

## Original Article

# Meal services after the Great East Japan Earthquake at nursery schools in a tsunami-affected town: focus group observations

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**Background and Objectives:** This study aimed to collect information on experiences in the Great East Japan Earthquake (hereafter, 3.11), current preparedness, and barriers to building up stockpiles in nursery schools in affected areas. Based on the needs heard from the staff, we decided what contents should be included in our manual developed with the Japan Dietetic Association. **Methods and Study Design:** A group interview was held in September 2012. We interviewed a principal, nurses, and registered dietitians working for a public and a private nursery school in Town A. We also invited an administrative dietitian who was an employee of Town A. **Results:** One of the barriers to building up stockpiles was that they did not have any idea of what and how many items they should store. To deal with this situation, we developed a formula that could be used to calculate the quantity of stockpiles for their facilities in a newly developed feeding manual. In terms of current preparedness, the registered dietitians were not prepared for alternative menus in emergencies or how to manage garbage when the garbage collection was disrupted by disasters. The manual recommends to obtain the services of at least two food service personnel and spare space for storing filled garbage bags until garbage collection resumes. **Conclusion:** Some improvements in stocks were found in both of the public and private nursery schools. To improve the situation further, more financial support and detailed guidelines should be provided by the local government and authoritative organizations. Our manual should be a great asset for all nursery schools to improve their stockpiles.

**Key Words:** The Great East Japan Earthquake, tsunami-affected town, nursery school, feeding manual in disaster, The Japan Dietetic Association

## INTRODUCTION

The Great East Japan Earthquake (hereafter, 3.11) attacked Tohoku district of Japan on 3.11 in 2011. It was reported that 15,889 were killed, 2,601 were missing, and 6,152 were injured.<sup>1</sup> In the three afflicted prefectures (Iwate, Miyagi, and Fukushima), 78 out of 722 nursery schools were completely or partially destroyed.<sup>2</sup> Infants and small children are vulnerable particularly in disaster and have high priority in terms of provision of meals and nutritional assistance.<sup>3,4</sup> Therefore, nursery schools, day-care facilities for infants and small children, should have stockpiles of food specifically designed for them. Although a large-scale mail survey on disaster preparedness had already been conducted,<sup>5</sup> it provided little information on feeding. In order to obtain in-depth information that could not be collected by a questionnaire survey, we held a group interview focused on meal services in nursery schools.

According to our previous research, both private and public nursery schools needed a feeding manual in or

during a disaster.<sup>6-7</sup> The primary purpose of this study was to collect information on experiences in 3.11, current preparedness in nursery schools, and barriers to building up stockpiles. Based on the needs heard from the school personnel who experienced 3.11, we decided what contents should be included in our manual that was developed together with the Japan Dietetic Association.

## METHODS

In September 2012, we visited nursery schools in a tsu-

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nami-affected town (Town A in prefecture B) and interviewed nursery schools' staff to hear their stories at the time of 3.11. We focused on the following two points: The first was the change in stockpiles before and after 3.11, and the second was if they had a manual for meal services during disasters.

We held a group interview along an interview guide for two hours and 25 minutes. The second author was the interviewer. In order to collect comprehensive information about the whole town and the relation between nursery schools and the town government, a dietitian (a) who is a town employee was added as a participant in the group interview as well as staff from a public and a private nursery school in Town A. We recruited other participants from two nursery schools in Town A, one being a public school and the other one a private school. From the public nursery school (Nursery C), the ex-principal (registered dietitian) (b), the current principal (nurse) (c), and a registered dietitian (d) participated. From the private nursery school (Nursery D), a chief nurse (e) and a dietitian (f) participated.

Nursery schools in Town A accept children aged 6 months to 5 years. Only in public nursery schools, there is an admission requirement that children should have an address in Town A.

There are four public nursery schools in Town A, but only Nursery C with 120 children has a registered dietitian. Therefore, the registered dietitian (d) makes and distributes school meal menus for all public nursery schools. There are two private nursery schools in Town A, and both of them have a dietitian. Nursery D had 90 children.

The institutional review board of Ochanomizu University approved the study procedures (approval number 24-8). We sent the transcript of the interview to all participants beforehand and obtained the confirmation of the contents, and permission for publication. In addition, we told all participants that whenever they felt uncomfortable, they could decline our request without any disadvantage.

## RESULTS

### *The change in stockpiles before and after 3.11*

#### **Town A Office**

Town A office did not have information to what extent they were prepared for disaster in each nursery school in its jurisdiction. The city dietitian (a) thought that it was important for the town government to make a bulk purchase and to distribute stockpiles to all public nursery schools in Town A. She said that they had enough money to do so.

#### **Public Nursery School C**

At the time of 3.11, Nursery C had some stockpiled foods including two boxes of 24L of water, about 50 cans of canned bread, some juice and candies. Furthermore, in an emergency backpack, they had milk (including milk which is safe for children with allergies), feeding bottles, some baby foods, and diapers.

Due to the earthquake, water supply had stopped and they could not wash dishes and hands. Thanks to enough stocks of cling-wrap, they were able to use dishes covered with it. Since there were not many wet tissues, which are

useful for cleaning one's hands, they had trouble eating. For instance, they could not wipe their own hands and eating utensils before and after eating. In addition, the stocked quantity of disposable eating utensils was not sufficient. They could use flush lavatories by bringing water from the agricultural water which flowed right in front of Nursery C because it became filled with water influenced by the tsunami.

Since there was only one electric heater in Nursery C, they borrowed an oil stove from a close-by factory. Since there were no blankets for staff, they used children's futon usually used for naps.

After 3.11, they improved their stockpiles. The quantity of stocked water was increased to 48L, twice the original amount. Two storage places, one was inside and another was outside, were full. Although they did not make an inventory, they estimated that it would provide two meals per child. They had enough space for the construction of a new warehouse but they did not have any idea of what and how many items they should store in it. This made it difficult for them to determine the size of a new warehouse and budget for building up stockpiles.

#### **Private Nursery School D**

Before 3.11, Nursery D stocked 100 meals of pre-processed rice and 24 bottles of water of 1.5 L each. After 3.11, they separately stored their stockpiles in a lunch room, a warehouse in the backyard, and a new warehouse in the kindergarten yard. In addition, the quantity of stockpiles had been increased. Now they had much more pre-processed rice, 100 cans of canned bread, two boxes of 24 cans of dried bread. They kept date-expired bottled water to use as daily life water. Nursery D made the list of stocks, but the dietitian (f) was concerned they may forget replacing the canned bread every year since its shelf life is relatively short.

The Private Nursery D will not be provided stockpiles by the town government and therefore, they have to purchase these for themselves. They had not decided which budget they should use for purchasing stockpiles. Since it was difficult to increase the burden of guardians, they thought they could not collect money from guardians for that purpose.

### *Preparation of the manual for meal services during disasters*

#### **Town A Office**

At the time of 3.11, Town A did not have any manual for meal services during disasters. The town dietitian (a) said that because they entrusted judgments of each nursery school, there was no plan to provide such town level manuals in the future either.

#### **Public Nursery School C**

According to the registered dietitian (d), preparation of emergency menus was under consideration but she never thought about alternative menus in emergencies or how to manage garbage when the garbage collection was disrupted by disasters.

#### **Private Nursery School D**

From the experience of 3.11, they simulated the condi-

**Table 1.** How our findings were used in the feeding manual in disaster for nursery schools

Our findings <sup>†</sup> (category of information)	Description or contents in the manual issued by JDA	Chapter in the manual
Public Nursery School C did not have enough wet tissues to keep their hands clean. (experiences in 3.11)	→ Through simulation of feeding and using toilets without tap water for hand washing, you could know what kind of and how many sanitation items should be stocked.	Disaster drill
Public Nursery School C could use flush lavatories by bringing water from the agricultural water which flowed right in front of the school. (experiences in 3.11)	→ However, if drainpipe is broken, you cannot flush a toilet by bringing water. Stock emergency toilets and diapers for infants. Consider excretion along with consumption.	Disaster drill
Public Nursery School C did not have any idea of what and how many items they should store. This made it difficult for them to determine the size of a new warehouse and budget for building up stockpiles. (barriers to building up stockpiles)	→ Store food for five days since in 3.11, it took three and two days for procurement and transportation of food, respectively. The number of meals/day/person to be stored is one meal (lunch) and a snack. In addition to food for children, food for staff should be stored since they need to be healthy to protect the children. For the adult members, the same items as children are stored although the quantity should be doubled. Lunch should consist of one staple food (bread, rice, or porridge) and one side dish (canned/retort fish/meat or soup). Long shelf-life foods are listed with their standard portion size for children by three categories; staple food, side dish, and snack. From each category, food items are chosen to cover five meals and five snacks. The total amount of food (kg) to be stored can be calculated by each item as follows: Portion size (g) × use of the item (times) × (A + (B × 2)) / 1000, A: The number of children aged 1 and older, B: The number of staff (adults)	Stockpile of food
The dietitian in Private Nursery School D was concerned they might forget to replace the canned bread every year since its shelf life is relatively short. (barriers to building up stockpiles)	→ The manual shows an example of inventory in which the storage periods of each food item are graphically displayed by long arrows and that makes it easy to know when they should be replaced. The contents and their expiration dates should be labelled on the door of the storage and the top and four sides of the boxes.	Stockpile of food
The registered dietitian in Public Nursery School C never thought about alteration of menus in emergencies and how to manage garbage when the garbage collection is disrupted by disasters. (current preparedness)	→ Secure at least two food service personnel. According to the number of children, you may need more. You can find this number when disaster drills are performed. When electricity is disrupted, refrigerated or frozen foods should be used as soon as possible. Conventional plates or bowls covered with cling wrap is easier to handle for children than disposable ones and can reduce the volume of garbage. You need spare space for storing filled garbage bags until garbage collection resumes.	Staff assignment Meal services in emergency
From the experience that some food items were not available after 3.11, Private Nursery School D was going to plan at least two varieties of menus: a bread menu using canned bread and a rice menu with pre-processed rice. (experiences in 3.11)	→ Make a list of food retailers and their substitutes.	Food service in emergency

JDA: The Japan Dietetic Association; 3.11: The Great East Japan Earthquake.

<sup>†</sup>In order appeared in the text.

tions such as interruptions of gas, electricity, and water supplies. From the experience that some food items were not available after 3.11, they were going to plan at least two varieties of menus: a bread menu using canned bread and a rice menu with pre-processed rice. They would like the town to prepare some guidelines for items they should store and their recommended amounts.

## DISCUSSION

### *Barriers to building stockpiles*

Before 3.11, 69% of all feeding facilities in the three afflicted prefectures had food stockpiles.<sup>8</sup> Although Nurseries C and D had some stockpiles of food at that time, it was difficult to build stockpiles further if they did not

know what and how many items they should store. Nursery C did not make the list of stockpiles. If they do not have a list or do not ascertain the present storage condition, they cannot request from the government to provide insufficient things or construct a budget.

Another barrier to building stockpiles was the difficulty in stock management. Nursery D worried about forgetting to replace the stockpiles before the expiration date. Suzuki et al. reported that 43% of victims of the Niigata Chuetsu Earthquake answered that they had no intention to have any stockpiled foods because it was troublesome to check the expiration dates.<sup>9</sup> The foods with a long shelf life are favored to reduce labor and money for replacement. The longer the storage period they have, the lesser

expenditure per single year.<sup>10</sup> However, stockpiles which have long shelf life such as dried bread are not always a good option. Children are not familiar with these kinds of foods, and they probably do not want to eat them even in emergencies. Furthermore, it is difficult to eat dried food with limited water. This means, it is important to change the idea that only dried, not-tasty, and long-lasting foods should be stockpiled for use in disasters. In the facilities with meal services, like hospitals and nursery schools, it is easy to practice “rolling stock”; purchasing usually consumed foods a little more for reserve on a regular basis and consuming them in daily meal services.

In addition, more financial support is required to improve disaster countermeasures for the future. In 2011, the Tokyo Metropolitan Government assisted nursery schools by subsidizing 500 Japanese yen (USD 4.19) per child to reinforce nursery schools’ disaster countermeasures.<sup>11</sup> In our previous study, a designated city in the metropolitan area provided every private nursery school 150,000 Japanese yen (USD 1258.35) a year to build up preparedness for natural disasters.<sup>7</sup> Financial support from local governments is essential for stockpiles in the event of natural disasters.

#### *Development of a feeding manual in disaster*

The study area was located in the middle of the tsunami-affected area. In these areas, nursery schools could not resume their service for at least one month after 3.11. We could not conduct dietary survey or anthropometric measurement for children since these nursery schools were closed. Therefore, we could not get information on what impact of meal services or stockpiles in nursery school on children’s nutritional status after the earthquake. Generally, however, meal services during disaster play an important role to supply micronutrients which are often deficient in instant foods.<sup>12</sup> At the time of 3.11, since it was so cold in the disaster area, something hot to eat was good not only for nutritional support but also as a psychological relief.<sup>13</sup> After disasters occur, early recoveries of meal services help to maintain and improve the nutritional status. In fact, at the time of 3.11, the ability to cook and gas availability significantly improved the evacuees’ dietary provision as they were better enabled to serve balanced meals in the emergency shelters.<sup>4</sup> However, it is difficult to resume service without gas, electricity, and running water. If we have guidelines or manuals for disasters, anyone could understand what they should do in appropriate ways. Kogure et al indicated that having an emergency manual for food services was associated with a higher proportion of early food service resumption.<sup>14</sup> This means that the emergency manuals are effective for the early resumption of food service. The manuals should include the following contents: human resource planning of nursery school cooks, alternative food suppliers in emergencies, and how to manage garbage when the garbage collection is disrupted by disasters.

The registered dietitian (d) and dietitian (f) had been working hard to create lunch menu plans in emergencies. When developed, it should be available on the Internet so that everyone can use it. According to a nation-wide questionnaire survey among dietitians in prefectural

health centers, 66.2% of them wanted mass feeding menus to be available on the Internet.<sup>15</sup>

#### **Conclusions**

Some improvements in stocks were found in both of the public and private nursery schools. To improve conditions further, more financial support and a detailed guideline for stockpiles should be provided by the local government and authoritative organizations. Partly based on this study, the Japan Dietetic Association issued a 27-page feeding manual for use in disasters.<sup>16</sup> Table 1 shows how our findings were reflected in the manual. This is the first manual issued by the specialized authoritative nationwide organization. It has been published in its monthly journal and website and disseminated through workshops, and lectures held all over the country. Nursery schools can refer to this in order to create their own manual.

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#### **AUTHOR DISCLOSURES**

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