Experiences of Public Health Nurses after the Great East Japan Earthquake Lead to Post-Traumatic Growth

Saori IGUCHI¹, Misako MIYAZAKI² and Mina ISHIMARU²

¹Tokyo University of Technology, School of Health Science, Department of Nursing, Tokyo, Japan
²Chiba University, Graduate School of Nursing, Chiba, Japan

Abstract

Aim: Post-traumatic growth suggests that experiencing difficult situations can lead to growth if meaning is given to the experience. Public health nurses who experienced the Great East Japan Earthquake of 2011 through their health activities reflected on that event, and our study investigated how they negotiated feelings of conflict and suffering and made sense or meaning of their work during this disaster.

Methods: Narrative interviews with seven public health nurses who experienced the earthquake and who provided health activities for more than 1 year afterwards were conducted. Post-traumatic growth was defined as giving meaning to their experiences and finding new ways of thinking. Data for each case were categorized by similarities, and themes were named for each case; data from all cases were then integrated.

Results: Three broad concepts emerged with 13 sub-themes: ‘self-understanding’ (three sub-themes; e.g., ‘positive self-perception’ and ‘acceptance of emotions such as pain and loss’), ‘ways of thinking about relationships with others’ (six sub-themes; e.g., ‘feeling of solidarity with colleagues’ and ‘trust in related organizations’), and ‘beliefs and values about public health nurses as an occupation’ (four sub-themes; e.g., ‘having a long-term responsibility to the community’ and ‘need for a sense of mission and resolution to protect residents’ lives and health’).

Conclusions: Public health nurses’ giving meaning through reflection enabled them to understand their actions and responses to circumstances beyond their control during their service after the earthquake. In post-disaster health care, reflecting on how nurses responded in disaster situations may be valuable to both personal and professional growth.

Key words: giving meaning, post-traumatic growth, public health nurses, the Great East Japan Earthquake, reflection

INTRODUCTION

Psychological trauma is generally understood to have long-term detrimental effects on health; for example, post-traumatic stress disorder (American Psychiatric Association, 2000). Conversely, post-traumatic growth (PTG) suggests that personal growth can occur as a result of a trauma, if one gives meaning to the traumatic experience (Tedeschi & Calhoun, 2004). Ando (2011) summarized PTG and other positive changes after trauma into three broad categories: ‘changing thoughts about oneself’, ‘changing thoughts about one’s relationships with others’, and ‘changing one’s philosophy towards life, values, and spirituality’ (Ando, 2011, p. 134). PTG and personal growth have been observed in natural disaster survivors, in Japan and elsewhere (Kitamura, Tachibana, Shindo, & Someya, 2012; Zhou, & Wu, 2016). Particularly, there are quantitative reports of PTG among disaster rescuers, including rescue workers (Britt, Alder, & Bartone, 2001) and police officers (McCanlies, Mnatsakanova, Andrew, Burchfiel, & Violanti, 2014). Our study sought to understand how public health nurses...
dealt with the psychological trauma of working in the aftermath of a major earthquake in 2011.

The Great East Japan Earthquake was a large-scale earthquake disaster, occurring on March 11, 2011. This 9.0-magnitude earthquake, the largest ever recorded in Japan, took place off the Pacific coast of Tohoku, and generated a tsunami, numerous aftershocks, and a partial meltdown at the Fukushima nuclear power plant. The focal region was enormous (500 km north to south, and 200 km east to west) and Pacific coastal areas across multiple prefectures and municipalities were devastated by the earthquake and resulting tsunami, which had a maximum run-up height of 40.1 m (Japan Meteorological Agency, 2011). Overall, 18,440 people were deemed dead or missing and 6,152 were injured. Furthermore, 400,381 houses were completely or partly destroyed. At the peak of the disaster, over 400,000 people took refuge in shelters or temporary housing (National Police Agency, 2017). Even in 2016, approximately 148,000 people remain in long-term evacuation centers (Reconstruction Agency, 2016).

In Japan, laws and regional disaster plans dictate what government employees have to do when a disaster occurs. These employees must organize rescue efforts, prevent fires, floods, and minimize disaster-related harm. They must immediately create shelters, ensure the safety and livability of those shelters; distribute food, clothing, pharmaceuticals, and other life-sustaining goods; provide healthcare services; and take the necessary measures to establish a suitable living environment for victims in the shelters. They must carry out disaster recovery efforts (The Basic Act on Disaster Control Measures 1961, No 223, revised 1997 (Japan)). Many public health nurses (PHNs) are employed by municipalities in Japan. They must provide assistance to residents in the affected area, even if the PHNs are affected residents themselves (Miyazaki, 2008).

Japan’s Association of Public Health Nurse Directors (2013) has established what PHNs must do following a disaster (Table 1). The disaster response is categorized by six phases (0–5).

When the Great East Japan Earthquake occurred in 2011, some municipalities could not support affected residents because the disaster had damaged their bases of operations (public office buildings), affected staff, and disrupted administrative functions. These problems prevented PHNs from implementing their required healthcare activities (Miyazaki, 2013). Public officials had great difficulties when implementing their duties as required by law (Miyagi Prefecture General Affairs Department Crisis Control Division, 2014). PHNs particularly encountered problems (Sasaki, 2011).

Kayama et al. (2014) explored PHNs’ experiences of the Great East Japan Earthquake and identified two

<table>
<thead>
<tr>
<th>Phase</th>
<th>Examples of activities</th>
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<tbody>
<tr>
<td>Phase 0~1 &lt;3 days</td>
<td>- Gather information about the disaster situation and determine activity policy. - Secure the victims’ safety and provide first-aid treatment in cooperation with local medical institutions. - Check the safety of those people requiring medical care and support. - Coordinate neighborhood medical and healthcare staffs. - Arrange regular business operations.</td>
</tr>
<tr>
<td>Phase 2~3 When support is concentrated within shelters</td>
<td>- Gather information about the disaster situation. - Formulate, implement, and evaluate health activity plans concentrated within shelters. - Arrange regular business operations. - Coordinate external supporters (doctors, nurses, other PHNs, volunteers) and health support for them. - Establish work shift of local staffs.</td>
</tr>
<tr>
<td>Phase 4~5 When support is concentrated within temporary housing or a community in need of reconstruction</td>
<td>- Gather information. - Formulate, implement, and evaluate medium- and long-term health activity plans for independence support. - Resume regular business operations. - Coordinate external supporters (doctors, nurses, other PHNs, volunteers). - Reconstruct support systems in the community.</td>
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</table>

Table 1 Activities of public health nurses (PHNs) following a disaster (Japan Association of Public Health Nurse Directors, 2013; pp. 47–49)
themes: ‘experiences of difficulties and dilemmas’ and ‘professional challenges and the meaning of excellence as a public health nurse’ (Kayama et al., 2014, p. 520). In several reports on the healthcare activities of PHNs who experienced the earthquake, PHNs reported that despite being victims of the earthquake themselves, they fulfilled their obligations as public officials by providing support to residents (Okaji et al., 2011; Ouchi, 2014; Suzuki, 2013; Takahashi, 2012). How these PHNs reflected on this experience has not been explored in detail. Our study sought to investigate how PHNs negotiated feelings of conflict and suffering, as they participated in healthcare activities. We wanted to understand how they made sense or meaning of their work as nurses in this disaster.

METHODS
This was a descriptive qualitative study using in-depth interviews.

Participants
The inclusion criteria were as follows: (1) PHNs who were employed by municipalities located in the Tohoku coastal areas affected by the Great East Japan Earthquake, and where the municipalities’ organizational chain of command and human resources had been damaged; (2) PHNs whose own families or relatives had been harmed or whose houses had been damaged; (3) PHNs who undertook work-related health activities for over 1 year immediately after the earthquake occurred; and (4) PHNs who were able to reflect on their progress after the event and capable of telling their story without difficulty.

Seven PHNs participated. All seven experienced the earthquake and provided healthcare services for approximately 1 year post-disaster. We used purposive sampling to recruit participants. First, we collected 22 published reports that described PHNs’ healthcare activities after the Great East Japan Earthquake. From them, we contacted six authors who were PHNs. Of the six authors, three consented to participate in this study. Additionally, we obtained one featured PHN’s consent. Thus, we obtained consent from four PHNs through the first recruitment. We then asked the four participants to introduce us to other PHNs for participation in order to expand the age range of participants (e.g., 20s to 50s). Through snowball sampling, we received three additional PHNs’ consent. As a result, a total of seven PHNs participated in this study.

Data collection
Narrative interviews (Holloway & Wheeler, 1996) focusing on PHNs’ PTG were conducted to explore their subjective experiences and feelings during delivery of their health activities after the earthquake. Two interviews per PHN were carried out by the same interviewer in each case, in order to develop the narrative in as much detail as possible during the 1-month study. The interviews were recorded on a voice recorder (SONY, China), and field notes were taken by the researchers with participants’ consent. The interview period was from April to September 2014.

Data analysis
We defined PTG with reference to Tedeschi and Calhoun (2004) and Ando (2011); namely, the act of finding positive aspects in an experience or new ways of thinking by giving meaning to that experience. We captured PTG in terms of three broad concepts: ‘self-understanding’, ‘ways of thinking about the relationships with others’, and ‘beliefs and values about PHN as an occupation’.

We defined experiences as events triggering PTG during healthcare activities delivered post-disaster, and the PHNs’ subjective feelings and thoughts regarding the event. We did not limit experiences to those that were critical and difficult (i.e., negative experiences), but included those in which PHNs felt appreciated by residents or believed their healthcare activities to have had some positive effect.

We regarded PHNs giving meaning to their experience as PTG data. We performed a narrative analysis (Holloway & Wheeler, 1996) and transformed the narratives into codes to represent their content; this included: (1) who was involved; (2) the current disaster phase (Table 2); (3) time-point of PHNs’ giving meaning (Table 2); (4) type(s) of situations; (5) type(s) of difficulty experienced; and (6) how to think about and take action regarding the difficulty.

Then, we categorized these data according to the three aforementioned concepts of PTG. From these, we identified emerging themes for each case. Finally, we illustrated the relationships between the themes and described the PTG process in each case.

Data integration from the seven cases resulted in the emergence of themes. The PTG of PHNs was represented structurally based on the associations between the themes of each case.

Ethical considerations
This study was approved by the Ethical Review Committee of the Graduate School of Nursing, Chiba University (No. 25-106). Voluntary participation, informed consent, the right to withdraw without conse-
sequence, and anonymity were preserved. In the extracts of interviews, we used pseudonyms for our participants. We acknowledged that the interviews had the possibility of placing a mental burden on PHNs when they recalled emotions related to the disaster and its aftermath, and as such, we observed participants’ facial expressions and behavior and considered interruption and resumption when necessary. Further, counseling services were available if anyone became too upset.

RESULTS

Participants
Participants (males: 1; females: 6) were from five cities and towns in the region. Their average age was 42.1±10.6 years. Their average years of experience as a PHN was 19. The PHNs had varied roles: four worked directly with communities and three were health administrators. All participants were requested to be interviewed twice by the same interviewer to obtain detailed information; however, only two participants could be interviewed twice because the other participants were not available. The average interview time was 162 min (range = 105–240 min; Table 3).

Sub-themes of PTG
Through analysis, we identified 13 sub-themes under the three main concepts of ‘self-understanding,’ ‘ways of thinking about relationships with others,’ ‘beliefs and values about PHN as an occupation’ (Table 4).

Concept 1: Self-understanding
PHNs came to understand themselves as practising nursing in a positive way. Three sub-themes emerged under the concept of self-understanding, though hereon in, we describe two representative sub-themes.

Positive self-perception
Tomoko used her own judgement independently without direction. She said:
Now, reflecting on when I had patrolled the shelter right after the earthquake occurred, I was looking for people requiring assistance, like the person who had a mental disorder who was under my charge in the pre-disaster period, and the elderly there, even though I had no instruction from my superior.

Table 2  Disaster phase and time-point of public health nurses’ (PHNs’) meaning-giving

<table>
<thead>
<tr>
<th>Disaster phase</th>
<th>Acute phase</th>
<th>Sub-acute phase</th>
<th>Chronic phase</th>
<th>At that time</th>
<th>Gradually</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-point of PHNs’ meaning-giving</td>
<td>~3 days post-disaster</td>
<td>~7 months post-disaster, when support was concentrated within the shelters</td>
<td>When support became concentrated within temporary housing</td>
<td>When the event was occurring</td>
<td>When the PHNs reflected on their experience during the days and months after the event</td>
<td>During the interview</td>
</tr>
</tbody>
</table>

Table 3  Participant details

<table>
<thead>
<tr>
<th>Participant names</th>
<th>Age (years)</th>
<th>Gender</th>
<th>Years of PHN experience</th>
<th>Municipalities</th>
<th>Position in health activities</th>
<th>Individual damage state</th>
<th>Government building damage status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ken</td>
<td>20s</td>
<td>Male</td>
<td>1</td>
<td>A town</td>
<td>Staff member</td>
<td>House completely destroyed</td>
<td>Could not use government building due to fire</td>
</tr>
<tr>
<td>Megumi</td>
<td>30s</td>
<td>Female</td>
<td>12</td>
<td>B town</td>
<td>Staff member</td>
<td>Could not return home for 12 days</td>
<td>N/A</td>
</tr>
<tr>
<td>Tomoko</td>
<td>30s</td>
<td>Female</td>
<td>16</td>
<td>C city</td>
<td>Manager</td>
<td>Could not return home for 20 days</td>
<td>Could not use government building due to problems of earthquake-resistance</td>
</tr>
<tr>
<td>Emi</td>
<td>40s</td>
<td>Female</td>
<td>20</td>
<td>C city</td>
<td>Staff member</td>
<td>Closed in under water for 4 days</td>
<td>N/A</td>
</tr>
<tr>
<td>Akemi</td>
<td>50s</td>
<td>Female</td>
<td>26</td>
<td>C city</td>
<td>Staff member</td>
<td>House partly destroyed</td>
<td>N/A</td>
</tr>
<tr>
<td>Yoko</td>
<td>50s</td>
<td>Female</td>
<td>29</td>
<td>D town</td>
<td>Manager</td>
<td>House completely destroyed</td>
<td>Government building completely destroyed</td>
</tr>
<tr>
<td>Keiko</td>
<td>50s</td>
<td>Female</td>
<td></td>
<td>E city</td>
<td>Manager</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

PHN, public health nurse.

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Acceptance of emotions such as pain and loss

In the “sub-acute phase,” Yoko, despite being an affected resident, continued caring for unwell residents. With time, she was able to reflect on this experience, expressing thankfulness for her situation compared with others. She explained:

My family was safe, but a lot of colleagues and local residents lost their family members and relatives. So, I thought that I should not feel pain. Because my house was destroyed but I didn’t lose my family … I also had a sense of loss because of the loss of the residents who had worked with in the community health care activities before the earthquake … I had memorized almost all of the residents’ faces and home locations. But, the town had been destroyed and people died. I could not say anything about the fact that I had lost what I had accumulated.

Concept 2: Ways of thinking about relationships with others

One of the most important elements in the PHNs’ activity was how they were able to work with others; for example, people who were their peers, whom they knew before the disaster, were their patients, were victims of the disaster, and were other health professionals. This concept consists of six sub-themes, though hereon in, we only expand on four representative sub-themes.

Feeling of solidarity with colleagues

In the “sub-acute phase,” Tomoko directed other PHNs like a manager and established the healthcare activities policy despite being one of the staff members. She experienced difficulties in relationships with PHN colleagues, and reflected on and gave meaning “gradually.” She stated:

I felt some differences between PHNs colleagues at that time … about the aims and thoughts for business. I had felt pain because I was feeling like, only I work hard! But, when I read a report colleagues had written, I noticed that they had also been working hard and did their best … We survived and are working hard still now. I thought we should act as a team more.

Trust in related organizations

In the “acute phase,” Megumi began to provide aid and support activities for affected residents with the relevant organizations. She reflected on and gave meaning in the “present”:

Immediately after the earthquake occurred, we gave clothes that were given from the nearby social welfare

### Table 4 Sub-themes of post-traumatic growth in public health nurses (PHNs) after the Great East Japan Earthquake

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Sub-themes</th>
<th>Participants who provided sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Positive self-perception</td>
<td>Ken, Megumi, Tomoko, Emi, Akemi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>2 Acceptance of emotions such as pain and loss</td>
<td>Ken, Megumi, Tomoko, Emi, Akemi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>3 Considering the balance of work and family life</td>
<td>Tomoko, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>Ways of thinking about relationships with others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Feeling of solidarity with colleagues</td>
<td>Ken, Megumi, Tomoko, Emi, Akemi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>5 Trust in related organizations</td>
<td>Megumi, Tomoko, Yoko</td>
<td></td>
</tr>
<tr>
<td>6 Temporary reliance on outside supporters</td>
<td>Ken, Megumi, Tomoko, Emi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>7 Feeling of friendship with citizens</td>
<td>Ken, Megumi, Tomoko, Emi, Akemi, Yoko</td>
<td></td>
</tr>
<tr>
<td>8 Strongly united with family members</td>
<td>Megumi, Tomoko</td>
<td></td>
</tr>
<tr>
<td>9 Reliance on outside audience who listened to their experiences</td>
<td>Megumi, Tomoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>Beliefs and values about PHN as an occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Sharing health problems and health activity aims of the community with colleagues during the pre-disaster time</td>
<td>Tomoko, Akemi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>11 Believing in the abilities of citizens and working together with related organizations</td>
<td>Ken, Megumi, Tomoko, Emi, Akemi, Yoko</td>
<td></td>
</tr>
<tr>
<td>12 Having a long-term responsibility to the community</td>
<td>Ken, Megumi, Tomoko, Emi, Yoko, Keiko</td>
<td></td>
</tr>
<tr>
<td>13 Need for a sense of mission and resolution to protect residents’ lives and health</td>
<td>Megumi, Tomoko, Emi, Yoko, Keiko</td>
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</tbody>
</table>
council to residents who were soaked by the tsunami. We also bought futons that were used for naps by the children from a nearby nursery and spread them in a shelter. We made handwritten prescriptions and prescribed medications with cooperation from the local doctors and pharmacy. We often made contact with nurses at the local hospital and cooperated with them when there were difficulties. We were able to have conversations face to face with staff of local organizations who had no involvement before the earthquake. It became easy to provide healthcare activities in the community.

Temporary reliance on outside supporters
In the “sub-acute phase,” Tomoko took care of unwell residents and tried to maintain a hygienic environment with cooperation from external supporters in the shelters. She reflected on and gave meaning “at that time.” She said:

I felt relieved and stable when an external team of doctors with extensive experience of disaster support in overseas locations had arrived. Their long-term support was very reliable. They usually go into various countries and support local residents making some system that the local residents can use easily even after they are gone.

Feeling of friendship with citizens
In the “sub-acute phase,” Megumi sought out individuals needing medical care or support in the shelters. She saw that the affected residents had assisted one another and tried to maintain a hygienic environment with their cooperation. She reflected on and gave meaning “gradually”:

When I asked how residents had spent their time immediately after the earthquake, I heard that one of the residents drew water from the river and provided a bath to neighbors. That was amazing. I thought the ability the residents had was great. In the small shelter, residents had acted independently. Everyone had used shelters to keep clean ... they decided on a leader and helped residents who needed assistance. There are many residents who can think and act independently. I came to believe in the residents and trust them. Initially ... I didn’t look at the residents in that way.

Concept 3: Beliefs and values about PHN as an occupation
For our interviewees, in working during the aftermath of the earthquake, the PHNs drew on their practice experience in different ways. Four main themes emerged in this concept, though hereon in we explain three representative main themes.

Believing in the abilities of citizens and working together with related organizations
In the “chronic phase,” Yoko engaged in new work with the relevant organizations and residents to respond to the new needs of local residents after the earthquake. She reflected on this experience in the study interview. She said:

We had lost a lot of human resources, such as the welfare department ... I believe that there is no choice but to change the capability of residents into resources through the involvement of the government. For example, we think that we want multi-generation residents to move to disaster public housing. In public housing, we want to make an arrangement so that the elderly and children can interact. The elderly should be placed on the first floor so as not to be isolated. From the window, they can see the grounds and children. I think that will help their preventive care. Recently, when I bring such ideas to housing sector staff, they also think about this together. We have been able to make this kind of relationship through the healthcare activities. I want to reconstruct the community with the staff of other departments and residents.

Having a long-term responsibility to the community
In the ‘chronic phase,’ Megumi continued caring for unwell individuals and residents of temporary housing with assistance from local supporters. Her giving meaning came in the “present”:

Now, I am thinking that I want to do activities rooted in more regional areas. It is because I noticed a lot of important things from relationships with individuals in the health activities after the disaster. Recently, it has become highly specialized in each field of community health. But, I think the work of the original PHN is talking with each resident and picking up their health needs from the relationship. Otherwise, it might become so that a PHN could not act without a manual, basic knowledge, and rules, like what I used to be. I want to be a PHN who can act independently, even in a different place, like the PHNs I met in health care activities after the earthquake.

Need for a sense of mission and resolution to protect residents’ lives and health
In the “acute phase,” Tomoko traveled to a shelter located in an isolated area using a Self-Defense Forces helicopter, and undertook a health survey of the affected residents.
She reflected on this experience “at that time”. She said:

I didn’t forget things when I headed to a shelter in an isolated area using the Self-Defense Forces helicopter. Though I worried, the affected residents were self-supporting. For example, they carried the goods by the bucket brigade on their own and made a list of people requiring assistance. But, I saw they were relieved by PHNs coming … At that time, I made up my mind to go around to all shelters. I thought there is not much I can do, but I can go anyway and do or notice something for residents … I wanted to deliver the message that the city was not abandoned.

DISCUSSION

Structure of PTG among PHNs who experienced the Great East Japan Earthquake

We structured the three broad concepts and 13 sub-themes as shown in Figure 1, wherein contents that emerged are shown in [italics].

**Concept 1: Self-understanding**

PHNs reflected on their experience through opportunities such as speaking with external supporters and internal staff, thinking by themselves during private time, reporting on their healthcare activities at symposiums, drafting summary reports about their healthcare activities, and being interviewed by external researchers.

Through this reflection, PHNs gave meaning to their experiences; for example, they could accept themselves for who they are. Such meaning-giving, in turn, helped them accept themselves and their responses to the disaster in the immediate aftermath and over time. This self-understanding could be considered as the [principal axis of PTG].

**Concept 2: Ways of thinking about relationships with others**

PHNs were able to recognize a diverse and deep relationship between others, whether they be existing patients, peers, community members, or other health
professionals. The relationships were: [strongly united] with their own families, [solidarity] with internal staff, [trust] with local related organizations, [friendship] with the local residents, and [reliance] on external supporters and external researchers. PHNs reflected on and gave meaning to experiences on topics such as how they could understand and trust others. Indeed, it was through this meaning-giving that they experienced growth, enabling them to trust others. We considered the ways of PHNs’ thought about relationships with others are influencing self-understanding as the [principal axis of PTG].

Concept 3: Beliefs and values about PHN as an occupation

PHNs reflected on and gave meaning to experiences such as engagement in healthcare activities to protect residents’ lives and health, as well as fulfilling their responsibility to the community. Through this meaning-giving, our study participants re-recognized their mission and responsibilities as professional nurses. We conclude that PHNs beliefs and values about their occupation can strengthen the relationship between the other two concepts, and helped direct participants’ [actions and behavior as a professional].

Factors influencing how PHNs make meaning from their experiences

Personal factors

Within our diagrammatic conceptualization, there are factors likely to influence how PHNs make meaning from their experiences in disaster care. For our study participants, these were: years of experience as a PHN, job-related position, personal role, personality, personal harm as a result of the disaster, situations reflecting on their experiences, and period of meaning-giving.

Schön (1984) reports that a distinctive feature of middle-aged and skilled practitioners is that they make meaning while taking action, as they practice their skills and put their knowledge to work. In our study, young PHNs (aged in their 20s) said they often did not think about anything during the situation itself; instead, they gave meaning to their experiences by reflection on their experiences afterward.

Ken, Megumi, and Tomoko, who were young or middle-aged (aged in their 20s to 30s), realized a change in their skills related to assisting others, through providing such assistance during the post-disaster period. In contrast, Tomoko, Yoko, and Keiko, who were managers/administrators, reflected on their experiences from that perspective and recognized the importance of preparedness for the future. Saeki, Izumi, Uza, & Takasaki (2004) observed that the interpersonal assistance ability of PHNs working in government institutions increased significantly, via their practice of such abilities when they were younger. Furthermore, their management ability tended to increase with experience. We believe that even in disasters, PHNs giving meaning to the experience of recognizing their growth in accordance with their amount of experience is important.

Robertson et al. (2016) pointed out that resilience is associated with individuals’ personality traits. In our study, PHNs’ individual degree of resilience — namely, their ability to positively adapt to adversity — may have influenced any PTG they experienced. Variations in such traits can be seen in the way that PHNs expressed their own personalities throughout the interviews. For instance, Ken was ‘optimistic,’ Megumi worked ‘at her own pace,’ and Keiko ‘did not hesitate.’

Other factors

There are many additional factors likely to affect how PHNs subsequently make meaning from their roles in post-disaster care. These include the presence of others who can talk during health activities, relationships with others pre-disaster, the structural damage dealt to the community and workplace by the disaster, the system of health activities in place pre-disaster, and opportunities for reflection.

Among our study participants, Ken and Megumi tended to reflect on their experiences during conversations with trusted external supporters. They also used the interviews conducted for this study. Emi, by contrast, tended to reflect during regular daily meetings with colleagues. Tomoko, Yoko, and Keiko (all of whom were managers) had numerous opportunities to discuss or report their experiences at professional symposiums. They reflected via conversations with colleagues, and staff with whom they had a good relationship before the disaster, or trusted external supporters. Overall, it seemed that skilled and manager-class PHNs had more opportunities to reflect and give meaning to their experiences than did younger PHNs who were working in the community.

All seven PHNs reflected on, and gave meaning to, their experiences at the time of the interviews for this study. Bulman and Schutz (2013) argue that through reflection, nurses can learn from the experience, evaluate themselves critically, change their practice, and obtain professional motivation to achieve more. Reflection after an action helps to mentally organize the lessons learned from that action and increases one’s awareness.
2011). We believe that providing opportunities for reflection at some point during the delivery of health activities post-disaster is valuable for PHNs. Megumi’s and Yoko’s bases of operations were government buildings, severely damaged by the earthquake. This prevented PHNs from engaging in healthcare activities (Miyazaki, 2013). Other factors have been reported to influence the PTG of disaster rescuers more so than their personal characteristics (Paton, 2006), and can interfere with health promotion activities, which can also influence their PTG.

As Miyazaki (2013) has reported, several elements contribute to the effective provision of public health activities by the municipal PHNs after disasters. These include a foundation of trust between PHNs, local residents, and locally related organizations, as well as familiarity with land, local resources, culture, and customs. Thus, constructing relationships with local residents and locally related organizations in the pre-disaster period is important. As our interviewees explained, good relationships with others were critical when it came to PHNs interpreting making meaning from their disaster experiences.

Pre-earthquake, PHNs were distributed across municipalities. After the earthquake, these municipalities began providing health activities via a placement system of collective arrangement. Here, PHNs realized that pre-disaster relationships with their colleagues and knowing each other’s expertise influenced their health activities post-disaster. Keiko, for example, whose municipality had used a district representative system since before the disaster, reported how easy it was for PHNs to provide health activities because they knew the community they were serving.

Equally important is giving meaning to experiences such as relying on local residents and related local organizations with a sense of solidarity.

Limitations
This study had several limitations. While the interviews produced rich data, the number of interviewees at seven means that these individuals are not representative of a larger population of PHNs. Also, the participants were only those who felt able to reflect on their experiences. Some PHNs declined to participate in this study because reflecting on and talking about their experience was painful for them. These seven participants may be more resilient psychologically or may have a genetic background that protects them from trauma.

Despite these limitations, we believe that our study is the first to provide analysis on PHNs’ meaning-giving and possible personal growth following disaster experiences in Japan.

CONCLUSIONS

For our participants, expressions of possible PTG emerged under the concepts of self-understanding, relationships with others, and beliefs and values about PHN as an occupation. Within these concepts, ideas about self-acceptance, trust and understanding others deeply, and carrying out healthcare activities to help protect residents’ health and lives were pivotal to how PHNs made meaning from their experiences of providing care in the aftermath of the Great East Japan Earthquake of 2011. We interpret these various meanings as personal growth, growth in relationships with others, and professional growth.

We conceptualized personal growth as the principal axis of PTG in this study, and as being influenced by the growth in relationships with others. Furthermore, professional growth was strengthened by the other two types of growth (i.e., personal growth and growth in relationships with others), and helped direct participants’ actions and behaviors as professionals. For our participants, the exercise of reflecting on their practice through meaning-making was valuable and helped them to understand their actions and responses to circumstances beyond their control. We believe that in post-disaster healthcare opportunities, reflection on practice may be invaluable not just to PHNs but to other healthcare providers as well.

After the earthquake, through an iterative process of reflecting and giving meaning to their experience, our study participants sometimes changed their way of thinking and reconstructed their view of the world. This process enabled PHNs to be individuals influenced by the disaster and continue to function as professionals providing care to victims. As part of post-disaster healthcare activities, giving PHNs opportunities to engage in this meaning-giving may be important for leading PHNs’ growth and helping them to adjust to these new practice circumstances.

ACKNOWLEDGMENTS

The authors wish to thank the participants. This study was supported by a Sasakawa Scientific Research Grant from The Japan Science Society Grant Number 26-606.

AUTHOR CONTRIBUTIONS

S. I. was responsible for the study conception and
design, data collection, analysis, and drafting of the manuscript; M. M. and M. I. critically reviewed the manuscript and supervised the overall study process.

**DISCLOSURE**

No conflicts of interest have been declared by the authors.

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