

Original Article

A survey on the needs of rescue and relief teams in Bam earthquake on deployed timeAli Ardalan¹, Kourosh Holakouie Naieni², Elham Ahmadnezhad^{3*}, Maryam Kandi³, Mohamad Reza Aflatoonian⁴, Mahmood Nekouie Moghadam⁵¹ Department of Disaster & Emergency Health, National Institute of Health Research AND Department of Disaster Public Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran² Department of Epidemiology & Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran³ Department of Disaster & Emergency Health, National Institute of Health Research, AND Department of Epidemiology & Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran⁴ Health Service Research Unit, Kerman University of Medical Sciences, Kerman, Iran⁵ Department of Environmental Health, School of Public Health, Kerman University of Medical Sciences, Tehran, Iran

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ABSTRACT

Background & Aim: Following the Bam earthquake, relief teams and individual volunteers influx in the scene. We conducted this survey to determine the needs and health status of relief workers when they were in the scene.**Methods & Materials:** This was a concurrent nested mixed-method survey that the qualitative nested in a quantitative approach. Interviews were through an open-ended semi-structural questionnaire three weeks after Bam earthquake. Respondents were from the relief team who had been staying in Bam at least for one week at the time of interview.**Results:** We surveyed 235 relief workers and majority of them (75%) were in the scene since the 1st or 2nd week of earthquake. Twenty-eight of them experienced illness, and the most common complaint was respiratory track illness. One hundred eighty five of them (79%) expressed their need to a psychology consultation. The results of thematic analysis of qualitative phase of survey were about the 19 themes expressed by the subjects.**Conclusion:** The results of this study revealed that all relief workers should be trained for self-protection. Preparing the basic needs by him/her-self may maximize the performance of relief workers in disaster regions. The study method design applied was appropriate for the similar situations.**Introduction**

On the Global Seismic Hazard Map, Iran stands out as one of the most earthquake prone countries in the world (1). On 26th December 2003, at 5:26:26 local time, an earthquake measuring 6.5 on the Richter scale struck this city and

surrounding village along Bam fault (1, 2).

During a disaster, many teams, including volunteers and organizations influx to the scene. In some cases, when the individual volunteers arrive to the area they come even without the basic medical needs and water and food. And they may harm themselves under such scenario. (3-5).

The initial rapid assessment on the health status of the affected population by World Health Organization (WHO) with the Ministry of Health (MOH) identified the extremely difficult living conditions of people after the

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earthquake, considering the basic and health needs that should have been addressed by rescue and relief teams, effectively (1). Following the earthquake, various government agencies including the Ministry of Interior (MOI), MOH, Army, Iranian Red Crescent Society and National and International Non-Governmental Organization launched a massive rescue and relief operations. More than 1600 searches and rescues, health and relief personnel from around 40 countries arrived in the affected areas within a couple of days to help with the relief operations. There were some coordinating roles from MOI that was responsible for the organization of teams and accountable for the welfare, health and safety in this area.

Data for the study was collected at the time of earthquake occurrence. Several efforts were made to build capacity to cope with the situation. Even though 9 years have passed by we did not find any studies in our region, which highlights the relief-teams problems when earthquake occurs. Therefore, we decided that publishing our information would help and hence published.

This study determined the needs and health status of the rescue and relief teams when they were deployed in the disaster region during Bam earthquake.

Methods

Study area and study period

We conducted the study in Bam, since 3 weeks after the earthquake when the rescue teams were still settling in the scene.

Definition of the study population

Two hundred and thirty-five rescue and relief teams from 10 organizations were surveyed. These workers, who are members of specified (affiliated) national team and individual volunteers, were specifically assigned for rescue and relief works in these areas.

Study design and methods of data collection

This was a concurrent nested mixed method survey that the qualitative approach nested in the open-ended questionnaire as in quantitative

approaches. A semi-structured face-to-face interview was conducted. Some open questions were created as questionnaire, and a data collection team consisting of five groups of volunteer students from the school of public health at Kerman University of Medical Sciences were assembled and trained. Each group consisted of 3-4 students with at least one male for securing concerns in the field. All questionnaires were completed anonymously.

Data analysis

The results of the quantitative and qualitative approaches were combined in the same sheet. Then, all data were analyzed using Stata 8 (StataCorp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP). Absolute and relative frequencies of main themes were reported.

Regarding ethical issues, verbal consents were obtained from subjects and individual information maintained confidential.

Results

Two hundred and thirty-five subjects were interviewed completely. Majority of them were males (94.5%), and they were 26-45 years old (108 of 235 - 46.5%). One person was above 65 years. Majority of them were in the 1st or 2nd weeks after earthquake (75%). Each team composition was almost similar. Twenty-eight people who had no affiliation were providing aids as volunteers. Table 1 presents the basic characteristics, duration of presence in Bam and affiliations of the subjects studied. Among the studied subjects, 28 (11.9%, confidence interval [CI] 95%: 7.7-16.1%) experienced an injury during their activities in Bam. Thirteen of the injured (46.5%) did not need to refer to medical services, 11 cases (39.3%) received outpatient services, two (7.1%) were hospitalized, and two (7.1%) did not referred despite the need. Multiple traumas were reported by two workers. One hundred and sixty (49.3%, CI 95%: 42.9-55.7%) of rescue and relief teams experienced at least one episode of illnesses, among them 78 cases (67.2%) received medical care. The most common illness among the subjects was the

complications of the respiratory tract (38%). Gastrointestinal bleeding was reported by three persons. Table 2 presents the distribution of injury types and the occurrence of illnesses in these subjects during their activities in Bam. Regarding the potential psychological problems for rescue and relief workers in Bam, 185 (78.7%, CI 95%: 73.5-83.9%) of them believed on the necessity of psychological consultations for prevention of psychological disorders and improving the quality of service deliveries.

According to thematic analysis of qualitative phase of survey, about 19 themes were expressed by the subjects. Eleven of the 19 themes were mentioned by all subjects. Overall satisfaction of rescue and relief workers about the most important personal needs was classified under three options: high satisfaction, moderate satisfaction, and low satisfaction. Table 3 presents the result of this phase.

One hundred and twenty-nine (54.9%, CI 95%: 48.6-61.3%) of the studied subjects expressed that they were not trained for action in crises before leaving for Bam.

During the qualitative phase of the study, main Organization/System problems were asked. The main Organization/System problems that the relief teams encountered are summarized in Table 4.

Discussion

This survey was conducted among National deployed teams and volunteers who worked as humanitarian aid workers, 3 weeks after Bam earthquake for identifying the major needs and health status. Just following the earthquake,

multiple teams came from various other countries and fields and carried out a variety of humanitarian roles.

Table 1. Characteristics of 235 rescue and relief workers who were studied on 21th day of post-disaster period in Bam

Variable	n (%)
Sex	
Male	222 (94.5)
Female	13 (5.5)
Age group (year)	
17-25	106 (45.1)
26-45	108 (46.0)
46-65	20 (8.5)
>65	1 (0.4)
Education status	
Elementary	26 (11.1)
Middle	35 (14.9)
High school	123 (52.3)
University	51 (21.7)
Duration of presence in Bam (weeks)	
1	89 (37.9)
2	87 (37.0)
3	59 (25.1)
Affiliation	
Iranian Red Crescent Society	23 (9.8)
Ministry of Health	23 (9.8)
Police	24 (10.2)
Ministry of Building & Housing	23 (9.8)
Ministry of Jihad	24 (10.2)
Social Welfare Organization	23 (9.8)
Ministry of Rah	24 (10.2)
Power and Electricity Organization	19 (8.1)
Basij	24 (10.2)
Volunteer people	28 (11.9)

Table 2. Types of injury and occurrence of illnesses in rescue and relief workers during their activities in Bam

Injury			Illness		
Type of injury	n	% among 28 injured	Type of illness	n	% (CI 95%)
Superficial wound	8	28.6	Respiratory tract infection	90	38.0 (31.8-44.2)
Contusion	5	17.9	Headache	51	21.7 (16.4-27.0)
Open wound	5	17.9	Fever	21	8.9 (4.6-11.6)
Sprain	4	14.3	Nausea/vomiting	18	7.6 (4.3-11.1)
Dislocation	3	10.7	Oral and tooth problem	14	5.9 (3.0-9.0)
Fracture	2	7.1	Abdominal pain	10	4.2 (1.7-6.9)
Abdominal trauma	2	7.1	Watery diarrhea	11	4.7 (1.9-7.4)
Chest trauma	2	7.1	Bloody diarrhea	1	0.4 (0-1.3)
Multiple trauma	2	7.1	GI bleeding	3	1.3 (0-2.7)
Burning	2	7.1			

CI: Confidence interval, GI: Gastrointestinal

Table 3. The overall satisfaction of rescue and relief workers about their personal needs during their presence in Bam

Item	Overall satisfaction rate		
	High, n (%)	Moderate, n (%)	Low, n (%)
Accommodation status	35 (14.9)	16 (6.8)	184 (78.3)
Bath room	51 (21.7)	25 (10.6)	159 (67.7)
Cooking instruments	78 (33.2)	39 (16.6)	118 (50.2)
Latrines	98 (41.7)	38 (16.2)	99 (42.1)
First aid kit	121 (51.5)	21 (8.9)	93 (39.6)
Hygienic instruments	103 (43.8)	54 (23.0)	78 (33.2)
Heating appliances	114 (48.5)	46 (19.6)	75 (31.9)
Water for sanitary usage	147 (62.6)	41 (17.4)	47 (20.0)
Food	108 (46.0)	84 (35.7)	43 (18.3)
Electricity	156 (66.4)	53 (22.6)	26 (11.1)
Drinking water	200 (85.1)	21 (8.9)	14 (6.0)

Table 4. The main organization/system problem that the rescue and relief workers were faced during their activities in Bam

Problem	n	% (CI 95%)
Coordination	204	86.8 (82.5-91.1)
Professional instruments	200	85.1 (80.6-89.6)
Communication	128	54.5 (48.1-60.9)
Transportation	117	49.8 (43.2-56.0)
Terms of reference	84	35.7 (29.6-41.9)

CI: Confidence interval

Our assessment on the health status of rescue and relief workers revealed that the occurrence of injuries is a common phenomenon as about 10% experienced injuries during their activities. However, fortunately, most cases were not serious and did not need visit by medical professionals. About 40% were not satisfied with the available first-aid kits. Actually, organizational managers should ensure availability of the first-aid kits and relevant training for dispatched teams to the disaster-stricken area so that the personnel themselves would treat many mild problems such as superficial wounds and contusions. In the majority of relevant surveys as context of health needs, this issue has been addressed. Hence, Partiridge et al. (6) has mentioned that this problem is common among relief workers. They also found that 60 workers who were deployed after typhoon Sudal had some medical complications or serious trauma (6). In addition, injuries and death were the major problems among Australian rescue and relief workers during Asian Tsunami (7), and the same results were reported in Van during the recent earthquake. (8). In some other studies violent trauma, attacks from hostile groups, and land

mine wounds were reported as main cause of death and injuries (9).

Other health problems depend on the disaster location and seasonal time. As the Bam earthquake occurred during winter, respiratory infection was reported as major complications. It is important to note that the respiratory infection can be potentially caused because of epidemic among relief workers and victims. Because of occurring infection disease, vector protection, is a must in many deployments, to minimize risk of contracting disease such as malaria or dengue fever and should be a basic component at the health care deployed team. The Austrian relief team for east south of Asia Tsunamis received prophylaxis against malaria and hemorrhagic fevers (10-12).

It is important to bring primary remedies and having prophylaxis against special disease that can be due to endemicities of disease and time of the event.

According to the findings, mental health problem has been mentioned as major complications in our surveyed relief workers. Mental health problems among relief workers has been experienced in different levels but it is a very common complications among them (9). Even among well-organized teams, it is mentioned as the main problem (9, 10, 13-15).

Majority of our study subjects (75%) involved were in the early response phase of Bam earthquake (1st or 2nd weeks after the earthquake). Subjects involving in early phases of responses may be at the high risk of having psychological problems. Because of the high prevalence of mental complications among rescue and relief workers, it is important to

establish psychological support practices, and they should be provided for teams during their deployment. This practice must be incorporated in recovery training of personnel.

The major strength points of our survey; we interviewed the subjects 3 weeks after the earthquake and when the workers were still in the scene. Therefore, the recall bias may be less compared to the interviews which are done after coming back from disaster regions (16). We used the mixed method approach to obtain maximum data in a dirty field. We used a qualitative method within a framework of the quantitative one. We obtained two types of data during the single collection phase.

Our sampling includes all teams and workers and the results can be general in comparing the specific samples. Hence, majority of study subjects in this article are inclusive of specific teams such as medical teams (10-12, 15, 16) and our results are more general.

In our study, lack of coordination and no previous effective training were the main problems. Disaster relief teams in Bam earthquake included several individuals from various organizations and even volunteers.

Because Iran is a disaster-prone area, multi-organ team training will provide effective education for people interested to work as relief-teams, and it is a good practice for coordinating. The teams with specific composition may be having the same problems between other teams, but it is more or less within team members (11).

The limitation of this survey is that the survey study is not reviewed or approved by any research committee; however, developing questionnaire and methods of study were discussed among some experts in the fields. Other limitation is the sampling method. We Used the stratified sampling for obtaining the appropriate sex ratio due to gender difference.

Conclusion

All relief workers should be trained for self-protection and providing a personal kit that include as much as possible basic, minimum and adequate food, water, shelter, and personal hygiene as well appropriate clothing for cold protection and

primary remedies. Subjects must be careful for all aspects of personal protections to maximize effective responses. As in governmental efforts, the responsible organs provide the efficient teams with special combinations. For maximum utilities, rescue and relief works can focus on the local recourses and persons.

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