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Investigation of obstacles against effective crisis management in earthquake

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ABSTRACT

Floods, hurricanes, landslides, hurricanes, tornadoes, earthquakes are events that a large group of people on earth are affected. In December 2003, the residents of Bam, Iran experienced an earthquake that measured 6.6 on the Richter scale and destroyed more than 90% of the city. The purpose of this study was to investigate obstacles against effective crisis management with considering service received by individuals in the Bam earthquake. In this study, domestic journals, foreign dissertations in Persian bases such as Google scholar, Magiran, IranMedex, SID and in English bases such as PubMed, Web of Science, Google scholar were used. The results of this study showed that there were many problems in various aspects of planning including: lack of coherent programs, lack of attention to the needs of health care, poor coordination between agencies and organizations and lack of appropriate training of volunteers and people.

1. Introduction

Floods, hurricanes, landslides, hurricanes, tornadoes, earthquakes, wildfires are events that a large group of people on earth are affected. Iran is one of the most earthquake-prone countries in the world, and over the past 90 years has experienced 18 earthquakes of more than seven Richter causing major financial losses, physical, economic, social and hot damaged a large part of the population[1]. Among the issues and natural disasters, earthquakes are greater surprise and it can be a disaster. The best way to prevent accidents is to prevent its occurrence, but the earthquake that it cannot be prevented, the best way in the first place, is to prevent a crisis after the disaster. The second step is the preparation and coordination of aid resources through a coherent and efficient forces equipped and trained force and the third step, is to face the disaster, the speed category corresponding to of the needs of the disaster[2].

Among the recent earthquakes occurred in Iran, catastrophic earthquakes Rodbar Manjil and Bam earthquake on 5 January 2003 are important. Richter 6.3 earthquake with an intensity of 100 square kilometers within a period of 12 s-shook the city and surrounding areas. The most coherent and highest documented estimate of the damage that earthquake has made which World Bank with the cooperation of various ministries and agencies of the country (Iran) has done. Based on these estimates, the earthquake, more than 30 thousand people were killed and over 25 000 wounded[3]. About 85% of homes, commercial buildings, schools, hospitals and office buildings in the city and surrounding villages were heavily damaged or destroyed. While the earthquake in Bam, has destroyed the place which was for more than 2000 years old[4].

In recent years, large destructive earthquakes have occurred in many developed countries or developing countries. Followed by them we have been witnessing the damage, loss, various measures of preparedness, response, mitigation and reconstruction and we can say that earthquakes in these countries led to large laboratories of the facts and actions of right and wrong to cause earthquakes. So time should be important and we should learn from the experiences gained in these events and never repeat the wrongs and use the strengths obtained after these events occurred in the preparedness, response, prevention, reconstruction and rehabilitation, in addition to analysis and appropriate planning policies applied in the management of earthquake disaster[3].

As it is clear, when the plan is more comprehensive and consistent, the earthquake has less damage and better quality and faster service required to receive[3]. So taking advantage of the service recipient's opinion is one way to evaluate the effectiveness of crisis management in the disaster. Since most

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of the studies are from the perspective of service providers, therefore, in this study with regard to this important matter, the authors have tried to determine the management obstacles in disaster with considering service received by individuals in crisis. It is hoped that the results will be useful to the authorities in order to reduce the problems.

2. Materials and methods

2.1. Research question

Although the existence of numerous studies that have been done about the problems of the Bam earthquake, this study seeks to express what are the obstacles management and planning with considering service received by individuals in crisis.

2.2. Search strategy

In this study, published studies in electronic sources in domestic journals between 2003 and 2015, were searched in Persian bases such as Google scholar, Magiran, IranMedex, SID and English bases such as PupMed, Web of Science, Google scholar were used. English and Persian articles with keyword search strategy and main vocabulary is possible combination. Search using keywords Persian earthquake, planning and management and English bam earthquake, management, planning was done. Search in a period of 9–14 June 2015 was performed.

2.3. Selection of studies

Firstly extracted full texts or abstracts of all papers and documents were searched. Then, after the studies were reviewed, duplicate studies were deleted and unrelated cases were removed, and a detailed study of the remaining documents and issues related to the chosen topic was for the study. After documentation was read and reviewed in the first search, initial results were compared again.

2.4. Data extraction

Data were based on article and sample, and the results of each study using content analysis and classification were taken in notes. It was important to pay a special attention to the parts containing the main message of the article. Those sections included the end of introduction, which included purposes, important results and messages presented in the discussion, especially in the conclusion.

2.5. Inclusion criteria

All foreign and domestic studies on Bam earthquake from 2003 to 2015 selected from the perspective of the service recipients in generally all aspects of planning, outreach, information, design, assessment, coordination and control, human resources and support-support were examined. After studying the documents, studies that did not serve the recipients, were deleted. Also, studies that only state health problems were eliminated. In addition, the studies of systematic review were excluded from study.

3. Results

A total of 2 513 documents in search databases referred to, in the format of writing, research and review and validate reports published in reputable sites were assessed. Eventually after the elimination of irrelevant content, 26 subject-related studies, 16 articles in Persian and 10 articles in English were reviewed. The number of affected households in some examples was considered, while some studies also examined the number of people affected, which was why exact numbers were not available in all samples (Figure 1).

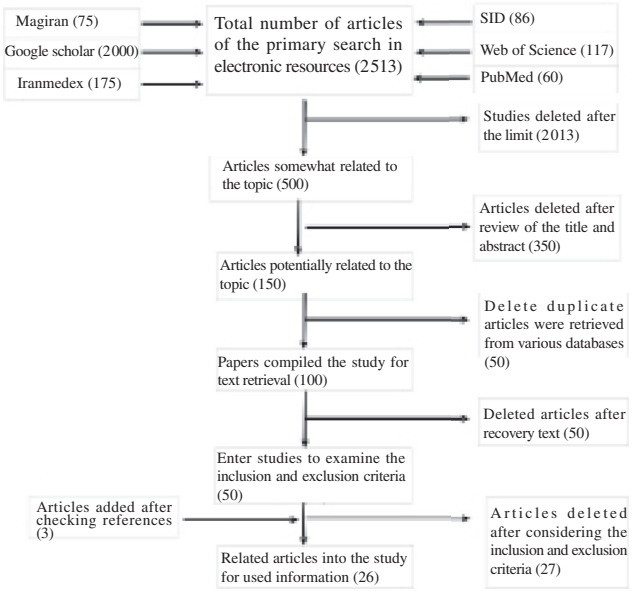

Figure 1. The flowchart of reviews and search articles.

The results obtained showed that there were many problems in various aspects of planning that was classified (Table 1).

3.1. Design

3.1.1. Lack of coherent programs

Most studies showed the absence of a coherent post-earthquake. A retrospective study on the strategy and management of the victims of the Bam earthquake shows that the lack of a comprehensive program had a direct impact on the people affected[5]. Lack of an orderly plan, even the use of the resources delayed and management of optimal utilization of resources in the first days after the disaster in Bam was very weak.

3.1.2. Lack of proper information

Information systems and information management in the earthquake were ineffective and inefficient. It is suggested that a wide variety of information received from the quake, which was confusing people and government planners. In general, the main sources of information on the earthquake in Bam were communication, interpersonal, that means that other information tools coherent planning and targeted there[6], so that 94 percent of survivors did not have access to items such as radio TV, *etc.*[7].

3.2. Need assessment

3.2.1. Lack of attention to the needs of health care

Surveys taken after the earthquake in Bam, suggesting that good condition, and the health care needs do not show, which implies the lack of attention to the health needs of the people of the region[6]. Bam earthquake survivors stated that only

Table 1
The obstacles management and planning.

Aspects	Obstacles
Design	Lack of coherent programs Lack of proper information
Need assessment	Lack of attention to the needs of health care Lack of coherent programs and assistance to transport the injured by air
Coordination-support	Poor coordination between agencies and organizations Lack of a coherent program to collect donations search
Manpower	The absence of a coherent plan for human resources and public education Lack of appropriate training of volunteers and people

"average" medical care has supported them. Evaluation of patients transferred to hospitals around the country and the earthquake victims shows that a fast and efficient treatment has been done and rescue operations were delayed and have resulted in deaths and serious injuries[[6,8–12]].

In the case of health needs over the life of the survivors of Bam, it showed that a high percentage of the survivors' access to facilities and raw materials, such as safe drinking water, food, tents and sleeping facilities, washing and toilet was not satisfied or relative satisfaction. Other studies confirm that lack of attention to health needs[2,3,6,7,13–16].

3.2.2. Lack of coherent programs and assistance to transport the injured by air

Drain and transfer of victims is the main cause for mortality and reduction of losses[11,14]. Cross-sectional study shows that in the early hours of the earthquake, manual transmission like blankets has a lot of side effects[12]. Also in the other study, it says removal methods of the injured from the rubble was in the most difficult situation (handheld, blankets, patient). Its consequences result from the temporary or permanent disability of the victim, and the most common used vehicles were personal vehicles[17].

3.3. Coordination-support

3.3.1. Poor coordination between agencies and organizations

The analytical data in study show that coordination thereby causes increasing efficiency and success of the rescue operation. So poor coordination should be part of the shortcomings and weaknesses in rescue operations directly engaged in this search[3]. In the study conducted by the innocent survivors of co-ordination and co-workers, their organizations were viewed in these states. The lack of preparation and lack of programs and procedures agreed between the agencies and forces in dispatching aid to the region was very evident. Aid agencies dispatched to the city had not been coordinated in advance with the justification[18].

3.3.2. Lack of a coherent program to collect donations search

After the initial publication of the news of the devastating earthquake, the people of the cities and provinces around the country, excessively prepared for the aid, but the aid in the early hours of the accident, rather than plans for reorganization. In this particular study, the opinions of the survivors of Bam display and state that the quality of distribution facilities is very poor and many were rotten food[19].

3.4. Absence of a coherent plan for human resources and public education

The results showed that the most effective groups in the Bam earthquake assistance were relatives and local people, however, because of poor public education, their performance decreased. The efficiency of professionals and volunteers was reduced because of lack of proper management in crisis conditions, affecting the rescue operation. Bam earthquake was studied in various aspects of poor performance to depict the deficiency in human resources, including these[2,9,11,20,21]:

1. The lack of a systematic method used to send personnel to the affected area.
2. The discrepancies between skills supply and actual demand in the region.
3. Lack of equipment, accommodation and replacement for personnel and manpower, resulting in physical and mental fatigue in the region.
4. Poorly trained health care providers.

4. Discussion

One of the main problems of the Bam earthquake was a lack of programs to deal with the crisis. Many in the Bam earthquake study from the perspective of service providers[14,22], as well as the affected people[5] the lack of a coherent and codified plan as a fundamental weakness of the state. Nasrabadi also states that one of the lessons learned from disaster response to disaster is to create a strategic plan[23], but the contrary results were seen in an Haiti earthquake in 2010[24].

About information and communication in Bam earthquake, the research have been expressed on the relationship between the lack of information from the perspective of service providers[25] and in terms of people affected[3,26]. As it is clear, people can help a lot. According to one of the most challenging reliefs Asmilo supply chain management, quality and quantity of aid is in the chain[27], which it is consistent with the results of the Bam earthquake. The fast timely deployment of field hospitals in providing health care to the victims is important[28]. Equipped field hospital for immediate care, which would be useful 38 h after the accident, is in place. In the case of earthquake in Islamic revolution 2, although in the Iranian revolutionary guard on field hospital launched the hospital health measures delayed, but found the results useful[29]. Although the panel was also available in the Haiti earthquake and field hospital was very helpful but need proper planning, better equipment and training in this direction[30] which is consistent with the results of the Bam earthquake. Halpern *et al.* stated in 1999

earthquake in Turkey that establishment of field hospital is very beneficial, especially for patients in intensive care and the rest of the field hospital is inseparable in disaster; contrary to the Bam earthquake, the field hospital in Turkey is used efficiently[31].

But studies conducted on the health care needs after the earthquake in Bam, in this regard does not show good condition[2,16,32] which implies the lack of attention to the health needs of the people of the region. The lack of attention to the needs of specific social groups has been evident and studies suggest that in the Bam earthquake, there was no one who has thought about old people, women and kids[16,22]. Mori *et al.*'s survey of earthquake survivors from Hanshin found that 90% of the survivors suffered from the health problems after a year and a half, 25% were the care received and chronic diseases[33]. These results indicate the absence of programs to meet the needs of the affected people, which is consistent with the results of the Bam earthquake.

News of the earthquake in Bam after the initial release of the major cities around the province and across the country are about that people almost were ready for the aid, but there were no plans for organizing disaster aid in the early hours. Also study of donated food from opinions of bomb survivors showed that the quality of distribution facilities were very poor and many were rotten food[19]. The appropriate ways to prevent corrosion and deterioration of the food were detachment of the source material and to help in the first site, which fortunately has been done in Iran.

Management of human resources in Bam has been said in numerous studies – from the perspective of service providers[17,25], and from the perspective of the service recipients[11,21,34] - about lack of organization and planning aid and parallel forces expeditionary forces in the region. Medical aid in Hanshin earthquake also was conducted without any help or agenda and many medical volunteers were confused and more than anything to be seen in parallel[35], which is consistent with the results of the earthquake Bam.

One of the undeniable in this disaster was the lack of coordination between the organizations dispatched to Bam which were trained and coordinated[36], and other studies have confirmed this[18]. The study conducted by Nabi after the earthquake in 2005 Kashmir states that the coordination between organizations and organizations and other agencies, especially NGO, is very poor for relief, rehabilitation and disaster response, and the associated program coordinating organizations to respond to natural disasters is necessary[37], which is consistent with studies of the Bam earthquake. The 12 January earthquake in Haiti in 2010 showed barriers to coordination at the local level suggesting that planning is essential in this regard. But the analysis of a coordination mechanism established by the United Nations Office for the Coordination of Humanitarian Affairs to support the international delegation is the evidence for good communication[38], which is consistent with studies of the Bam earthquake.

Results show that planning supply chain management relief in the province has been very strong in the labor force and the factors that facilitate the training of managers and employees at all levels, are a training program and to organize volunteers, provincial maneuvers and emergency call team members and successors. The next obstacle is a lack of volunteers and identification about strengths and weaknesses of provincial maneuvers.

By the way, Bam earthquake posed the worst memories in people's mind, and it will not be forgotten, but it had a lot of experiences to learn from. In Rudbar-manjil earthquake, we have asked from government to pay more attention to these weaknesses and to have plans, but in Bam we did not see any changing[3]. It is hoped that this weakness after 12 years since the earthquake has passed in Bam has been considered.

Conflict of interest statement

The authors report no conflict of interest.

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