As the City Heals…Post-earthquake Reconnaissance to Bam, Iran

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ABSTRACT

On 26 December 2003, an earthquake measuring 6.7 on the Richter Scale struck Bam, an ancient city on the old Silk Road and also a UNESCO World Heritage site. More than 90% of buildings were destroyed beyond salvage and there was a total of 27 000 deaths. About 90 000 people were displaced and lost their livelihood and 2 500 children became orphans overnight. Three months post-earthquake, 15 000 were still receiving treatment and people were still mending their lives and trying to overcome their post-traumatic stresses.

This paper will discuss the situation in Bam and the efforts targeted at rebuilding and reconstruction after a major mass casualty incident. Needs assessment will be discussed, especially pertaining to basic and healthcare needs, educational and social needs, the Emergency Ambulance Services expanded role, supply of clean water and proper sanitation as well as psychological support and counseling services. The Iranian Red Crescent Society and government's plans at disaster preparedness and training will also be looked at.

Keywords: earthquake, disaster, healthcare needs, needs assessment, reconstruction

INTRODUCTION

Many residents of the historic city of Bam, a tourist destination on the old Silk Road, were still sleeping at 0526 hours on 26 December 2003 when an earthquake of magnitude 6.7 on the Richter Scale struck.[1,2] Their traditional mud brick and clay houses put up little resistance to the violent shaking as walls and roofs crumbled and collapsed with thousands of victims trapped beneath the rubble. In a matter of seconds, women lost their husbands, parents lost their children and families lost their homes. The earthquake was centred about 10km southwest of Bam, a United Nations Educational, Scientific and Cultural Organisation World Heritage Site, which borders the Dasht-e-Lut desert, in the Iranian province of Kerman. There was a suggestion that this earthquake occurred on the Bam fault, caused by the northward drift of the Arabian plate against the Eurasian plate.[1,2]

Bam was a wealthy middle class city and its economy was based on the foundations of agriculture and enterprise. It was also a booming tourist city.

Iran has had more than its fair share of earthquakes and it is ranked as the world's fourth most disaster prone country. The following earthquakes have occurred in Iran with significant impact:[3]

1. June 1981: More than 1 000 killed in the earthquake that destroyed the town of Golbaf
2. June 1990: 25 000 deaths and half million made homeless in the earthquake affecting Gilan and Zanjan
3. February 1997: Over 1 000 killed in the earthquake in northwestern Iran
4. May 1997: 1 500 killed in eastern Iran following an earthquake
5. June 2002: More than 200 killed in Western Qasvin and Hamedan regions

In fact, in the twentieth century itself, at least 65 major events in Iran have claimed about 126 000 lives. In terms of human cost, the Bam earthquake is the worst disaster in Iranian history. Such devastation and

massive loss of life is attributable in part to poor construction methods in a society where people traditionally build their own homes.[4,5]

"Each earthquake is different from the last one, so we have to take them as they come"

Rab Barrie, IRCS, Organiser

A United Nations Damage Assessment Team estimated that 90% of buildings in Bam sustained 60 to 100% damage (i.e. 25 000 of 29 500 structures). The other 10% of buildings recorded 40 to 60% damage. There was annihilation across entire city blocks. The historic city centre and fortress were destroyed, together with at least 94 healthcare homes, 14 rural and 10 urban health centres, 131 schools and 3 universities.[1] A 2 500-year-old citadel "Argo-e Bam" was also partially destroyed. Total damages was estimated at USD1.5 billion and housing was the worst affected, with damages amounting up to USD700 million. The key economic sectors of agriculture, commerce and manufacturing suffered a combined loss of about USD300 million.[1]

There were about 27 000 deaths and most of the 90 000 displaced survivors had lost their livelihoods. Fifteen thousand people were still undergoing medical treatment and 2 500 children became orphans. The city was flattened and ganats — ancient irrigation channels that have watered this oasis for centuries — ruptured. Natural springs were ruined and the date trees could not receive the 3 tonnes of water they required per week. Electricity lines were brought down and thousands of cattle were buried. The number of people affected by the loss of economic activities and damage to property and infrastructure was as high as 200 000. Overall, it was estimated that the recovery efforts would take at least 24 to 36 months.[6]

THE SINGAPORE EFFORT

Singapore sent a reconnaissance team, from 10 to 15 April 2004, led by Mercy Relief and the Singapore Red Cross, 2 non-governmental organisations (NGOs), to assess the needs in Bam 3 months after the earthquake. The objectives of the trip were to evaluate first-hand the situation and needs of the victims 3 months after the earthquake, i.e. in the recovery and reconstruction phase; and to determine the feasibility of mounting a Singapore Relief mission and its possible contributions. The team would then propose an appropriate type and level of assistance which would also help to disburse the funds raised by Singaporeans for the Bam earthquake victims.

Before leaving for Bam, "research" was performed using various resources to gather information on the current situation and needs. The resources utilised included the worldwide web, news reports and articles, input from the Iranian ambassador as well as from the Iranian community in Singapore. The Singapore Red Cross Society members were also in touch with their counterparts, the Iranian Red Crescent Society (IRCS), to get as much ground information as possible.

Some of the challenges we anticipated included that of religious and cultural sensitivities. As Iran was known to be a strict Islamic republic, certain dress codes and behaviour had to be adhered to. We were also cautioned about the use of language, touching others, especially members of the opposite sex, attitude in public and overt shows of affection. Women in this part of the world were more often "seen" than "heard" and they were not to voice their opinions loudly and openly in public. Some of these may seem harsh or restrictive by Western standards. What seems like a misdemeanor in our society may represent a capital crime in the Islamic republic.

NEEDS ASSESSMENT AND DISASTER RESPONSE

Disaster needs assessment refers to the survey and information collection activities carried out to determine the effects of a disaster on the victims of a stricken community. The assessment is carried out at different stages: the initial or immediate assessment and the subsequent assessments. The former provides information to guide emergency services in search and rescue missions and also to locate sites of secondary threats which may continue to endanger survivors. Rapid needs assessment of the affected population is a very important initial step in the response to any disaster.

The subsequent assessment is a survey to compile detailed information on the extent of losses and other information required to develop and execute relief and reconstruction programmes. Further assessments can also be carried out to provide specific information pertaining to other pertinent needs issues. Information from emergency surveillance may help local health authorities focus on allocation of resources.[7]

Needs assessment is usually performed by experienced staff from the agencies that will be implementing the relief programmes. They are usually personnel who have been involved in disaster management and are trained to gather the relevant information. The team will tend to be multidisciplinary and will collect

information pertaining to various areas such as housing needs, medical needs, public health, sanitation and hygiene issues, weather conditions, psychological trauma, psychological support and needs, education and other social issues. Disasters follow no rules but a consistent medical approach is becoming the accepted practice throughout the world. This mass casualty incident response enables teams from various countries to work together to meet disaster related needs, despite language and cultural barriers.

Culture and religion are known to influence the way in which people define health, express pain, select treatment options and deal with grief. The diversity of the population engulfed in any disaster may represent unmet challenges to the expatriate international community rendering aid.

ASSESSMENT FINDINGS

Basic Needs

After the disaster, many earthquake victims lived in tents provided by the IRCS and other NGOs. Many were relocated to designated tent camps but others remained on their partially or completely destroyed property as they felt this was the only form of "possession" they had left. To shelter victims from freezing temperatures during winter, and hot weather of the summer, there were plans to relocate them into prefabricated housing units which were being constructed. The government had ensured that the reconstruction of buildings in the strickened area would follow seismic-resistant specifications, as much as possible. The clearing of debris rubble was still ongoing and lorries performing this function were seen very commonly. The devastated city was left without water, power, gas supplies and communications came to a standstill. Water was made available and shared via communal pipes. Cooking was done with the use of propane stoves. Cold storage boxes had also been provided for temporary food storage and preservation. Communication remained difficult.

Life goes on for the residents of Bam. Shops and stalls have already started business. The IRCS has also implemented the government-driven cash coupon system to replace the ration card system in order to improve the economy. Food distribution programmes successfully provided for up to 213 000 people in January and February 2004.

Healthcare Needs

The damage to healthcare facilities and personnel was significant. All 3 hospitals, 14 rural and 10 urban health centres in the area were destroyed and many of the healthcare staff were killed. Search and rescue activities began within one hour of the onset of the earthquake. Urgent treatment of injured survivors and those with medical conditions was carried out swiftly by the authorities in Iran working together with the World Health Organization (WHO) and many international NGOs. Airlift operations, via helicopters and planes, were implemented to transport casualties to hospitals in surrounding cities and provinces.

Blood loss compensation, emergency surgical intervention and medical life-saving support measures created a massive demand that consumed the capacities of many neighbouring hospitals and healthcare units. The public health functions with top priority included caring for the vulnerable groups (elderly, disabled and children), ensuring adequate shelter, food, water and medication and especially, responding to psychosocial needs.

The epidemic that developed in the Bam was a function of the large concentration of displaced persons living together in close proximity. Overcrowding and unhygienic conditions, in particular, contributed towards disease transmission. Communicable diseases, such as upper and lower respiratory tract infections and gastroenteritis, were rampant in the tent camps. Measles were common, especially among children. The other common diseases seen in this earthquake were asthmatic attacks, musculoskeletal illnesses, skin rashes, skin infections, physical injuries especially limb injuries, chest complaints (chest pain, angina) and headache.

Today, the essential healthcare needs of the people of Bam have largely been met by the various day clinics as well as the multifunctional field hospital. These were set up very early on after the earthquake with the help and aid from international NGOs working together with the IRCS. The field hospital was a multidisciplinary, 200-bed hospital able to handle both medical and trauma cases. This tented hospital set-up, which had been in place since the early days after the earthquake, was transferred to a more permanent prefabricated facility. To do this, the IRCS worked together with the Finnish, Spanish and German Red Cross. The IRCS had also planned to gradually phase out the foreign healthcare staff and replace them with the locals in this recovery and reconstruction period. This process was completed in June 2004. There are also currently sufficient stockpiles of medication, equipment and vaccines which has been received from various countries as well as from the other provinces of Iran.

Earthquakes cause high mortality from trauma, asphyxiation, dust inhalation and exposure to severe environmental conditions. It is thus crucial to have effective disease surveillance, monitoring of morbidity and mortality and prompt outbreak response. These needs were met quickly and effectively with the help from WHO, the United Nations and also Iranian authorities.

The general health is now good. The numbers of respiratory and gastrointestinal diseases seen in the earlier months had decreased and stabilised. The healthcare providers are now tending to the chronic illnesses.

The ambulance and prehospital transportation services were up and running. In the aftermath of devastation, the ambulance service delivered a substantial proportion of less emergent and primary care type cases. The adoption of this non-conventional role was to compensate for the deficit in the healthcare system, facilities and personnel. This expanded role of the emergency healthcare providers is necessary in mass disaster situations.

The worst scars in disasters such as earthquakes are the psychological scars, some of which can even be transgenerational. It is thus generally accepted nowadays that mental health is a priority in disasters, be it at the individual or community levels. Mental health must be a part of the disaster plan. The central problem with psychological stress pertains to the quality of life. Survival is more than just "not dying".

As in any major disasters, psychological trauma and post-traumatic stress are real issues facing the community in Bam. Since the early days after the earthquake, various psychological support teams had been working with the population of Bam. These included staff from WHO, who assisted the Iranian Ministry of Health (MOH) in establishing the emergency mental health support programme for survivors. They worked closely with the IRCS team of between 50 to 100 volunteers and social workers to implement a strong psychological support programme which reached out to about 200 000 people, according to the MOH. The common types of psychological reactions faced included acute stress reaction, post-traumatic stress disorder and adjustment disorders. The level of distress depended on the personal characteristics of the victims, the capacity to cope and adjust as well as the nature of the disaster (ie. the speed, duration and impact of it).

The councillors had gone from tent-to-tent speaking to families, and they also functioned at the day clinics. They had also visited the tent-schools and spoken to the children. The reception had been very positive. Psychological instructions and explanations were coordinated by psychologists and psychiatrists with the use of specific protocols. People were encouraged to express their feelings and anxieties.

The common secondary stressors encountered among the Bam earthquake victims were the loss of home, property, business, jobs, family members, security and dignity; bereavement; hasty burial of many relatives and family members; and spread of many illnesses.

Post-traumatic counselling posed challenges even on the councillors. Therefore, it was necessary to have debriefing and ventilation sessions for them as well.

For many international organisations and overseas volunteers, communication was challenging due to the differences in language usage. Local interpreters had to be relied on for counselling purposes.

Children and Education

About 90% of the schools in Bam were completely destroyed. Those remaining sustained irreparable damage. School buildings as far as 40 to 90km away were damaged and rendered unfit for occupancy. United Nations Children's Fund, together with assistance from Belgium, put together over 400 "School in a Box" kits containing teaching supplies for 100 children per kit. The Ministry of Education (MOE) started classes in tents and containers for children. The children played and interacted with each other as a form of distraction from their current situation. The MOE, under the reconstruction masterplan, had also put forth the proposal for building of permanent schools, as the tent and container schools were gradually phased out.

The child-victims in Bam were at high risk not just of physical injuries, but also from the social and psychological perspectives. They deserve special attention and it becomes important to identify them early in disasters. These children tend to come from single parent families or they may be handicapped. Active community participation after the disaster would also be helpful in identifying them early.

Many children orphaned by the disaster were being cared for by relatives who had been given monetary support by the government. Some of the orphans had been transferred to orphanages throughout Kerman. The Iranian government, under the reconstruction plan, hoped to build 20 orphanages to house these orphans.

THE MAJOR NEEDS AND SINGAPORE'S CONTRIBUTION

The major needs during the reconstruction phase in Bam can be summarised as follows:

Basic Needs

This included transfer of residents from tent camps to more permanent buildings, provision of proper housing, water supply via piping and proper sanitation.

Healthcare Needs

This comprised reconstruction of healthcare facilities, recruitment of more local healthcare workers, responding appropriately to the decreasing numbers of infectious and acute phase problems and preparing to manage chronic illnesses and complications which may have developed in the acute phase, post-injury rehabilitation, and the setting up of a proper rehabilitative-care facilities

Children and Educational Issues

Here, the priorities were the conversion of makeshift schools and tent educational centres to more permanent infrastructure, temporary placement of orphans with relatives and provision of funds to aid their care and the setting up of orphanages as a more long-term solution.

Others

The main concern was the preservation of cultural and national heritage such as the rebuilding and repair of the damaged citadel and heritage centre and the introduction of an Emergency and Disaster Preparedness training programme.

The Iranian government and the IRCS have taken the lead and have come up with a structured plan for the rebuilding of Bam. Projects planned to meet the various urgent needs of the community have been put forth to be addressed without delay. They will work in partnership with various countries, NGOs and international aid organisations on many of these projects.

The reconnaissance team assessed and looked at all the needs and the channels available for Singapore to contribute efficiently. Information obtained from data gathering, observations and interviews with various key people on the ground were consolidated and brain-stormed. The decision was made as objectively as possible, taking into account the greatest needs of the city, the amount of money we had collectively raised to support this cause and also the creation of channels for enhanced bilateral exchanges, interaction and sharing of knowledge.

The areas we would be contributing towards are:

1. The construction of 2 900sqm warehouses in the Bam-Kerman area. These buildings would be built according to the seismic specifications of the Iranian government and would store supplies and stockpile items and equipment needed in response to disasters. These could be easily and readily activated and mobilised in the event of any acute crisis in the area. The warehouses would be located just off the expressway on the way to Kerman airport, a very strategic location indeed. This would also serve to support the disaster preparedness programme in this area, which is disaster-prone.

2. The construction of 2 orphanages with full dormitories, one for boys and the other for girls. Here, we would be working closely with the Iranian Welfare State Organisation and this project would also provide an avenue for Singapore to send psychosocial support staff and paediatric medical staff on exchange programmes, which would contribute towards the holistic care of these orphans.

Various organisations have pledged their support for many of the projects planned for the rebuilding of Bam. We did not wish to duplicate these as there could be an oversupply in one area, in the long run. Moreover the team felt the projects undertaken would address the current needs and also have long term benefits for the community.

CONCLUSION

At 3 months post-earthquake, there appeared to be sufficient staff and personnel to undertake the various tasks. Foreign staff and international NGOs were gradually being replaced with locals. There was also sufficient experienced Iranian personnel to lead the people in their efforts. The relevant authorities, the Ministries of Health and Medical Education, the local officials and people with the "know-how" had taken the necessary lead and this was indeed exemplary.[8,9] They would be working closely with the WHO's team of experts in emergency healthcare, epidemiology, environmental health and health services planning. Spirits were high and the people were hopeful.

The progress we observed in post-earthquake Bam has been very encouraging, with both the IRCS and the government spearheading various initiatives and

masterplan in the reconstruction phase.[9,10] It is essential to have knowledgeable and proactive leaders who can lead the community in their proposed efforts.

The Emergency and Disaster Preparedness Programme will see the strengthening of the overall capacity and capability to manage all types of disasters and large-scale emergencies. There will be various training programmes, ranging from courses for lay persons and the public to those for professional healthcare providers. The programme is extremely appropriate, especially since Bam and Kerman are natural disaster prone areas. It will help in the "vulnerability reduction", policy development, and training and education of people in all aspects of emergency response.[11]

In the long term, there will also be the possibility of bilateral exchange programmes between Iran and Singapore in the area of Disaster and Emergency Preparedness.

As responsible global citizens, it is appropriate and timely for Singaporeans to contribute towards this cause. This will also enable us to disburse the money collected for this cause in a useful and effective manner that will have a significant impact on the affected community. From a political perspective, our involvement will provide a platform to strengthen bilateral ties and Singaporeans can thus take on with pride, the ownership of some of these projects.

There is much the Singapore team has learnt from this mission and some of these experiences are indeed invaluable:

1. Proper coordination is required in the midst of chaos
2. Able and knowledgeable leaders are needed to take charge in the field of operations
3. Governmental and community involvement is essential from the very early stages
4. A long-term "vulnerability reduction" plan is important
5. Training and preparedness of the whole community is important. Even if Singapore is not natural disaster prone, training and information will still need to be passed on to the community, so that the concepts and principles can be understood. We do have our own fair share of mass emergencies and other disasters.
6. The Singapore team gained greater exposure to the NGOs and international aid organisations: the networking, meetings and collaborative efforts on the ground enhanced our knowledge and understanding of disaster management.

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