Factors affecting public health nurses’ satisfaction with the preparedness and response of disaster relief operations at nuclear emergencies

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To the editor:

After the accident at the Fukushima Daiichi Nuclear Power Station (FDNPS) following the Great East Japan Earthquake (GEJE) in March 2011, many medical workers visited affected areas to offer care to the local population as part of a disaster relief operation (DRO). Public health nurses (PHNs) also provided health management and psychological support for residents in affected areas. PHNs’ satisfaction and motivation with their DRO in affected areas is important for maintaining medical services, even during devastating and complicated circumstances. With this in mind, we conducted a questionnaire survey in 2016 of PHNs who participated in the DRO after the accident at FDNPS and identified factors related to the PHNs’ subjective satisfaction with their DRO. At the beginning of this study, we asked all 336 PHNs working in the Nagasaki prefecture to answer a questionnaire containing items including: demographic factors (sex, age, employment position, how long they have worked as a PHN); experience of disaster relief operations (DROs), including locations and training experience for natural disasters or nuclear disasters before the Great East Japan Earthquake (GEJE); and subjective satisfaction with their DRO. Among 336 study participants, 123 PHNs were dispatched to areas affected by the GEJE. The mean period each PHN was dispatched for was ~7 days per dispatch between March 2011 and March 2014.

Among the 123 study participants, 63 (51.2%) were subjectively satisfied and 60 (48.8%) were not subjectively satisfied with their DRO. Logistic regression analysis revealed that having training experience for dealing with nuclear disasters before the GEJE (OR = 3.38, P = 0.009) and having experience with a DRO before the GEJE (OR = 0.28, P = 0.017) were independently associated with a PHN’s subjective satisfaction with their DRO following the GEJE (Table 1). After huge natural disasters in Japan, such as the Great Hanshin-Awaji Earthquake in 1995 and the Niigata Chuetsu-Oki earthquake in 2007, but before the GEJE, 30 PHNs (24.4%) had experience with their DRO. During these experiences, the PHNs were engaged in improving environmental sanitation and preventing the spread of infection in the emergency phase and in the post-disaster and rehabilitation phase, supporting self-management for health and the restoration of livelihoods of local residents. In addition, lessons from these past disasters were used to create a daily preparation for disaster risk reduction. Disaster training has been implemented by local municipalities based on the disaster risk reduction manual formulated by the Japan Association of Public Health Nurse Directors. Nuclear emergency training, including basic knowledge of radiation and the health risks of radiation exposure, had been implemented by each local municipality according to the emergency radiation medical training instructed by the Ministry of Education, Culture, Sports, Science and Technology of Japan. Our results suggested that prior training and experience are important factors for PHNs’ satisfactory engagement in DRO.

Based on lessons learned after the accident at the FDNPS, several research institutes have reported on the need for more medical personnel with expertise in radiation risk and treatment [1]. The International Commission on Radiological Protection (ICRP) has recommended that authorities establish infrastructures for supporting the implementation of all protection strategies, including self-help strategies to be implemented by the affected population for the protection of people living in long-term contaminated areas after a nuclear accident or another radiation emergency [2]. The dissemination of a ‘practical radiological protection culture’ across all segments of the population, and especially among professionals in charge of public health and education, is also an important element.
of the strategy. From this perspective, PHNs are expected to implement a comprehensive risk communication strategy during a nuclear emergency response, because they usually carry out health management tasks in close cooperation with local residents. However, education about radiation protection science in the course of PHNs’ training has rarely been implemented in the past. It is vitally important for public health nurses to have the base knowledge about radiation protection and radiation health care, in terms of considering the ways in which experts can help with recovery from nuclear disasters and for improving daily practices for nuclear emergency preparedness and response.

This study was approved by the Ethics Committee of Nagasaki University Graduate School of Biomedical Sciences (No. 16092300).

| Variables                                      | Units                | OR  | 95% CI     | P-Values |
|------------------------------------------------|----------------------|-----|------------|----------|
| What is your position?                         | Chief≤/<Chief        | 1.62| 0.69–3.77  | 0.265    |
| Where do you work?                             | Prefectural/Municipal| 1.10| 0.47–2.59  | 0.829    |
| Did you ever participate in training for nuclear disaster before the Great East Japan Earthquake? | Yes/No               | 3.38| 1.35–8.45  | 0.009    |
| How many times have you carried out DRO, including at the Great East Japan Earthquake? | First/two or more time(s) | 0.28| 0.10–0.80  | 0.017    |

aOR = Odds Ratio, b95% CI; 95% confidence interval.

CONFLICT OF INTEREST

We declare that none of the authors have competing financial interests.

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