ORIGINAL RESEARCH

Nursing in Sudden-Onset Disasters: Factors and Information that Affect Participation

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Abbreviations:
EMS = emergency medical services
JRCS = Japan Red Cross Society
JSDF = Japan Self-Defense Force

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Abstract

Introduction: Little has been reported regarding the minimum conditions, information, and knowledge essential for dispatching nurses to join in sudden-onset disaster events from the viewpoint of nurses. This paper explores the issues and concerns that nurses faced when asked to respond to the 1995 Great Hanshin-Awaji Earthquake event in Japan.

Methods: A standardized written survey tool was developed using input from four nurses who had responded to the disaster event. Questionnaires that included both "yes" and "no" answers and multiple-choice answers were developed and sent to 823 nurses who worked in four hospitals.

Results: A total of 477/823 (58.0%) questionnaires were completed and returned. Of the respondents to the questionnaire, 309 (62.1%) were qualified nurses, and 148 (37.9%) were students. Sixty-nine (15%) of the total 477 respondents participated in the disaster response to the Great Hanshin-Awaji Earthquake. Primary among respondents' concerns were that they should wait for their superiors or institutions to direct them to go "somewhere" and to do "something", and how far away from home would they be required to travel. Home responsibilities conflicting with disaster response were a common concern for respondents.

Conclusion: Managers should consider including the following conditions in disaster dispatch plans: (1) the dispatches should be made part of nursing duties; (2) the disaster plan should be constructed with organizations near disaster sites; and (3) clear directions regarding destination and expected activities should be provided to nurses.

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Introduction

The Great Hanshin-Awaji Earthquake, which had a magnitude of 7.2 (Richter scale), occurred in the southern area of Hyogo prefecture, Japan, on 17 January 1995. Six thousand, four hundred, thirty-two people were killed and three were missing, 10,683 were seriously injured, 33,109 suffered minor injuries, and 512,882 dwellings collapsed.[1] Shelters were made available to earthquake victims until the end of August 1995, and temporary housing was in place for five months after the earthquake.

At the time of the Hanshin-Awaji Earthquake, there was no public or private system in place for responding to disasters. Therefore, during the response and reconstruction phase to this earthquake event, responding agencies and institutions had to improvise. Several organizations, such as the International Red Cross, responded quickly to the event, but

there was little in the way of established procedures or plans to allow for cooperation and coordination among the various responding organizations.

The Japanese Nursing Association and Hyogo Prefecture Nursing Association worked with one another to dispatch volunteer nurses to care directly for those affected by the earthquake and to support the nurses who were working in the area. These nursing dispatches continued from 25 January to the end of March 1995. In addition to those nurses dispatched by the Nursing Association, nurses came to work in the disaster area on the basis of their individual decisions.

Immediately after the earthquake event, there was a need for a large number of nursing professionals to provide hospital-based nursing support to care for victims. There also was a recognized need for nursing professionals to help provide primary medical care to the affected population in order to maintain basic health and prevent aggravation of chronic disease states and infectious disease outbreaks.

When the disaster occurred, rescuers, police, the army, and emergency medical services (EMS) personnel were dispatched to the disaster area. During the acute phase, these responders worked cooperatively to save victims' lives. But as the reconstruction phase of the disaster response developed, nurses were required for work in shelters or temporary houses to provide basic medical care for the victims and public health services. These nursing activities were required to minimize the adverse health outcomes that resulted from the disaster. The emergency response phase of the disaster was short (hours and days), while the reconstruction phase, during which nursing personnel were in highest demand, was measured in weeks and months. For effective recovery after the initial acute disaster phase, nurses needed to be dispatched to the scene of the disaster for longer lengths of time as compared to the requirements of the rescue workers.

The Kamiizumi *et al* study of the Hanshin-Awaji Earthquake[2] looked at institutions that dispatched nurses to the earthquake area and the nurses who had been dispatched. The study reported that nurses were dispatched based upon their abilities, career, specialties, physical and mental health and stamina, and family situations. Their activities in hospitals included "injections", "measurement of vital signs", "medication administration", "support for toileting", and "support for taking baths". For those victims remaining in the shelters, the dispatched nurses "performed nursing rounds in the shelters", "served as companions", "measured vital signs", "served as consultants about health", and "helped in the arrangement of documents". Other than the study described above, there has been one other recent study that evaluated nurses being dispatched to a hurricane disaster event. In this latter study, family safety, pet care, and personal safety, as well as basic physical needs and rest, were the major concerns for the dispatched nurses.[3]

The objective of this study is to clarify the kinds of conditions for nurses that should be considered and the kinds of information required by nurses to be dispatched in response to a disaster caused by an earthquake.

Methods

This project was conducted during November 2000. Questionnaires were sent to 823 nurses who worked in four hospitals near the earthquake-affected area. These nurses were dispatched as part of the relief teams in response to the Great Hanshin-Awaji Earthquake, and also were a key element in the provision of regional medical services.

Prior to the study, to construct the elements to be used in the questionnaire, interviews were conducted of four nurses who had worked in the response to the Great Hanshin-Awaji Earthquake. Based on these interviews, issues were identified, and from these, the content of a study questionnaire was developed. The subjects who participated in the interviews that resulted in the initial questionnaire development were asked to select what they considered were the five most important content points from a total of 15. Additionally, questionnaire contents about information and knowledge required of the disaster response nurses were adopted from the *Disaster Mental Health Care Training Manual* developed by one of the authors [SM], which is accessible on the Internet.[4] The questions either were of "yes" and "no" or multiple-choice type (Table 1). Statistical analyses were performed using SPSS 10.0J (SPSS Inc., Chicago, IL USA).

Results

A total of 823 surveys were distributed to nurses who worked in four hospitals. Of these, 477 (58.0%) questionnaires were returned. Twenty of the surveys were excluded from further analyses because of missing data. Included in the analyses were 457 responses. The mean value for the age of the respondents was 34.6 ±10.5 years (±1 SD). The mean value for the number of years in the nursing profession was 12.2 ±9.5 years. At the time of the Great Hanshin-Awaji Earthquake, 309 of those respondents whose surveys were included in the analyses were qualified nurses (65.4%), and 148 were nursing students (34.6%).

The type and level of involvement during the Great Hanshin-Awaji Earthquake of those nurses studied is listed in Table 2. Fifty-eight of 309 (18.8%) nurses included in the study participated in the disaster nursing response during the Great Hanshin-Awaji Earthquake. Among those participating, 45 (77.6%) were dispatched from their base hospitals to work in the disaster response as part of their work duties; nine volunteered and took an absence from their usual nursing duties; and the remaining four were without a regular occupation at the time. Eleven student nurses joined in the disaster relief as volunteers. Therefore, a total of 69 (15% of the study subjects) nursing personnel participated in the earthquake-response efforts.

Of the respondents included in the study, 388 (85%) did not join in the disaster relief. The reasons for not joining in the disaster relief are shown in Figure 1. These reasons included: (1) concern about the distance from their homes (159, 41%); (2) being a student at the time (125, 32.2%); (3) not understanding their own abilities (115, 29.6%); (4) not receiving an order from their superior to respond (98, 25.3%); (5) having no information on a site to respond to (88, 22.7%); and (6) being hesitant (80, 20.6%).

1	Did you join the disaster relief at the Great Hanshin-Awaji Earthquake?	Yes/No
	If yes, was it duties or volunteer work?	One choice
	If no, whynot?	Multiple choice (3 from 12)
2	Will you join the disaster nursing, when any major disaster might strike in our country in the future?	Yes/No
	If yes, what conditions are essential?	Multiple choice (5 from 14)
3	If you will join in the disaster nursing, what information on the site would you need?	Multiple choice (5 from 15)
4	If you will join in the disaster nursing, what knowledge about disaster response would you need?	Multiple choice (5 from 21)
5	*Please check the items you do not know in Question No.4*	*Multiple choice*

Table 1—The disaster nursing that was called in this questionnaire was the relief response to the disaster, like the Great Hanshin-Awaji Earthquake, that occur many injuries and serious damages to social infrastructures at one time.

		n	(%)
Nurse	**Total**	**309**	(67.6)
	Yes, join in the disaster nursing	58	(18.7)
	On duty	45	(14.6)
	Volunteer	9	(2.9)
	Other	4	(1.3)
	No, not join in the disaster nursing	251	(81.2)
Student	**Total**	**148**	(32.4)
	Yes, join in the disaster relief as a volunteer student	11	(7.4)
	No, not join in the disaster relief	137	(92.6)

Table 2—Involvement at the Great Hanshin-Awaji Earthquake

	n	(%)
Yes, without any conditions	29	(6.3)
Yes, with some conditions	385	(84.2)
No	43	(9.4)
Total	457	(100.0)

Table 3—*Will you join in a future disaster nursing with any condition? (n = number)*

Regarding future participation in a disaster response and the conditions under which they would participate, 29 of 457 (6.3%) of the responding nurses reported that they would participate in disaster work without any conditions, and 385 (84.2%) would respond with certain conditions. Forty-three (9.5%) answered that they would not want to participate in any disaster response (Table 2).

The conditional requirements the 385 nurses posed are shown graphically in Figure 2. The second question had a multiple-choice format that asked survey participants to choose three from the 15 choices. The common essential conditions were (in rank order): (1) instruction from their superiors (235/385, 61.0%); (2) the distance from their homes (192/385, 49.9%); (3) ability to function independently (186/385, 48.3%); (4) the delination of their activities (172/385, 44.7%); and (5) the approval by their companions at their hospitals (170/385, 44.2%).

Essential information they would require for participation in a disaster response provided by all 457 nurses, are shown graphically in Figure 3. This information in rank order of frequency includes: (1) the scale and the damage of the disaster (407/457, 89.1%); (2) the site and terms of their dispatch (290/457, 63.5%); (3) the contents of their work and their status (198/457, 43.3%); (4) transportation (187/457, 40.9%); and (5) the situation of electricity, gas, and waterworks (184/457, 40.3%).

Essential knowledge-based elements for nursing in disaster response are graphed in Figure 4. These elements in rank order of frequency include: (1) first aid (359/457, 78.6%); (2) psychological support of the victims (238/457, 52.1%); (3) counseling centers for the victims (183/457, 40.0%); (4) resuscitation (167/457, 36.5%); (5) helping in management of post-traumatic stress disorder (156/457, 34.1%); and (6) care for the elderly (149/457, 32.6%).

Discussion

More than 90% of the nurses, who participated in this research project reported that they would join in future domestic disaster relief activities without any conditions (6.3%) or with some conditions (84.7%). Therefore, if the conditions for response are recognized and addressed, there probably would be a sufficient pool of nurses who would be

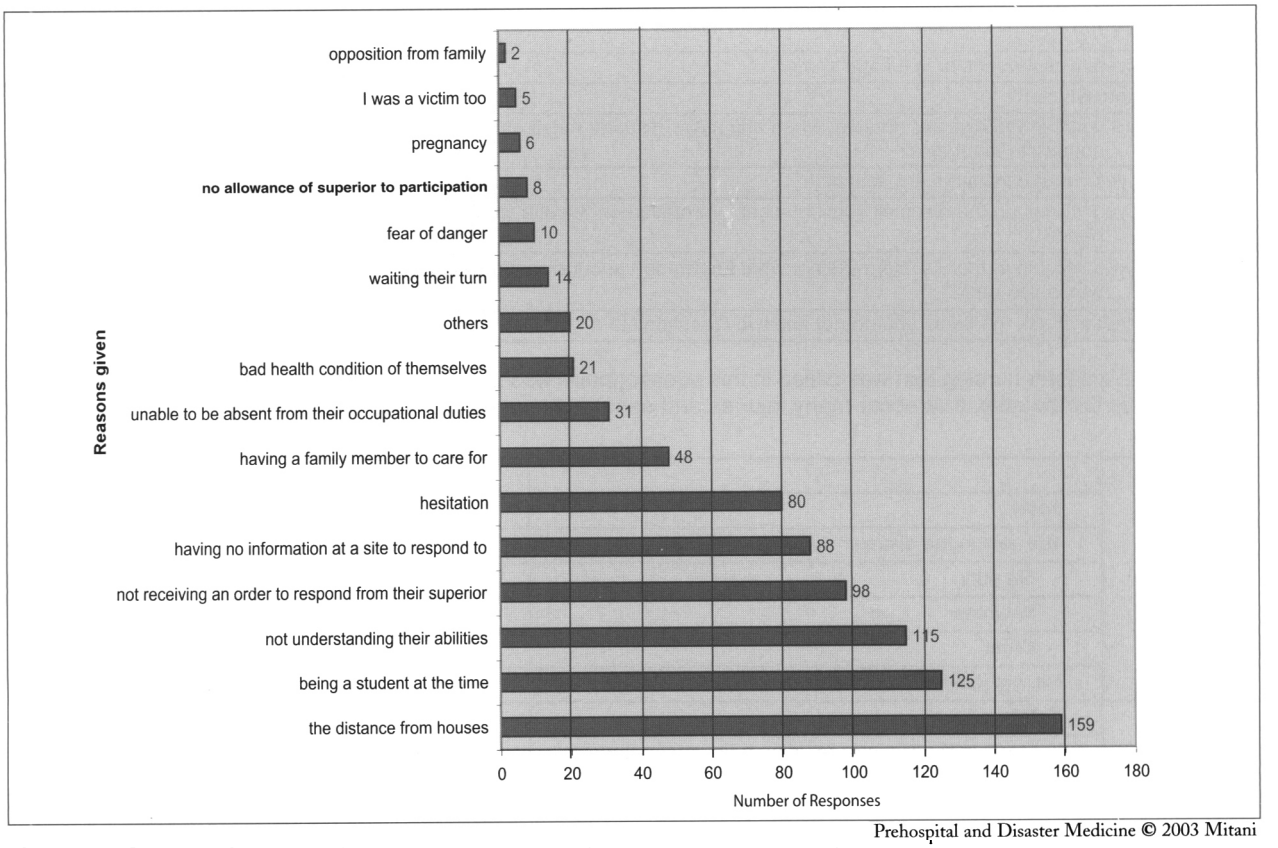

Figure 1—Reasons for not joining in the disaster relief at the Great Hanshin-Awaji Earthquake

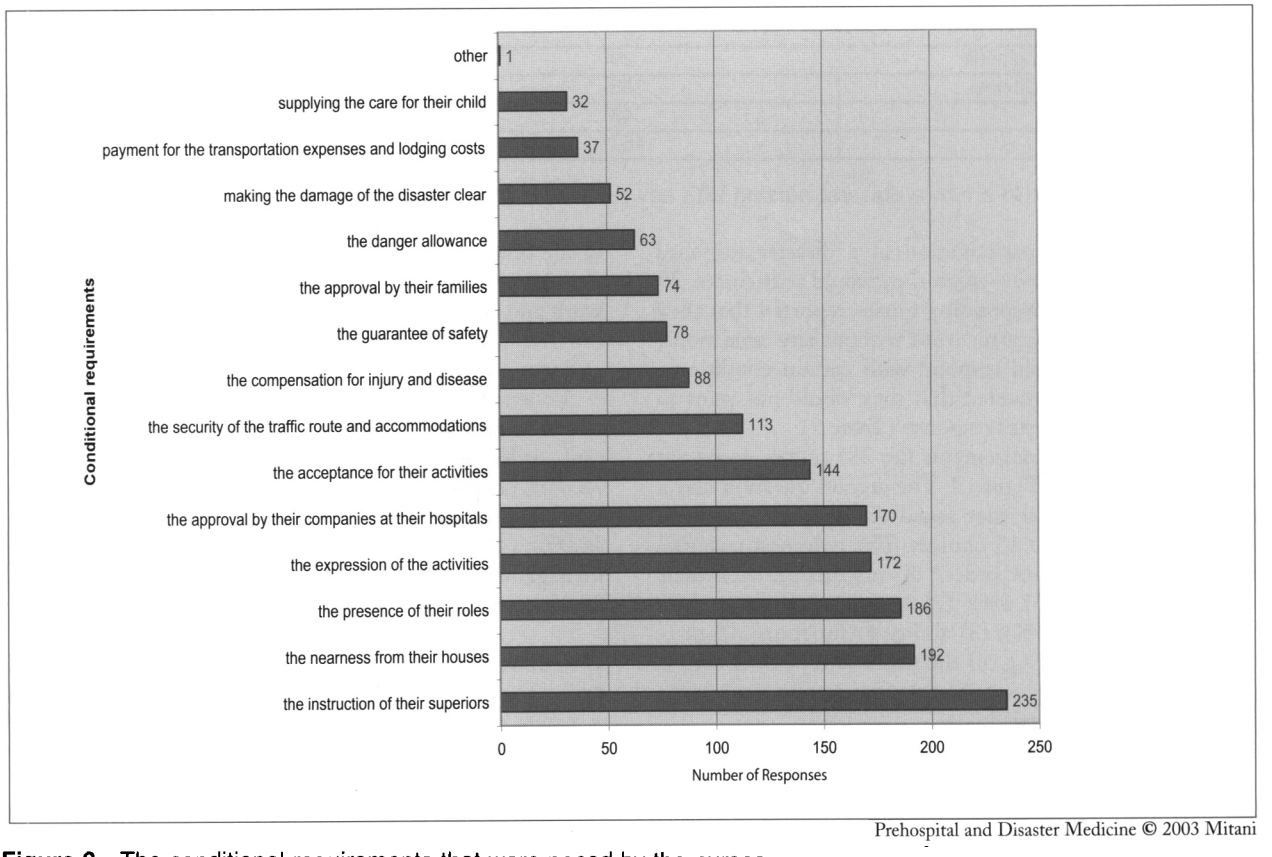

Figure 2—The conditional requirements that were posed by the nurses

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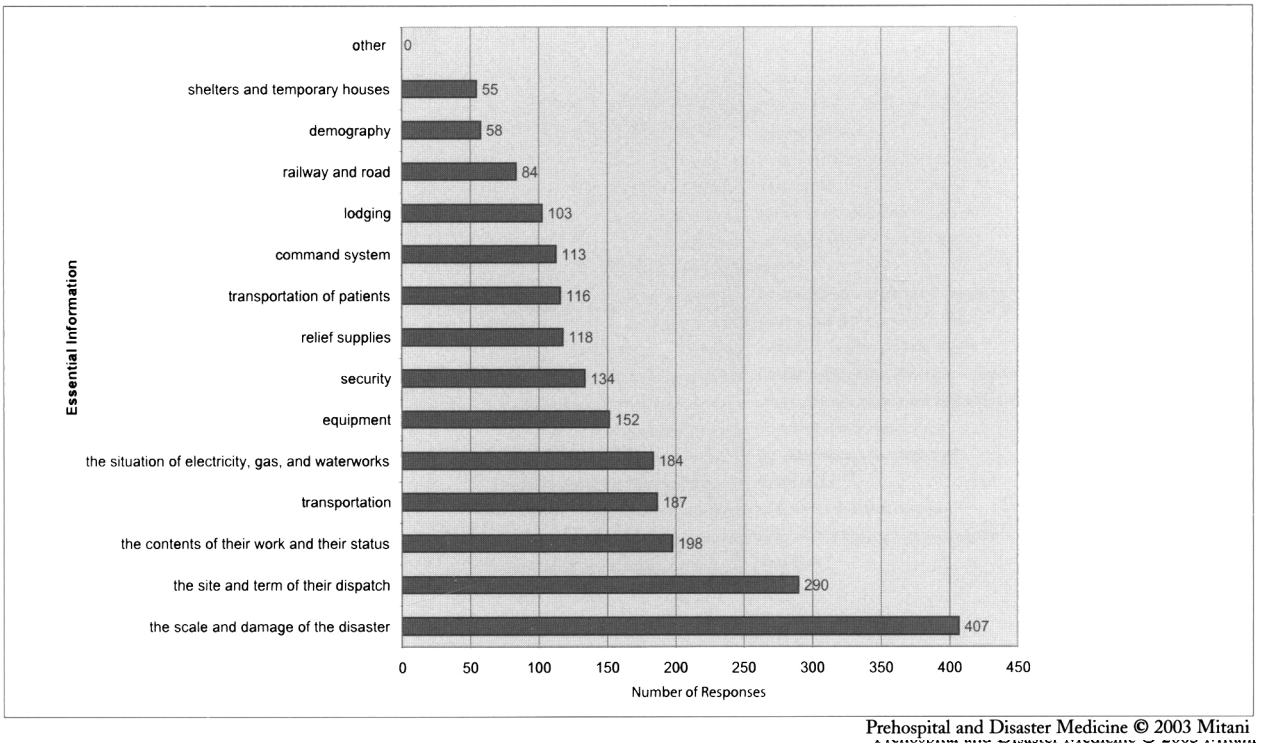

Figure 3—Essential information required for participation by 457 nurses

willing to participate in the disaster nursing response to a sudden-onset disaster.

Among the nurses who did not participate in the disaster response to the Great Hanshin-Awaji Earthquake, the most common reason was that "they lived in the area far away from the affected area". The second prerequisite condition was that "the affected area must be close to their dwelling". Therefore, it is conceivable that having a dwelling close to an affected area is an important determinate for disaster response participation. It appears that being away from home means that most nursing personnel cannot also fulfill their roles at home.

This theory is supported by a study conducted during wartime in Israel in which it was reported that a role-conflict between nurse and homemaker was exacerbated during wartime work.[5] In the Israeli study, nurses who had children ≤14 years of age would not respond to emergency call-ups unless an on-site, child-care facility was available.

Among the qualified nurses at the time of the Great Hanshin-Awaji Earthquake, only 58 (18.1%) participated in the disaster response. Of these, more than three-fourths dispatched from their institutes. One-fourth indicated that they did not participate in the disaster response because there was no approval or request to respond from their superiors, and the most common reason for requiring prerequisite conditions was their superiors' indication to do so (61.0%). Thus, for a nurse with regular clinical duties, responding on behalf of an organization makes it possible for the organization to secure rotation staffs to cover the responding nurse's shifts and to reassure the responding staff about indemnity and the logistics of the response. However, even with ideal conditions, it is difficult to immediately respond to a disaster because of the time taken to make decisions on what to do and to gather responders. One reason nurses hesitate to leave their daily work to participate in a disaster response is that they may be anxious about the reactions of their co-workers, since participation in disaster work might impose a burden on those co-workers who choose not to respond or are required to work due to the absence of those responding. Thus, the two essential conditions required for nursing personnel to respond to a disaster are: (1) being dispatched as part of their duties; and (2) the nearness to their home of the place to which they are dispatched.

An element of essential information required by nurses was "the scale and the damage caused by the disaster." When this information is provided, nurses who will participate in disaster work may be ready for it psychologically, and anxiety may be reduced. Unfortunately, during the acute phase of a disaster, the availability of such information is limited. To gather and provide this information, nursing and hospital managers should know how to obtain it. Further, they should network with other institutions before the disaster as part of their disaster preparedness. It is useful for nursing managers to participate in framing local disaster plans.[6] An effective disaster plan provides those making response decisions with the ability to respond automatically in the event of a disaster, and to avoid delays by delineating decision-making processes prior to a disaster.

The current study indicates that with regard to specific nursing knowledge areas, the most essential elements were first aid and resuscitation. The most commonly chosen psychological knowledge elements were the psychological reactions of the victims and the development of the post-traumatic stress disorder.

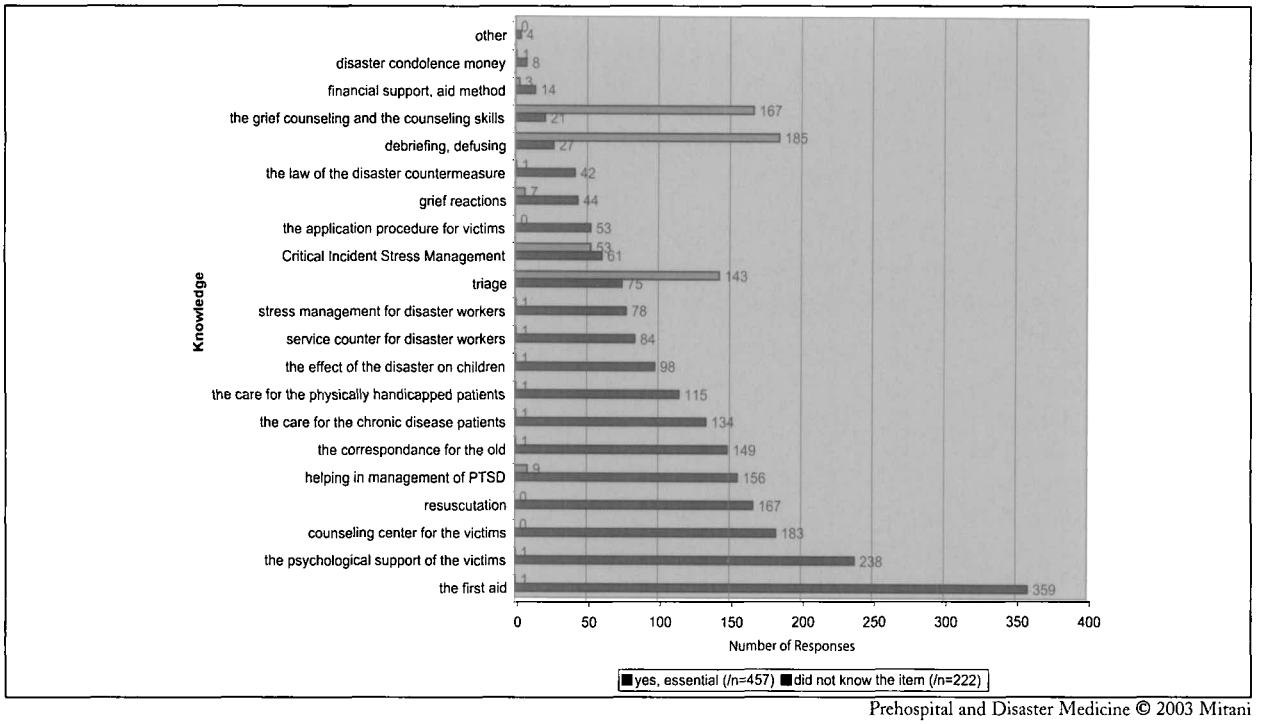

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Figure 4—Essential knowledge and items not known

Hence, the respondents considered disaster nursing as trauma care. This is contrary to a study in a similar earthquake event that reported headaches and upper respiratory tract infections were more common than were musculoskeletal problems or injuries.[7] However, according to the current study, from a nursing prospective, it is important to take the mental health care of victims into account.

Although most disaster nursing is an extension of daily work, some knowledge specific to disaster nursing is essential. The examples of the specific knowledge on disasters are triage, mental care for the victims, and mental health of the helpers.

When this study was conducted, 31% of the nurses responded that they did not know the principles of disaster triage, and 40% did not know about debriefing or defusing techniques. Knowledge about triage is necessary for the management of injured persons who are in need of transport in a short-time interval. Debriefing and defusing are useful for preserving the mental care for helpers.

In Japan, the Japan Red Cross Society (JRCS) and Japan Self-Defense Force (JSDF) are authorized organizations for participation in disaster relief. Both organizations have developed internal disaster planning and training programs, and therefore, maintain essential knowledge bases that can be provided to medical staffs. Knowledge about disaster relief is essential for all disaster-response participants. Disaster response is stressful, and disaster workers are exposed to various stresses and may suffer from long-term, painful memories generated by the disaster.[8] In the aftermath of the Great Hanshin-Awaji Earthquake, medical staffs not only of JRCS or JSDF, but also of general hospitals participated in the disaster-relief operation. Adopting the training in disaster response developed by JRCS and JSDF as part of regular, continuing education of general hospital staffs would improve the ability of general hospital medical staffs to respond outside of the hospital to disaster events.

The nurses who participated in the responses to the disaster resulting from the Great Hanshin-Awaji Earthquake were volunteers with little special knowledge regarding disaster response. If managers and/or organizations provide nurses with information and knowledge about disaster events and meet personal conditions of concern for nurses, a considerably larger number of nurses can be dispatched and will participate in a disaster response.

A limitation of this study is that a local disaster occurring in an urban environment was examined. Developed countries generally have sufficient social-support resources and systems in place to make use of them. But, developing countries often lack social-support resources, and often have different needs than those of developed countries.[9] Therefore, this study is more applicable to disasters that occur in developed countries as opposed to undeveloped or developing countries.

Another limitation is that disaster workers, such as mental-health staffs, need to be native speakers of the language that victims speak.[10] In the current study, the requirement for "being a native speaker" was not considered to be one of the essential conditions for dispatch because almost all of the people who live in Japan homogeneously speak Japanese. However, more and more people from many countries have come to Japan, and this may pose a problem in the future.

Conclusion

The subjects in this study were nurses who worked in general hospitals. Following the Great Hanshin-Awaji Earthquake, most nursing personnel did not act as disaster responders, and instead, awaited directions from their superior officials to go somewhere and to do something. Managers should consider the following conditions in making disaster plans that include dispatch of nursing personnel to the disaster site: (1) the dispatches should be made as part of nursing duties; (2) disaster plans in coordination with the hospitals and disaster-response organizations in nearby prefectures (jurisdictions) should be made; and (3) clear directions to nurses regarding the destination and expected activities should be given.

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Editorial Comments

Nursing in Sudden-Onset Disasters: Factors and Information that Affect Participation

The authors of Nursing in Sudden-Onset Disasters: Factors and Information that Affect Participation have made an important contribution to both the disaster and nursing literature. They confirm previous data published by French *et al* and add further to data that explore disaster response expectations and duties of nursing professionals.[1] During the initial phases of disaster response, nursing personnel that are available are required for staffing hospital and public health departments. More importantly, as described by Satoko Mitani and co-authors, nurse staffing is an essential element during the recovery phase of disaster management.

For sudden-onset disasters such as earthquakes, previous literature has described the emergency disaster response phase as lasting a relatively short period, often only four to five days.[2] The need for nursing availability during this initial disaster response period easily can overwhelm the local supply of nurses and has been discussed to a minor degree, in prior disaster medicine literature.[3] Satoko Mitani and co-authors point out that demands for nursing skills become a major priority during the reconstruction phase of disaster response. These nursing skill sets, as described by the authors and others, include patient health assessments, dispensing medications, administering immunizations, and basic community nursing. Also of interest in this paper by Sakoto Mitani is the key role that nurses played in serving as health consultants for the disaster-affected population and in helping arrange documents. The need for nursing skill sets during disaster response is emphasized further when reviewing published experiences of US Disaster Medical Assistance Teams that have responded to disasters resulting from hurricanes. In these reports, it is described that activities such as primary care and public health nursing, are immediate priorities when arriving to deployment sites.[4]

Sakoto Mitani and co-authors help define a number of important personal considerations for nursing professionals who may respond during a disaster. Included in these considerations is that, for women in the nursing profession, there often is the need to care for one's family as a priority over disaster response activities. Further, nurses are accustomed to working directly with physician's orders or defined protocols, and a nursing professional would function best in a chaotic disaster response environment when their expected duties are clearly defined. Until recently, "essential disaster knowledge" has not been provided in both clinical and public health nursing education. Efforts are underway to introduce disaster nursing into the curriculum of primary nursing education programs, but continuing education for nursing responses in disaster is not necessary. Inclusion of updated disaster nursing education in both nursing schools and continuing education programs will lead to more effective nursing responses to disaster events. Also, there should be a way

of determining nursing credentials and skill sets when nurses respond to a disaster site. Nursing skill sets span a broad range, and nurses expect that they will be assigned to settings that allow them to comfortably maximize use of their skills. Specific disaster hazards, such as those that lead to structure collapse, predictably may require specialized nursing skills such as emergency nursing and renal dialysis nursing.[5] Utilization of specialty trained nurses must be planned and economized in managing a disaster response.

Nurses associate their nursing activities with a hospital or other medical care sites, and, during a disaster most likely only will consider responding to their site of employment. Hospitals worldwide are dependent on nursing staff for day-to-day operations. Because nursing staff are essential for hospital operations, there is little flexibility in allowing nurses leave to respond to off-site disaster events. Because nursing staff members look to their nursing administrators for job assignment direction, a coordinated communication and action plan by nursing administrations within a hospital or community are required for a significant deployment of nursing personnel to the scene of a disaster. Another important consideration with regard to nursing employment patterns is the tendency, in some communities, for nurses to maintain working arrangements at more than one location (called registry nursing in the US). In determining the nursing resources for a community, there may be a tendency for over-estimating the number of nurses when those who work at more than one site are counted more than once.

The paper by Mitani *et al* is an important addition to the medical and nursing disaster knowledge base. The authors are to be congratulated for exploring and describing the response challenges that face nurses during a sudden-onset disaster. Most importantly, they point out the need to integrate nursing into disaster response education and planning. Nursing education programs should include disaster information in mainstream curriculums to facilitate the essential nursing participation required for an adequate disaster response. Current global nursing shortages demand that nursing professionals are prioritized as a resource in disaster response, and that they be included in efforts to develop disaster response plans. Further scientific evaluation of the integration of nursing professionals with their skill sets in disaster planning, mitigation, and response clearly is warranted.

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