target population

This included the statistical population of children aged 5 to 15 years with experience of traffic accident in urban streets and roads between cities around Tehran. A random method was used for sample selection.

Inclusion criteria

This comprised children who sustained injuries from traffic accidents during a past year (a year before doing the study), children who were witnesses to traffic accident in Tehran city and inter-urban roads around Tehran.

Exclusion criteria

This included children with previous history of chronic psychiatric disorders before the traffic accidents.

Methodology

The researchers (experts in psychology) were justified on how to collect data using the relevant tool (questionnaire) and the questionnaires were completed by the interview. After selecting the samples in each considered hospital, the parents were called by phone. If there was not the possibility for phone calls, then their place of residence were referred. After obtaining informed consent of parents of children in order to participate in the study, the purposes of the study were explained to them and the questionnaires were completed by interviewing with them.

Data collection tools

Data, including information about some of the background characteristics of studied children was collected using a questionnaire, while a standard questionnaire was used to measure post-trauma stress disorder in children. The questionnaire comprised 20 questions which were provided according to the opinions of experts in psychology and the CTSQ, TESI-C, PEDS, LASC and CPSS questionnaires. As a result of differences in the studied population and statistical communities from which the listed tools have been prepared and also considering all aspects of post trauma acute stress caused by the disorder in the studied children, the questionnaire was designed [9-11]. In order to determine the risk of children suffering from post- trauma stress disorder, the Summed Lickert Scale was used. Firstly, reliability and validity of the questionnaire in each of the areas (Children from 5 to 9 years, and children from 10 to 15 years) were evaluated separately. Internal consistency reliability was investigated in order to determine the reliability of questions in each area, using Cronbach's alpha. If the obtained values were 0.7 or higher than 0.7, then the questions of that area were considered reliable. In order to determine the validity in each area, its content validity was evaluated by the opinions of the psychology experts, while the construct validity was studied using factor analysis and principal component analysis. If the extracted factors constituted 80% of the variance, the construct validity of the considered area was approved. Multi trait multi method was applied, in order to determine the criterion validity of the questionnaire. If the correlation of each item made up by the questionnaire with the related items in the questionnaire was more than 0.4, then the criterion validity was approved. The average of total obtained factor was considered as a cutoff point. Children who achieved a score higher than the cut-off point, were considered as being under stress whereas those with lower scores for the cut-off points were considered being without stress.

Sample size and the selection method of samples

The values of P which are the relative frequency of children with the post- trauma stress were considered as 0.5 due to the lack of similar research in the country, in order to determine the sample size. The maximum rate of the first kind of error was considered as 0.05, while the accuracy was also 0.05. Therefore, the sample size was 384. Owing to the lack of accountability, the total sample size was considered equal to 450. The next step involved the division of the total sample size into sex and age groups, according to their individual ratios in the studied sample, or through the proportional allocation

method. A preliminary study was conducted in order to determine the ratio of each class in the entire sample before collection of the baseline data. All medical records of injured people in traffic accidents during 2014 in the hospitals covered by Tehran University of Medical Sciences, which accepted most of the wounded people in the traffic accidents, were extracted in order to select the samples, thereafter 450 cases which contained at least one person less than 15 years, who had injured in the event or were witness of the accident were chosen randomly.

Results

In this research, a total of 450 people were investigated which included 344 (76.4%) males and 106 (23.6%) females. The average and standard deviation of the age of participants in the study were 10.90 and 4.04 years, respectively. Table 1 demonstrates the prevalence of post-trauma stress in the studied children and also their content variables. Based on the information of this table, the post-trauma stress was higher in the boys, children over 10 years, children with less birth rate, children with family members of more than 4, children whose parents were less educated, children whose father were workers or unemployed, children whose mothers were keepers of the house, children with incidence of accident in the cities, children who experienced accident as pedestrians, children with injuries sustained from accident, children who do not speak Persian as their native language, and finally children who have passed less than 6 months since the disaster. Statistical analysis showed that the relationship between the post- trauma stress in the studied children and variables including sex, location of the accident, ethnicity and time elapsed since the incident was significant.

Table 2 reveals that the relationship between sex, maternal education level, location of the accident, ethnicity and the elapsed time after the accident, as well as the prevalence of acute stress after traffic stress, was statistically significant, after removing the effect of confounding variables using logistic regression model.

Discussion

This study showed that the occurrence of slight and sever acute post- trauma stress have been 16.9% and 26.9% among the studied children, respectively. These results are comparable rather than the results of studies which were conducted in the UK, Germany, Australia, Switzerland and the United States of America, and showed that the prevalence of post-trauma stress was variable in children from 6% to 34% [12-19].Given that the prevalence of this complication has been measured up to 3 months after the accident in the mentioned studies, it seems that the prevalence of post- trauma stress in the studied children in Tehran within 3 months after the accident was higher than the studied cases in European countries and the United States of America. The present study demonstrated that generally, various environmental and underlying factors are related to the prevalence of post-trauma stress in children. Hence, the prevalence of this type of complication has a significant relationship with sex, maternal education level; location of the accident, ethnicity and the time elapsed since the event. The prevalence of post-trauma stress was significantly more in boys than in girls. These results are similar with the results of Guédon-Moreau et al. in France which showed that the prevalence of stress, 6 months after the accident in boys is higher than in girls [20]. In contrast, some studies including that of Kassam-Adams et al. in the United States and the study of Stallard et al. in the UK were different, as they showed that the prevalence of post-trauma stress in girls was different from that in boys [15,17]. However, some studies, including that of Keppel-Benson in the United States revealed that the prevalence of this complication has been the same in boys and girls. It seems that one of the reasons responsible for these differences is the environmental and cultural difference between the various societies. The present research showed that the prevalence of post-trauma stress in children who were victims of traffic accidents in urban areas and inside of Tehran was higher than in children who had the accident in the streets outside of the city and suburbs of Tehran. Also, the prevalence of stress in children who were accident victims while trying to cross the street or at pedestrian status were higher than the children who were onboard the vehicles and the rate were also higher for those who witnessed the accident. One of the reasons for this could be the high proportion of pedestrians who are children and had an accident in Tehran. However, due to the effect of environmental and socio-economic factors on the incidence of traffic accidents with children in Tehran, one of the best ways of reducing these impacts was to reduce the incidence of traffic accidents related to the children through the adoption of appropriate actions and implementation of short-term and low price programs, including training the parents and children and securing the commute way of children to the school and public transport. The prevalence of stress in children injured during traffic accident was higher than those who did not sustain any injuries in the accidents. The main reason for this problem is that the severity of traffic accident in the injured children was higher, while the circumstances of the accident and the injuries were retained in the child's memory for a long period. Consequently, this revealed more signs of stress. Due to the fact that the traffic load and speed of traffic are high in the city of Tehran, the incidence of severe traffic accidents, followed by their complications, including stress increased. Given that several studies in the world, including the study of Robert et al. in New Zealand Auckland [21], Mueller et al. In Washington [22], Rothman et al. in Canada [23] have shown that a calm and quiet traffic in residential areas corresponds to less injuries and accidents for children. Some strategies for reducing the complications caused by traffic accidents include stress in children, organizing the speed and traffic in Tehran. The risk of accidents and complications associated with the traffic load can be reduced through qualitative and quantitative improvement of special passages for the movement of pedestrians across streets and highways, especially around schools and other children centers, such as cultural centers in some areas of Tehran which have high population density in addition to high-speed traffic. One of the most important results of this research was the meaningful border relationship between the post- trauma stresses associated with traffic accidents in children and maternal education level in the final model, given that maternal education is one of the main components for determination of economic and social status in the family. Various studies around the world, including the research of Anthikkat et al. in Australia [24], Yiannakoulias et al. in Canada [25], Chakravarthy et al. in the United States [26], Turrell and Mathers in Australia [27], Chen et al. In Australia [28], Factor et al. in Palestine [29], Laflamme et al. in Sweden, Sethi in the European Office of the World Health Organization [30], the review study of Laflamme and the research of Diderichsen in Sweden [31] have shown that the incidence of this type of events is usually higher in households with socially weak economic situation. It can be noted that the complications of this type of accidents, including acute stress, is more common in the lower socio-economic classes of society.

This study revealed that the prevalence of acute post-trauma stress in the children still having a fresh memory of the accident was significantly higher than in children who had the experience a long

doi: 10.4172/2324-8947.1000173

Table 1: Association between aggression and background variables in studied students of Tehran (Univariate analysis).

		Aggression						
Variable		Yes		No		P-value	OR	95% CI OR
		No.	%	No.	%			
Gender	Male	193	49.5	197	50.5	0.3	1.17	0.88-1.55
	Female	173	45.5	207	54.5			
Age	<15 Year	177	44.1	224	55.9	0.04	1.33	1.01-1.76
	≥ 15 Year	189	51.2	180	48.8			
Education grade	1	110	42.3	150	57.7	0.07	-	-
	2	123	48.2	132	51.8		1.27	0.88-1.82
	3	133	52.2	122	47.8		1.48	1.03-2.14
Birth rank	1	199	48.5	211	51.5	0.5	1.09	0.82-1.44
	≥ 2	167	46.4	193	53.6			
Family size	<5	247	48.2	265	51.5	0.6	1.08	0.80-1.47
	≥ 5	119	46.1	139	53.9			
Sibling number	0	52	43.0	69	57.0	0.4	-	-
	1	179	49.4	183	50.6		1.29	0.84-2.01
	≥ 2	135	47.0	152	53.0		1.17	0.75-1.85
home ownership	Rented	113	47.9	123	52.1	0.9	1.02	0.75-1.38
	proprietary	253	47.4	281	52.6			
Home type	Villas	97	55.4	78	44.6	0.01	1.50	1.07-2.11
	Apartment	269	45.2	326	54.8			
Parents living condition	Living together	327	46.3	380	53.7	0.05	-	-
	Divorced	22	59.5	15	40.5		1.70	0.82-3.59
	Death one of parents	17	65.4	9	34.6		2.20	0.91-5.66
Father education	Primary	56	56.6	43	43.4	0.1	-	-
	Guidance	63	49.4	64	50.4		0.75	0.43-1.32
	High school	100	43.3	131	56.7		0.59	0.35-0.97
	University	144	46.6	165	53.4		0.67	0.41-1.08
Mother education	Primary	63	52.9	56	47.1	0.2	-	-
	Guidance	54	46.2	63	53.8		0.76	0.44-1.31
	High school	113	50.0	113	50.0		0.89	0.55-1.42
	University	132	43.4	172	56.6		0.68	0.43-1.06
Socioeconomic status	Low	83	51.9	77	48.1	0.1	-	-
	Middle	215	47.8	235	52.2		0.85	0.58-1.24
	High	62	40.8	90	59.2		0.64	0.40-1.02
Watching violent films	Yes	318	51.5	299	48.5	<0.001	3.32	1.59-3.38
	No	48	31.4	105	68.6			
Rough sports	Yes	151	66.5	76	33.5	<0.001	3.02	2.18-4.18
	No	215	39.7	327	60.3			
Conflict between parents	Yes	249	51.4	235	48.6	<0.001	1.65	1.22-2.23
	No	108	39.0	169	61.0			
Violence between parents	Yes	191	57.2	143	42.8	<0.001	2.10	1.56-2.81
	No	166	38.9	261	61.1			
Corporal punishment	Yes	239	41.2	341	58.8	<0.001	2.87	2.03-4.05
	No	127	66.8	63	33.2			
Emotional abuse	Yes	245	73.8	87	26.2	<0.001	7.37	5.34-10.18
	No	121	27.6	317	72.4			

time ago. In this case, children who were interviewed were more than 6 months old in their experience [32]. These findings conform to the results of most studies conducted in this area, including the studies of Hruska et al. [33]. One of the reasons for this situation is that the children gradually forget the memory of the accident with the passage of time. Therefore, it is necessary that appropriate treatments should be taken in less than 6 months, especially the first few weeks after accident for the injured children, in order to reduce the psychological effects of the accident. This study is among the few studies that investigated post-traumatic disorders in children affected by the traffic accidents in Iran. Although this point was a main advantage for the study, the major restrictions for our research was method of measuring some studied variables such as watching violent films, doing rough sports, existence of violence between parents and corporal punishment of children that we specified them through interview with children parents.

Table 2: Association between aggression and independent variables in studied students of Tehran (Multivariate analysis).

Variables		OR*	SE	P-value	CI: 95%	
					Lower limit	Upper limit
Gender	Male	1	-	-	-	-
	Female	0.85	0.16	0.4	0.57	1.25
Age		1.12	0.12	0.3	0.90	1.39
Birth rank	1	1	-	-	-	-
	≥ 2	0.87	0.08	0.1	0.72	1.05
Education grade	1	1	-	-	-	-
	2	1.19	0.29	0.5	0.74	1.93
	3	0.96	0.30	0.9	0.52	1.79
home ownership	Proprietary					
	Rented	0.85	0.16	0.4	0.59	1.23
Home type	Villas	1	-	-	-	-
	Apartment	0.78	0.16	0.2	0.51	1.18
Mother education	University	1	-	-	-	-
	High school	1.13	0.23	0.5	0.75	1.71
	Guidance	1.27	0.33	0.2	0.76	2.13
	Primary	1.25	0.34	0.4	0.73	2.15
Watching violent films	No	1	-	-	-	-
	Yes	1.45	0.34	0.1	0.90	2.32
Rough sports	No	1	-	-	-	-
	Yes	2.10	0.38	<0.001	1.47	2.01
Violence between parents	No	1	-	-	-	-
	Yes	1.09	0.19	0.6	0.76	1.55
Corporal punishment	No	1	-	-	-	-
	Yes	1.64	0.34	0.01	1.08	2.48
Emotional abuse	No	1	-	-	-	-
	Yes	5.79	1.05	<0.001	4.04	8.29

* OR: Adjusted odds ratios in logistic regression
Hosmer and Lemeshow test (p=0.58)

Conclusion

This research is one of the few studies that have studied the consequences of accidents with children in Iran. Our results showed that the prevalence of slight and sever acute post- trauma stress have been 16.9% and 26.9% among the studied children, respectively The increasing production of the vehicles in Iran and rapid growth of their application in the different areas of the country, and consequently the increased traffic load in the public places necessitated the result of this research, which can be used in order to design better prevention programs from the traffic accidents and promote pedestrian safety, especially pedestrians less than 15 years and health care services for the wounded people after the accidents. Due to the importance of environmental and socio-economic factors on the incidence of complications, followed by traffic accidents in the children, especially post-traumatic acute stress, the removal of social, economic, and environmental risk factors, further studies on more detailed identification of these factors are necessary. Using the results of such researches can be effective in designing and implementing better and more targeted preventive programs, and finally provide better conditions and better facilities for the care of the injured during traffic accidents. Subsequently, it should be noted that because Iran is an inappropriate status, in terms of these accidents, the advantages of the experiences of developed countries should also be taken into consideration, in order to minimize the incidence of traffic accidents. Also, some efforts are necessary to clarify and inform the people and society in this regard, and also for the provision of sustainable infrastructure and efficient strategies and programs, in order to reduce these incidents and its consequences to the barest minimum.

Acknowledgement

At the end all the people who contributed in this study particularly, staff, and archive of Sina, Imam Khomeini, and Vali emergency hospitals, Children's, Ziaeian and Bahrami medical centers, and all who involved in the data collection are acknowledged. The budget for this research project (with the number of 23047) was provided by the research department of Tehran University of Medical Sciences.

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