

Regular Article

Responses of Public Health Nurses to the Consultations Following a Nuclear Disaster - Issues Associated with Level of Knowledge

Chiaki Kitamiya

Department of Health Promotion, Division of Health Sciences, Hirosaki University Graduate School of Health Sciences, 66-1 Hon-cho, Hirosaki, Aomori 036-8564, Japan

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The purpose of this study is to clarify the responses provided by public health nurses who were consulted by residents after the Fukushima nuclear disaster in 2011. Study participants were eight public health nurses working in health centers in Ibaraki Prefecture. All nurses had experience with the criticality accident in facility of JCO Co., Ltd. in 1999. Semi-structured interviews were conducted from February 10-15, 2012 and comprised the following three questions: (1) What kind of actions did health care providers take following the disaster? (2) What kind of supports were provided to the Fukushima evacuees living in shelters? (3) What have you learned from JCO accident, and how did you put the experience of the JCO accident to an account? Data were analyzed qualitatively. This study was approved by The Committee of Medical Ethics of Hirosaki University Graduate School of Medicine, Hirosaki, Japan. Interviews ranged in length from 70 to 100 minutes and lasted an average of 81 minutes. This study is a qualitative analysis of these interviews. As a result, seven subcategories were classified into three categories. These three categories were: (1) transmitting, (2) understanding, and (3) giving advice. 'Transmitting' comprised simply providing information, 'understanding' was based on the public health nurses' understanding, and 'giving advice' was based on knowledge, understanding, and judgment.

Key words: nuclear disaster, public health nurse, health crisis management, consultation, issues

1. Introduction

On March 11, 2011, the Great East Japan Earthquake led to a massive tsunami and subsequent nuclear disaster. It is still fresh in our memories that many residents lost everything and were forced to evacuate to temporary shelters. Some of the affected areas have yet to be rebuilt and thus, many residents continue to live in temporary

shelters.

Many of these residents have been concerned about the effects that the nuclear power plant accident will have on their health. Some of them have conveyed their fears to public health nurses through channels such as telephone consultation and other public health services.

It was reported that about 20% of public health nurses had received education concerning the disaster.^{1, 2)} Of the limited number of nurses who were sent to work in the nuclear disaster area, some had only attended a lecture on radiation emergency medicine.^{3, 4)} It has been also reported that lessons learned were difficult to apply to the JCO facility accident in 1999.⁴⁾ How did public health nurses give support to residents affected

Chiaki Kitamiya: Department of Health Promotion, Division of Health Sciences, Hirosaki University Graduate School of Health Sciences, 66-1 Hon-cho, Hirosaki, Aomori 036-8564, Japan
E-mail: chiaki@cc.hirosaki-u.ac.jp

by the Fukushima nuclear disaster? Previous studies focusing on consultations by residents affected by criticality accidents based on public health nurses' narratives were not found.

The purpose of this study is to clarify the responses provided by public health nurses who were consulted with residents who worried about a nuclear power plant accident. In addition, how public health nurses used the information to help residents were examined.

2. Methods

Study design

Semi-structured interviews were conducted from February 10-15, 2012 and comprised the following three questions: (1) What kind of actions did health care providers take following the disaster?, (2) What kind of supports were provided to the Fukushima evacuees living in shelters?, (3) What have you learned from JCO accident, and how did you put the experience of the JCO accident to an account?

Study participants were eight public health nurses working in health centers in Ibaraki Prefecture. All public health nurses had experience with JCO accidents. Six public health nurses were in their 50s and two were in their 40s at the time of the interview. Data were analyzed qualitatively from seven interviews; one group interview was conducted with two public health nurses and individual interviews were conducted for the other six public health nurses. Interviews ranged in length from 70 to 100 minutes and lasted an average of 81 minutes. The installation system of each shelter, the schedule of the shelter and the public health nurses' work shifts were also checked in our analysis. Each public health nurse's narrative was recorded. Next, data with similar meanings were extracted and grouped into categories and subcategories. Categories were determined by researchers with qualitative study experience who strove to maintain the validity of the data. We expected that the public health nurse's knowledge derived from the experience with the JCO accident would have a significant influence on the responses to the residents and that public health nurses must have given advice to residents based on their experience with JCO accident. Special attention was paid to specific verbs used in the interviews, including 'tells', 'says', and 'answers'.

Generally, public health nurses are civil servants who work for the public health center of the local government and the prefectural establishment. They are engaged in work to preserve residents' health following disasters. For instance, they provide health care in shelters and health counseling for residents. Then, the study request was mailed to each local government and public health center. Consent to interview their employees was obtained from

each organization by mail. We asked each organization to recommend public health nurses to be interviewed. The main points of the study purpose, details of the study, and ethical considerations were specified in the document. We coordinated the time and place for the interview with each participant. This study was approved by the Committee of Medical Ethics of Hirosaki University Graduate School of Medicine in Hirosaki, Japan. Verbal and written explanations of the ethical considerations were provided to all participants at the time of their interviews and the study was started only after written informed consent was obtained.

3. Results

1. How did public health nurses deal with anxious residents?

Public health nurses provided consultations with a focus on mental care. They described their consultations using words and phrases such as "listening", "residents were understood", and "responses matched the condition of the resident". The public health nurses also offered information on radiation to the residents and the manner in which they shared this information was categorized. As a result, seven subcategories were classified into three categories (Table 1). These three categories were: (1) transmitting, (2) understanding, and (3) giving advice.

The first category identified was 'transmitting'. This comprised simply providing information. Public health nurses felt a sense of helplessness and expressed as "I could say nothing to help." when residents could not understand the situation yet wanted to know how much radiation they had received, and the residents' questions had to be referred to a specialist.

The second category identified was 'understanding'. This was based on each public health nurse's understanding of the situation. The public health nurses who were able to understand the meaning of the information about radiation explained the situation plainly to the residents. On the other hand, the nurses hesitated to explain the information which they felt they did not fully understand.

The last category identified was 'giving advice'. It was based on knowledge of radiation protection, understanding of the knowledge, and judgment on influence on health. The public health nurses knew that the residents were put at ease by the information, explanations of the situation, and additional information based on the knowledge that the public health nurses provided. Narratives about this third category included, "I have proposed to residents, 'Please pouch clothes for eight days if you worry about the radioactive material. Afterwards, let's wash it.' Such suggestions come from

Table 1. The stages of response to the consultations

Category	Subcategory	Summary of narratives
Transmitting (Transmission of information)	The inquiry is received without understanding	<ul style="list-style-type: none"> - I could not distinguish what was correct and what was incorrect. - No one knew what was safe or not. - Because there was uncertainty, there was no confidence in the available information. - I could only say, "Please don't drink the water if you are worried about radioactive contamination". - We expressed our own true feelings. - There was a feeling of helplessness.
	Confusion while passing on information from a specialist	<ul style="list-style-type: none"> - The written information was trusted and passed on. - When the government announced that a certain dose of radiation was safe, we told the residents that it was safe. - We passed on information like a spokesperson of the nation. - We could do nothing, but pass along information to the worried residents. - Information from specialized agencies was trusted.
	A specialist must be consulted	<ul style="list-style-type: none"> - We introduced others in charge who could more appropriately answer the residents' questions. - There were questions that could not be answered by nurses. - After all, a public health nurse is an amateur. - Regarding radiation, the level of understanding of public health nurses was about the same as that of residents. - Specialists should impart information directly instead of expecting nurses to learn and relay all of the information.
Understanding (Own understanding is deepened)	Information is understood and the public health nurse imparts the information to the residents	<ul style="list-style-type: none"> - There were actions for people who were worried about water and food consumption to take. - There were consultations with residents who saw information on food radiation doses on the internet, but hesitated about eating food and wanted to confirm with the nurses. - Knowledge on radiation could be gradually understood and passed on as a result of consultations with the residents. - We could only take the stance of the government when answering the residents' questions. - I could do nothing, but explain that iodine could not be distributed.
	Lack of understanding is changed into understanding	<ul style="list-style-type: none"> - It was difficult to interpret the evidence. - We consulted with specialized agencies due to the lack of understanding. - Specialized agencies were asked about topics in need of clarification. - Public health nurses are not the ones who should have been asked about such topics. - It was difficult to answer the uneasiness of residents when I too felt uneasy.
	Information is clearly connected	<ul style="list-style-type: none"> - When information based on evidence was shown to the residents, they were put at ease. - The publishing source of the information was shown to the resident, who was told not to worry. - Scientific information was shown to demonstrate safety.
Giving advice (The residents' understanding is improved and the public health nurse advises)	The public health nurse explains the situation using personal experience and knowledge and advises	<ul style="list-style-type: none"> - A resident became uneasy from recalling and reliving a past accident and responded to the consultation. - A consultation and explanations were given to an elderly woman living in another prefecture who was worried about the possible radiological consequences on her pregnant daughter-in-law and the baby. - To relieve residents' worry, basic decontamination knowledge was given. - Decontamination was recommended in the conversation. - The exposure situation was judged according to the place of residence and recommendations were made to evacuees. - Dosimetry procedures for measuring radiation in mothers' milk were explained. - It was possible to provide consultations to residents based on basic knowledge. - Public health nurses only had general knowledge. - Public health nurses responded to the consultations and confirmed that the information was understood. - The technique of the public health nurse determined how effectively information was delivered. - We ascertained the uneasiness of the residents, and guided them on subsequent decontamination methods.

Table 2. The stages of response to the consultations

Category	Subcategory
Tiredness from tension following the consultation	- Tension to answer the consultation.
	- Pressure without the answer.
	- Tiredness that caught resident's anger.
	- Tiredness in caring.
Fumbling for the right words and what to say	- I wanted to speak logical.
	- The technique is not understood.
Relief as the residents sounded reassured	- Attempt to obtain advice.
	- Voice of the resident who demands.
The sense of mission to become a source of support	- I was not able to run away.
	- I was not confident.

Table 3. Preparations for health counselling of radiation (Prefectural Public health center)

Category	Subcategory
System-making of consultation	- Sharing of information
	- Analysis of the content of the consultation
	- confirmation of the response
	- Information sending to city
System-making of radiation screening	- Screening and decontamination
	- Exposure examination

training and/or experience. Public health nurses are studying what public health nurses can do in natural disasters and learning about nuclear energy. Our activities and learning will probably be united."

Residents were advised according to the public health nurses' knowledge level of 'transmitting', 'understanding', and 'giving advice'. The 'transmitting' part of the narratives produced the largest source of issues among public health nurses because they told residents that their health would not be affected by the radiation even though they were not able to make such a judgment.

2. Stress that public health nurse experienced from consultation with residents

As a result of our analysis, four categories of narratives related to the consultations were compiled (Table 2). The ten subcategories were classified into four categories.

The four categories were: (1) tiredness from tension following the consultation; (2) fumbling for the right words and what to say; (3) relief as the residents looked reassured; and (4) the sense of mission to become a source of support. Public health nurses worried that they might have a difficult consultation. Therefore, they faced tension. They thought about methods of effective answering the residents' questions. Public health nurses were relieved as the residents looked reassured. They had a sense of mission, recognizing that it was not possible to run away from this problem.

3. Preparations for responding to consultation requests

(immediately after the disaster)

The preparation is needed to consult under a special situation of like a radiation accident. The preparations for health counseling on radiation were extracted from the narratives of public health nurses who chiefly belonged to the prefectural public health center (Table 3). A private power generator for emergency secured the power supply in part of the public health center. The information pipeline and the telecommunication facility have been recovered by having secured the power supply. As a result, two preparation systems addressing the nuclear disaster were set up: one was a system for radiation screening and the other was a system for consultations. The system for consultations was executed by the sharing of knowledge, analysis of the consultation contents, and confirmation of the response in the organization. Additionally, the prefectural public health center passed on the information to local governments. Radiological information from the Japanese government, a specialized agency, the neighboring facilities for inspection of contamination, etc. was also classified in the information passed on to local governments.

4. Discussion

1. Response to residents in consultations

The narrative part of the study corresponding to consultations varied according to the extent of the public health nurses' knowledge because the public health nurses in this study had the experience of JCO accident. When consulting, Figure 1 showed the height

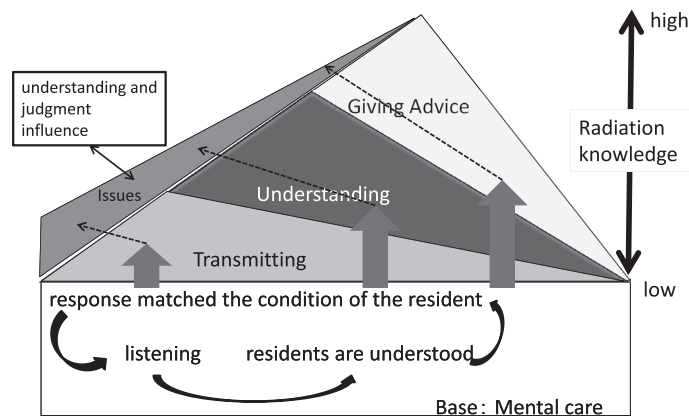


Fig. 1. Response model of consultation.

of public health nurses' radiation knowledge level the category of the different response. Public health nurses become transmitter if knowledge level is low, and respond "Advice" if it is high. In "Transmission" part, one nurse said, "I only told residents not to worry about their health because the national officials said so." She learned about radiation, and although she had previously supported residents affected by JCO accident, she still expressed her feelings as 'puzzled' by Fukushima nuclear disaster.

Issues existed among public health nurses concerning whether residents could understand and judge information on their own or if they had to be convinced. These issues produced responses in which public health nurses either 'attempted to learn information to provide better answers during consultations' or 'desired to leave judgment to a specialist (referring specific questions on radiation to a specialist)'. We found that public health nurses would request a specialist depending on their own response level when the request for consultation was received. Issues existed in all the responses in Figure 1. However, a lot of Issues were caused in transmitting as the area on the left of figure showed. Of course, the base of the consultation of public health nurses was Mental Health.

The activities of public health nurses concerning mental care are especially important following a disaster, when such support is particularly needed. However, in this case, public health nurses had opposite ideas concerning the 'transmission' of information at their consultations. The public health nurses could not always think of answers that could satisfy the residents' questions. Residents wanted a scientific judgment that radiation exposure had no influence on their health. However, agencies were not necessarily monitoring radiation exposure to determine its influence on health. Residents wanted to be told that they were not exposed to dangerous level of radiation, yet they did not believe

it when they were told that the dose of radiation they had been exposed to was below levels that could influence health. Even though the nurses were worried themselves, they tried to listen patiently to the residents and attempted to correct any mistaken perceptions so that the residents could have correct understanding of radiation. One public health nurse said, "The situation frazzled my nerves." To reduce these issues in the future, public health nurses should be required to have at least a minimal amount of knowledge and training concerning radiation-related disasters. Having this knowledge and training will address aspects of morale when it is not possible to consult with a specialist promptly.

2. Possibility of an applicable response model

This model may be applicable to health counseling that requires new knowledge. The health counseling by the public health nurse had bases in knowledge and mental health care.⁵⁾ The features of knowledge in such consultations have not been discussed up to now. The likelihood of a public health nurse having training in the medical treatment of radiation exposure was small, except in prefectures with nuclear plants.³⁾ The consultation responses of the public health nurses who had such training were diverse. The primary difference in the responses of nurses during the consultation experience was due to the nurses' individual level of knowledge. This model may be applied to the response to any unknown health matter.

3. The public health nurses' psychological load

The public health nurses responded to consultations by the residents with tension, even though the public health nurses had attended training before the disaster. Issues stemmed from their inability to speak with conviction when only imparting information to the residents. Because public health nurses did not imagine

that the radiation disaster would be repeated, they had difficulty retaining knowledge concerning radioactivity. It was reported that public health nurses had training in radioactivity as members of an administrative organization.³⁾ Though the public health nurse was experiencing the JCO accident, the consultation on the residents who worries about influence on health weighed heavily on the minds of the public health nurses. One public health nurse said, "It is not possible to run away [from the seriousness of the situation]." The nurses had rules of professional conduct with which to confront the difficulty. Their understanding of the influence of radioactivity on health will continue to be deepened through training and practice, and it is thought that backup from a radiation specialist is important.

5. Conclusion

The public health nurses' system of consultation was based on providing mental health care. In addition, information and knowledge were used effectively according to each level of 'transmitting', 'understanding', and 'giving advice'. When public health nurses were not able to judge the certainty of information, they were faced to the issue of whether they could explain the content to residents. Advice from a radiation specialist was needed at such times.

The public health nurse's educational program proposes to add the following content. (1) Basic knowledge of radioactivity (including radiation protection and influence on health), (2) Training for use of first-aid stations and participation in disaster drills (including conducting interviews, radiation surveys, and behavioral surveys), (3) Consultation with residents at the disaster site (including risk communications and

mental care).

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