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Role of Crisis Management in Reducing Socio-Psychological Vulnerabilities after Natural Disasters (Case Study: Citizens of Bam City)

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Abstract
Natural disasters in various forms have been identified as destructive phenomena during the life of earth planet and are also a serious threat to the inhabitants of the planet. Therefore, this issue leaded to the formation of a process called crisis management which includes activities occurring before, within and after the event to reduce the vulnerability. The country of Iran is considered as one of the world's affected countries from natural disasters due to its geographical location and climate diversity. In this research, the role of crisis management in reducing the socio-psychological vulnerability of affected citizens in 2003 earthquake of Bam city was investigated. Library and field study methods have been used to collect information in this study. Also, a qualitative-quantitative method was used to analyze the data by employing the theme method and consequently the most important factors affecting the citizen's socio-psychological vulnerabilities of Bam city after the earthquake were identified.

Keywords: Earthquake, Socio-Psychological Vulnerability, Bam City, Crisis Management, Theme Method.

Introduction

The expansion of urban space and consequently the increase of urbanization around the world have resulted in more attention to economic and environmental issues as well as different roles and functions in the cities. As the number of megacities in the world increases, natural disasters are among the important issues that matter. It is necessary to make the right decisions at the right time due to the fact that most of these events occur suddenly (Darban Astaneh et al. 2006).

The country of Iran is known as one of the most affected countries in the world by the natural disasters due to its geographical location and climate diversity. Occurring different floods, earthquakes, storms, droughts and etc. over the years have caused many human and financial losses in this country (Ajami and Fattahi, 2009). Approximately 86 percent of Iran's soil is located in earthquake-prone areas on the one hand and a large part of Iran's gross national

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product is spent on compensation for damages caused by natural disasters, on the other hand. Therefore, the issue of crisis planning and management to reduce damages is so important (Hosseini, 2008). The crisis management system in Iran has enough experience in this regard due to the constant exposure to regional crises and this system can control the crises using urgent emergency system, non-governmental organizations such as Red Crescent and the popular mobilization of the forces.

Vulnerability refers to conditions which enhance susceptibility of a community to the impact of hazards. The vulnerabilities in the aftermath of an earthquake could be accumulated due to the immediate impacts of the earthquake including asset loss, livelihood interruptions as well as challenges of people's health caused by temporary relocation. The majority of people at risk from earthquakes do little or nothing to reduce their vulnerability (Villegas-Gonzalez et al. 2017; He et al. 2018; Solberg et al. 2010).

The main objective of risk reduction methodological and operational approaches is to protect lives and properties against the impact of natural or industrial disaster. Although it is unrealistic to expect to live in a risk free environment, it is possible to decrease this risk through pertinent prediction and management strategies (Boukri et al. 2018; Robat Mili et al. 2018). Lack of coherent programs, lack of attention to the needs of health care, poor coordination between agencies and organizations and lack of proper training of volunteers and people are obstacles against effective crisis management in earthquake (Nekoei-Moghadam et al. 2016). People living in areas prone to natural hazards often fail to act, or do very little to lessen their risk of death, injury, or property damage. Therefore the task of facilitating community members to act is a challenging area (Bedini and Bronzini, 2018). A crisis management plan can guide various institutions responsible after natural disasters especially in low- and middle-income countries (Cordero-Reyes et al. 2017; Barthe-Delanoe et al. 2018).

The comprehensive and national crises create a large volume of relief, health and treatment demands in a short period of time depending on the extent of the incident and due to the large populations affected and constraint of the response capacity of the responsible organizations. Their management requires the coordinated use of both national and international material and human resources (Uekusa, 2017; Pongponrat and Ishi, 2017; Mallick et al. 2011). The management of widespread crises in Iran in the past was limited to the aspects of relief-rescue and reconstruction after the accident and other dimensions of the crisis management including prevention, reduction of socio-psychological vulnerabilities and preparedness responses as the part of a coherent and organized process were forgotten (Unlu et al. 2010).

Therefore in this research, it was attempted to study the role of crisis management in reducing the social and psychological vulnerability of citizens affected after natural disasters (Case study: Citizens of Bam City) regarding the importance of the subject.

Material and Methods

Case Study

The Bam County has an area of 5170 km^2 equal to 2.8% of the total area of Kerman province, and this city is located at 58 degrees and 37 minutes east and 29 degrees and 14 minutes north. Bam County leads from the north to Kerman, east to Fahraj, south to the city of Reagan and from the west and southwest to the city of Jiroft and Anbarabad. Table 1 and Figure 1 show the political divisions and the geographical location of the city of Bam (Fallahi, 2008).

Table 1. Bam's latest political divisions

County	District	Village town	City
Bam	Baravat	West Roodbar Kerk and Nartij	Baravat
	Central	Suburbs Deh Bakri	Bam

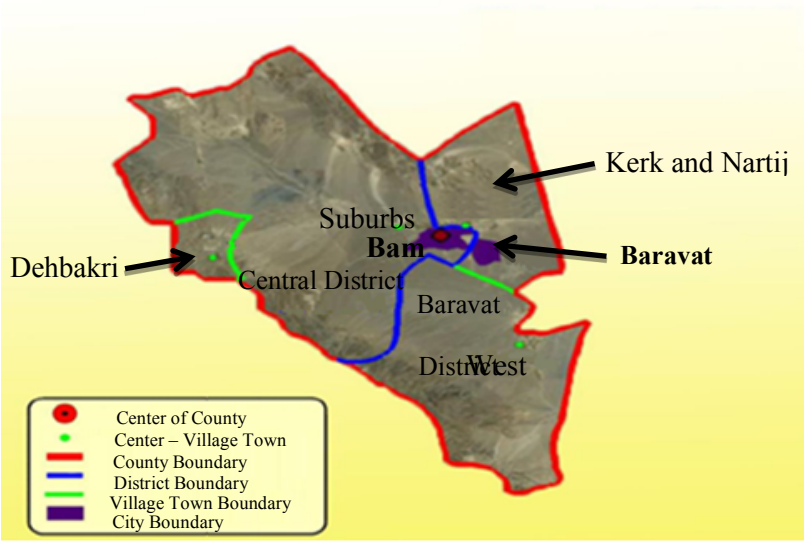

Figure 1. Bam's political borders map

Research Method

The present research is an applied research that seeks to obtain information in order to solve a problem and is a descriptive survey approach. In this research, library studies and field methods were used simultaneously to gather information. In the library studies, content analysis methods and statistics and documents have been used and in the field method, a semi-structured interview and a questionnaire were used. The statistical population of the present research was selected among the citizens of Bam city, managers, planners and experts related to the research topic; also in order to analyze the data, the qualitative-quantitative method has been used.

Theme Method Analysis

In this study, a semi-structured interview with an emphasis on exploratory approach was initially used regarding the subject of the research. This decision was due to the fact that one of the goals of this research was to identify the factors affecting social harm based on qualitative findings. In the first step, the research's main purpose was said to the interviewees and then it was emphasized that the results of the interviews would be used only for scientific purposes (Armas and Gavris, 2013).

According to the title of the research, the questions were included in the interview and other questions were raised regarding the responses due to its semi-structured nature and the concept of the answers was provided for clarification. At the end of the interview, the interviewees were asked if they would add another item. After the interviews, the content of the interviews was carefully implemented and were used for analysis along with the notes. The theme analysis method which is widely used in qualitative research was applied to analyze the text of the interviews. Based on this method, the interview's content was implemented at the first step and then completed using the notes taken during the interviews. In the following, all identified

effective factors in most of the concepts and sub-themes were recognized by studying the implemented texts carefully for each of the interviews. Then the code was assigned to each one. This process was done for each interview and for sections with similar content in the context of previous interviews, the previous codes were used as indicators. Subsequently, for all of the identified sub themes, a more general classification was made throughout the research, leading to the identification of the main themes of the research.

Factor Analysis

In this research, factor analysis has been used to find out the underlying variables of a phenomenon and the summary of the data. The primary data for factor analysis in this study was the matrix of correlation between variables.

Results and discussion

At first, the theme method based on the semi-structured interview was used in order to collect information in this research. In this way, the necessary coordination was done with the citizens after designing the questions and the preconditions for the interview were provided. Each interview lasted about 30 minutes and questions were asked from interviewees.

According to what already was mentioned, the collected data were first carefully weighed to identify the most important factors affecting post-earthquake related socio-psychological vulnerabilities in Bam city after the interview. Then, various concepts used in this research were extracted by incorporating data into tables and separating meaningful sentences in different rows. These concepts encoded in terms of apparent content in conceptual categories that in fact represent an independent concept. The above categories referred to in the various sections were compiled and classified according to the Table 2.

After putting the text of the interviews and giving the code to each sub-concept, similar concepts were separated and the main concepts were implemented. In this stage, the most important factors affecting the socio-psychological vulnerabilities after the earthquake in Bam city were identified.

After analyzing the qualitative data and putting together similar concepts, it became clear that the most important factors affecting the socio-psychological vulnerabilities after the earthquake in Bam city are as follows in Table 3:

After identifying the most important factors affecting post-earthquake socio-psychological vulnerabilities in the city of Bam, the identified factors were reduced using the exploratory factor analysis method due to the multiplicity of factors and in order to find out the underlying factors and to reduce the number of factors. The findings were as follows:

The number of women among all 384 respondents was 153 and there were 231 men present in the list. In this study, 39.8% of respondents were men and 60.2% of the respondents were women. Regarding the age of the respondents, the findings showed that 32% of them were less than 30 years old, 36.2% were between 30-40 years old, 17.4% were between 40-50 years old and 14.4% were older than 50 years old.

On the other hand, the findings of the research regarding the educational qualifications showed that 13.5% had diplomas and less than diplomas, 45.6% had undergraduate degrees, 26.6% were graduate students and 14.3% had Ph.D. qualifications.

Table 2. The results of the theme method to identify the factors affecting the socio-psychological vulnerabilities after the earthquake in Bam city.

Factor Code	Similar Concepts	The most important factors affecting socio-psychological vulnerabilities after the earthquake in Bam city
1	I'm deeply depressed / I'm deeply depressed after the earthquake / I'm not interested in life like past / I cannot enjoy life like past / I think so much about suicide / I always feel there's no reason to be happy / it's been I want to die / I feel very depressed / I'm no longer happy in my life / Nothing is important / I'm always sad / I'm depressed at all the time.	Depression
2	I'm always worried after the earthquake / I think more unfortunate events happen to me / I always think that tomorrow is again an earthquake / I always feel worried / I'm always worried about everything / I think more unfortunate events happen to me, but it's no longer important.	Stress
3	I'm really disappointed of my future / I think another earthquake will happen again / I'm disappointed of future because I have nothing / i have no longer hope for life.	Decrease in life expectancy
4	I think that it is again earthquake happening and I feel it	Understanding unrealistic experience
5	After this earthquake, I'm very angry / Street clashes are very common in the city / If someone joking with me, I will get angry fast/ People in the street fight each because of the smallest issue / I think everyone is angry	Anger
6	I think I cannot resist anything	Reduced self confidence
7	I think that without my family, life has become meaningless / I do not have anyone to speak with him / someone does not pay attention to us.	Loneliness
8	I do not think	slowness in intellectual activity
9	Many of my friends have been addicted / Drugs have become abundant	Addiction
10	I always wake up after a dream with a heart beat/ I'm having a major problem with sleeping / I sleep very late / I cry in my sleep	Insomnia
11	My family say i have hallucinate in sleeping	Painfulness
12	Many of my friends have migrated to other cities	Migration
13	I no longer trust anything	Distrust
14	I've lost my focus / I'm no longer focused on the past / I'm too distracted and I forget everything / I cannot focus.	Reduced focus
15	Sometimes I feel that my whole body is painful / Sometimes my body is shaking without reason	Physical pains
16	I do not have appetite and I usually eat very little	Anorexia
17	Unemployment has engaged my mind	Unemployment
18	I lost all my assets	Financial problems

Table 3. the most important factors affecting socio-psychological vulnerabilities after the earthquake in Bam city

No.	Factor	No.	Factor
1	Depression	10	Insomnia
2	Stress	11	Painfulness
3	Decrease in life expectancy	12	Migration
4	Understanding unrealistic experience	13	Distrust
5	Anger	14	Reduced focus
6	Reduced self confidence	15	Physical pains
7	Loneliness	16	Anorexia
8	Reduction in intellectual activity	17	Unemployment
9	Addiction	18	Financial problems

The results of the definitions of the use of factor analysis

Before using factor analysis method, it was necessary to ensure that the scores of correlation coefficients between the questions of the questionnaire were high. According to the findings of the present study, Kayser, Mire & Alkin index was 0.87. Thus, the data related to this variable could be reduced to a number of underlying and fundamental factors.

In addition, the Bartlett Sphere test (356/2995 = x2 ، 435 = df ،000/0 > P) showed that the correlation matrix between items is not a unique single matrix. Therefore, there is a high correlation between the items inside each factor and on the other hand, there is no correlation between the items of an agent with other factors. These findings provide the necessary assumptions for using the factor analysis of this study.

Exploratory Factor Analysis

The main component analysis method was used to examine the factor structure of the questionnaire. In order to determine the number of components, a special value chart was drawn and the number of factors to be extracted was determined based on the Scritic criterion. Also, the variance ratio explained by each factor was determined by the relevant data presented in Table 4.

Table 4. Total explained variance for special value of agents

	Extracting the sum of the squared loads of the factor			Rotation of the total squared load factor		
Factors	The specific value	percentage of variance	Cumulative variance percentage	The specific value	percentage of variance	Cumulative variance percentage
First	6.928	23.095	23.095	4.622	16.58	16.587
Second	3.177	10.589	33.683	3.253	12.86	29.45
Third	1.772	5.905	39.588	2.721	12.19	41.654
Fourth	1.513	5.043	44.631	1.822	11.783	53.437
Fifth	1.315	4.383	49.014	1.822	11.388	64.825
Sixth	1.014	3.381	52.395	1.248	10.409	75.234

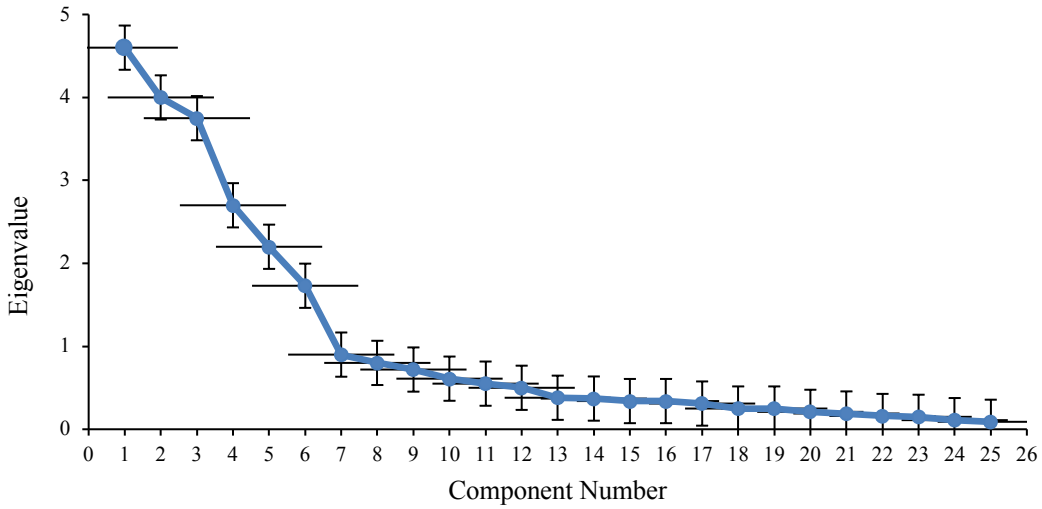

Figure 2. Scritic diagram based on principal factors analysis

Factor analysis based on principal factors analysis led to the extraction of six factors with a specific value higher than one and the Scritic diagram proposed six factors. The extent of explaining the variance of variables for these six factors on each other was 234.75% of the total variance of variables. The first factor had a special value of 62.24 which explained 16.58% of the total variance. The second factor's special value was 3 / 253.3, and 12.86% of the variance of the test was attributed to itself. In the obtained factors, the third factor resulted in a special value of 2.721 which explained 12.19% of the variance. The fourth factor had a special value of 1.822 and this factor estimated the rate of variance of 783/11 percent. The fifth factor was the specific value of 822/1, which was 11.338% of the test variance and the sixth factor had a specific value of 1.248, which explained 40.99% of the variance of the test. Finally, in order to obtain a structure with the meanings of factor loads, the extracted components based on the orthogonal rotation were transferred using the Varimax method (Table 5).

Table 5. Matrix pattern based on orthogonal rotation in the Varimax method

	Factors					
Items	1	2	3	4	5	6
X1	0.750					
X8	0.763					
X2	0.698					
X13	0.821					
X9	0.756					
X3	0.699					
X18	0.724					
X14		0.825				
X4		0.836				
X10		0.814				
X15		0.863				
X5			0.936			
X16				0.509		
X11					0.741	
X17					0.723	
X6					0.752	
X12					0.760	
X7						0.699

The results of this phase resulted in the extraction of six factors, which according to the results all the factors are suitable for the number of items. On the other hand, according to the six factors identified with respect to the sub factors, the factors are named in Table 6.

Finally, the model is extracted as follows in Figure 3.

Table 6. Naming items according to sub factors

Factor	Sub Factor
Depression	Depression, decreased life expectancy, Reduced self-confidence, loneliness, slowness in intellectual activity, decreased Focus, anorexia
Re-experience the incident	Understanding the unrealistic experience
Anxiety	Stress, anger, insomnia, distrust
Physical pains	Physical pains
Psychological burden of livelihood problems	Addiction, Migration, Unemployment, Economic Problems
Psychosis	Delirium

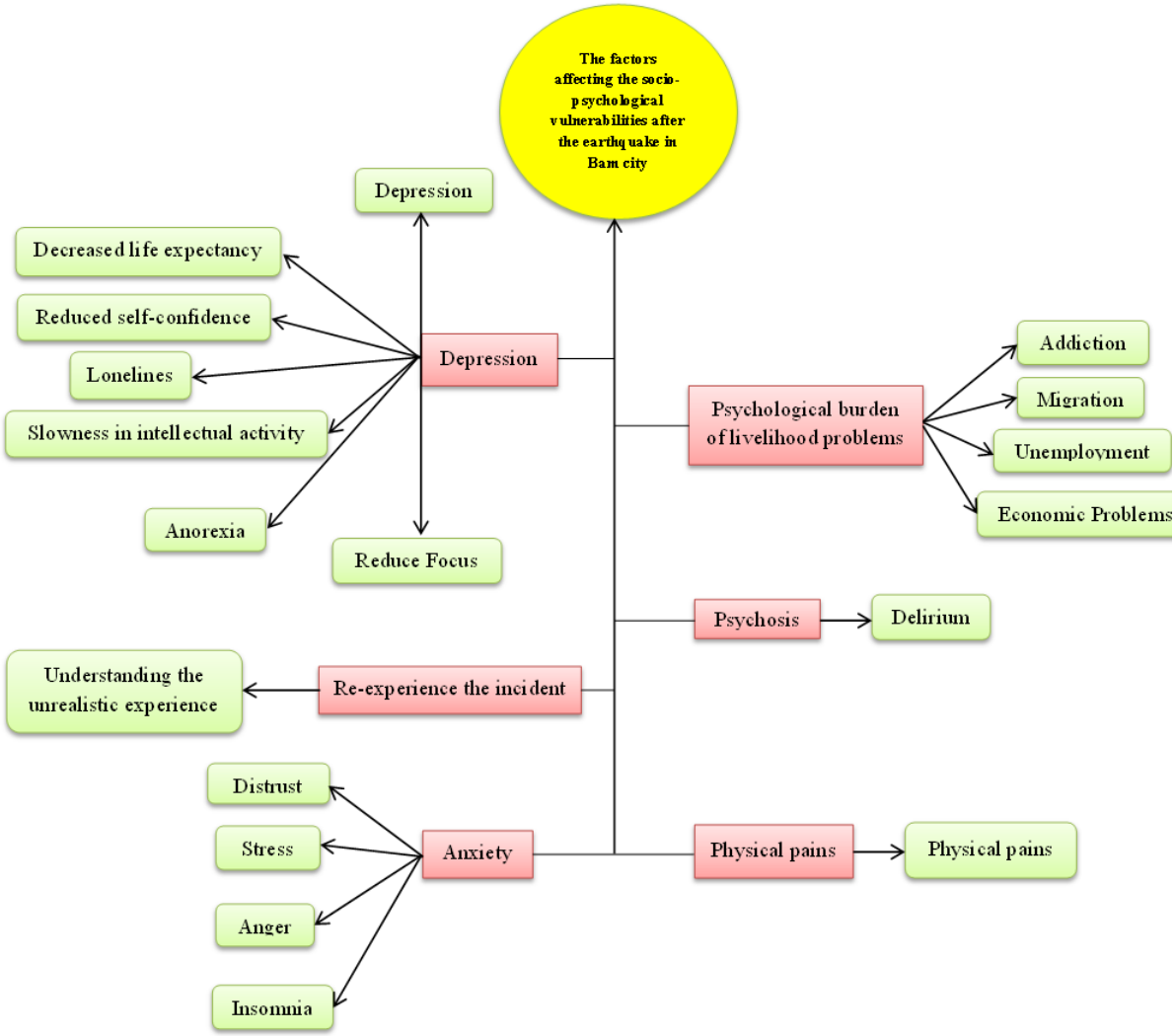

Figure 3. The most important factors affecting socio-psychological vulnerabilities after the earthquake in Bam city.

Conclusions

The country of Iran is among the earthquake-stricken countries of the world and is located on one of the two major seismic belts of the planet known as the Alpide and a great earthquake may happen in this territory at any time. Due to the fact that a major earthquake may occur one day, we need to be trained in how to manage the situation and the emergency and crisis situations and how to deal with it. Although Iran has suffered great earthquakes in its past nowadays it has been proven that the phenomena such as earthquakes are not just the result of divine providence. Human mistakes, lack of foresight, scientific management and planning exacerbate the crises in which the prediction of the time and place of their occurrence is difficult. Given the importance of prevention before crises, the greatest effort and cost should be spent on planning and preparedness pre-disaster.

But psychological stresses, depression, anxiety, life expectancy and etc., are the results of crisis situations that crisis management cannot end these pressures but could reduce them. According to the findings of the this Research, it was noted that for a proper decision to face socio-psychological vulnerabilities after earthquake, the appropriate approach is quick action, but without hurry which provides a process for predicting and preventing a crisis and also action and intervention in crisis and well-being. On the other hand, psychosocial interventions for the injured people can reduce mental disorders, increase their ability to adapt to the conditions created and improve their mental health. According to the results of this study, intervention of the psychological consequences of survivors of natural disasters is necessary in order to normalize the reactions and prevent the occurrence of long-term complications, which leads to poor quality of life and decreases the efficiency of individuals.

It is also necessary that some of the affected groups who for various reasons suffer more and they are more vulnerable to disasters should be given special attention. Certainly, further research with emphasis on this issue, in other areas affected by the earthquake and comparing the findings with each other, will help to develop the science of crisis management in Iran. According to the results, the following suggestions are made:

Applied suggestions

1- Addressing the psychological reactions of natural disasters' survivors with the aim of normalizing the reactions.
2- Avoid making long-term complications that lead to a loss of quality of life and a decrease in the efficiency of individuals.
3- Given special attention to some of the affected groups who for various reasons are more vulnerable and suffer of disasters.
4- Use of the power of social-cultural capital in the city and surrounding cities in order to adopt solutions to reduce identified damage.
5- Proper planning for training, preparing and reduction of people's psychosocial vulnerability.
6- Family education to reduce socio-psychological vulnerabilities.
7- Long-term planning to create jobs for youth.
8- Encouraging state institutions to invest on the management of socio-psychological crisis issues.

Research suggestions

1- Identify the most important strategies for managing the socio-psychological crises caused by the earthquake.
2- Comparing the results of this research with similar researches in order to achieve a comprehensive model of management of socio-psychological crises caused by the earthquake.

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