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Report

Contributions of Nurses after a Nuclear Accident and a Proposal for Education in Radiation Nursing

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We propose an education program for radiation nursing based on the experiences and approaches of nurses during and after the Fukushima Daiichi Nuclear Power Plant (FDNPP) accident. In the initial phase after the nuclear accident, nurses played a role in helping the patients deal with the radionuclide contamination and in developing a radiation emergency system. In the chronic phase, nurses participated in consultations with evacuees regarding their anxiety about the radiation exposure and contributed to preparedness strategies for radiation emergencies. Fukushima Medical University (FMU) has run this consultation project for evacuees since 2012 to deal with anxieties about the health effects of radiation and resulting physical and mental problems. Nurses have participated in many situations since the FDNPP accident. However, they have insufficient information about radiation-related health effects because such information was not included in their education programs. This disaster showed that health care providers need to be able to communicate correct information to patients and residents about radiation-related health effects. Based on our experiences, we propose the establishment of a practical education system of radiation nursing in Japan. We also propose a training system to authorize specialists who will provide this education.

Key words: Fukushima Daiichi Nuclear Power Plant, radiation nursing, radiation education

1. Introduction

The nuclear accident at Fukushima Daiichi Nuclear Power Plant (FDNPP) of the Tokyo Electric Power Company on 11 March 2011 was accompanied by a 9.0 Richter-scale earthquake and a tsunami, the largest in Japan's recorded history[1, 2]. The accident resulted in the release of a large amount of radionuclides into the atmosphere. The total release of ^{131}iodine, ^{134}caesium, and ^{137}caesium, estimated by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), was 120, 9.0, and 8.8 Peta Becquerels (PBq)[3], respectively. Since the accident, much attention has been paid to radiation exposure, including medical radiation exposure, in the Japanese general population, especially in Fukushima[4].

On 13 March 2011, Nagasaki University formed the Radiation Emergency Medical Assistance Team (REMAT), which included two nurses[5, 6] (Fig. 1). Since March 15, they have served on the medical relief team organized by FMU Hospital (Fukushima City). The specialists on the team were prepared for the treatment of acute radiation syndrome, within the framework of

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Fig. 1. REMAT at Nagasaki University

the WHO's Radiation Emergency Medical Preparedness and Assistance Network[7]. In this report, we propose an education program for radiation nursing based on the experiences and approaches of the nurses during and after this accident.

2. The activity of nurses after the FDNPP accident

2.1. The initial phase

Two nurses from Nagasaki University arrived at Fukushima on 14 March 2011 and worked at the FMU Hospital and evacuation zone. One of the nurses went to the site near the FDNPP to rescue a nuclear worker and returned with him by helicopter to the FMU hospital on 16 March 2011. This nurse also performed the emergency radiation medicine at the ER in FDNPP. Then, the nurses coordinated the establishment of a system for radiation emergency medicine and treatment of trauma and trained the medical staff at the FMU in the treatment of patients with acute radiation syndrome.

2.2. The chronic phase

Since 2012, the FMU has run a consultation to minimize anxieties about radiation-related health effects and resulting physical and mental problems in evacuees. The nurses have participated in this consultation.

Since the accident at the FDNPP, the radiation doses of exposed individuals have been estimated and directly measured[6, 8, 9]. The Fukushima Health Survey estimated the external radiation dose based on descriptions of self-reported behavior following the accident[8-10]. Its findings suggest that the external and internal doses from the FDNPP accident were relatively limited in the general population. Nevertheless, the residents of Fukushima Prefecture remain extremely anxious about radiation exposure. Even in cases where a resident's exposure was limited, they think that they have several health effects in a high ratio as results of radiation exposure in Fukushima[4]. A recent study conducted a study to identify the determinants that affect the decision to return home after the FDNPP accident, and found that expressing anxiety over radiation exposure, as well as being female and living in areas with relatively higher ambient doses, was independently associated with decisions not to return[11]. After such accidents, radiation health risk communication is mandatory across generations to avoid misunderstandings about radiation exposure and health effects. Based on experiences from a comparable incident in Chernobyl, Lochard suggested that an effective way to improve reconstruction is by the direct involvement of residents and local professionals in the management of the situation[12].

According to one study, nurses do not necessarily have the requisite knowledge about radiation-related health effects[13]. After the accident, nurses at local hospitals were not able to cope with the ensuring social panic due to a lack of knowledge about radiation-related health effects. At that time, All medical staff, including nurses, some of whom did not have knowledge about radiation-related health effects, had to care for residents. To deal with future emergencies, nurses who are trained to cope with radiation disasters are needed.

3. Education in radiation nursing

Nurses have had to deal with many radiation-related cases following the accident, from the initial aftermath to now. However, they had insufficient knowledge to perform their jobs properly due to a lack of training about radiation-related health effects in their education programs. The FDNPP accident showed that health care providers need to be able to communicate with patients and residents to provide correct information about radiation-related health effects. We propose that radiation training is needed for nurses in Japan and elsewhere in the world. In sum, we propose that based on the lessons learned from the FDNPP accident, we establish a practical education program on radiation nursing. The proposed program would include training in radiation risk communication, radiation-related health effects, and radiation protection, as well as clinical radiology.

In conclusion, in addition to having knowledge about radiation, radiation nurses require clinical management skills and practical skills that can be put to use at the disaster site. The establishment of the proposed personnel-training program is important for nurses to gain the aforementioned skills.

Disclosure

I declare that the authors have no conflicts of interest.

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