ORIGINAL ARTICLE

Value of mutual assistance for disaster risk reduction in Japan, Indonesia, and Nepal: A preliminary study

Yudi Ariesta CHANDRA, Yuko KAWAMURA, Sushila PAUDEL and Megumi NISHIGAWA
Cooperative Doctoral Course in Disaster Nursing, Graduate School of Nursing, University of Kochi, Kochi, Japan

Abstract
Aim: To strengthen disaster risk-reduction capacities of a community, a combination of self-help, mutual assistance and government aid is crucial. Government aid is limited for the large-scale disaster due to many reasons, and not all people can protect their own lives themselves. Thus, mutual assistance could enhance their capacities in response to a disaster. This paper aimed to explore mutual assistance activities during disasters at communities in Japan, Indonesia and Nepal, in order to understand its value in nursing for disaster risk reduction. This study was needed to get the database for further research focusing on nursing contribution to disaster risk reduction.

Methods: Case analysis was conducted based on authors’ experiences, government documents, news articles, and personal communications with affected community peoples who experienced disasters in Soma, Japan; Jakarta, Indonesia; and Bhaktapur, Nepal.

Results: Mutual assistance was performed in the community in each of the three countries despite differences in regional, socio-cultural, economic, and types of disaster. Until the arrival of government aid, community people helped each other to evacuate, provide first aid, distribute food, maintain sanitation in shelters, and so on. Nurses provided routine care before the disaster and during the response activities following the disaster.

Conclusion: Mutual assistance helps the community people to minimize the disaster effects before the disaster, and to recover better in the post-disaster period. Nurses should expand their roles in improving mutual assistance in the community for disaster risk reduction. This study suggests the needs of study in identifying nursing activities for strengthening mutual assistance.

Key words: disaster risk reduction, government aid, mutual assistance, nurse, self-help

INTRODUCTION
Asia-Pacific is the most disaster-prone region in the world, and is the home to 60 percent of the world’s population. According to Guha-Sapir and Hoyois (2015), ~3,581 disasters occurred during the last 10 years, in which nearly 85% were in Asia, affecting ~1.7 billion people. Correspondingly, Japan, Indonesia and Nepal are among those disasters-prone countries in the region that have frequently been targeted by natural disasters. These three countries have experienced earthquakes, tsunamis, volcanic eruptions, floods, typhoons, snowstorms, forest fires, glaciers, and other diverse catastrophes over the last decade. On March 11, 2011, a magnitude-9 earthquake shook northeastern Japan, unleashing a savage tsunami (ADRC, 2012). This disaster took the lives of 15,894 people and 2,561 became missing. Likewise, on January 22, 2014, 33 sub-districts and 99 city villages in Jakarta, Indonesia, were flooded with a water level that was 20–600 cm deep (Suara News, 2017). During this disaster, 89,334 people were evacuated to 338 evacuation shelters. Also, on April 25, 2015, a massive earthquake of magnitude 7.8 struck Nepal; this earthquake took the lives of 8,896 and seriously injured 22,303 people (Government of Nepal, Ministry of Home Affairs and Disaster Preparedness network Nepal, 2015).
To strengthen disaster risk reduction, a balanced approach of self-help, mutual assistance and government aid is important. In Japan, the concepts of jijyo (self-help), kyojyo (mutual assistance), and kojyo (government aid) are well integrated into the disaster management system. Jijyo (self-help) means protection of one’s life and securing oneself at an individual and family level; kyojyo (mutual assistance) means protection of local community people by helping each other; and kojyo (government aid) means disaster support and countermeasures for survivors provided by the government.

Implementation of mutual assistance among the three countries was diverse. Disaster countermeasures in Japan had relied on kojyo (government aid) over years, but while responding to the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake, kojyo was considered inadequate, and it triggered escalating awareness for the importance of improving jijyo (self-help) and kyojyo (mutual assistance) (Narasino City News, 2017). Indonesia and Nepal have no formally established concepts of self-help, mutual assistance and government aid in their disaster system; however, there are the terminologies like “Gotong Royong” in Indonesia, and “Apasi Sahayog” in Nepal that hold a similar meaning to mutual assistance. The response activities in both of these countries have heavily relied on self-help and mutual assistance of the people. In developing countries like Nepal, the public sector is weaker than in developed countries because of economic and technical constraints. Private sector or individual income is also poor, so development process depends on community help (Kobayashi, 2015).

It has been well proven that government aid is limited at the time of a large-scale disaster due to multiple reasons. While self-help is the basis of disaster responses, not all people can protect their own lives by themselves. Thus, mutual assistance is important to enhance the capacity of disaster responses in local communities, particularly helping vulnerable people such as children, senior citizens, women and disabled people. Mutual assistance in the community is also one of the key factors to improve community resilience action, which is campaigned for by the Sendai Framework (UNISDR, 2015; Aitsi-Selmi et al., 2015; Walsh, 2007; Rodriguez, Wachtendorf, Kendra, & Trainer, 2006).

As the largest manpower group in the healthcare team, nurses play an important role in disaster risk reduction. Nursing roles are important not only in the emergency phase of a disaster for rescuing life and safeguarding the health of disaster sufferers, but also for the mitigation and preparedness activities in the community. However, very few studies have explored mutual assistance activities to enhance nursing activities for disaster risk reduction.

Therefore, this paper aimed to explore the mutual assistance activities during the Great East Japan Earthquake in 2011, the Jakarta flood in 2014 and the Nepal Earthquake in 2015, in the communities of Japan, Indonesia and Nepal, and also the nursing activities in communities prior to disasters and in the aftermath. This study was required to assist the database for further research study focusing on nursing contribution to disaster risk reduction. The findings can be used in enhancing the nursing activities in communities for disaster risk reduction. This study provides a framework for the nursing approach to further develop nursing activities for disaster risk reduction.

**METHODS**

**Design**

As a preliminary study, cases analysis was conducted. The data from the direct experiences of authors who faced the different disasters in Soma, Japan; Jakarta, Indonesia; and Bhaktapur, Nepal, as well as from personal communications with survivors and nurse responders were analyzed as primary data. After that, data from government reports, and online and printed newspapers articles were added as secondary data.

**Data collection**

Data collection was conducted during August and September 2017. At first, notes of authors’ experiences were made. Those notes described survivors’ experiences in facing disasters in Soma, Japan when an earthquake and tsunami occurred in 2011; Jakarta, Indonesia when a flood occurred in 2014; and Bhaktapur, Nepal when an earthquake occurred in 2015. Focusing on self-help, mutual assistance, and government aid, all important information about how people within communities managed to save their own lives and survive during these disasters were documented. To comprehend the information collected from authors’ experiences, personal communications with 12 disaster-affected community people from Soma, Japan; Jakarta, Indonesia; and Bhaktapur, Nepal, were conducted (Table 1). Their experiences were explored to identify self-help, mutual assistance, and government aid during the disasters. Personal communications were conducted in quiet places, where confidentiality and privacy were ensured. Each communication lasted 20–30 min. A digital voice recorder or field notes were taken, then being transcribed.
In addition, government documents, and online and printed newspaper articles were collected for article review. The review covered articles published between 2011 and 2017. Google searches were conducted using some key words, such as “Great East Japan Earthquake and Tsunami 2011”, “Jakarta floods 2014”, “Nepal earthquake 2015”, “disaster response”, “nursing activities”, “self-help”, “mutual help”, “government aid” in English, Japanese, Bahasa Indonesian, and Nepalese. As the authors were fluent in either Japanese, Indonesian, or Nepalese, an official language translator was not required. All information that demonstrated the activities of self-help, mutual assistance and government aid during those disasters was noted. Also, public or community health nursing activities, which could be classified as disaster risk-reduction activities, were highlighted.

Data analysis
Notes about authors’ experiences, transcription of personal communications, and article review were analyzed together inductively into the emerging themes. All sentences that indicated self-help, mutual assistance and government aid during those disasters, including public/community health nursing activities that could be categorized as disaster risk-reduction activities were arranged and interpreted. After several modifications, the final confirmed themes generated comprised general characteristics of the three disaster areas, importance of mutual assistance in the community, and activities of nurses in the community before and after the disaster. Thereafter, differences and similarities in disaster situations among the three areas were identified. All authors participated in this process and discussed the development of themes. Two of the senior researchers from University of Kochi, Japan reviewed the analysis processes and the results.

ETHICAL CONSIDERATION
Personal communications were conducted based on the consent of disaster-affected community peoples. These were performed after the purpose of this study was explained, and that participation was completely voluntary with regards to the protection of privacy and other personal information.

RESULTS
Three categories of findings were generated as a result of this study. Those categories included: (i) general characteristics of the disaster areas; (ii) mutual assistance among community people; and (iii) nursing activities before and after the disaster (Table 2).

General characteristics of the disaster areas
This category was created to understand the characteristics of affected areas, such as geography, economic, and socio-culture issues. It also included a history of disasters for each country to understand the effect of disasters on each area. Those characteristics might be affecting social relationships among the people in each community and country in terms of providing mutual assistance.

Soma is located on the eastern part of Fukushima prefecture in the South Tohoku region of Japan and has an area of 197.79 km², and was one of the cities that were affected by the Great East Earthquake 2011 (Soma City, 2018). Jakarta, in contrast, is the capital of Indonesia, is located on the western part of the country on Java Island and has an area of 699.5 km². This city was affected by a large flood in early 2014. Similarly, Bhaktapur, located in the hilly region of Nepal is the smallest district out of these three areas, with an area of 119 km² (District Coordination Community Office Bhaktapur, 2015). It was one of areas affected by an earthquake in 2015.

In Soma, which is known as a historical town, the social life of the residents is significantly influenced by its culture. Extended family, where three until four generations live together in a house, is one of the social characteristics about this city (Soma City, 2018). In Jakarta, various ethnicities live in this city. Most of the families who lived in the centre of the city are nuclear

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency (n = 12)</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
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<tr>
<td>Female</td>
<td>5</td>
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<tr>
<td>Age (years)</td>
<td></td>
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<tr>
<td>30–45</td>
<td>5</td>
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<tr>
<td>46–60</td>
<td>4</td>
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<tr>
<td>&lt;60</td>
<td>3</td>
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<tr>
<td>Education background</td>
<td></td>
</tr>
<tr>
<td>Junior high school</td>
<td>2</td>
</tr>
<tr>
<td>Senior high school</td>
<td>4</td>
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<tr>
<td>University level</td>
<td>6</td>
</tr>
<tr>
<td>Role in disaster</td>
<td></td>
</tr>
<tr>
<td>Survivor</td>
<td>6</td>
</tr>
<tr>
<td>Volunteer</td>
<td>3</td>
</tr>
<tr>
<td>Nurse responder</td>
<td>3</td>
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</tbody>
</table>

Table 1 Characteristics of informants as obtained by personal communication
families, but in the suburbs, most of them are extended families (Jakarta. go. id, 2008). Furthermore, for most Nepalese in Bhaktapur, family refers to extended relationships whereby the sons, along with their parents, wives, and children live together, sharing resources and expenses. In Soma, primary economy sectors include factories that produce precision instruments, agriculture, forestry, fishery, and also tourism (Soma City, 2018). Affected by the tsunami and the nuclear power plant accident after the earthquake in 2011, shipping restrictions of marine products were enacted and the fishery sector was significantly affected (Soma City, 2012). In Jakarta, many businesses and industrial areas could not operate during the flood disaster, and this caused enormous economic losses (Neraca News, 2015). Similarly, tourism influences the economy of Bhaktapur. This city is also known as the “city of culture and the living heritage”, with several festivals practised over the ages. Earthquake damaged most of the heritage structures and economic life was affected.

**Mutual assistance among community people**

Disaster-affected community people in three countries performed mutual assistance activities. All data from author experiences, personal communications, and article review conveyed that various mutual assistances were conducted from the acute phase, prior to the governmental aid, to the recovery and rehabilitation phases, when relief activities were carried out (Table 2).

In the acute phase of a disaster, prior to government aid, the affected community people provided mutual assistance to overcome the hardship suffered during this situation. After those disasters occurred, due to disruption of access, limited resources or another reason, government aid could not reach the affected community immediately; it required a couple of days or weeks. In Soma, affected community people helped each other to survive. They also evacuated senior citizens, handicapped people, and children to higher ground to escape the high tsunami waves; and they shared essential everyday items and amenities to survive including water and food. In Jakarta, affected community people helped each other to evacuate themselves, their goods and belongings (Suara News, 2017; Berita Satu News, 2014; Kompas, 2014). Sometimes they also decided the safest place to which to evacuate (Kompas, 2014). In Bhaktapur, some of the earliest aid to reach villages was not sent by the government, but by the affected community and ordinary Nepalese; the people rescued each other, and they even provided each other with counselling to reduce stress (Jha, 2015; Andersen, 2015; Mendel, 2016; Mercy Corps, 2015).

In recovery and rehabilitation phases, during relief activities, mutual assistance activities among community people continued. In Soma, community people talked to each other to check on everyone’s safety to prevent isolation in temporary housing, particularly for senior citizens and handicapped persons. They also shared food and water to survive. Similar to Soma, in Jakarta, affected community people helped each other to distribute food and goods to maintain a healthy environment for survivors in shelter. In addition, survivors cooperated and helped to clean the debris away after the flood waters had subsided and transported injured or sick people to hospital. Some of the affected community people had even cooperated and worked together to find monetary or

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Situation</th>
<th>Japan (Soma)</th>
<th>Indonesia (Jakarta)</th>
<th>Nepal (Bhaktapur)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author experience</td>
<td>Prior to governmental aid</td>
<td>• Helping each other to evacuate</td>
<td>• Evacuating people, goods, and belongings</td>
<td>• Rescuing people</td>
</tr>
<tr>
<td></td>
<td>During relief activities</td>
<td>• Checking safety of senior citizens and handicapped persons in temporary housing</td>
<td>• Cooking food</td>
<td>• Sharing foods, clothes, belongings and even money</td>
</tr>
<tr>
<td>Personal</td>
<td>Prior to governmental aid</td>
<td>• Checking on the safety of each other</td>
<td>• Deciding a place for evacuation</td>
<td>• Counseling each other</td>
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<tr>
<td>communication</td>
<td>During relief activities</td>
<td>• Sharing food and water to survive</td>
<td>• Referring injured people to hospital</td>
<td>• Praying together</td>
</tr>
<tr>
<td>Article review</td>
<td>Prior to governmental aid</td>
<td>• Evacuating senior citizens to the higher ground</td>
<td>• Evacuating people and goods to hospital</td>
<td>• Rescuing people</td>
</tr>
<tr>
<td></td>
<td>During relief activities</td>
<td>• Cooking food together in evacuation shelters</td>
<td>• Sharing food and clothes</td>
<td>• Sharing belongings</td>
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<td></td>
<td></td>
<td></td>
<td>• Sharing donations of money or logistical efforts</td>
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<td></td>
<td></td>
<td></td>
<td>• Rebuilding houses</td>
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<td></td>
<td></td>
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<td>• Cleaning the debris away</td>
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</table>
logistical donations during the time when government aid was insufficient. In Nepal, local community people were the first to volunteer to help with response activities. They shared scarce resources with those in need, such as food, clothes, or money to survive. They also cooperated and helped to clean the debris within their environment. Furthermore, some of them cooperated and helped to rebuild their houses.

The community people within these three disaster-affected areas also confirmed their awareness of mutual assistance. Some people stated that providing mutual assistance was part of human nature; some stated they must do it because of the insufficiency of government aid; and others believed that through mutual assistance, they could rebuild their future. Three informants from Japan, Indonesia, and Nepal stated their opinion as follows:

Helping each other was naturally performed as human nature. At that time, my job was ensuring the safety of students. So, I did it also when disaster occurred. (a Japanese informant)

We helped each other in shelter to distribute food and goods and to maintain sanitation. We work together in cleaning the environment after flood. Due to insufficiency of government aid, like or not, we must help each other like that. (an Indonesian informant)

Though we are still struggling for rebuilding, reconstruction, and relocation of the destruction and damages, no one has lost their hope because we move hand-in-hand. It is the strength of mutual assistance. And yes, mutual assistance is very important to get back to normal situation from that unbearable loss of disaster. (a Nepali informant)

Nursing activities before and after the disaster

A public health nursing (PHN) system and dispatching nurse system are included as part of the Japanese health system. Before the Great East Japan Earthquake, PHN activities involved identifying common health problems within a community and seeking solutions valuing partnership and collaboration with residents. Their activities also included disaster preparedness education and providing training to the community (Koshida and Morita, 2013). After the earthquake, dispatched nurses were actively involved in the health response to this disaster. The dispatched nurse stayed at the evacuation center and medical institution of the disaster area for 24 h and provided medical care, nursing care, infectious disease assessment and environmental hygiene, infection control measures, consultations and health education. In the wake of the Great East Japan Earthquake, the work of PHNs became more community-centered. The public

health nurse visited all of the inhabitants of the affected community and provided health, medical and welfare activities to support community recovery.

A community health nursing (CHN) system is also available in Indonesia. Furthermore, the Jakarta local government has established a regulation that set nurses and other healthcare professionals to be dispatched to disaster-affected areas. Before a disaster, community health nurses who worked at a public health center provided care and education for the community by empowering participation of community people in improving health, social conditions, the physical environment, and rehabilitation. Also, community health nurses provided activities on prevention of diseases and greater hazards (Indonesian MoH, 2014). After a disaster, community health nurses and dispatched nurses provided an active response, such as first aid to injured people, health assessments, nursing-medical care, health information in shelters, hygiene package distribution, health education, and also assisted in shelter management.

Community health nursing is included in the nursing system of Nepal as well. However, the system for dispatching nurses during disasters has not been initiated formally yet. Before the disaster, community health nurses were providing community nursing care in Bhaktapur, especially focusing on improving standards and raising awareness on hygiene, sanitation, infectious diseases, and care of vulnerable people. After the disaster, these nurses were actively involved in carrying out emergency responses in health centers and shelters to help the survivors. Following the Nepal earthquake, the concept of the epidemiology nurse evolved and local nurses started caring for local people as part of the community recovery and disaster preparedness.

Regarding situation that are shown in Figure 1, which depicts that, although the three disaster areas are located in different regions and have various economic, socio-cultural, and differing disaster backgrounds, they have similarities in terms of having mutual assistance, and health care by nurses at the community level.

DISCUSSION

Mutual assistance is crucial in disaster risk reduction. The Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015) encouraged the enhancement of community resilience through promoting the cooperation of affected people in disaster risk-reduction activity. Strengthening mutual assistance in the community will reinforce the implementation of the framework. It also stated that the Disaster Risk Reduction activities for
healthcare professionals include integration of disaster risk management into primary, secondary and tertiary health care, especially at the local level; developing the capacity of health workers in understanding disaster risk and apply and implementing disaster risk-reduction approaches in health work; promoting and enhancing training capacities in the field of disaster medicine; and supporting and training community health groups in disaster risk-reduction programs (Aitsi-Selmi et al., 2015; Dar et al., 2014).

According to the present study findings, the public health nursing system has been established in each of the three countries. In everyday life, nurses are in close contact with community members. They provide community health-based care to empower community people to fulfill their health needs in a normal situation. They educate the public on the prevention of illness, injury and hazards; identify those who are vulnerable; provide care and treatment; support rehabilitation; and advocate for health promotion for each individuals and families in communities. It could be understood that nursing activities have played a direct and indirect role to help people in the community to respond to disasters in terms of protecting their own health (WHO & ICN, 2009). By providing routine community health-based care, nurses could strengthen mutual assistance and enhance capacity building of people in a community to save their life and maintain their health in the event of a disaster (Aitsi-Selmi et al., 2015; UNISDR, 2015).

During disasters and emergencies, family, neighbors and community people are the first to assist and are in the best position to save lives, especially when the emergency workers might not be able to arrive on time. The value of mutual assistance will determine how community people can protect their lives. Communities provide mutual support, shared responsibilities, and encouraged hope and effort to help with recovery (Danna, Pierce, Schaubhut, Billingssley, & Bennett, 2015; Walsh, 2007). Enhancing the role of mutual assistance and participation in community decision-making would support disaster risk reduction (Rodrigues et al., 2006).

DRR activities for nursing should focus on disaster preparedness and mitigation during non-disaster times. For disaster mitigation, nurses’ activities should include awareness campaigns on hazards, vulnerabilities, and risks; providing vaccination; and improving health and nutrition. Similarly, in disaster preparedness, nurses should be involved in disseminating early warning signals, planning for emergency evacuation plans, holding drills, trainings and formulating policies on emergency and disaster (Bonito & Minami, 2017; Veenema et al., 2016; WHO & ICN, 2009).

Based on the present study findings, and considering mutual assistance as a key factor for DRR, a draft of the nursing approach for DRR can be created (Figure 2).
This draft of the nursing approach describes that nursing activities should focus on strengthening mutual assistance to enhance disaster risk reduction, without ignoring the balanced approach of self-help and government aid. Based on this approach, nursing activities on mutual assistance should be able to have an effect on both self-help and government aid.

CONCLUSION
Mutual assistance allows the community people to minimize the disaster effects before a disaster occurs, and to recover better in the post-disaster period. The nursing role should be expanded to improve mutual assistance in the community for disaster risk reduction. This study suggests that there is a need for further investment in identifying nursing activities for strengthening mutual assistance.

AUTHORS’ CONTRIBUTIONS
All authors contributed to conceptualization and design of this study; data collection, translating the language, analyzing the data; and drafting the manuscript. All authors also critically reviewed the manuscript and supervised the whole process of study.

DISCLOSURE
There is no relationship or conflicts of interest with any commercial companies pertaining to this article.

REFERENCES