

Post Earthquake Health Information Management in Japan—the Challenges

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Abstract

On March 11, 2011, a megathrust earthquake of magnitude 9.0 hit Japan, causing destruction of homes, large-scale fires, giant tsunami, and demolition of nuclear power plants in the Tohoku region on the northeastern coast of Japan. This article focuses on the response of the Japan Hospital Association (JHA) and the Japan Society of Health Information Management (JHIM) to the devastating Great East Japan Earthquake, the results of their efforts, the invaluable lessons learned from the disaster, and the recommendations arising from discussions during symposia held at JHIM's 38th and 39th annual meetings, held in 2012 and 2013 respectively.

Other major disasters caused by earthquakes, tsunami, and hurricanes have occurred in recent years, including the 7.2-magnitude Great Hanshin Earthquake of 1995 and the 6.8-magnitude Chuetsu Offshore Earthquake of 2007 in Japan, the 9.2-magnitude Sumatra Earthquake of 2004, and the 8.2-magnitude Iquique Earthquake of 2014 in Chile. Based on the unprecedented major earthquake disaster that occurred in Japan, this article analyzes the status of health information management in Japan at the time of the disaster and considers its implications in relation to health information management at times of disasters that potentially may strike around the world at any time.

Keywords: health information manager, major disaster, health information during disasters, electronic health record

Background

At 2:46 p.m. on March 11, 2011, a major earthquake originating off the coast of Miyagi Prefecture struck Japan (see Figure 1). At a magnitude of 9.0, it was the largest earthquake in Japan and its vicinity in recorded history (see Figure 2). The earthquake's focal region spanned some 500 kilometers north to south and 200 kilometers east to west. Its intensity was the strongest in Kurihara City in Miyagi Prefecture, which recorded 7 on the Japan Meteorological Agency's seismic intensity scale. Intensity of 6 was also observed in the four prefectures of Miyagi, Tochigi, Fukushima, and Ibaraki.

The earthquake also caused tsunami more than 20 meters high, sending water to heights of 40 meters or more above sea level once it reached shore. The tsunami caused terrible damage to coastal regions in Japan's Tohoku and Kanto regions (see Figure 3). In addition to the destruction of homes by the earthquake and tsunami, such essential infrastructure as railroads, roads, and dams was destroyed.

More than 400,000 homes were either completely or partially destroyed, and more than 400,000 people were forced to evacuate. As of March 11, 2015, 15,891 people had died from the disaster, and 2,584 people remained unaccounted for. The search for those listed as missing continues. As a result of the nuclear meltdown and hydrogen explosion at the Fukushima Daiichi nuclear power plants in the wake

of the earthquake and tsunami, the areas surrounding the power plants remained off-limits three years after the disaster, preventing some 80,000 people, or 28,000 households, from returning to their homes.

The damage to medical institutions from the disaster was considerable. Ten hospitals were either completely destroyed or burned down, and another 581 hospitals were partially damaged, delivering a serious blow to emergency care for inpatients as well as many injured in the disaster. Figure 4 shows a public hospital in Miyagi Prefecture that was damaged by the tsunami. Located 400 meters inland, the hospital was engulfed by the tsunami, which reached the fourth floor of this five-story building. Because most of the inpatients were elderly and had difficulty walking, 72 out of 107 inpatients either died or went missing. Three nurses also lost their lives in the tsunami.

Medical teams sent by different organizations arrived from all over the country and made dedicated efforts to provide emergency care. However, because of the impairment of medical records, both in paper and electronic formats, power outages, and the assortment of medical teams taking part in relief activities, it cannot be said that health information was accurately recorded and appropriately stored to enable sufficient future use and analysis of the data as “records of emergency care.”

This article focuses on the response of the Japan Hospital Association (JHA) and the Japan Society of Health Information Management (JHIM) to the devastating Great East Japan Earthquake, the results of their efforts, the invaluable lessons learned from the disaster, and the recommendations arising from discussions during symposia held at JHIM’s 38th and 39th annual meetings, held in 2012 and 2013 respectively.

Objective

The objective is to learn from the experience of JHA and JHIM in the Great East Japan Earthquake and gain insight into ways in which health information managers around the world could prepare medical records at the time of a major disaster so that the information can be put to good use for future emergency care and healthcare in general, and what preparations are needed to make this possible.

Response to the Disaster

The response of JHA, which trains and certifies health information managers, and of JHIM, whose activities revolve around health information managers, to the disaster was as follows:

- JHA set up a disaster-response headquarters and an ad hoc committee on disaster response immediately after the catastrophe (setting up an organizational structure for disaster response).
- JHA coordinated the dispatch of physicians and health information managers to support the relief effort (medical assistance in the disaster-stricken areas).
- Immediately after the earthquake, JHA, JHIM, and Japan Health Information Manager Association (JHIMA) inquired about the safety of their members residing in eastern Japan (106 of 2,500 JHA hospitals, 242 of 5,700 JHIM members, and 418 of 2,830 JHIMA members) by mail and e-mail. The three organizations also posted requests on websites for information about their safety (gathering information about the safety of members, students, and other related persons).
- JHA and JHIM collected donations and sent large sums to the disaster-stricken areas. The donations, including those from Lions Clubs International, amounted to some 578 million yen (\$5.7 million) and were used to provide relief to medical institutions in the affected areas (fundraising).
- JHA, JHIM, and JHIMA exempted member hospitals and members in the affected areas from payment of membership fees.
- Teaching materials and copies of the International Classification of Diseases were sent to HIM students in the disaster areas.
- JHA’s HIM education committee and JHIM recorded their activities in response to the disaster (maintenance of records of activities).
- In May 2012, Japan Medical Association, the Japanese Association for Acute Medicine, the

Japanese Association for Disaster Medicine, the Japanese Red Cross Society, and JHIM jointly established the Joint Committee on Medical Records during Disasters (deliberations on recording health information during disasters in Japan).

- In July 2012, more than a year after the disaster, JHA's health information management education committee conducted a questionnaire survey on 322 students enrolled in JHA's distance learning courses who were living in three prefectures hit the hardest by the disaster (Iwate, Miyagi, and Fukushima) to assess the local situation (follow-up).

Inquiry about Medical Records in the Disaster Area

Ten days after the earthquake and tsunami, a health information manager from a hospital in the disaster-stricken area called JHIM to inquire about storage of medical records. The caller said that all six staff members, who were in the health information management department on the fifth floor of the emergency center on the day of the disaster, managed to evacuate without harm. However, all the shelves in the storage rooms were knocked down, and access to the hospital was prohibited because it was too dangerous to enter the area. The shelves and walls, together with the medical records, in the repository outside the hospital also collapsed. Everything was dysfunctional and in disarray. Under the circumstances, the health information managers wanted to know what they should do with the medical records.

In Japan, the Medical Practitioners' Act requires physicians and medical institutions to retain medical records for five years and hospital journals, prescriptions, surgery records, and x-rays for two years. However, no provisions detailed the response to loss or damage of medical records in a disaster.

JHIM immediately consulted with JHA and JHIMA, and the three organizations jointly made an inquiry to the Ministry of Health, Labour and Welfare of Japan.

Results

The surveys on the safety of distant training students of HIM and JHIM members in the disaster-stricken areas and on the local situation immediately after and one year after the disaster helped us to assess their situation and needs. The survey conducted from April 21 to June 21, 2011, assessed the damage given to them in Iwate, Miyagi, and Fukushima prefectures (see Figure 5). Responses were received from 129 of 242 members for a response rate of 53.3 percent. A year later, in July 2012, a subsequent survey assessed the remaining damage (see Figure 6). A total of 78 of 332 members responded (24.2 percent response rate). This survey also examined work-related problems arising as a result of the disaster (see Figure 7). The surveys in the disaster-affected areas immediately after and one year after the disaster did not reveal details about the lost medical records. However, the surveys did show a general trend of life becoming more difficult for them. In particular, in Fukushima prefecture, which was affected by the nuclear power plant accident, the temporary or complete suspension of hospital operations forced some health information managers to lose or change their jobs or to accept cuts in their salaries, causing them significant stress (see Figure 7).

The response obtained from the Ministry of Health, Labour and Welfare concerning the handling of medical records in the disaster-stricken areas was disseminated to members through JHA and JHIM journals and websites. They also widely provided information related to recording of health information during disasters on our websites.¹

The Joint Committee on Medical Records during Disasters, which was established by related organizations as described above, heard reports on how the medical records were recorded, stored, and used at the medical care sites during the disaster. The committee discussed the benefits of having a uniform format for medical records during disasters, and created a draft format for reporting medical records during disasters.

JHIM organized a symposium at its 38th annual meeting, which was held a year after the Great East Japan Earthquake, and another symposium at its 39th annual meeting in the following year, on the topics

“Major Disaster and Health Information: Lessons from the Great East Japan Earthquake” and “Medical Records: Considering the Possibility of Disasters,” respectively. With experts from a range of fields reporting their findings and expressing their views, the symposia provided a scientific approach to the subject of recording health information during disasters.

Observations Presented at the Symposia

Immediately after the earthquake and tsunami, healthcare personnel from the Japanese Red Cross, medical associations, hospital associations, and other organizations arrived from all over Japan in the regions affected by the disaster. They faced a serious lack of medical equipment and supplies, and emergency medical care had to be provided in evacuation centers outside medical institutions. Healthcare personnel brought with them medical records of assorted formats from their respective organizations. The way in which medical records were managed also varied. With the power cut, they could not use electronic health records and had to rely on paper. For patients who had to move from one evacuation center to another, a new medical record had to be drawn up each time the patient received treatment at different evacuation centers.²

Destruction or submergence of electronic equipment and power cuts disrupted the use of electronic health records and all electronic data at medical institutions using electronic health records. The loss of patient data caused havoc as hospitals struggled to maintain their functionalities for providing care, referring to case histories, and keeping accounts. On the other hand, one hospital ravaged by the tsunami was able to keep its electronic data intact because, although its in-house computer servers were destroyed, it had a backup server in a remote location that it maintained with partner hospitals.³

Discussion

Preparation of a uniform medical record format for use during disasters at the national level is essential so that health information can be recorded and maintained during major unanticipated disasters, such as the Great East Japan Earthquake, in ways that will benefit local communities as well as advance the way emergency care is provided. Such records would not only provide health information about individual patients during disasters but also be of benefit for administrative purposes. Guidelines also need to be established at the national level on the handling of lost or damaged medical records during disasters.

As for electronic health records, the use of which is spreading, a remote data backup system or a national scheme for such a backup regime is imperative. Because loss of data is often accompanied by destruction of the hardware, the backup location needs to have both sufficient proximity to allow delivery of replacement computers containing the backup data and sufficient distance so that it is not affected by the same disaster.

Many health information managers and other healthcare professionals lost their employment as a result of the earthquake and tsunami, an issue that still persists four years after the catastrophe. JHA and JHIM plan to consider how they can address this issue.

Over the long term, the focus of treatment will need to shift from treatment of injuries immediately after the disaster to treatment and care for individuals with chronic diseases and mental disorders. Long-term investigation on the effects of the fallout from the nuclear power plants on the national health also needs to be conducted. This issue is extremely important and requires long-term analysis of health information from accurate records in a variety of fields with the cooperation of the government, medical institutions, and health information managers.

Finally, health information managers need skills and knowledge to be able to provide the best health information management under the challenging and difficult circumstances that arise at the time of a disaster.

Limitations

The unpredictable nature of the disaster and the need for swift and effective response to the life-threatening situations encountered did not lend themselves to a traditional, planned, scholarly research project. Rather than waste the invaluable experiential lessons learned during the unprecedented disaster known as the Great East Japan Earthquake, JHA and JHIM took a practical and reflective approach to accurately identify and document the two organizations' efforts in the immediate aftermath of the disaster in order to specify what would be needed to mount a swift and effective response should a similar catastrophe occur in the future and to identify necessary prospective preparations. Accordingly, discussions were scheduled during symposia held at JHIM's 38th and 39th annual meetings held in 2012 and 2013 respectively, and this article documents the recommendations that came out of these discussions. These recommendations will also be of use to health information managers in other nations where natural disasters of this type are likely to occur in the future. This article is, therefore, the result of retrospective, reflective, and discursive investigation rather than traditional, planned scientific research although it is anticipated that such research will be undertaken in the future and could include the outputs from additional surveys and analysis of the resulting data. Although some articles have discussed health information management and disaster preparation in other countries, the literature lacks sufficient published HIM natural disaster preparation/response studies against which the findings of this study could be compared or validated.⁴⁻⁶

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Notes

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Figure 1

Map of Areas Affected by the Great East Japan Earthquake



Figure 2

Destruction from the Great East Japan Earthquake



Copyright: Japan Hospital Association

Figure 3

Damages Caused by Tsunami after the Great East Japan Earthquake (inside a hospital)



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Figure 4

Public Hospital in Miyagi Prefecture



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Figure 5

Survey on the Damage Given to Students of Distant Training of HIM, Members of JHA and JHIM as of April 2011 in Iwate, Miyagi, and Fukushima Prefectures

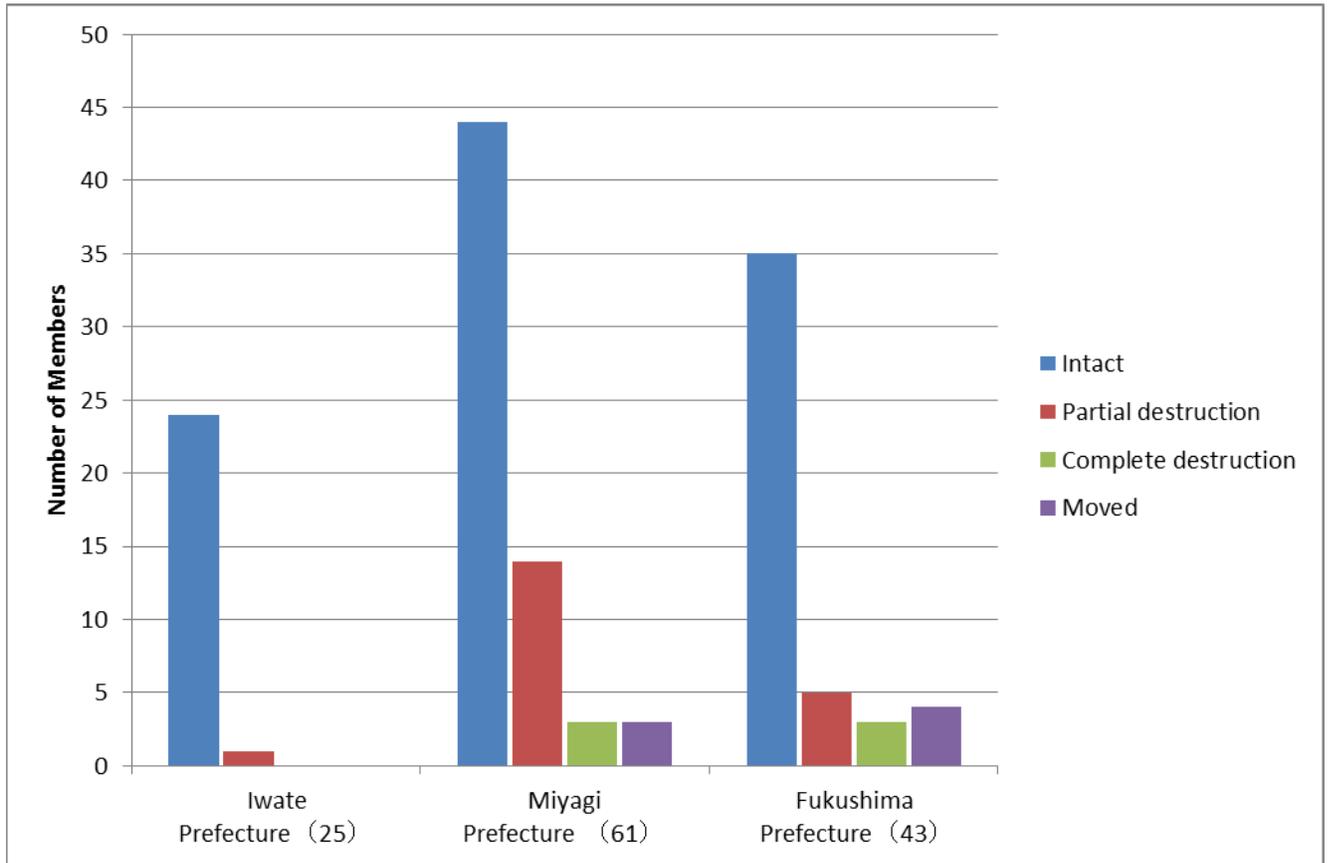


Figure 6

Survey on the Damage Given to Students of Distant Training of HIM, Members of JHA and JHIMAs of July 2012, a Year after the Disaster, in Iwate, Miyagi, and Fukushima Prefectures (Survey Period: July 2012)

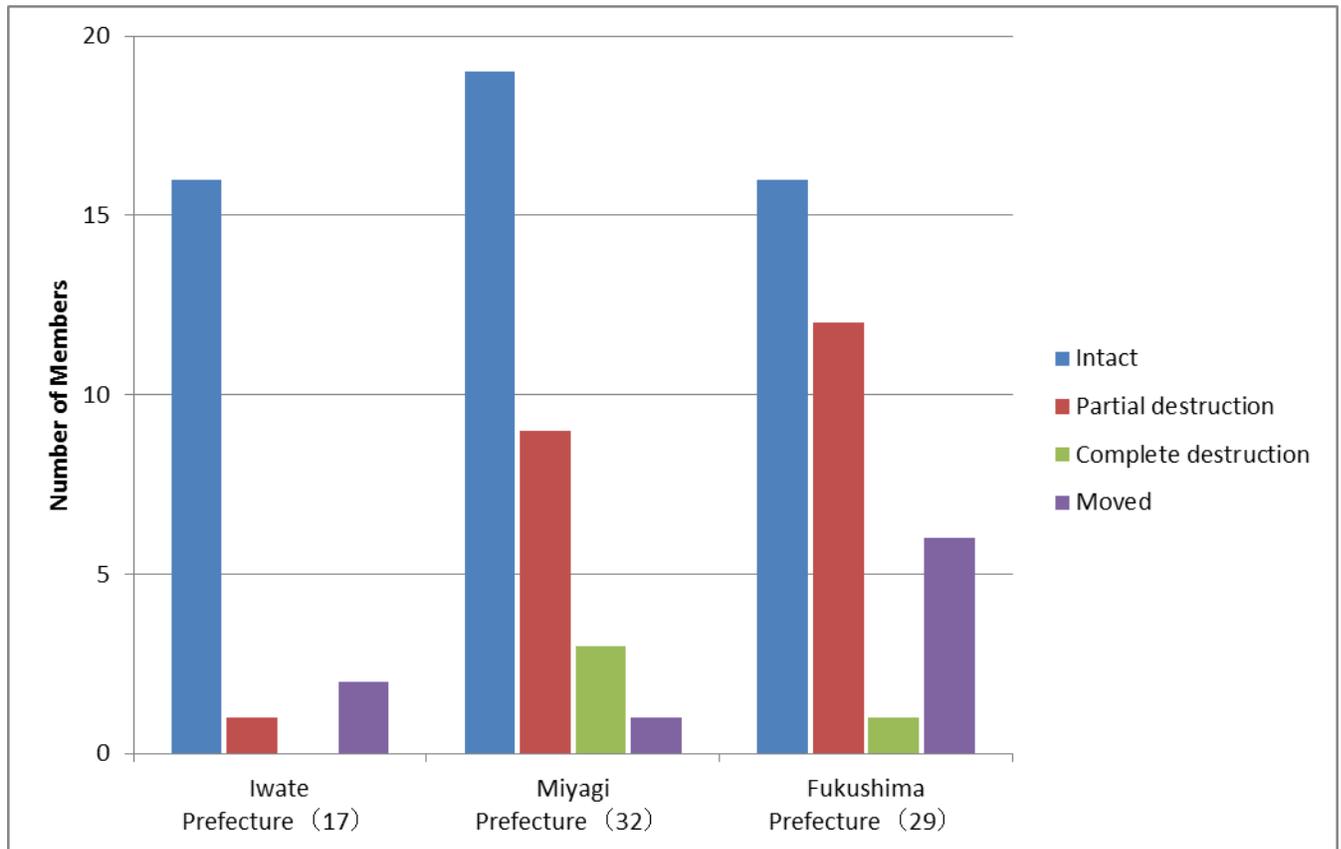


Figure 7

Survey on the Effect of the Disaster on Employment as of July 2012 in Iwate, Miyagi, and Fukushima Prefectures

