RAPID COMMUNICATION

Information and response shortfall in shelters after the Earthquake in Kumamoto: The nursing perspective

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Abstract

This paper addresses and illustrates shortfalls in information sharing and responses for public health issues in shelters and the affected areas after the Kumamoto Earthquake of April 16, 2016. Drawn from situation reports published by the Japanese Cabinet Office and major newspaper companies, analysis of these various reports within 1 month of this natural disaster revealed chaotic situations in evacuation centers. Despite the availability of consultations regarding health problems and living conditions provided by various organizations, health assessment and public health surveillance were slow and unsystematic, especially in their application to vulnerable groups that required population study and high-risk approaches for health. Furthermore, overall health response management tended to overlook the problems that existed outside of shelters. What is needed is more efficient information-sharing methods and a system that enables reasonably rapid responses to health problems and population care during the acute phase and issues requiring long-term care.

Key words: disaster response, Kumamoto Earthquake, disaster nursing, Public health

DAMAGES BY THE EARTHQUAKE IN KUMAMOTO

At 1:25 a.m. local time (16:25 UTC) on April 16, 2016, an earthquake of 7.3 magnitude on the Richter scale hit Kumamoto city in Kumamoto Prefecture, an area with a population size of approximately 1.8 million. This quake occurred 2 days after an earthquake, with a magnitude of 6.5 on the Richter scale, shook the region on April 14, 2016, at 21:26 local time (12:26 UTC) (Japan Meteorological Agency, 2016). It was the strongest earthquake ever recorded in the history of the region, and it occurred in Kyushu Island which is located southwest of the main island of Japan, a country where natural disasters such as earthquakes are frequent and cause great damage. Preliminary media reports on the Earthquakes in Kumamoto showed many collapsed buildings, including hospitals and health centers.

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Figure 1 shows the number of evacuees in shelters, injured people, and damages in public health. The estimates are drawn from the Japanese governmental reports on the 2016 Kumamoto Earthquakes. The bar graph in Figure 1 represents the number of refugees in need of medical care. In contrast, the line graph refers to the number counted by the municipality. By April 17, the number of injured people seemed to have declined. This reflects the difficulty with correctly counting the number of victims and survivors immediately after the disaster due to the fact that the disaster victims may not have gone to shelters at the foreshock or might have gone back and forth between the shelter and their homes.

DISASTER RELIEF ACTIVITIES FOR PUBLIC HEALTH IN TEMPORARY SHELTERS

It is extremely important for relief/rescue workers to reach the affected areas immediately following the occurrence of a disaster. The most obvious reason would be to rescue the victims and treat the wounded. But also for more far-sighted and holistic reasons, it is important
for disaster response teams to assess and get a full understanding of overall health situations in the disaster-affected areas so that the health response can be speedily and effectively delivered. This would prevent any unnecessary damage to people’s health that is often caused by delays in treatment or ill-equipped living arrangements in shelters and other evacuation settings, as the details from this paper will illustrate below.

Figure 2 shows the number of Disaster Medical Assistance Teams (DMAT), Japan Medical Assistance Teams (JMAT), Japan Nursing Association (JNA) Disaster Relief Nurses, and Public Health Nurses, as health response teams, which were dispatched to Kumamoto after the earthquake. As response to medical care needs, ~70 DMAT reached the affected areas on April 15. Coordinated by the Emergency Management Information System (EMIS), health professionals from private sectors, the Red Cross, and other health-related non-governmental organizations successively provided care to the severely wounded people (Ministry of Health, Labour and Welfare, 2016). The staff at the Kumamoto Prefecture Council began to assess the disaster situation and the needs in the affected areas in preparation for assistance on the April 16. The Japan Society of Disaster Nursing (JSDN) dispatched the experts of disaster nursing, referred to as “The Advance Party”, on the April 16 morning, and they identified nursing needs in consultation with local nurses and provided direct care immediately following the earthquake. They also assessed community health needs and conditions of the shelter environment in disaster settings, and continued to report their activities on their homepage (Japan Society of Disaster Nursing, 2016).

In response to health and care issues, however, the
The arrival of public health relief teams was later than the arrival of the medical emergency relief teams, as shown in Figure 2. The Japan Nursing Association (JNA) also dispatched the disaster nursing relief team and the Kumamoto Nursing Association (Japan Nursing Association, 2016). The dispatched members of the JNA carried out health consultations, improved living conditions, and provided health education in shelters (Figure 3). Public health nurse teams from other prefectures also arrived upon the request of the Ministry of Health and Welfare. These public health nurses surveyed shelters and parks, including parked cars, and carried out the communicable diseases monitoring, health check-ups, and mental health care for longer than 1 month (Ministry of Health, Labour, and Welfare, 2016). Development of the Disaster Health Emergency Assistance Teams, which is led by the Japanese Association of Public Health Center Directors, was still underway even after one month since the occurrence of the earthquake. Also, a series of training sessions designed for disaster responders began after May 21, 2016. The Council of Social Welfare prolonged the dispatch of their volunteers until the April 21 because of the continuing aftershocks.

As these cases of stalled public health responses to the earthquake disaster in Kumamoto indicate, the health assessment and dispatch of medical services to prevent further damage to health were delayed as they arrived after the immediate rescue teams. Due to the delayed arrival of the health response personnel, information gathering on public health risks in the affected areas was also inevitably delayed.
HEALTH IMPACT OF THE KUMAMOTO EARTHQUAKE

Figure 3 outlines the reported health issues in Kumamoto after the earthquake. These are based on reports obtained from various sources, including mass media, social media, and from other disaster responders in the affected areas. It also illustrates relief activities carried out by various health sector groups in the first month after the occurrence of the earthquake.

The transportation system was damaged, including highways and the local airport, a food shortage was caused by the difficulty with transporting emergency food items, and all commercial flights were suspended for an extended period of time (Cabinet Office, 2016). The populations in need were left in waiting until helicopters from Japan’s Self-Defense Force and the Japan-based US forces brought relief items (Ministry of Defense, 2016).

Running water was not available in houses, apartments, and temporary shelters for days due to the damage done to water pipes. Public toilets in shelters were not available for days, which threatened the health of the communities (The Asahi Shimbun DIGITAL, 2016a).

Most temporary shelters in Kumamoto became crowded, and the sanitation system was not fully functioning. Manpower was in shortage for sorting relief supplies, and there were shortages of supplies at small-to medium-sized shelters. The relief goods were sent to Kumamoto, but there was a lack of hands for inventory control available on-site (Toyo Keizai Online, 2016). Consequently, these relief goods could not be distributed in a timely manner.

As the days passed, population density at the shelters increased, and the living conditions in evacuation centers worsened. The situation reports during the first month after the earthquake revealed that more than 100,000...
people were living either in evacuation centers or in their vehicles in Kumamoto and Oita prefectures because of the continuing quakes that were of relatively low intensity, which were occurring every day (Mainichi Shimbun, 2016). The total number of these low-intensity earthquakes occurred more than 1,040 times within the 1-month period after the April 15 earthquake.

From the early phase, the precariousness of living conditions in temporary shelters contributed to an outbreak of infectious diseases (The Japanese Association for Infectious Diseases, 2016). It was one of the feared ailments, along with the uncertainty of the length of stay that people had to spend at the shelters. Also, an increasing number of acute venous thromboembolisms, also known as the economy-class syndrome, required the implementation of prevention programs among the evacuees. There were 49 deaths as the result of the direct impact of the earthquake (e.g. pressure), and 19 deaths caused by health-related issues as a result of the disaster-induced changes in the living environment of the survivors. During the first 10 days, there were 35 pulmonary embolism cases requiring hospitalization, and elderly women aged 65 years and over accounted for 19 of these cases (Jiji.com News, 2016; The Asahi Shimbun DIGITAL, 2016b).

Outside of the shelters, the vulnerable populations seemed to be in invisibility and exclusion from immediate response activities. The percentage of elderly persons who were aged 65 years old or over was 28.0, so Kumamoto and its vicinity was called a super-aged society. Also, foreign residents numbered 10,079 (including 4,166 permanent residents) in Kumamoto, which ranked the city 32nd out of 47 prefectures for the most number of foreign residents in Japan (Kumamoto Prefecture, 2014). Media reports said that some elderly people remained in their homes rather than moving to the shelters due to physical infirmity, so they were overlooked from assessments and relief operations. Thus, their healthcare needs may also have been underserved, not only in terms of accessibility, but also in respect to provisions for health care and resources for chronic health and disabilities. Foreign residents, mothers with infants and young toddlers, and people with disabilities remained largely out of evacuation centers because they did not wish to burden other people and refused to ask for relief supplies (Nikkei, 2016). This was caused by the lack of relief workers and due to lack of social awareness (Toyo Keizai Online, 2016).

These types of long-term health-threatening conditions can cause an outbreak of communicable diseases, like flu and food poisoning, and psychological syndromes. Within the one month period immediately following the earthquake, more than 100 survivors contracted communicable diseases, including flu and norovirus (Yomiuri Online, 2016).

As shown in the top left corner of Figure 3, the shelter situations were chaotic, but no speedy systematic health assessment for public health was available to groups that required population and high-risk approaches for health. Various organizations after their arrival at the disaster-stricken areas offered consultations concerning health problems and living conditions.

**CHALLENGE TO SYSTEMATIZE CARE NEEDS**

The Kumamoto Earthquake case illustrates the potential threat of health-related problems among the affected populations in the acute phase of a disaster. Taking into account damage to infrastructure and systems, which become hurdles to delivering rescue and assistance to the victims and survivors, it is essential to develop a systematic approach to gather information public health situations in order to prevent further and unnecessary damage during the recovery phase.

Often the highest priority of relief activities in the first several days after disaster is saving the lives of victims. Health risks arising from living conditions in temporary evacuation settings have not been directly addressed in disaster relief discourse. The first disaster responders in shelters play a vital role in the identification of high-risk factors leading to health problems in vulnerable populations. Their responsibilities include: offering health services to the people in need in shelters and evacuation centers rather than rescue work or emergency care in hospitals. But most of the relief workers began their activities in shelters after they received approval from their affiliated organizations. Therefore, there is an urgent need to develop a system to better deliver the necessary health services.

The health and socioeconomic impact on the affected populations varies, and the implemented emergency support systems and responses are delivered in unanticipated manners due to damages to infrastructure and human resources. To provide more efficient relief responses, nursing care should be made seamless and more efficient through early identification of issues that can only be resolved through care during the acute phase, as well as issues requiring long-term care (e.g., future issues that tend to be overlooked). It is becoming increasingly important that the rapid, descriptive statistical assessment of health information in the affected areas...
is essential to carry in carrying out the relief work; for example, the characteristics and potential effects of disasters on the lives, health, and livelihoods of the affected populations.

When providing care to a community, many nurses provide not only direct care, but they also coordinate volunteer care. What is in urgent need is an inclusive, analytical, and rapid system that is practical for timely and efficient response. This new system should include what are commonly treated as incomputable data, such as living environment and nursing practice for preventive care information, which have not been considered as analyzable data until recent years.

Maintaining an optimal health level of disaster victims and survivors, as well as detecting early signs of warnings for any public health threat, have been overlooked in the acute phase relief activities. Nursing scientists, whose methodology is grounded in human scientific perspectives, should contribute to overcoming these shortcomings in current nursing disaster response systems, so that it would be clear about how many nurses and what care should be assigned to specific activities. In this way, disaster nursing responders would not require any additional time for adjustment to the work settings and be delayed in getting to tasks in their assigned posts.

One of the more immediate and practical solutions would be to utilize IT solutions, such as usage of social networking services, mobile phones, and other electronic devices to gather information. By making the data or information gathering easier and available to nurses, healthcare workers, and volunteers in disaster-affected areas, public health risk assessments can be delivered in a more effective and prompt manner.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTION

SK HL SN contributed to the design of this study. SK, HL drafted the manuscript. SY, NR and KT supervised the study. All authors critically reviewed the manuscript.

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