Original Article

Prevalence of adjustment insomnia among the children who survived the earthquake in west of Iran (Sarpol-e-Zahab) in 2017: a cross-sectional study

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Abstract:

Background: Natural disasters such as earthquakes affect children's individual and social function and can cause various problems such as sleep problems in children. Therefore, the present study aimed to investigate the prevalence of adjustment insomnia in children who survived the earthquake in west of Iran in 2017.

Methods: The present research method was cross-sectional. The statistical population of the study included all the children who survived the earthquake, who in 2017 lived in the earthquake-stricken areas of Sarpol-e-Zahab, a city in west of Iran. The number of the samples in the present study was 337 people who were selected by the available method. The research instruments included a demographic questionnaire and an Insomnia Severity Index (ISI). The Chi-square test and the Fishers test were used to analyze the data.

Results: The results of this study showed that the prevalence of adjustment insomnia in children who survived the earthquake was 59.3%. The study of the relationship between insomnia severity and demographic characteristics showed that children's age had a statistically significant relationship with insomnia severity (P less than 0.05). Also, it was found that there is a significant statistical relationship between losing home and insomnia severity in children (P less than 0.05).

Conclusion: The results of this study showed that adjustment insomnia are prevalent in the children who survived the earthquake. The experience of earthquake in children may disrupt children's sleep and cause many problems in them. Therefore, sleep problems need to be considered as a common disorder in children who have survived an earthquake.

KEY WORDS: ***Sleep Disorder, Children, Earthquake Survivor***

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Introduction

An earthquake measured 7.3 on the Richter scale hit Kermanshah on Sunday, November 13, 2017, near Azgeleh in Kermanshah province, 32 km southwest of Halabcheh in Iraq. The epicenter was 5 kilometers away from Azgeleh in Kermanshah. The death toll rose to 620,

with 9,388 injured and about 70,000 people were left homeless.[1] Every year around the world, natural disasters such as earthquakes cause the death and disability of millions of people and many financial losses.[2] Most health systems, when an earthquake happens, focus on reducing the physical consequences of this disaster, while disasters like earthquakes impose a great deal of stress on survivors and have serious psychological consequences, especially in children.[3] Due to their special physical and age conditions, children are at the risk of traumatic events more than other age groups and have the least emotional and psychological support against natural disasters.[4] Also, children may be shocked and panicked during natural crises, especially earthquakes, which occur suddenly and unexpectedly, especially if they are accompanied by severe life-threatening injuries.[5]

Children are severely affected by the damaging effects of natural disasters, and these effects may continue until they are teenagers or adults.[6, 7] Severe earthquakes can cause a variety of disabilities in children, such as sleep problems.[8] Most studies have focused on post-traumatic stress disorder in children who survived the earthquake, and fewer studies have examined the impact of natural disasters on children's sleep disorders.[7, 9] Sleep is a natural function of the body that plays an important role in maintaining people's mental and physical health.[10] Any disturbance in normal sleep can affect your health.[11] In addition to sleep problems, sleep disorders have side effects on daily functioning and negative effects on the quality of life.[12] Daily fatigue and drowsiness, memory problems, attention and concentration decrease, and inability to enjoy communication with others, negative health effects, greater use of medical services, and increased risk of mental illness are some of the consequences reported among people with insomnia.[13]

Sleep problems are common in children who have been exposed to natural disasters, either immediately after the event or in the long run.[9-14] In a study by Kato et al.[14], 46% of young people had sleep problems after the earthquake, and Brown et al.[15] thirty months after the Katrina event in a study done on children aged 8 to 15 years, reported a total of 50 percent of sleep disorders. In another study, sleep disorders have also been seen in more than 50 percent of the children who survived an earthquake.[16] In a study, Iwadare et al.[17] examined the changes in sleep patterns among high school students after the great earthquake in east of Japan. The results showed that the average sleep duration and delay in the sleep phase were significantly shorter after experiencing the earthquake. Also, in a 20-month study, the daily sleep duration was shortened. Traumatic events and related experiences, such as the destruction of the home, disrupted the long sleep in the children in this area.

Also in a study done by Usami et al.[18], which examined the duration of sleep in children 8 months after the 2011 earthquake and tsunami in Japan, it was found that the children whose homes were damaged slept less than other children who had not had this experience.

Adjustment insomnia caused by earthquakes and other disasters can last and disrupt the individual and social function of the survivors and continue for many years.[9, 19-21] Since cultural differences can affect the prevalence and severity of sleep problems, generalizations from other studies may be associated with estimation errors, therefore, conducting such research to examine the epidemiology and frequency of disorders caused by natural disasters is necessary. The low number of studies investigating the effect of traumatic events on children, in addition to the fact that Iran is one of the most earthquake-prone countries in Asia, makes it necessary to conduct research to investigate the prevalence of adjustment insomnia among children. Therefore, this study was conducted to estimate the prevalence of adjustment insomnia among children survived the earthquake that hit the west of Iran in 2017.

Methodology

This study was a cross-sectional study conducted to investigate the prevalence of adjustment insomnia in the children survived the earthquake in the west of Iran. The statistical population of the study included all children who survived the earthquake in west of Iran, they lived in the earthquake-stricken areas of Sarpole Zahab, in

Kermanshah province, in 2017 and were present in these areas at the time of the earthquake. Sampling volume was determined by considering the ratio of 5% (in order to reach the maximum sample size), with 95% certainty and 6% accuracy, including a 25% (68 people) drop, equal to 337 people, who were selected from the members of the study community according to the inclusion and exclusion criteria of the study. The inclusion criteria are: living in the earthquake-stricken areas, being in the earthquake-stricken areas at the time of the earthquake, not having a history of previous mental illness, and being 7-15 years old. Children with psychiatric disorders background, those with a history of physical illness and mental retardation, would be excluded from the study. Evaluation of inclusion and exculsion criteria was performed according to DSM V based on an interview conducted by a child psychologist. The data collection method in this study was through interviews and questionnaires. Systematic sampling was performed periodically and the project was carried out in such a way that the researcher, after obtaining a license and a letter of introduction from the relevant organizations and coordinating with the relevant authorities, was present in the earthquake-stricken areas among the earthquake victims and systematically selected the tent or the conex box periodically and from the selected tent or conex box, if possible, a child, according to the inclusion and exclusion criteria of the study, was selected in an accessible way, and if the legal guardian agreed, the children included in the study.

Research tools

Insomnia Severity Index: This index measures the severity of insomnia over the past two weeks and has 5 questions, and its minimum and maximum score is between 0 and 28. The high score in this questionnaire indicates serious risks and the need for clinical support, and the low score indicates that the person does not have significant insomnia. This test was first presented and used by Morin et al. in 1993, whose structural validity was 0.72 with variance of 0.74 and 0.78 with Cronbach's alpha method. In Iran, Haidari, Ehteshamzadeh and Marashi (2010) in a study calculated the reliability coefficient of this questionnaire using Cronbach's alpha and composite alpha methods. These coefficients were 0.78 and 0.72 respectively, which indicate generally acceptable coefficients.[22]

Data analysis

In performing analyses, to determine the distribution of age and sex of the children along with information about age, education, employment status, number of siblings, parents' economic condition, family disorder, loss of home, the current place of living and the severity of insomnia, descriptive statistics methods (frequency and percentage) were used. In order to measure the relationship between the severity of insomnia with the demographic characteristics of the child and the parents and their self-report records, the Chi-square test was used and, if it was necessary, the Fishers accurate test was used. At the end, the information about 337 people was collected and entered into the software and was analyzed by the relevant statistical methods using SPSS 20 statistical software. All analyses were performed at the error level of 5%.

Result

Totally 337 children participated in the study, of whom 175 were (51.9%) girls and 162 (48.1%) boys, 111 (48.1%) were at the age of 7-9, 126 (37.4%) in the age group of 10-12 years, 100 children (29.7%) were at the age of 13-15. 194 children (57.6%), who participated in the study, had 1-2 siblings, 120 children (35.6%) had 3-4 siblings and 23 children (6.8%) had more than four siblings. The majority of these children's fathers, 208 (61.7%), were 36-45 years old and the minority, 51 (15.1%), were 25-35 years old. 78 (23.1%) of the fathers were <46 years old. The majority of these children's mothers, 161 (47.8%), were 36-45 years old and 146 (43.3%) were 25-35 years old and the minority, 30 (8.9%), were 46. Most of these children's fathers, 188 (55.8%), did not have a High School diploma, and the minority of them, 42 (12.5%), had Bachelor-degree. And the majority of these children's mothers, 225 (66.8%), did not have a High School diploma as well and the minority of them, 15

(4.5%), held bachelor degree. Most of the fathers, 240 (71.2%), were self-employed and minority of them, 28 (8.3%), were unemployed. Also, 69 (20.5%) of the fathers were employees. The economic condition for the majority of the participants in this study, 193 (57.3%), was average and 118 (35%) of them were poor. Minority of the participants, 26 (7.7%), declared that they had good economic condition. The majority of the children, 280 (83.1%) of them, had not experienced the death of a family member or a relative. 277 people (82.2%) had lost their homes in the earthquake. 167 people (49.6%) lived in tents and 170 people (50.4%) lived in conex boxes. Also, 229 people (68.0%) reported the most important problem in their lives, at that time, lack of hygiene and 108 people (32.0%) reported lack of housing.

The prevalence of adjustment insomnia in these children was reported to be positive for 200 people (59.3%) (Table 1). A study of the relationship between demographic characteristics and self-report records of parents and their children with the severity of insomnia showed that there is a statistically significant relationship, with 5% error level, between the age of children and the severity of insomnia (P <0.05). This means that as the children get older, insomnia increases in them. So that most children who had normal sleep were younger and children with insomnia were older (Table 2).

Table 1: Investigating the demographic characteristics of children and their parents with the severity of insomnia prevalence

Variable	Levels	Frequency(%)	Variable	Levels	Frequency (%)
Child's age	7-9	111(32.9)	**Child's gender**	girl	175(51.9)
	10-12	126(37.4)		boy	162(48.1)
	13-15	100(29.7)	**Father's job**	employee	69(20.5)
The number of siblings	1-2	194(57.6)		Self-employed	240(71.2)
	3-4	120(35.6)		unemployed	28(8.3)
	> 4	23(6.8)	**Economic condition**	poor	118(35)
Father's age	25-35	51(15.1)		average	193(57.3)
	36-45	208(61.7)		good	26(7.7)
	36-45	161(47.8)	**Death of a family member or a relative**	yes	57(16.9)
	>= 46	30(8.9)		No	280(83.1)
Father's education	Secondary or lower	188(55.8)	**Family history of mental disorder**	yes	82(24.3)
	High School to Associate's degree	107(31.8)		No	255(75.7)
	Bachelor's degree	42(12.5)	**Losing home**	yes	277(82.2)
Mother's education	Secondary or lower	225(66.8)		no	60(17.8)
	High School to Associate's degree	97(28.8)	**The current place of living**	Tent	167(49.6)
	Bachelor's degree	15(4.5)		Conex Box	170(50.4)
Insomnia	No	137(40.7)	Total		337(100.0)
	Yes	200(59.3)			

Table2: The results of the relationship between the age of the child and the loss of the home with the severity of insomnia.

Variable		Insomnia		X2 (Sig)
		No	Yes	
Child's age	7-9	35(25.5%)	65(32.5%)	7.86 (0.020)
	10-12	45(32.8%)	81(40.5%)	
	13-15	57(41.6%)	54(27.0%)	
Loss of home	Yes	17(12.4%)	43(21.5%)	1.93 (0.034)
	No	120(87.6%)	157(78.5%)	

The results of Table 2 also showed that among children with insomnia, 157 people (78.5%) had lost their homes, and it was found that there was a statistically significant relationship between home loss and the severity of insomnia in children. (P<0.05).

Discussion

The aim of this study was to investigate the prevalence of adjustment insomnia in children survived the earthquake which hit the west of Iran in 2017. The present study showed that the prevalence of adjustment insomnia was found in 59.3% of the children. This finding, the prevalence of sleep problems in children and teenagers who survived the earthquakes and natural disasters, is aligned with the studies done by others such as Tang et al.[19], Geng et al.[8], Brown et al.[23], Pynoos et al.[16] Brown et al.[23], thirty months after Katrina event, in a study done on children aged 8 to 15, reported sleep disorders 50 percent in them. Also, in another study sleep disorders were seen in more than 50 percent of the children who survived the earthquake.[16] Some studies have reported a lower prevalence; in a study by Geng et al.[8], the prevalence of general sleep problems, 18 to 30 months after the earthquake, using the overall PSQI scale of 28.79 to 30.18 percent among 1573 teenagers surviving the 2008 earthquake, has been reported. In the study done by Tang et al.[19], three years after the earthquake, more than 29.1% of the children and the teenagers (9 to 18 years old) who survived the 2013 earthquake had sleep problems.

In comparison with the studies done on the general population in Iran, sleep problems were more common in the present study.[24] In a study in which Panaghi et al.[24] investigated sleep disorders in elementary school students in Tehran, they reported sleep disorders 41.6% in primary school children. Also, cross-sectional studies in the United States have reported sleep problems 19.3 percent in 700 children between the ages of 5 and 12.[25]

In explaining this finding, we can point to some mechanisms in this field. According to the model of emotional regulation of trauma, there is a network of fear that contains a lot of information about the causes of fear in the memory of the affected people. Information related to this structure of fear can be activated by real or imaginary clues related to trauma and ultimately lead to a response to fear.[26] Therefore, people who have already been exposed to trauma often stay alert to protect themselves from these real or imaginary threats, for example through experiencing disturbed dreams that recreate the traumatic event during sleep. This explanation is also supported by the finding, which shows that the survivors of traumatic events experience increased arousal during sleep, which leads to lighter sleep or more intermittent sleep.[27]

However, to explain the above finding, it should be noted that the present study was mainly cross-sectional, therefore, for practical reasons, the participants could not be followed. If the data set was longitudinal, the causal relationship between the variables could be examined effectively. The longer the time between the earthquake and the survey is, the more secondary or independent factors occur that can play a role in creating these relationships. Therefore, other factors, including socio-economic status, side effects of medications, psychological factors, environmental factors and the child's interactions with parents may play a role in the prevalence of insomnia in children.[28] For example, studies by Bavafa et al.[29] and Mohammadi et al.[30], which were done on earthquake survivors in Kermanshah (West of Iran), showed that the severity of depression, anxiety, and stress can predict sleep quality in survivors[29] and there was a significant positive relationship between the quality of sleep and physicality, obsessive-compulsive disorder and depression.[30]

In addition, the study found that among the children who had sleep problems 157 (78.5%) of them had lost their homes. This finding is consistent with the research done by Iwadare et al.[17], as well as the one done by Usami et al.[18] As the previous studies have shown, the effects of catastrophic physical damage (financial failure, home destruction, and the destruction of health care) can predict sleep problems in the survivors. Those who have lost their homes live in a worse physical environment. Limited living space, living in conex boxes with poor cooling and heating facili-

ties, and poor hygiene can all contribute to sleep problems. In addition, financial failure and the effects of physical destruction can lead rumination before sleep.[31] Being worried about safety may trigger cognitive arousal that can delay the onset of sleep. The existence of these connections can also reflect the "memory of fear", which suggests that the experience of infinite fears beyond the capacity of children and teenagers can lead to abnormal sleep patterns in them.[19, 23, 26]

It was also found that there is a significant statistical relationship between children's age and their sleep problems. Most children who slept normally were younger and children with insomnia were older. This finding is consistent with the results of the studies done by Tang et al.[10] in which the various sleep problems in the children and the teenagers who had survived the earthquake increased as they got older. This finding can be explained by the fact that the students of higher grades may be exposed to more academic stress than the students of lower grades.[8] Therefore, one of the reasons for this finding is the increase in the child's understanding of stress and the stress caused by environmental and family conditions, as well as worries and stress caused by school conditions of higher grades, more difficult lessons and more homework.

The results of the present study should be interpreted according to its limitations, among the limitations of the present study we can mention the limited number of samples and the non-random sampling method. The study also used a questionnaire that may have led to biased answers. In addition, the participants' sleep conditions before the earthquake were unknown, and it is recommended that these cases be resolved in further research and the people be tracked.

The present study showed that exposure to natnatural disasters can lead to sleep problems in the children who have survived an earthquake. Due to special physical and emotional conditions, children and teenagers are exposed to sleep problems during traumatic events and natural disasters such as earthquakes. Also, natural disasters, especially events such as earthquakes which are sudden and surprising, can cause temporary or permanent sleep problems in children. Early detection of sleep problems in the children who have survived an earthquake can help pediatric therapists design and implement intervention programs. In addition, by examining the prevalence of these disorders, the necessary measures can be taken to provide services to this group.

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