



## Disaster Prevention and Nuclear Disaster Management in Home-visit Nursing Stations Located in Prefectures with Nuclear Facilities

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The purpose of this study is to clarify the current status of disaster prevention and support measures throughout the whole disasters at home-visit nursing stations. The study involved a cross-sectional survey of 81 directors of home-visit nursing stations in 6 prefectures having nuclear facilities, which are located in eastern Japan. The survey was carried out by a questionnaire, which asked about knowledge and recognition of disaster prevention and disaster support measures including nuclear disaster management. Most of participants felt that their knowledge regarding disaster support was insufficient, but they generally recognized necessity of disaster prevention and support measures against natural disasters. Over 80% of participants were unaware of 7 categories, including knowledge on nuclear disasters and disaster prevention, medical systems and responsibility in the time of the nuclear disaster, and municipal and prefectural assistance. Most of participants were unaware of the implementation of emergency drills. Furthermore, they were unaware of the role of home nursing in time of the nuclear disaster. These results collectively suggest that visiting nurses must participate in measures against nuclear disasters organized by local governments; disaster drills and training sessions, in order to improve their awareness of nuclear disaster. This will enhance their awareness of disasters and it will promote revision of disaster manuals.

*Key words:* disaster prevention, support measures, nuclear disaster, recognition,  
home-visit nursing stations

### 1. Introduction

Owing to the shortened hospital stays and increasing elderly population, home care is becoming more common. In particular, necessity of visiting nurses is growing as patients require medical treatment. Nonetheless, home-visit nursing stations have not yet met this demand with a chronic shortage of visiting nurses.

Home nursing care by visiting nurses has allowed patients

**Table 1.** Knowledge on disaster prevention and disaster support measures

	Disagree	Neither	Agree	<i>p value</i>
I know about:				
1 —Disaster prevention	34 (42%)	29 (36%)	18 (22%)	.495
2 —Disaster support measures	35 (43%)	32 (40%)	14 (17%)	.008

Chi-square test, n=81

**Table 2.** Necessity of knowledge for assistance in time of disaster at home-visit nursing stations

	Disagree	Neither	Agree	<i>p value</i>
Disaster prevention measures necessary for each home-visit nursing station:				
3 —Earthquake	1 (1%)	12 (15%)	68 (84%)	<.001
4 —Storm and flood damage	2 (3%)	21 (26%)	58 (72%)	<.001
5 —Fire	4 (5%)	14 (17%)	63 (78%)	<.001
6 —Tsunami and heavy snowfall	5 (6%)	26 (32%)	50 (62%)	<.001
Disaster support measures necessary for each home-visit nursing station:				
7 —Earthquake	1 (1%)	10 (12%)	70 (86%)	<.001
8 —Storm and flood damage	2 (3%)	15 (19%)	64 (79%)	<.001
9 —Fire	2 (3%)	21 (26%)	58 (72%)	<.001

Chi-square test, n=81

with various diseases and disabilities to lead a life in the comfort of their own homes. The role of visiting nurses has become important under disaster situations, where they must take concrete measures and carry out their nursing care. Unlike mandated disaster prevention measures in every organization such as medical and welfare facilities, however, the home-visit nursing stations must develop their own prevention plans. Therefore, this indicates that there may be various disaster measures among them.

With regard to disaster prevention and countermeasures at home-visit nursing stations, the national association for home-visit nursing care has drafted a disaster response manual for home-visit nursing stations in 2003<sup>1)</sup>. Therefore, visiting nurses should play an active role in their establishment. Thereafter, reports on disaster prevention and disaster came out. Original manuals were made on the basis of the disaster response manual, and disaster drills with simulating home-care patients as disaster victims were reported<sup>2-4)</sup>. Studies on natural disasters have reported the importance of collaboration among various institutions and individuals<sup>5-8)</sup>. However, these surveys did not include nuclear disasters. In particular, the home-visit nursing stations located in the prefectures near nuclear facilities should always prepare for the disaster measure against nuclear disasters. The aim of this study is to clarify the current status of disaster prevention and support measures in time of nuclear disasters at home-visit nursing stations.

## 2. Methods

### *Participants and data collection*

A descriptive cross-sectional study was conducted in Japan between December 2009 and February 2010. Participants were directors of home-visit nursing stations in 6 prefectures (i.e., Hokkaido, Aomori, Miyagi, Fukushima, Ibaraki, and Niigata) with nuclear facilities in eastern Japan. Potential participants were retrieved from a list provided by the National Association for Home-visit Nursing Care of Japan.

We sent questionnaires to the directors of 402 home-visit nursing stations. Subsequently, 97 directors filled in and returned the questionnaires (response rate: 24%). Among these responses, 81 were used for data analyses.

The survey included a questionnaire, which asked about the characteristics of the home-visit nursing station (region, size, number of employees, and other characteristics), 24 items related to knowledge and recognition of disaster prevention and disaster support measures at the home-visit nursing station, as shown in Table 1 to 5, and 24 items related to disaster prevention and support measures against nuclear disasters, as shown in Table 6 to 9. Accordingly, 48 items were assessed with respect to disaster prevention and support measures at home-visit nursing stations. Questionnaire items were both positively and negatively described to prompt participants to carefully read those statements and respond appropriately. Participants chose from five options ranging from "strongly agree" to "do not strongly agree" on a Likert scale.

## 3. Ethical Considerations

This study was approved by the Committee of Medical Ethics of Hirosaki University Graduate School of Medicine, Hirosaki, Japan. The following points were explained in the contents of the request statement document: the participants are not forced to answer the questionnaire; anonymity is preserved; and a decision to not participate will not cause any disadvantages. Their consent was considered to be obtained when the questionnaires filled out by them were retrieved.

## 4. Data analysis

The 5-grade evaluation scale was converted to a 3-grade evaluation scale. Because most of participants did not answer our questions by choice of "strongly agree" or "do not strongly agree", it was not possible to statically analyze

**Table 3.** Programs to increase knowledge on disaster prevention and support measures

	Disagree	Neither	Agree	<i>p value</i>
I request:				
10 —The unification of disaster prevention manuals	6 (7%)	18 (22%)	57 (70%)	<.001
11 —The unification of requirements for providing assistance in disaster manuals	2 (3%)	24 (30%)	55 (68%)	<.001
12 —The standardization of disaster prevention manuals	3 (4%)	11 (14%)	67 (83%)	<.001
13 —The standardization of requirements for providing assistance in disaster manuals	1 (1%)	18 (22%)	62 (77%)	<.001
14 —Training sessions on disaster prevention	2 (3%)	13 (16%)	66 (82%)	<.001
15 —Training sessions on providing assistance during disasters	2 (3%)	9 (11%)	70 (86%)	<.001
16 —Emergency drills at the local government level (envisioning home-care patients as disaster victims)	2 (3%)	28 (35%)	51 (63%)	<.001
17 —Emergency drills at fire department jurisdictions (envisioning home-care patients as disaster victims)	1 (1%)	28 (35%)	52 (64%)	<.001
18 —Disaster drills for home-care patients in conjunction with an institution (an enterprise)	3 (4%)	28 (35%)	50 (62%)	<.001
Chi-square test, n=81				

**Table 4.** Recognition of the role in time of disaster

	Disagree	Neither	Agree	<i>p value</i>
19 In the event of a fire in my neighborhood, I rush to help without hesitation.	10 (12%)	35 (43%)	36 (44%)	.004
20 In the event of an earthquake, I do not neglect to confirm patient safety.	3 (4%)	22 (27%)	56 (69%)	<.001
Chi-square test, n=81				

the data with the 5-grade evaluation scale. The 3-grade evaluation scale included the following answers: "Agree," "Neither," and "Disagree." Data were analyzed using SPSS 16.0 software (SPSS, Chicago, IL, USA). The chi-square test was used for comparisons.  $P < 0.05$  was considered statistically significant.

## 5. Results

### *Analysis of the responses of 24 items related to recognition of disaster prevention and disaster support measures*

A significant difference was observed in 23 of the 24 categories with respect to the relative extent of recognition of disaster prevention and support. Moreover, participants' knowledge of disaster prevention varied substantially.

About the knowledge on disaster prevention and disaster support measures at home-visit nursing stations, 43% of participants felt that they possessed insufficient knowledge regarding disaster support, and 40% of them were unsure whether they possessed it or not (Table. 1).

Table 2 shows necessity of knowledge for assistance in time of disaster at home-visit nursing stations. In the items of recognition of the need for knowledge of assistance in time of disaster at home-visit nursing stations, fewer participants felt that disaster prevention measures for tsunami and heavy snowfall were necessary than those who felt that measures for natural disasters such as earthquakes and storm and flood damage were necessary. However, the results did reveal that a significant number of participants generally recognized the necessity of disaster prevention and support measures for visiting nurses.

Table 3 shows programs to increase knowledge on disaster prevention and support measures. In the items of providing assistance in time of disaster, a significant number of participants believed that the 9 categories were needed: development of manuals for disaster prevention and support measures at home-visit nursing stations; the standardization of these manuals; necessity of training sessions and disaster drills at the local government level; those conducted at fire department jurisdiction areas with simulating home-care patients as the disaster victim.

Table 4 shows recognition of the role of visiting nurses in time of disaster. In the items of recognition of roles of visiting nurses during disasters, a significant number of participants indicated that they would rush to help without hesitation if a fire occurred in the neighborhood of their home-care patients and that they would not neglect to check on their safety if an earthquake occurred.

Table 5 shows disaster prevention and support in time of disaster. In the items of disaster prevention and support measures during disasters, however, a significant number of participants found it difficult for a home-visit nursing station to practice disaster drills or disaster measures by itself. Furthermore, many visiting nurses felt the need to provide personal information of the service users in disaster situations.

### *Analysis of the responses of 24 items related to recognition of nuclear disaster prevention and support*

A significant difference was observed in 20 of the 24 categories that assessed the relative extent of recognition of nuclear disaster prevention and assistance.

**Table 5.** Disaster prevention and support in time of disaster

	Disagree	Neither	Agree	<i>p value</i>
21 It is difficult for a home-visit nursing station to implement disaster prevention measures.	14 (17%)	29 (36%)	38 (47%)	.004
22 It is difficult for a home-visit nursing station alone to provide assistance during disasters.	10 (12%)	23 (28%)	48 (59%)	<.001
23 Disaster drills envisioning home-care patients as disaster victims would pose difficult challenges.	19 (23%)	25 (31%)	37 (46%)	.045
24 I will provide patient information to related organizations when required.	4 (5%)	29 (36%)	48 (59%)	<.001

Chi-square test, n=81

**Table 6.** Knowledge on nuclear disasters and disaster prevention

	Disagree	Neither	Agree	<i>p value</i>
I know about:				
1 —The Special Measures for nuclear disasters	69 (85%)	10 (12%)	2 (3%)	<.001
2 —The prevention of nuclear disasters	74 (91%)	6 (7%)	1 (1%)	<.001
3 —Nuclear disasters	68 (84%)	9 (11%)	4 (5%)	<.001
4 —The medical system for nuclear disasters	65 (80%)	14 (17%)	2 (3%)	<.001
5 —The responsible party during nuclear disasters (e.g., task force)	66 (82%)	10 (12%)	5 (6%)	<.001
6 —The response to nuclear disasters at the local level	71 (88%)	8 (10%)	2 (3%)	<.001
7 —The response to nuclear disasters at the prefecture level	70 (86%)	9 (11%)	2 (3%)	<.001
8 —The role of home-visit nurses during nuclear disasters	65 (80%)	14 (17%)	2 (3%)	<.001
9 — That prefecture-wide disaster drills are conducted for nuclear disasters	51 (63%)	12 (15%)	18 (22%)	<.001

Chi-square test, n=81

**Table 7.** Necessary of knowledge on nuclear disasters and a sense of crisis

	Disagree	Neither	Agree	<i>p value</i>
I feel that knowledge on the following is required:				
10 —Effects of radiation exposure	12 (15%)	8 (10%)	61 (75%)	<.001
11 —Prevention of nuclear hazards	15 (19%)	17 (21%)	49 (61%)	<.001
12 —Nuclear disasters	14 (17%)	11 (14%)	56 (69%)	<.001
13 —Nuclear disasters in the medical system	16 (20%)	10 (12%)	55 (68%)	<.001
14 Participation in emergency drills for nuclear disasters should be mandatory across the prefecture.	22 (27%)	42 (52%)	17 (21%)	<.001
15 I recognize that eliminating nuclear disasters is practically impossible.	35 (43%)	36 (45%)	10 (12%)	<.001
16 Nuclear disasters should include not only weapons and accidents in nuclear facilities, but also terrorism.	12 (15%)	38 (47%)	31 (38%)	<.001
17 I feel a sense of crisis about nuclear disasters.	29 (36%)	30 (37%)	22 (27%)	.495
18 I feel the need to prepare for nuclear disasters.	20 (25%)	31 (38%)	30 (37%)	.254

Chi-square test, n=81

In the items of knowledge on nuclear disasters and disaster prevention as shown in Table 6, over 80% of participants were unaware of 7 categories, including knowledge on nuclear disasters and disaster prevention, medical systems and responsibility in the event of a nuclear disaster, and local and prefectural level support. Over 60% of participants were unaware of the implementation of disaster drills. Furthermore, 80% of participants were unaware of the role of home nursing in the event of a nuclear disaster.

In the items of necessity of knowledge on nuclear disasters and a sense of crisis in Table 7, over 60% of participants

thought that knowledge on the effects of radiation exposure and nuclear disaster support, which include nuclear disaster prevention and medical systems, was necessary. Forty four percent of participants were unsure whether a nuclear disaster could conceivably occur, and 51% of participants were unsure of necessity of participating in disaster drills.

In the items of recognition of roles of visiting nurses during a nuclear disaster in Table 8, 53% of participants believed that they would visit non-restricted areas in order of priority.

In the items of support of home-care patients during a nuclear disaster in Table 9, while 77% of participants

**Table 8.** Recognition of roles of visiting nurses during a nuclear disaster

	Disagree	Neither	Agree	<i>p value</i>
19 I will visit on a priority basis during a nuclear disaster, except for off-limits areas.	4 (5%)	34 (42%)	43 (53%)	<.001
20 I will act under the direction of the home-visit nursing station during a nuclear disaster.	19 (24%)	32 (40%)	30 (37%)	.163
21 I will provide patient information to related organizations when required.	19 (24%)	36 (44%)	26 (32%)	.670

Chi-square test, n=81

**Table 9.** Support of home-care patients during a nuclear disaster

	Disagree	Neither	Agree	<i>p value</i>
22 I worry about patient safety during nuclear disasters.	4 (5%)	14 (17%)	63 (78%)	<.001
23 I think it will be difficult for me to handle patients during a nuclear disaster.	7 (9%)	33 (41%)	41 (51%)	<.001
24 It would be best if I didn't handle patients during a nuclear disaster.	24 (30%)	46 (57%)	11 (14%)	<.001

Chi-square test, n=81

believed that they would worry about the safety of home-care patients during a disaster, 50% considered it would be difficult to support the home-care patients. Fifty six percent of participants also were unsure whether they should support home-care patients during a nuclear disaster.

## 6. Discussion

This study revealed current perceptions of visiting nurses regarding disaster prevention and support (including nuclear disasters).

### *Disaster prevention and support*

In this study, we found that 43% of participants considered their knowledge of disaster support to be inadequate. Many participants also felt the need to support disaster prevention efforts in general. However, in practice, many participants found it difficult to conceive that such disasters would occur and that disaster prevention and countermeasures are necessary.

The reports of the national association for home-visit nursing care revealed that the manual for disaster prepared for home-visit nursing stations have developed. In the category of anxiety and concerns in time of disaster, "responses to home-care patients need an additional visit besides the scheduled one" was decreased, whereas "contact to their doctor" and "communication and coordination with other institutions and community" were increased<sup>9</sup>. These findings suggest that the needs of collaboration became common and stable among home-visit nursing stations and many other organizations, before visiting nurses started recognizing a strong need of disaster measures.

### *Nuclear disaster prevention and support*

Over 60% of participants in this study were unaware of the implementation of disaster drills, and 80% of them were unaware of the role of home nursing during nuclear

disasters. Many participants considered knowledge on the effects of radiation exposure, as well as other issues surrounding nuclear disasters and disaster prevention, to be necessary. Moreover, many participants could not consider a nuclear disaster scenario, and were unsure whether there was a need to participate in disaster drills or not. Because this study was conducted before Fukushima Daiichi nuclear accident, we did not assume that participants did not have high awareness of a nuclear disaster crisis. Mizushima et al.<sup>6</sup> had reported the following findings based on research on disaster management in home-visit nursing stations: There were many problems to be solved in the disaster countermeasures conducted at the home-visit nursing station. As this background, there have never been any disasters in that area in the past. Therefore, those visiting nurses did not consider any countermeasures against the disaster due to lack of the sense of crisis. From this report, particularly in busy home-visit nursing stations, knowledge regarding measures taken during nuclear disasters is of low priority. However, given their proximity to nuclear facilities, these home-visit nursing stations need to be acutely aware of potential nuclear disasters and maintain an appropriate degree of alertness.

### *Opportunities for training sessions and emergency drills and the development of disaster prevention/response manuals*

Visiting nurses were aware of the need for disaster prevention. However, they had less opportunity to participate in training sessions and disaster drills. Because, home-visit nursing stations are plagued by a chronic shortage of personnel, despite the increasing number of home care patients<sup>10</sup>. Therefore it is difficult for employees to participate in training sessions and disaster drills held in distant regions. One possibility to address this issue is to hold workshops at various accessible locations.

On the other hand, since home-visit nursing stations are not regarded as the medical institution in the disaster

measures plan, it is considered that it can hardly contact home-visit nursing stations in the time of disaster<sup>9</sup>). However, visiting nurses need to confirm safety of their patients under disastrous situations. They are also expected to work as the main force in the community health nursing. When municipalities develop a disaster plan, opportunities must be provided so that visiting nurses can actively participate in disaster drills organized by the municipalities. In particular, although activities of the home-visit nursing station are limited in the drill, visiting nurses should participate in the drill implemented by the local government. Because this will facilitate the cooperation between home-visit nursing stations and other organizations.

Many participants recognized that disaster prevention manuals needed to be developed. Several previous studies revealed that about 20% of home-visit nursing stations developed disaster manuals<sup>6, 7</sup>, though about 50% of home-visit nursing stations experienced disasters<sup>5</sup>. In addition, they revealed that visiting nurse do not know whether the disaster prevention manuals is well functioning or not, and many visiting nurses have not decided anything about disaster preparedness between the home-care participants and their families<sup>7</sup>. From these facts, visiting nurses are playing an important role in reviewing disaster manuals and disaster prevention plans, and thus expected their participations in disaster drills and training sessions.

## 7. Conclusion

This study demonstrated that directors of home-visit nursing stations considered their knowledge of disaster support and nuclear disasters to be insufficient. The difficulty of providing assistance during disasters can be attributed to inadequate knowledge, inadequate formalization of a disaster manual and few opportunities for participating in disaster drills among small-scale establishments. We also found that many participants felt necessity of standardization of the general disaster manual and of establishing a nuclear disaster management system. On other hand, we also found that recognition of necessity for nuclear disaster drills was low in many participants. The current situation in Japan, i.e., post-Tohoku Region Pacific Coast Earthquake and post-Fukushima Daiichi Nuclear disaster, will prompt even busy home-visit nursing stations to reassess their disaster management and support plans.

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