

# Response to the Bam Earthquake: A Qualitative Study on the Experiences of the Top and Middle Level Health Managers in Kerman, Iran

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## Abstract

**Introduction:** The 2003 Bam, Iran earthquake resulted in high casualties and required international and national assistance. This study explored local top and middle level managers' disaster relief experiences in the aftermath of the Bam earthquake.

**Methods:** Using qualitative interview methodology, top and middle level health managers employed during the Bam earthquake were identified. Data were collected via in-depth interviews with participants. Data were analysed using thematic analysis.

**Results:** Results showed that the managers interviewed experienced two main problems. First, inadequacy of preparation of local health organisations, which was due to lack of familiarity of the needs, unavailability of essential needs, and also increasing demands, which were above the participants' expectations. Second, inappropriateness of delivered donations was perceived as a problem; for example, foods and sanitary materials were either poor quality or expired by date recommended for use. Participants also found international teams to be more well-equipped and organised.

**Conclusions:** During the disaster relief period of the response to the Bam earthquake, local health organizations were ill prepared for the event. In addition, donations delivered for relief were often poor quality or expired beyond a usable date.

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## Introduction

Annually, over 5,000 earthquakes are recorded worldwide with 3,000 earthquakes felt by human populations.<sup>1</sup> Iran is ranked in the top 10 countries with the highest occurrence of earthquakes. On December 26, 2003, a 6.8 magnitude struck Bam a historical town in southeast Iran. Approximately 40,000 died and over 30,000 were injured. The historical citadel of Bam, the largest adobe structure in the world, and over 25,000 buildings were destroyed.<sup>2-4</sup>

Adequate, prompt, and appropriate emergency assistance are crucial to the well-being of victims in the aftermath of an earthquake. However, prompt relief may not materialize due to lack of experience and limited resources.<sup>3,5-8</sup> Prehospital and hospital readiness play an important role in the reduction of casualties. These include appropriate and adequate equipment, personnel training, and effective management.<sup>9,10</sup>

The Bam earthquake presented complex conditions and challenges for national health policy makers who had never experienced such an extensive earthquake.<sup>11</sup> Local policy makers' experience could be helpful for other policy makers in developing countries, and also for international aid agencies.<sup>5,6,9,10</sup> A number of papers in Farsi (the main language of Iran)<sup>5,12-14</sup> and in English<sup>2-4,7,8,10</sup> have discussed the problems that arose after the Bam earthquake. However, they are based mainly on personal observation or interviews with the general public and rarely have included interviews of local policy makers. This study's goal was to review the Bam earthquake experiences of local policy makers and managers in the health domain.

## Methods

This study was of phenomenological qualitative design. Purposive and snowball sampling were used, and participants were recruited if they were high level managers in the health domain during the Bam earthquake. To access these, a list of eight key managers was identified. In total, six participants from among those identified were accessible. The study protocol was approved by the ethics committee at Kerman University of Medical Sciences (k/92/402, Kerman, Iran). The participants were informed of the objective of the study and the recording of the interviews. Due to cultural issues, a written consent form was not used.<sup>15</sup> The participants consented verbally to participation and to having their voices recorded. An interview guide was developed based on literature review and was subsequently amended based on the first two interviews. Each interview took slightly over one hour. In total, the six participants were interviewed with saturation level reached. In order to keep confidentiality, the results were number coded. In addition, all records were coded and participants were not referred to by name or job title. Interviews were recorded and transcribed word for word. During the interview, main points were noted by the researcher.

Data were analysed using thematic analysis. In order to enhance reliability and validity of the study, two researchers attended each interview, and both took their own notes and developed themes. A third person listened to a recorded sample of interviewees and developed themes. Afterwards, they all met to discuss the themes, and inconsistencies between themes, to reach a consensus on the extracted themes. Finally, three main themes were developed, including adequacy of preparation, appropriateness of donation and delivery service, and issues with external assistance teams.

## Results

### *Adequacy of Preparation*

Inadequate preparation for the disaster was perceived by most interviewees. Unfamiliarity with needs after the earthquake, unavailability of essential needs, and rising demands which were far above the participant's expectations were mentioned as due to lack of preparation:

Respondent 2: We had limited amounts of Bicarbonate [a type of medicine] in our stock, whereas there was high level of demand for that at the beginning. This challenged us in the initial hours before we could request that other cities send us their supplies.

Respondent 1: At the beginning, there were no toilets, and people used the surrounding area around the camps for this purpose, which caused the environment around the camps to be polluted.... The menstrual cycles of many of the women in the field, including female aid personnel and the local female population, were altered, and they had premature menstrual cycles. Sanitary towels were required, however, this had not been anticipated, and none of the aid parcels included this item.... After day four, people also required condoms, which were also not supplied.

Respondent 6: Notebooks and papers were needed to organize our tasks, yet they were in scant supply during those days. This was something we had not even considered.

Respondent 2: Well, we had a considerable number of opium addicts, and they needed morphine, which overwhelmed our pharmacy system.

Lack of guidelines and prior training were noted as other problems with preparation. Listed below is a quote extracted from interviews, which reflect these issues:

Respondent 3: There was a lot of emotion at that time, and we worked hard. At the beginning, we forgot our personal needs and could not even sleep at night. I can say we worked through the day and night. We all aimed to do something useful, but you know we were not sure what was the best thing to do. We were all in shock. Everybody worked based on their own personal experience and opinion, and in any case, we did not have any experience [working in disaster conditions]. I think we should have had some training.

Another problem was that there was no specific budget allocated to disasters. The following quote reflects on this issue:

Respondent 4: At that time, we did not have any budget allocated for disasters, and we were not sure how to cover the expenses; this slowed down the process of assistance as we needed to cover extra expenses related to disaster.

### *Appropriateness of Donation and Delivery Service*

From the participant's points of view, sometimes essential goods, including food and sanitary materials, were either of a poor quality or out of date. The shipping of extra and unnecessary goods, such as nonessential medicine and food, which had sometimes lost its quality as a result of shipping, were mentioned as examples:

Respondent 4: Some medicine that was received from national and international aid was out of date, and we had problems destroying it. Also, some medicines were in languages other than English, and we had problems with classifying and using them.

Respondent 1: Some food had no expire date, and we did not want to take the risk of food poisoning, so we disposed of them.

Respondent 2: All provinces sent us serum, yet we did not need it, and this even created problems with respect to unloading, handling, and stocking...; also, I can remember, we received a train loaded with bread from the city of A, and when it got to us, all the bread was mouldy and useless. You can imagine how difficult it was to have to unload useless bread, and then think how you can destroy it; this is hard, particularly when you have many more important tasks to do.

Inappropriate distribution of the aid parcels, including food, was noted as another problem:

Respondent 5: Distribution of essential goods was just awful; food parcels were thrown down from the trucks at people.

The participants added that they required a rough estimation of the population to enable a good service delivery and to be able to help disaster-stricken people efficiently; however, due to mass-population movement, this was neither easy nor possible:

Respondent 4: Population census and screening was extremely necessary to be aware of real disaster-stricken people and to provide them with appropriate health services and resources. However, a large number of poor residents from other cities rushed into Bam, and into the health services, to take advan-

tages of the free and high quality care, and this overburdened the health system.

#### *External Assistance Teams*

Most interviewees praised the way in which international teams worked and were equipped. However, they criticized national teams for inadequacy in equipment and lack of specific guidelines in response to disasters. These points were raised by several participants; the following are examples of quotes from part of their interviews:

Respondent 2: Often, many team members worked based on their own evaluation and decisions, not based on specific leadership. Our national team did not take essential equipment to the field, while international teams carried all necessary equipment and acted based on specific and clear guidelines, and they knew what they were supposed to do.

Respondent 4: National teams were not self-sufficient, and they demanded equipment from us, while international aid teams were self-sufficient and did not need our help for equipment.

Respondent 3: We realized then, for example, that a spade is an essential tool for removing debris and rescuing victims who were buried under debris. You cannot come to aid and not have a spade, but some national teams did not have such equipment.

Also, assistance teams were unfamiliar with the region and they had their own authorities to follow; sometimes they did not follow the local authorities, which caused chaos on different occasions:

Respondent 6: The members of the teams became confused when they received different and inconsistent commands from different levels of authority, and this slowed down the process of response.

Respondent 2: National assistance teams interfered in each other's responsibilities, and sometimes this caused trouble for themselves and for local authorities.

Interviews also revealed that the arrangement of the teams was not suitable, and teams did not include required experts:

Respondent 5: We really needed an Iranian pharmacologist to categorize medicine arriving via international aid, but there was no such expert in the team.

Although it was pointed out that international aid teams were very well prepared, the local teams argued that international teams could have been even more efficient if there was more coordination, particularly at the beginning:

Respondent 3: At the beginning, with all that chaos we did not think about the arrival of international aid workers and making them familiar with region...; however, it was ok in the next few days.

#### **Discussion**

This study highlighted problems perceived by health managers and authorities at the time of the Bam earthquake. While they acknowledged that huge efforts had been made, problems were reported in the process of assistance. Lack of adequate resources, preparation, documented guidelines, efficient coordination (specifically defined responsibilities), and poor needs

assessment were all noted as weaknesses of response. All these weaknesses can affect the efficiency and sufficiency of response, particularly at the beginning, in the aftermath of a disaster. This is because in emergency medicine, a well-prepared and prompt response is crucial.<sup>16</sup> Preparation is usually considered the responsibility of national agencies.<sup>17,18</sup> However, the level of preparation is unsatisfactory in many countries; for example, preparation and planning for disaster has been evaluated as weak in Oceania, which leaves these countries dependent on external aid in times of catastrophic events.<sup>19</sup>

Inconsistency in aid strategies and lack of cooperation and coordination can result in losing time, and may cost lives in disaster situations. Coordination of assistance teams is crucial in the provision of an efficient response. During the Bam earthquake, there were approximately 40 international teams, with around 1,600 staff, which posed a challenge to coordination by the local authorities.<sup>11</sup> In a study carried out in Turkey, coordination also was noted as a major problem.<sup>20</sup>

For donations, unnecessary and unwanted goods were identified as a problem. This problem included diverting resources from real needs and occupying both personnel and storage space with unnecessary items.<sup>21-24</sup> In order to increase the efficiency and usefulness of external aid and donations, the local government should indicate to international organizations which materials are required.<sup>25</sup> However, lack of experience, shock due to the size of the disaster, and problems in conducting rapid surveys caused limitations for the local government.

Service delivery, such as food distribution after the Bam earthquake, was unsatisfactory. There was poor supervision, late provision of food, and unavailability of food storage equipment.<sup>26</sup> This is consistent with previous reports suggesting that an earthquake changed the pattern of availability, access, and utilisation of food in Pakistan.<sup>26</sup>

Eraghizadeh and colleagues discussed a lack of predefined guideline for response and ill-defined responsibilities during the Bam earthquake led to confusion among assistance teams, and ultimately, an ineffective response.<sup>5</sup> It was argued that unclear role definition and the existence of different commands from different authorities at different levels were problematic.<sup>5</sup> Furthermore, in order to provide a prompt and effective response, a corresponding responsible organization must have adequate resources. In Pakistan, for example, the military is expected to respond in disaster situations. The army response in Pakistan in relief and rescue is evaluated as effective due to it being the only institution in the country with adequate resources, including human resources, appropriate transportation, and communication and unity in commands and discipline.<sup>27</sup> Lack of unity in command and low levels of preparation can lead to a type of anarchy and be reflected in different aspects of response with weak prioritization of aid, such as late referral of patients with poor health conditions to the hospital and the provision of expensive and unnecessary care.<sup>5,22</sup>

#### **Limitations**

This study focused on the viewpoints of high level managers; the results may differ in more recent earthquakes due to improvements and development in disaster management.<sup>28</sup> As an interview study, there is risk of selection bias due to the small number of participants interviewed. This study was conducted well after the earthquake event, and it is likely there was memory decay and temporal loss of immediate event recall. This study may lack external validity outside the Bam region of Iran.

## Conclusions

The present study showed that the managers experienced two main problems. First, there was inadequate preparation of local health organizations, which was due to unfamiliarity of the needs,

unavailability of essential needs, and increasing demands, all of which were above the participants' expectations. Second, inappropriateness of donation and delivery service was perceived as another problem.

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