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Saudi medical relief mission to earthquake in Bam, Iran: medical perspectives, experience and lessons learnt

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Abstract

***Objective*: To discuss the experiences of a medical relief team to an earthquake hit area and provides suggestions for organization of similar missions to disaster sites in future so that more cost-effective relief may be provided.**

***Design*: Descriptive study.**

***Setting*: City of Bam in southeastern Iran's Kerman province which was hit by an earthquake of 6.8 Richter on December 26, 2003. This destructive earthquake killed 43,200, injured 30,000 of the city's 125,000 residents and destroyed 90% of the buildings. Most of the survivors lost family members, homes, jobs and suffered from depression and post-traumatic stress syndrome.**

***Relief mission and interventions*: The Saudi government sent a group of experts from the Saudi Red Crescent, National Guard Health Affairs, Ministry of Health and Military and Defense forces to provide acute care to the injured and contribute to the process of rebuilding the health care system. The Saudi mission was divided into three teams, one to triage patients for transfer to other health facilities, the second team was the air medi-vac transport staff, and the third team was assigned to establish a field hospital in Bam.**

***Results*: From December 28, 2003 to January 3, 2004 the air medi-vac transferred 400 patients uneventfully. Majority of the transported suffered from fractures or crush syndrome injuries to the lower extremities. In 9 days, the Saudi Field Hospital treated 1849 patients for earthquake-related injuries, as well as other medical emergencies. This mission generated lot of goodwill and was able to create efficient medical facility in short time. However, numerous shortcomings were encountered in coordination, decision-making, security, team composition and communication.**

***Conclusions*: During this swift and massive relief operation, many positives were achieved but at the same time, difficulties were encountered which may have compromised the efficiency and effectiveness and increased the costs.**

Key words: Bam, earthquake, injuries, lessons, medical relief, Saudi, Iran.

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Introduction

Earthquakes are one of the most destructive and violent natural disasters. Every year numerous earthquakes are reported and more than 10 are documented to cause substantial loss of lives and property. (1,2) Quakes usually come suddenly and with little or no warning and hence are often more devastating than other natural disasters. Over the previous few decades, disaster management training and preparedness has increased substantially. Better communication systems have also allowed faster relaying of information and quicker responses from the relief teams. However, each earthquake is unique and presents with different challenges. Learning from and documenting each experience equips us to face the next challenge better and minimize damage.

Disasters bring out in open, the strengths and weaknesses in the coordinated functioning of a large number of organizations, departments, non-governmental organizations (NGOs), people, governments and international protocols. At the same time, they also bring out the kindness, unity and humanitarian aspects of mankind wherein people are willing to help others in distress, often at great risk to themselves, even if the sufferers belong to different race, religion or country.

In this paper, we share our experience of being part of a Saudi medical relief mission to one of the most destructive earthquakes in recent times to the city of Bam, in southeastern Iran. The objective is bringing out many lessons--both positive aspects as well as the difficulties encountered so that future relief missions can perform better.

Material and methods

The earthquake.

On December 26, 2003, at 05.26 AM, the city of Bam was hit by an earthquake measuring 6.8 on Richter scale and resulted in extensive destruction of the city distributed as follows: 60% of the city where the mass ratio was 85%, 20% of the city where the mass ratio was 60% and 15% of the city where the mass ratio was 50%. This earthquake was unique in its devastation because, out of the 125,000 inhabitants of Bam, 43,200 people died and 30,000 got injured requiring visits to various hospitals. As the quake stuck at a time when most people were asleep in homes, the loss of life was more. (3) The quake caused the displacement of at least 35,000 people and destroyed all the dwellings of the city. It completely broke down all daily services to the residents such as electricity, water, health, security and transportation thus severely compromising the ability of surviving residents to help themselves. The most common injuries involved lower limbs (41%) and pelvis (26%). (4) More than 50% of patients had fractures. The incidence of injuries and fractures reflected the position of people at the time of the earthquake i.e. mostly supine or lateral. (5) The initial victims were transported to the city of Kerman by cars and ambulances.

The city of Bam.

It is important to be familiar with the sociodemographic and geographic characteristics of the city to understand the impact of the quake and planning of relief measures. Bam is an ancient and major city in the Kerman province in southern east Iran with a high population density. The majority of residents of this city of 125,000 people worked in agriculture and related industry. The socioeconomic level is low in this city and the population is suffering from rampant addiction to drugs of all kind. It is socially acceptable to talk openly about the addictions. The societies are characterized by a lackadaisical attitude and are willing to wait for things to happen on their own or to be done by someone else. This also gets reflected in the working of the local administration.

Observations

The Saudi relief mission.

The team arrived in the city of Kerman, which is 185 km north from the disaster site and split into three groups: the first group to triage patients for transfer to other health facilities, second to air-lift the most sick and the third group to prepare a field hospital in Bam. The first team upon arrival at the airport in coordination with the concerned officials of the health sector used the main hall of the airport as a sorting place and prepared for the transfer on board the aircraft medical evacuation. The first flight to Tehran carried 39 injured. A total of 257 injured persons were transferred

with the help of 27-member team within 48 hours in spite of a snowstorm hitting Tehran airport. A total of 400 patients were transferred by air medi-vac, 20 of them were critically ill and some of them were mechanically ventilated. Majority of the transported patients suffered fractures or crush syndrome injuries to the lower extremities, and a very few had head or chest injuries (**Figure 1**). Thirty-two patients were suffering from acute renal failure due to multiple injuries. No morbidity or mortality was reported during this extensive air transport operation.

The team, entrusted with the task of establishing field medical facility in Bam visited the headquarters of Idarpalkuart -the Iranian Red Crescent and selected a location in the city center in front of historic citadel, which was destroyed in the earthquake. This area is surrounded by population from all sides. The field facility was planned to provide three sections: an area for the reception of public containing emergency department, clinics, pharmacy and laboratory; an area providing 50-bed admission facility, intensive care unit and related services; and an area providing accommodation and living facilities for the relief team. The whole team arrived in one day with the help of 7 aircraft and cargo carriers. They transferred the entire cargo to the site of the field hospital in less than 12 hours and build the hospital in 14 hours of continuous work.

The team implemented a plan for informing the public about the existence of the field hospital by distributing pamphlets in Persian in all parts of the city. The publications also carried condolences from the Saudi people. This information campaign was effective as the number of patients reporting increased rapidly within 48 hours (**Figure 2**). Apart from earthquake related injuries, many patients reported with a variety of medical emergencies like acute coronary syndrome, pneumonia, diabetic ketoacidosis, asthma, panic attacks and drug overdose. Among the 1849 cases seen at the field hospital, 430 required surgical dressing, 270 were given tetanus toxoid and 210 underwent orthopedic treatments. No cases of malaria, typhoid, brucellosis, hepatitis or tuberculosis were reported. More than half of all patients seen in the field hospital were current or former drug users.

During the course of this mission, a lot of positive aspects emerged (**Table 1**). At the same time, there were moments of frustration and difficulties highlighting that the operation could have been managed more efficiently (**Table 2**).

Discussion

Inaccurate information about the public health consequences of earthquakes and other disasters is often disseminated through media. It can mislead the donors and promote inappropriate distribution of resources. (6) Hence, reliable and quick assessment of the damage by a nodal agency in a coordinated manner is crucial to elicit appropriate response and mobilize resources. In a major earthquake, the highest demand for health care occurs during 24 to 48 hours after the event. (7) The injured usually seek medical care during the initial 3 to 5 days and the demand for emergency medical care declines to baseline levels by end of first week. (8) Hence, the medical relief missions need to become operational very early and preferably mobilized from nearby areas. This can be achieved only if the structure of the teams is in place and they are always ready to move at short notice as in wars. It has been seen that most deaths in earthquakes are due to delayed medical care. (9) In Bam, as the health care system was totally destroyed, the residents of Bam continued to seek care from the field hospital for their routine medical problems. Field hospitals are established with the goal of providing medium term health facilities in situations where health system gets disrupted and they need to continue to function till the permanent structures come up again.

Lack of accurate data about causes of deaths and pattern of injuries during earthquakes is an important factor hindering medical planning for the relief measures. Knowledge about the demographic profile of the affected area is important to understand the requirements of various specialists in the team. A disproportionately higher percentage of females, young children and old may be affected in earthquakes, necessitating the presence of pediatricians, pediatric surgeons and women's disease specialists in the relief teams. (10) It would be ideal to have a national nodal agency to coordinate and route all relief efforts from multiple national and international agencies and organizations in a targeted and focused manner to avoid unnecessary duplication and wastage of resources. An effective triage system is essential for efficient health care delivery. One of the three teams of the Saudi relief mission had the responsibility of triaging

the patients and this proved very helpful. A similar approach has been tried successfully earlier by having a 'screening tunnel' to segregate patients needing minor, moderate and major injury management. (11) After the first week of an earthquake, the hospital visits are usually for medical conditions other than injuries. (12) The population often suffers from depression, anxiety and post-traumatic stress, which may last several weeks to months. (13) During this period, services of mental health specialists and counselors are required. Since earthquakes are unavoidable and would continue to occur, planning and preparation should be done in peacetime. Apart from identification and training of relevant personnel, mock drills, a good planning would also assess the medical response capacity for disaster in the local areas prone to quakes. (14) It is necessary to gauge the rescue, transport as well as treatment capacities.

In view of the difficulties and lessons learnt from the Saudi relief work in Bam, it is suggested that the national medical relief missions should be composed of all stakeholders to facilitate a fully prepared and organized response to similar situations. This will help to provide more effective and efficient services to the distressed and avoid the negative aspects similar to those encountered by the Saudi team in the Iranian city of Bam. It is proposed that the mission shall consist of representatives of Saudi Arabian Red Crescent Society (SARCS), medical services for the National Guard, Ministry of Health, the air medical evacuation unit and military medical services because the medical relief mission involves training, technical, administrative, information technology and program inputs. It is important to route the relief work through an official agency that regularly does this e.g. Red Crescent Society. We observed that this organization carried lot of respect and stature with the official authorities. Its vehicles and personnel were allowed access to all areas without any security or formal hindrances. This is also consistent with international practices at the disaster sites, including the host country where all relief work was under the umbrella of either the Red Cross or Red Crescent.

We would also like to stress the need for advance preparation for such tasks. It may be appropriate to organize, train and keep ready specialized task forces as well as equipment and accessories, which can be mobilized at short notice. The training should also prepare teams about the laws and protocols to be followed in international missions and acquaint them with international agreements governing such work to avoid uncomfortable and unpleasant situations as experienced by the team to Bam.

In summary, disaster relief should be targeted and focused, coordinated by a central unified agency and deployment of medical teams must be done rapidly and coincide with the medical needs.

Table 1. The positive outcomes from Saudi relief mission

1.	Opportunity for Saudi workers to demonstrate the spirit of love and giving for fellow mankind in distress
2.	Opportunity for Saudi government to confirm the goodwill and respect for Iranian people
3.	Appreciation of the efforts by local population and administration as demonstrated by repeated visits of many Iranian officials to the relief site. The visitors included the Supreme Commander of the Iranian forces, Governor General of the State of Kerman, Governor General of the city of Bam, Deputy Health Minister of Iran, editor of Iran's largest newspapers (Kihian) and a group of journalists and correspondents, President of the Iranian Red Crescent Society and Advisor to the Iranian Foreign Minister for International Affairs
4.	Visit by officials of Ministry of Defense to Mriyatem- one of the best facilities in the ground in their desire to study the specifications and the possibility of replicating the same
5.	Provision of high quality health services in a smooth and efficient manner by the Saudi relief mission in coordination and integration with Iranian medical services, in spite of repeated aftershocks, overcrowding and lawlessness

Table 2. The difficulties encountered

From Iranian side	
1.	Delayed decision making because of lack of unified and coordinated command
2.	Inadequate management and lack of coordination between various agencies at airports- leading to loss or misplacement of vital components of the field hospital e.g. 24 tents were shifted by Iranian Red Crescent to disaster site, assuming them as aid; loss of medical, electrical, sanitary and communication equipment
3.	Lack of logistic support e.g. lack of diesel to operate diesel engines; lack of availability of heavy machinery; failure to provide oxygen cylinders for medical services
4.	Failure to provide adequate security
5.	Personnel from multiple parties trying to collect information directly and indirectly
6.	Infringing on the property meant for field work as well as personal use
From Saudi side	
1.	Non-familiarity of team members about each other making effective coordination difficult
2.	Presence of non-qualified personnel in the team making them ineffective for the assigned tasks
3.	Lack of advance preparedness for providing operating logistics e.g. Kali uniform, identification cards, modes of movement
4.	Lack of knowledge about duration of the mission resulting in members arriving with inadequate clothing and money
5.	No one in the Saudi team speaks Persian language, thereby affecting communication with the local population. However, this problem was solved by urgently hiring 12 interpreters
6.	Absence of clear management structure of the team, thereby decreasing productivity and efficiency

Figure 1. Type of injuries in those transferred by air medi-vac

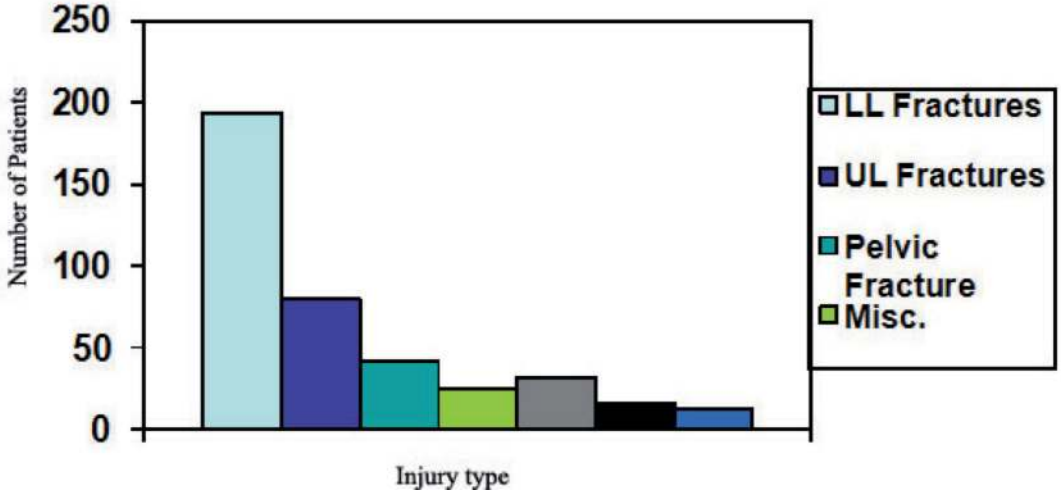
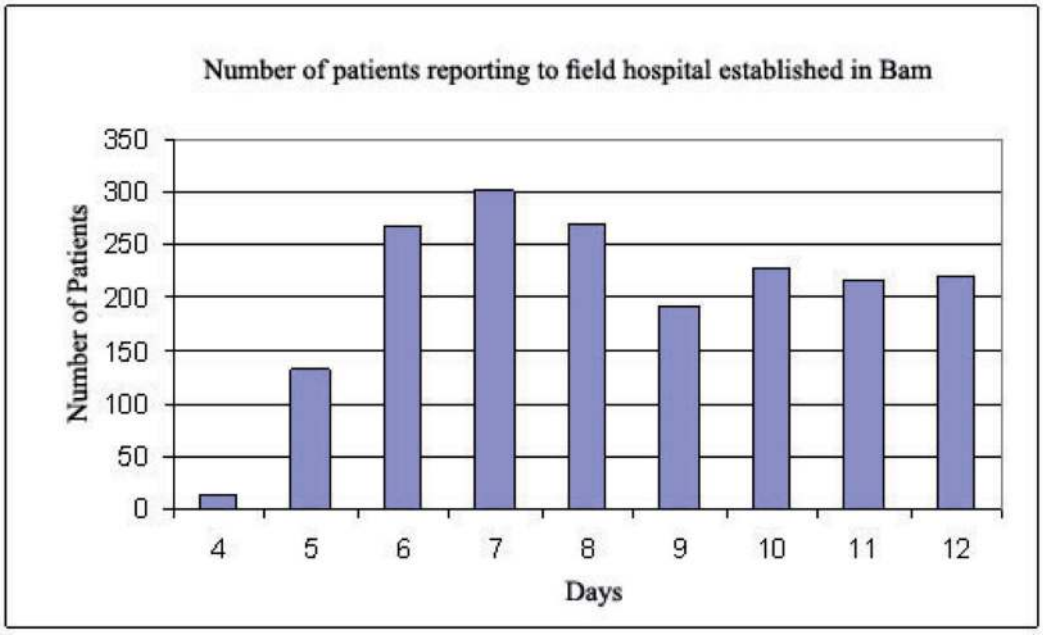


Figure 2. Day wise number of patients reporting to field hospital established in Bam



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