ORIGINAL RESEARCH

A Simultaneous Cluster Analysis of Cognitive, Emotional, and Personality Factors and Insomnia and Sleep Quality Among Earthquake Victims

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ABSTRACT

Objective: The current study compares the measures of sleep quality and intensity of insomnia based on the clustering analysis of variables including dysfunctional beliefs and attitudes about sleep, experiential avoidance, personality traits of neuroticism, and complications with emotion regulation among the individuals struck by an earthquake in Kermanshah Province.

Methods: This study is a cross-sectional study that was carried out among earthquake victims of Kermanshah Province (western Iran) in 2017. Data were gathered starting 10 days after the earthquake and lasted for 2 weeks; of 1,200 standard questionnaires distributed, 1,001 responses were received, and the analysis was performed using 999 participants. The data analysis was carried out using a cluster analysis (K-mean method).

Results: Two clusters were identified, and there is a significant difference between these two clusters in regard to all of the variables. The cluster with higher mean values for the selected variables shows a higher intensity of insomnia and a lower sleep quality.

Conclusions: Considering the current results, it can be concluded that variables of dysfunctional attitudes and beliefs about sleep, experiential avoidance, the personality traits of neuroticism, and complications with emotion regulation are able to identify the clusters where there is a significant difference in regard to sleep quality and the intensity of insomnia. (*Disaster Med Public Health Preparedness*. 2019; 13:745–752)

Key Words: cluster analysis, insomnia, psychological factors, sleep quality

Disasters such as earthquakes can create a high level of stress for residents due to the threat to life and security, which affects the sleep quality of individuals. Under such conditions, predicting the sleep quality and the influences of an earthquake is a very significant issue that should be investigated. The results of one study show that sleep quality of individuals decreases after an earthquake.[1] This can be due to highly stressful conditions after the earthquake. The results of some studies have shown that stress is related to sleep quality.[2,3] In other words, according to scholars, stress is an important factor for understanding the reasons behind insomnia and the decrease in sleep quality. The question is whether all individuals affected by these conditions would suffer from insomnia and reduced sleep quality, and which individuals can have desirable sleep quality under such conditions. The current study has been designed to answer these questions.

Research shows that emotions play an important role in sleep disorders.[4] Moreover, emotional situations can affect sleep patterns differently. These problems can result in difficulty with sleeping or sleep disorders.[5,6] Therefore, one of the variables evaluated in this study is the difficulties in emotion regulation. Today, it is claimed that emotional dysfunction can manifest in all psychological disorders.[7] In regard to sleep, the results of a study indicate the role of emotional regulation complications in insomnia.[8]

Another variable considered in this study is the personality traits of neuroticism. We believe that personality plays a key role in the manifestation of any behavior, and sleep is one of these behaviors. Neuroticism is defined as an individual's constant tendency to experience negative emotional states. Indeed, individuals with this characteristic experience emotions such as anxiety, anger, guilt, and depression much more than others.[9] Some studies have shown that neuroticism is a predictor for sleep quality.[10,11]

However, the majority of studies addressing the role of cognitive factors in insomnia have focused on before-sleep cognitions and nightly cognitions related to

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sleep. Research shows that people suffering from insomnia have more negative thoughts during the hours they are awake at night compared with people with normal sleep.[4] It is believed that people suffering from insomnia are also suffering from negative automatic thoughts and uncontrollable anxiety.[12] In the model presented by Harvey (2002), the roles of negative beliefs and dysfunctional attitudes about sleep in the formation and continuation of insomnia have been studied.[13] The current study also considers these beliefs.

Furthermore, it seems that another important variable in this regard is experiential avoidance whose role in insomnia must be investigated. In the theory of acceptance and commitment, one of the main reasons for pathologies in disorders is the relationship between the individual and thoughts, emotions, and behaviors.[14] Adverse cognitions cannot bring about complications such as insomnia on their own; rather, trying to avoid such negative mental experiences exposes the individual to psychological problems such as insomnia.[8]

Although there have been studies on the relationship between sleep and personality,[10,11] emotional regulation,[4,8] and thoughts,[12,13] there have been no studies on the combined roles of these variables on sleep and on the identification of clusters. On the other hand, the roles that these variables play among people who are under stressful conditions such as earthquakes have been neglected. Thus, the current study has been carried out to compare the measures of sleep quality and the intensity of insomnia based on the clustering obtained based on variables of dysfunctional attitudes and beliefs about sleep, experiential avoidance, personality traits of neuroticism, and emotional regulation problems among the earthquake victims in urban and rural areas of Kermanshah Province.

METHODS

This study was a cross-sectional study carried out among earthquake victims in urban and rural areas of Kermanshah Province in western Iran in 2017. Kermanshah, the capital of Kermanshah Province, is located 525 km (326 mi) from Tehran in the western part of Iran. According to the 2011 census, its population is 851,405. After the 7.3-magnitude earthquake in October, 2017, which resulted in a large number of deaths and injuries and the devastation of a number of cities, we decided to carry out this study. The process of gathering data started 10 days after the earthquake and lasted for 2 weeks. At first, 1,200 questionnaires were distributed among the residents of Sarpol-e Zahab city district (the epicenter of the earthquake), 1,001 questionnaires were later retrieved, and, finally, the analysis was performed using 999 participants. Participation in the study was completely voluntary and with the participants' consent. The questionnaire was administered to individuals who were at least 15 years of age with the ability to read and write. Moreover, the participants had to be local residents of the area with at least 5 years of residency. The questionnaires were completed in the presence of researchers, and the necessary guidelines were given on the spot.

After the research and its objectives were explained by the research team members, participants were allowed to answer the questionnaires. The participants were fully confident that their information would remain confidential and would not be shared with any organization or person and would be used solely for research purposes. The health and safety of each subject during and after the research were prioritized to our other concerns. Therefore, the research was designed and executed by people who had the necessary expertise and skills. Generally, there was no financial or health risk to the participants. In addition, the research complies with the Declaration of Helsinki.

Instruments

Pittsburgh Sleep Quality Index (PSQI)

The index is a self-report questionnaire developed by Buysse et al.[15] in 1989. This questionnaire is a standard questionnaire with 18 questions classified into 7 components. The first component is related to the mental quality of sleep, which is measured using 1 question (Question 9). The second component is related to the delay in falling asleep, which is measured based on the mean of the score for Question 2 and the score for the first part of Question 5. The third component is related to the duration of sleep, which is measured by 1 question (Question 4). The fourth component is related to the efficiency and effectiveness of sleep, whose score is calculated by dividing all of the hours of sleep by the hours that the individual is in bed, multiplied by 100. The fifth component is related to sleep disorders and is obtained by calculating the average score of Question 5. The sixth component is related to the consumption of sleeping drugs, which is measured using 1 question (Question 6). The seventh component is related to undesired functions during the day, which is measured using 2 questions (the mean score of Questions 7 and 8). The score for each question is from 0 to 3, and the maximum score for each component is 3. The collection of these 7 components provides the total score for the questionnaire, which can be from 0 to 21. The higher the obtained score is, the lower the sleep quality. Scores higher than 5 indicate undesirable sleep quality. The reliability of PSQI has been calculated using the Cronbach alpha coefficient, which was 0.83.[8] In the current study, the Cronbach alpha coefficient was 0.94.

Insomnia Severity Index (ISI)

To measure the extent of insomnia, the ISI questionnaire is used, which contains 7 questions, including questions for evaluating the presence of disorders in falling sleep, continuing to sleep (waking up repeatedly), waking up too soon, satisfaction with sleep pattern, the interference of

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sleep problems with daily functions, the effects of sleep disorder on quality of life, and creating concerns for the individual due to a sleep disorder. Depending on the intensity of the disorder, each one of these questions gets a score from 0 to 4, and the final score for the individual is obtained by adding the scores of these 7 questions.[16] In the current study, the Cronbach alpha coefficient for this questionnaire was 0.92.

Difficulties in Emotion Regulation Scale

This questionnaire is a self-report instrument that includes 36 items and 6 subscales. The subscales of this instrument include the following:

(1) Non-acceptance of emotional responses (NONACCEPT): 11, 12, 21, 23, 25, 29
(2) Difficulty engaging in goal-directed behavior (GOALS): 13, 18, 20, 26, 33
(3) Impulse control difficulties (IMPULSE): 3, 14, 19, 24, 27, 32
(4) Lack of emotional awareness (AWARENESS): 2, 6, 8, 10, 17, 34
(5) Limited access to emotion regulation strategies (STRATEGIES): 15, 16, 22, 28, 30, 31, 35, 36
(6) Lack of emotional clarity (CLARITY): 1, 4, 5, 7, 9

Total score: sum of all subscales

This questionnaire was developed by Gratz and Roemer[17] for measuring difficulties in emotional regulation. Higher scores indicate higher levels of difficulties in emotion regulation. The reliability of the original scale using the Cronbach alpha coefficient was reported as 0.93 and using test-retest was reported as 0.88.[17] In the current study, the Cronbach alpha coefficient for this scale was obtained as 0.82.

Experiential Avoidance Questionnaire

This questionnaire was developed by Hayes et al. (2004).[18] Its original form included 32 items scored, based on a 7-option Likert spectrum. The later versions included 16 and then 9 items. However, the final version of this questionnaire included 10 items scored, based on a 7-option Likert spectrum (the current study uses this version). A previous study has reported a single-factor structure for this scale with a Cronbach alpha coefficient of 0.84.[18] The reliability of this scale was measured in Iran in 2012 and the Cronbach alpha coefficient was obtained as 0.82. To evaluate the reliability of this scale, tools such as the Beck Anxiety Scale, Beck Depression Scale, and Difficulties in Emotion Regulation Scale were used, with correlation coefficients equal to 0.44, 0.59, and 0.59. The results of the factor analysis show that the factors have an acceptable weight.[19] In the current study, the Cronbach alpha coefficient was obtained as 0.76 for this questionnaire.

Dysfunctional Beliefs and Attitudes About Sleep (DBAS)

This scale, which was developed by Morin (1993),[12] including 10 items related to dysfunctional beliefs and attitudes before falling asleep, presumed to play a role in the continuity of sleep problems. The participants were asked to indicate their level of agreement with each item on a Likert spectrum from 0 to 10. Higher scores indicate higher dysfunctional beliefs and attitudes about sleep. The internal consistency of this scale, measured by Morin et al. (2007),[20] using the Cronbach alpha coefficient, was reported as 0.77 for a clinical population and 0.79 for an ordinary population. In the current study, the Cronbach alpha coefficient for this questionnaire was obtained as 0.93.

Zuckerman–Kuhlman Personality Questionnaire

This questionnaire is the 50-item version of Zuckerman–Kuhlman Personality Questionnaire. It includes 5 personality dimensions, one of which is the neuroticism trait. The questions related to the neuroticism scale include 10 items. The participant is asked to mark the answer to each item on a 2-option spectrum (*true* or *false*). The scoring involves giving the *true* option a score of 1 and the *false* option a score of 0 in some cases and, in some other cases, the *true* is scored as 0 and the *false* is scored as 1.[21] In the current study, the Cronbach alpha coefficient for the neuroticism items was obtained as 0.79.

Data Analysis

The obtained data were analyzed using the SPSS-22 software application. At first, K-mean was used for the cluster analysis. The criteria for clustering the participants involved their status in regard to variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, personality traits of neuroticism, and emotion regulation difficulties. In fact, the objective of a cluster analysis was to identify a classification scheme for the categorization of participants into 2 clusters in a way that individuals in the same cluster are similar to each other in regard to variables of dysfunctional attitudes and beliefs about sleep, experiential avoidance, personality traits of neuroticism, and difficulties with emotion regulation. After the cluster analysis was carried out, the variables were compared using the analysis of variance (ANOVA) test.

RESULTS

The results were analyzed for 999 participants, among which 57% were female. The participants' age range was 15–68 years with an average age of 30.68 ± 11 years. The demographic information for the selected sample is presented in Table 1. As shown in the table, there is a significant difference in the quality of sleep and insomnia severity among age groups; in other words, older people have more sleep problems. The results also showed that women have less sleep quality and higher insomnia than men.

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TABLE 1

Sociodemographic Characteristics of Participants Included in the Analyses (n = 999)

			Sleep Quality	Insomnia Severity
Characteristics		**Percent**	**M ± SD**	**M ± SD**
Age (years)	< 30	57.2	4.59 ± 3.13	6.15 ± 5.76
	30–50	34.8	5.51 ± 3.82	7.80 ± 6.73
	> 50	8	7.44 ± 5.59	9.53 ± 7.86
	P		***0.001***	***0.001***
Sex	Male	57.2	4.40 ± 2.98	6.05 ± 5.43
	Female	42.8	5.70 ± 4.09	7.74 ± 6.90
	P		***0.001***	***0.001***
Education level	Junior school	41.4	5.01 ± 3.71	6.47 ± 5.91
	High school diploma	47.1	5.10 ± 3.55	7.21 ± 6.36
	University degree	11.5	5.70 ± 4.26	8.23 ± 7.72
	P		***0.27***	***0.02***
Employment	Unemployment	53.4	5.47 ± 3.98	7.49 ± 6.79
	Student	16.8	4.28 ± 2.58	6.75 ± 5.75
	Employed	29.8	5.01 ± 3.68	6.48 ± 5.96
	P		***0.005***	**0.08**
Marital status	Married	55.8	5.64 ± 4.22	7.63 ± 7.02
	Single	41.3	4.53 ± 2.87	6.27 ± 5.34
	Other	2.9	4.43 ± 2.71	6.51 ± 5.76
	P		***0.001***	***0.005***
Substance abuse	Yes	1.0	9.14 ± 6.25	14.89
	No	99	5.10	6.94
	P		***0.004***	***0.009***
Gross household income	< 250 $	48.5	6.81 ± 4.50	9.59 ± 7.49
	250–500 $	42.5	4.15 ± 2.65	5.26 ± 4.73
	500–750 $	8.6	3.78 ± 2.03	5.25 ± 2.50
	> 750	0.5	2.50 ± 1	4.66 ± 3.99
	P		***0.001***	***0.001***
Physical illness	Yes	17.5	7.14 ± 4.91	9.84 ± 7.76
	No	82.5	4.73 ± 3.29	6.41 ± 5.87
	P		***0.001***	***0.001***
Psychological disorder	Yes	4.6	7.23 ± 5.91	10.11 ± 8.73
	No	95.4	5.03 ± 3.54	6.86 ± 6.21
	P		***0.001***	***0.001***

In Table 2, the rate of sleep quality and intensity of insomnia are considered after considering the severity of the disaster. The results of this table show that the components of disaster severity, including physical damage, house demolition, and job loss, contribute to sleep problems and severity of insomnia. In other words, those who have been physically injured, or their homes have been destroyed or lost their jobs, are more likely to have problems with sleep than others.

After performing the cluster analysis, participants were divided into 2 clusters. Participants in Cluster 1 included those who scored higher for variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of neuroticism, and difficulties with emotion regulation, whereas the participants in Cluster 2 were those who scored lower for the same variables. Table 3 presents the initial centroids for the clusters.

The results in Table 3 indicate that the centroids calculated for variables include 100 for the variable of dysfunctional beliefs and attitudes about sleep, 58 for the variable of experiential avoidance, 18 for the variable of neuroticism, and 152 for the variable of difficulties in emotion regulation as the preliminary means. Then, the individual scores closer to these mean values were considered as the first cluster, and the scores with higher distance from these centroids were entered into the second cluster. For the 4 variables considered, the initial centroids in the second cluster included 28, 30, 10, and 40, respectively. The results show that, in the 10th iteration, changes in the clusters' centroids reached 0. Table 4 compares the mean values of these variables based on the clusters.

In addition, the results in Table 3 show that the first cluster includes 386 participants and the second cluster includes 589 participants. Moreover, there is a significant difference between the 2 clusters in regard to all of the selected variables. In other words, the mean scores in the first cluster are higher for variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of

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TABLE 2

Sleep Quality and Insomnia Severity According to Damages

		N (%)	Sleep Quality M ± SD	Sleep Quality *P*	Insomnia Severity M ± SD	Insomnia Severity *P*
Physical Injury	Yes	185 (18.5)	7.29 ± 5.82	0.001	11.44 ± 8.75	0.001
	No	787 (78.8)	4.70 ± 2.87		6.01 ± 5.19	
Death of Relatives	Yes	590 (59.1)	5.37 ± 3.51	0.11	7.07 ± 5.78	0.79
	No	404 (40.4)	4.96 ± 3.83		6.97 ± 6.76	
Physical Injury of Relatives	Yes	627 (62.8)	4.92 ± 3.74	0.26	6.89 ± 6.47	0.46
	No	363 (36.3)	5.51 ± 3.63		7.21 ± 6.22	
House Damages	Yes	854 (85.5)	5.24 ± 3.84	0.001	7.29 ± 6.53	0.001
	No	136 (13.6)	4.28 ± 2.43		5.12 ± 4.87	
Job Loss	Yes	315 (31.5)	6.22 ± 4.71	0.001	9.29 ± 7.64	0.001
	No	632 (63.3)	4.67 ± 3.01		5.81 ± 5.22	
Temporary Housing	Yes	927 (92.8)	5.11 ± 3.70	0.93	7.15 ± 6.22	0.78
	No	72 (7.2)	5.16 ± 3.65		6.91 ± 6.33	

TABLE 3

Initial Cluster Centers and the Mean Values of These Variables Based on the Clusters

	Cluster 1 (n = 386)		Cluster 2 (n = 589)			
Variable	**ICC**	**M ± SD**	**ICC**	**M ± SD**	**F**	***P*-value**
Dysfunctional beliefs and attitudes	28	75.0 ± 11.3	100	42.4 ± 11.1	2026.97	0.001
Experiential avoidance	30	38.8 ± 8.1	58	35.0 ± 8.0	51.90	0.001
Neuroticism	10	15.8 ± 2.2	18	14.4 ± 2.6	75.58	0.001
Emotional dysregulation	40	102.4 ± 16.3	152	99.8 ± 15.0	9.14	0.003

F = ANOVA; ICC = initial cluster centers; M = mean; SD = standard deviation.

TABLE 4

Mean Scores of the Intensity of Insomnia and Sleep Quality for the Two Clusters

Variable		**Total M ± SD**	**Cluster 1 M ± SD**	**Cluster 2 M ± SD**	**F**	***P*-value**
Insomnia Severity		6.7 ± 6.1	9.7 ± 7.4	4.9 ± 4.4	134.25	0.001
Sleep Quality	Subjective sleep quality	1.2 ± 0.7	1.4 ± 0.8	1.1 ± 0.5	61.39	0.001
	Sleep latency	1.1 ± 0.8	1.2 ± 1.0	0.9 ± 0.6	26.71	0.001
	Sleep duration	0.6 ± 0.6	0.7 ± 0.8	0.6 ± 0.6	0.77	0.380
	Sleep disturbances	0.9 ± 0.7	1.1 ± 0.9	0.8 ± 0.5	32.52	0.001
	Use of sleeping medication	0.3 ± 0.7	0.5 ± 0.9	0.2 ± 0.5	28.95	0.001
	Daytime dysfunction	0.6 ± 0.8	0.9 ± 1.0	0.4 ± 0.6	94.74	0.001
	Habitual sleep efficiency	0.4 ± 0.7	0.6 ± 0.9	0.3 ± 0.6	21.73	0.001
	Total	5.1 ± 3.7	6.3 ± 4.9	4.3 ± 2.4	62.33	0.001

F = ANOVA; M = mean; SD = standard deviation.

neuroticism, and difficulties with emotion regulation. Furthermore, the results in Table 3 show that the highest difference between mean scores of the clusters is related to the variable of dysfunctional beliefs and attitudes about sleep ($F = 2026.97$), whereas the lowest difference between mean scores of the clusters is seen for the variable of difficulties in emotion regulation ($F = 9.14$).

Table 4 compares the mean scores of the intensity of insomnia and sleep quality for the 2 clusters. The results in the table show that, in regard to variables of intensity of insomnia and sleep quality, there is a significant difference between the 2 clusters. In other words, in the first cluster, the intensity of insomnia is higher and sleep quality is lower. Among the subscales of sleep quality (except for sleep

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duration), there is also a significant difference between the 2 clusters. Furthermore, the results show that, for the entire selected sample, the mean score for intensity of insomnia is 6.72 and the mean score for sleep quality is 5.09.

DISCUSSION

The results of the study show that sleep quality for the selected sample is not good. The results of the study in regard to this section is in line with previous studies,[1,22,23] which reported that, after an earthquake, individuals encountered decreased sleep quality, insomnia, and other sleep disorders. In earthquake-struck areas, individuals do not have good mental conditions because their houses are ruined, they are injured, or they have lost their family members, so most of them have to live in shelters or tents. All of these issues can be justified reasons for insomnia and lower sleep quality.

Our research also found that issues such as physical injury caused by the disaster, house demolition, and job loss contribute to sleep problems and severity of insomnia. In other words, those who have been physically injured or have lost their homes to destruction and/or their jobs are more likely to have problems with sleep than others. In this regard, the results of 1 study showed that there is a relationship between sleep variables such as house damage and evacuation experience with sleep duration in the post-earthquake period.[24]

The current study was carried out in rural and urban areas of Kermanshah Province to compare the measures of sleep quality and intensity of insomnia based on the clustering performed using variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of neuroticism, and difficulties with emotion regulation among the earthquake victims. The results of the study show that there is a significant difference between the 2 clusters in regard to variables of intensity of insomnia and sleep quality. This means that variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of neuroticism, and difficulties with emotion regulation can distinguish between "good sleeper" and "poor sleeper" individuals. In other words, people with higher scores for variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of neuroticism, and difficulties with emotion regulation will have a lower sleep quality and higher intensity of insomnia. On the other hand, people with lower scores for these variables will have a better sleep quality and lower intensity of insomnia.

In fact, we can claim that 2 clusters are composed based on variables of dysfunctional beliefs and attitudes of sleep, empirical avoidance, personality traits of neurotic, and emotional regulation problems. Thus, we named Cluster 1 as "unhealthy cluster in terms of emotional and cognitive factors" and named Cluster 2 as "healthy cluster in terms of emotional and cognitive factors." In Cluster 1, negative thoughts and more cognitive activities about insufficient sleep and the effect of sleep disturbance on health and daily functioning are seen. This causes stress and concern. In samples of Cluster 1, mental stress in the post-earthquake period along with emotional regulation problems lead to adverse consequences such as reduced sleep quality and increased sleep problems. It is believed that the interaction of cognitive and emotional stressors results in sleep problems.[24] This is a matter of clarity in Cluster 1.

In one study on cognitive factors related to insomnia, these factors were divided into descriptions and states. The study sample involved 2 groups; the first one included 53 people suffering from insomnia, and the second group included 33 normal people. The results of the study showed that there was a significant difference between the 2 groups in regard to metacognitive beliefs, cognitive arousal, beliefs and attitudes about sleep, and states of anxiety. For all of these factors, the average scores of people suffering from insomnia were higher.[25] The results of our study are in line with these results.

On the other hand, the results of a longitudinal study show that, at the baseline, there is no relationship between emotion regulation and the commencement and continuation of insomnia. However, in later periods, the results show that difficulties with emotion regulation are related to the commencement and continuation of insomnia, and problems with emotion regulation can also predict the likelihood of insomnia in the future. However, the researchers reported very low effect sizes.[26] The results of another study show that people with low sleep quality have difficulty with accepting their emotions, and when they experience negative emotions, they involve themselves in goal-directed behaviors. Moreover, the results of this study also show that people with lower sleep quality also have difficulty with controlling their impulses. The results of the study show a significant negative relationship between difficulties with emotion regulation and sleep quality.[27] Therefore, the results of our study in this section are in line with previous studies.

To explain the results of the current study, we can consider that an individual's functionality in various mental, cognitive, physiological, and behavioral aspects depends on emotion regulation. Desirable emotion regulation can lead to the regulation of mental assessments and reactions, which in turn results in appropriate reactions to different aspects of life.[28] We believe that people with difficulties in emotion regulation cannot have an appropriate assessment proportionate to stressful situations such as earthquakes. Therefore, they will have more negative emotions, which lead to lower sleep quality and higher intensity of insomnia.

Experiential avoidance is another important variable whose role in insomnia was investigated in the current study.

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Experiential avoidance is one of the constructs in the acceptance and commitment theory. In this theory, one of the main reasons of pathologies in psychological disorders is the individual's relation with thoughts, emotions, and behaviors.[29] In other words, the individual's response to thoughts and emotions indicates his or her health state. The results of the current study confirm this general principle of the acceptance and commitment theory. This is because people with high levels of experiential avoidance, that is, those who avoid their thoughts and emotions and even try to suppress them, will have an extreme negative assessment of unwanted emotions, feelings, and thoughts and do not want to experience these events and deliberately try to control or avoid them.[8] These are deliberate and conscious efforts, that is, they require mental involvement and cognitive activity, which can increase the mental and emotional arousal levels, leading to insomnia or lower sleep quality.

In regard to the role of neuroticism in insomnia and sleep quality, neurotic individuals have a high tendency to experience stress[30] and have difficulties with emotion regulation.[31] Therefore, they are prone to experiencing insomnia and lower sleep quality. On the other hand, it is believed that neurotic individuals are sensitive to symptoms of threats and dysfunctions, which can lead to their dysfunctional response to understanding sleep disorder.[32] This is particularly more tangible under stressful situations such as the situation selected for this study. They may believe these conditions to be more of a threat compared with normal individuals and, when faced with these situations where their bedrooms have been ruined and they have to sleep in shelters or tents, they may not have good reactions and functionality.

Espie (2007)[33] believes that dysfunctional beliefs and attitudes about sleep can play an important intermediary role in the continuation of insomnia. For the sample of the current study, it can be discerned that, because the participants are under stressful conditions, if they have dysfunctional beliefs and attitudes about sleep, they will face more sleep problems under these conditions due to the intermediary role of these beliefs.[33] To explain the results of this section, we can use Espie's (2007) theory[33]; he believes that cognitive-behavioral theories are based on the principle that cognition, emotion, and behavior interact and abnormal thoughts can create negative emotions, leading to changes in behavior. The results of another study[8] show that dysfunctional beliefs and attitudes about sleep compared with other cognitive and emotional variables play a more significant role in predicting insomnia and sleep quality. This is also apparent in the results of our current study.

It is given that the earthquake has caused challenges such as the loss of family members and relatives, the destruction of residential homes, and loss of job. Therefore, it is a stressful situation, and survivors in these conditions experience emotions such as fear, feelings of guilt, anxiety, and sorrow. In this situation, the emergence of emotional states is a natural process. However, people with emotional dysregulation along with high experimental avoidance and a neurotic personality face sleep problems. In fact, the variables of emotional dysregulation, experiential avoidance, personality traits of neuroticism, and ineffective beliefs of sleep in the post-earthquake period act as a set of mediator factors. This is because people with emotional dysregulation (in this study, those in Cluster 1) cannot control the harmful effects of negative emotions such as fear, feelings of guilt, anxiety, and sadness. Sleep problems are one of these harmful effects among survivors of the earthquake. Previously, in a study, the role of mediating variables such as experiential avoidance in the relationship between stress and mental health problems has been confirmed.[34]

CONCLUSIONS

Based on the results of the current study, variables of dysfunctional beliefs and attitudes about sleep, experiential avoidance, the personality traits of neuroticism, and difficulties with emotion regulation are able to identify clusters where there is a significant difference in regard to sleep quality and insomnia. In other words, these variables create 2 distinct clusters, and the cluster where the scores of these variables are higher will have higher insomnia and sleep disorders. Moreover, the role of dysfunctional beliefs and attitudes about sleep is much higher than the other selected variables in creating this distinction. Therefore, it is recommended that to improve sleep quality and reduce the intensity of insomnia in individuals under a stressful situation, psychologists consider these variables. One of the points that should be considered is that a significant proportion of the selected sample (about 200 people) did not have the necessary collaboration with the research team. This challenge may lead to some bias in the results. Finally, the current study has been carried out among earthquake victims in Kermanshah Province of Iran using a voluntary mode of sampling. Therefore, when generalizing its results to other populations, one may be wise to err on the side of caution.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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