Data collection after massive natural disasters (focusing on Bam earthquake, Iran)

Farzaneh Zolala
Kerman Medical University, Kerman, Iran and Medical School, Public Health Sciences, University of Edinburgh, Edinburgh, UK

Abstract
Purpose – The aim of this study is to explore mortality data collection after a destructive earthquake in Bam, Iran.

Design/methodology/approach – This is a case study of mortality data collection using a qualitative approach. The study data were collected through interviews with people involved with data collection and processing in Iran, and an evaluation of routinely collected data.

Findings – The results indicated that there were many limitations affecting data collection after the earthquake. These limitations are rooted in basic problems within the existing data collection system and a lack of co-ordination between the groups collecting data, including national and international aid groups that provided help after the earthquake.

Research limitations/implications – The research is based on a very large and destructive earthquake; the results may be different for other natural disasters such as floods.

Practical implications – The main target group of this study is the decision makers involved with the disaster relief issues at national and international levels. This issue of data collection is imperative for future disaster aid.

Originality/value – The study highlights the problems affecting routine collection of mortality data after a disaster, arising from the scant attention paid to proper documentation.

Keywords Natural disasters, Death rate, Data handling, Iran

Paper type Research paper

Introduction
Disasters have been described as the most impending threats for human societies, and have affected many populations worldwide. According to the World Health Organization (WHO), about two billion people were affected by disasters and 600,000 lost their lives in the 1990s alone (World Health Organization, 2002).

Disasters can affect societies in different ways, including health and socio-economic situations. These impacts can occur immediately after the disaster and can linger for a long time. The economical effects of a disaster can be on the individuals, such as the
In order to measure the effects of a natural disaster there should be ongoing and routine data collection commencing immediately after a disaster. These data produce information needed for planning, management, and evaluation of the health services, with an ultimate aim of returning to the original health conditions, at both the individual and population levels (Lippeveld, 2001). The number and characteristics of casualties are considered to be one of the main aspects of a disaster effects study (Seaman, 1990). Also, mortality data such as maternal and child mortality can reflect the longer-term effects of a disaster, indicating the socio-economic effects of a disaster (Graham et al., 2004; Onwudiegwu, 1997), as well as the quality and quantity of health care services (World Health Organization, 2006, 2007; Schaefer et al., 1999; Okafor and Aniebue, 2006).

Iran is one of the most disaster-prone countries in the world. The most frequent disasters occurring are natural: drought, earthquake and flood. Bam is an ancient city on the old Silk Route located in Kerman province in south east of Iran, and was almost destroyed by an earthquake on 26 December 2003 (United Nations, 2004). This earthquake resulted in 31,828 deaths, 17,500 injured and 525 lost; additionally 75,000 were rendered homeless (Ashtiany et al., 2005).

The aim of this study is to explore mortality data collection after a destructive earthquake in Bam, Iran.

**Background**

**Health system in Iran**

The health system in Iran is a combination of health education and health care. There is at least one medical science university in each province, which is the official representative of the Ministry of Health and Medical Education in that province (World Health Organization, 2001). The District Health Network is a bureau under supervision of Medical University, and is the official administrator of health and medical care in each district. The first points of contact with medical services are health houses in rural areas and health posts in urban areas. These health houses cover most rural areas, but a growing population in cities hinders the same level of coverage in urban areas (World Health Organization, 2000). This system is illustrated in Figure 1.

**Death registration system in Iran**

Mortality data in Iran are recorded by two organizations: the Vital Registry and Health Ministry. Vital Registration in Iran was established in 1918 with the aim of registering vital events, including births, deaths, marriage and divorce. This organization has a centralised and governmental setting under the Ministry of Interior, with the main offices in the centre of each province and peripheral administration branches around the country (Iranian National Civil Registration, 2007). People should visit the Vital Registry to register the deaths. The problems encountered with capturing all deaths, and the poor accuracy of cause of death, by the Vital Registry made the Health Ministry initiate a new system to collect mortality data (Naghavi, 2005). For the Health Ministry, mortality data are collected by the health staff from rural and urban areas, which are then sent to the district, then to the provincial level, before being sent to the Health Ministry. This hierarchy is demonstrated in Figure 1.
As mentioned above mortality data are very useful indicators of health and are used in planning and evaluation.

**Methods**
This study is a part of a larger study carried out in Bam, a town located in Kerman province, and in Kerman, a city in the centre of Kerman province. This is a qualitative study and the data were collected via interviews and documents. The interviewees were selected so as to involve informants involved in all levels of the data collection procedure, including data collectors in the rural and urban areas, data compilers and data processors. There were also a few interviews with policy makers. Subjects were selected in the number of ways, starting with purposive sampling to cover the hierarchies, snowball sampling to widen scope, and random sampling of a subset of health houses. Another source of data were documents, there is minimal information available on the Iranian health information system on the internet. There are, however, some books published in Persian which provided useful information (e.g. *A Series of Registration Rules and Regulation* by Mansoor (2003)), these can be accessed through the official health institutions. WHO health metrics information framework was used to develop the interview guide, and in-depth interviews were used to gain rich information.

**Results**
The results of this study relate to the number of deaths that happened immediately after the earthquake and were directly caused by the earthquake, as well as the number of deaths that happened within a few months following the earthquake.

The results of the interviews with data processors showed that there are no records of deaths caused by the earthquake at the Health Ministry. Indeed, the Vital Registry is the only organization that recorded the deaths caused by the earthquake. Information from interviews and viewing some of the data produced by the Vital Registry found that these data are available in cross tables based on gender, age groups, and causes of death. The data are not accessible from the original forms in order to maintain confidentiality, unless there is judicial permission. The data are entered electronically.
using software designed by the Vital Registry, which is different from the software being used in the Health Ministry. This makes it impossible to directly export data from the Vital Registry to the Health Ministry. In addition, deaths caused by disasters are registered as deaths due to accidents, and therefore are included along with deaths from incidents such as car accidents, suicide and poisoning. Deaths are to be registered by the relatives, neighbours or friends of the deceased. The interviews found that double registration of a death, and falsely reporting a living person as dead were problems associated with this method of registration. The interviews also illustrated that due to the mass tragedy and numerous casualties it is impossible to exam the bodies and determine the exact cause of deaths.

In terms of the recording of deaths that occurred after the earthquake, the results of interviews with data collectors, health staffs and policy makers revealed two types of problems, in both the provincial and local levels. At the provincial level, findings of this study show that, there was no routine connectivity between Kerman Medical University and Bam Health Network. At that time, Kerman Medical University did not maintain a supervisory role over the health network for a few months; instead Bam health staff worked in close relationship with the Red Cross and the Health Ministry. Interviews with the health staff in Bam found that initially the events were recorded on the patient’s file and on the Red Cross Organization log books, which were in English. They were then were replaced by patients’ files and logbooks in Farsi, the formal language in Iran. These files and logbooks were given to the Red Cross organization when their responsibility for health care delivery ended.

At the local level, the Bam Health Network had collapsed after the earthquake, and there was no place to hand in the data collected from the urban and rural health centres. These data included the routinely collected mortality data from the rural and urban health centres. Also, there was no way to enter data for a few months, those involved with the data collection and data processing said there was no place to do the work and no working computers. The interviews also revealed that after the earthquake the authorities were distracted from routine data collection, and focused on specific data collection, such as infectious disease. The large scale of the tragedy created by the earthquake made the routine data collection less of a priority. During as interview with one of the policy makers it was mentioned that “at that time [after the earthquake] nobody was thinking of routine data collection”.

Discussion
Health information system data, including mortality data, have an imperative role in decision-making processes. Cibulskis divided the utility of health information into four major groups: first, for planning and monitoring; second, for increasing organizational accountability; third, for securing financial resources; and fourth, for increasing the knowledge of systems in the long term (Cibulskis and Hiawalyer, 2002). In Iran the main policy decisions are made in the Health Ministry (World Health Organization, 2005), and therefore the Health Ministry is one of the main data users. However, the results of this study flag some serious problems which limited the data usage by the Health Ministry. In terms of data collection immediately after the earthquake the limitations are that the data at the Vital Registry are collected through individuals reporting it to the registry, while the Health Ministry collects the data through its health staff. This difference does not allow the Health Ministry to collect the data
routinely on its own immediately after a large disaster. Instead it relies on the Vital Registry data, which are aggregated into forms of data presented as cross tables. This form of data might be insufficient for epidemiological research to recognise at risk groups during an earthquake, which is claimed to be one of the major issues in disaster relief functions (Nishikiori et al., 2006). This in turn might impede the planning and evaluation for the next disaster. But, even if there is a judicial permission for use of individual data, the inconsistency between the software used in these organizations makes it impossible to transfer the data from the Vital Registry to the Health Ministry. This problem was also pronounced in Romania as one of the obstacle in the health information system (Csiki et al., 2003). Also the way earthquake mortality data were recorded relied on the people’s reports. This in turn limits the knowledge of the exact cause of death for victims, which is important in epidemiological research.

Regarding the long-term effects of a disaster on routine data collection, several factors hinder the resumption of data collection shortly after an earthquake. First, restoring the routine data collection system to the pre-disaster conditions takes considerable time, this can reflect either the ability of rehabilitation or the priority setting after an earthquake. The latter can be further explained by two issues: initially, the tendency of policy makers to solve the daily and short-term problems rather than the longer-term problems (Sauerborn, 2000), and finally, little interest in the collection of routine data. This may be due to the lack of skills and knowledge of data usage among policy makers that can hinder the data utility (Sæbø and Titlestad, 2004).

Second, changes in conditions caused by the earthquake, such as living conditions, distract the policy maker’s attentions away from the routine activities, instead focussing them on emergency and surveillance actions. Although these tasks are imperative in the critical conditions that occur in the aftermath of a disaster they should not undermine the routine tasks, particularly when the data are not only used to monitor the longer-term effects of a disaster, but also to make the governments accountable to their people (Cibulskis and Hiawalyer, 2002). Finally, low co-ordination between the national and international aids, in terms of sending routine data to the province was another problem after the earthquake. Although the role of national and international aids are imperative in the relief efforts after a disaster, poor co-ordination and a lack of defined tasks regarding routine data collection resulted in no data being sent to the Ministry of Health for a few months after the disaster. This time has critical effects on people’s health due to changing socio-economic factors. And, these data have a critical role in recognising the problems that develop after a disaster, and can be used as important indicators during decision making.

There is very little research on routine data collection following disasters, and this study could provide useful information in this important area. However, this study was conducted on the Bam earthquake, which was a massive earthquake. Therefore, the results might be different in less serious disasters, and other type of disasters such as floods.

**Conclusion**

The occurrence of natural disasters is increased over the time. Recent studies show that globally there has been an 18 per cent increase in the natural disasters frequency in 2004 and 2005 (Hoyois et al., 2006). This means that the preparedness and planning for future disasters should be a main priority for most societies. This study aimed to
explore the problems that arose from the Bam earthquake in terms of data collection, which is an imperative part of disaster preparedness. With regards to the availability of good quality data after a disaster, in developing countries most problems originate from the poor infrastructures. Furthermore, this study found that poor co-ordination between national and international aids to collect and register data leaves a significant hole in the data collected from the disaster stricken areas. This data can provide important information for recognition of vulnerable people, as well as on health services quality and disaster relief performance. This study suggests a multifaceted effort in the global and national level to strengthen the health information systems as a disaster preparedness activity, to be done by considering its efficacy during and after a catastrophic event.

References
Naghavi, M. (2005), Mortality Features in 23 Provinces in Iran in 2003, Iran Health and Medical Education Ministry, Tehran.


World Health Organization (2007), Skilled Attendants, World Health Organization, Washington, DC.

About the author
Farzaneh Zolala is Lecturer in School of Public Health at Kerman Medical University, Iran and a PhD Student in Public Health Sciences at Edinburgh University. Farzaneh Zolala can be contacted at: farzanehzolala@sms.ed.ac.uk

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints