ORIGINAL ARTICLE

Disaster preparedness among foreign residents in a rural area of Japan: A qualitative pilot study

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Abstract

Aim: Japan is a particularly disaster-prone country, with natural disasters posing a constant threat to the health and safety of the country's residents. Foreign residents in Japan have been identified as a group considered more vulnerable to disasters occurring in the country. The purpose of this paper is to describe findings from a pilot study exploring knowledge and perspectives related to disaster preparedness among foreign residents in Japan. It also highlights ways that public health nurses can contribute to enhanced disaster preparedness among members of this group.

Methods: A qualitative pilot study using key informant interviews and small group discussions was conducted. Participants were foreign residents living in two small cities in central Japan. A semi-structured interview guide was used, which focused discussion on knowledge, attitudes, and practices related to participants' household disaster preparedness. Interview data were analyzed using thematic analysis.

Results: Fifteen participants (N=15) were interviewed. Four major themes emerged: attitudes regarding disaster preparedness and risk; sense of community; perceived ability to prepare for disasters; and disaster preparedness behaviors. Participants provided suggestions on how to engage with foreign residents living in Japan regarding improving disaster preparedness among this population.

Conclusions: Findings suggest that communal linkages and language barriers were important factors influencing disaster preparedness among foreign residents in Japan. Information gained from this pilot study can serve as a basis for larger follow-up research studies, as well as provide insight on how to adapt community resources and services to better address the disaster preparedness needs of Japan's foreign residents.

Key words: disasters, emergency preparedness, Japan, public health nursing, qualitative research

INTRODUCTION

Japan is predicted to be at great risk for a catastrophic disaster within the next 30 years. For many years, the "Nankai Trough Disastrous Earthquake" has been predicted to hit the country, which is expected to cause significant damage to infrastructure and potential loss of

life (Xin et al., 2017). Due to this persistent disaster threat facing the country, Japanese citizens are reported to have considerable awareness of disaster risk and knowledge regarding how to prepare for commonly occurring disasters in their region (Kitagawa, 2015).

In 2020, an estimated 2.93 million foreign residents lived in Japan, growing in recent years to 2.25% of the country's total population (Adu-Gyamfi & Shaw, 2021). Foreign residents in Japan face barriers in regards to accessing health care and experience higher mortality from diseases as compared to Japanese citizens (Yasukawa et al., 2019). Such factors contribute to this group being considered more vulnerable to serious disasters occurring in the country (Green et al., 2020). Furthermore, few resources are available to prepare foreign residents for disasters in Japan (Sakurai & Adu-

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Gyamfi, 2020), with even fewer foreign language resources available in areas outside of major Japanese cities, such as Tokyo and Osaka. Little is known about the needs of foreign residents in terms of their ability to prepare their households for disasters. Due to the disaster-prone nature of the country, and with demographic and social factors in Japan driving a steady increase in the size of the foreign resident population, disaster preparedness of this group is a topic of growing importance.

Knowledge regarding readiness for disasters among foreign residents living in Japan is limited. Disaster risk awareness among foreign students attending a Japanese university was examined by Xin et al. (2017). Ranking highest among foreign students' concerns were worries about losing power or water, difficulties in going home or back to where they lived, and difficulties communicating with people in their home country. Lowest among their concerns was the availability of disaster preparedness information. Green et al. (2020) reported on factors influencing whether foreign residents of Nagoya City undertook disaster preparedness behaviors, such as putting together an emergency kit and preparing a household emergency plan. The study identified multiple influential factors, including national origin, experience with disaster training, and exposure to disaster preparedness information. Evacuation behaviors of foreign residents during emergencies such as the 2011 Tohoku and 2016 Kumamoto earthquakes have also been reported. Foreign residents were found to have reported to their workplaces or universities, areas that were not necessarily equipped to receive evacuees (Yang et al., 2017). Others who had received disaster training were more likely to go to designated emergency shelters (Gomez, 2013).

Japanese-language ability has been identified as an impediment to foreign residents' access to disaster preparedness information. For example, Kawasaki et al. (2018) found that foreign residents skilled in Japanese language were able to access similar amounts of disaster preparedness information as respondents who were native Japanese speakers, whereas foreign residents unskilled in Japanese encountered difficulties gathering information from Japanese-language media, though they were able to acquire some information through the internet. Efforts to address this problem have been undertaken in Japan in the past. In the aftermath of the 1995 Great Hanshin Earthquake, a simplified version of written Japanese known as *Yasashii Nihongo*, or 'Easy Japanese' was developed to disseminate disaster preparedness information to foreign residents who knew little Japanese and English (Iori, 2016). Despite its intent, this form of

Japanese was found to be difficult to comprehend by some foreign resident groups, mainly those originating from China. Furthermore, many Japanese citizens, including city authorities in small cities, were not familiar with this method of communication, nor had received training on how to use *Yasashii Nihongo*.

Although these studies provide some insight, gaps in knowledge still exist related to influences on household disaster preparedness behaviors among foreign residents living in Japan, especially among those who reside in small cities. The purpose of this paper is to discuss findings from a qualitative pilot study exploring knowledge and perspectives related to disaster preparedness among foreign residents of two small cities in Japan. It will also highlight ways that public health nurses (PHNs) can contribute to enhanced preparedness among members of Japan's growing foreign resident population. PHNs are experts in partnering with communities to promote, maintain, and restore health and reduce health risks when needed healthcare services are not available. They plan health services to address community health needs and reduce health inequity (American Nurses Association, 2013; Yoshioka-Maeda, 2020). Establishing a better understanding of readiness for disasters among Japan's foreign residents will better inform ways PHNs, government agencies, and community organizations can work together to bolster community preparedness efforts and empower members of this group to remain safe during disaster events.

METHODS

A qualitative pilot study using key informant interviews and small group discussions was conducted. A qualitative approach was appropriate for this study because little is currently known about disaster preparedness among foreign residents living in Japan. Data were collected between July through October 2019 in two small cities in Aichi Prefecture, an area located in Central Japan. Both cities have populations of fewer than 200,000 people and possess sizeable numbers of foreign residents. The University of Hawaii Human Research Protection Program (HRPP) reviewed and approved this project as exempt from federal regulations pertaining to the protection of human research participants.

The theory of planned behavior (TPB, Ajzen, 1991) served as the underpinning for this study. The TPB states that the intention to perform a behavior is influenced by a person's attitudes, views of significant others, and the ease with which a behavior can be performed. It has been used to explain a wide range of health behaviors and has

also been utilized to describe behaviors related to household disaster preparedness (Dantzler, 2013; Najafi et al., 2017).

Participants and sampling

A purposive sample of foreign residents was identified and invited to participate in the study. Criteria for inclusion in the study included people who were: (1) foreign residents residing in the cities in which the study was being conducted; (2) adults aged ≥ 18 years; and (3) able to speak and/or read Japanese or English to the extent necessary to meaningfully participate in the study. The names and contact information of potential participants were obtained through consultation with international exchange associations located in the region. Other participants were identified via snowball sampling (Parker et al., 2019). Sampling was conducted until data saturation was reached. Information about the study was provided to participants before enrolling in the study. All information was provided in either Japanese or English, depending on the participants' preference. After reviewing study information, each participant provided oral consent to participate in the study.

Data collection

A semi-structured guide based on the TPB (Ajzen, 1991) was developed by the research team. Questions were reviewed and refined before use by experts in the field who had experience working with foreign residents of Japan. The semi-structured guide elicited responses related to knowledge, attitudes, and practices regarding household preparedness for disasters. Questions from the semi-structured guide are listed in Table 1. A demographic questionnaire was completed before each interview. Interviews and small group discussions followed the semi-structured guide and were conducted in either Japanese or English. Each session took approximately 60 minutes and was conducted by the same researcher,

who took handwritten notes during the discussion.

Data analysis

Sociodemographic information was input into an MS Excel file to analyze descriptive statistics (Microsoft Corporation, Redmond, WA, USA). Qualitative content analysis (Creswell, 1998; Hsieh & Shannon, 2005) was used to analyze the qualitative data collected during interviews and group discussions. Handwritten notes were read multiple times to achieve immersion in the data. Two researchers worked independently to extract preliminary codes, then later compared codes for similarities and differences. Discrepancies were discussed and resolved to ensure intercoder reliability. Codes were then labeled and grouped into categories. Four general themes emerged from the analysis. Trustworthiness of the research was established using multiple strategies. Handwritten notes were read back to participants to confirm what was written recorded a true and accurate reflection of their words. An audit trail (Graneheim & Lundman, 2004) was maintained, which included detailed field notes taken during data collection.

RESULTS

Demographics

Fifteen ($N = 15$) people participated in the study. Six ($n = 6$) participated in key informant interviews; nine ($n = 9$) joined small group discussions (three groups of two people, one group of three people). Eight participants (53%) were male, and seven (47%) were female. Ages ranged from 22 to 60 years. Years living in Japan ranged from 2 months to 30 years. Participants were from five different countries of origin. Participant demographic information is summarized in Table 2. Most participants ($n = 10$, 67%) reported having received training or education on disaster preparedness either in Japan or their country of origin. Table 3 describes participants'

Table 1 Semi-structured interview guide questions

Tell me what you know about disaster preparedness in Japan?
How would you describe your (family's) preparedness for disaster?
Have you ever experienced a disaster in Japan? If yes, please explain this to me.
What kind of disasters do you anticipate in this area?
What would you do if you wanted to learn more about disaster preparedness?
How would you describe to other people around you what you know about disaster preparedness in Japan?
Is there anything that prevents you from preparing for disasters?
Is there anything that helps you prepare for disasters?
What kind of information do you think would help you when there is a disaster in Japan?
Do you have any other comments about disaster preparedness in Japan?

Table 2 Participant demographic information ($N = 15$)

	<i>n</i>	(%)		<i>n</i>	(%)
Gender			Years lived in Japan		
Male	8	(53)	<1	1	(7)
Female	7	(47)	1–5	2	(13)
Age (years)			6–10	1	(7)
18–24	1	(7)	10–20	7	(47)
25–39	5	(33)	>20	4	(27)
40–64	9	(60)	Home country		
Education completed			Brazil	7	(47)
Less than High School	3	(20)	China	4	(27)
High School	7	(47)	Vietnam	1	(7)
Associate	2	(13)	Paraguay	1	(7)
Bachelor	3	(20)	Philippines	2	(13)
Employed			Language spoken (not limited to one)		
Yes	13	(87)	Japanese	13	(87)
No	2	(13)	Portuguese	8	(53)
Number of people in household			Chinese	4	(27)
One	3	(20)	English	2	(13)
Two	5	(40)	Vietnamese	1	(7)
Three	3	(20)	Filipino	1	(7)
Four or more	4	(27)	Tagalog	1	(7)
			Spanish	1	(7)

Table 3 Disaster preparedness training received or past disaster experience

<ul style="list-style-type: none"> • Workplace training in Japan • Earthquake drill in home country • Disaster experience (flood) in home country • Fire/earthquake drill at Japanese language school • Cardiopulmonary Resuscitation (CPR)/Automated External Defibrillator (AED) training at driving school • Fire extinguisher training at housing complex

disaster preparedness training received or past disaster experience.

Qualitative analysis

A total of 82 codes were extracted from small group discussions and responses to open-ended questions. Codes were first grouped into 23 sub-categories, then into 10 categories. Four overarching themes emerged from the qualitative data: (1) attitudes regarding disaster preparedness and risk; (2) sense of community; (3) perceived ability to prepare for disasters; and (4) disaster preparedness behaviors. Themes were mapped to the TPB (Ajzen, 1991). Table 4 summarizes themes, categories, and illustrative quotes. Participant numbers were assigned to individuals when quotes were attributed to them to protect their identities.

Attitudes regarding disaster preparedness and risk

Risk perception for disasters

Many participants ($n = 11$) were familiar with catastrophic events occurring in the country, such as the 2011 Great East Japan Earthquake, the 2015 Kumamoto Earthquake, and the 2018 Hokkaido Earthquake. Two participants had lived in Japan long enough to recall the devastation of the 1995 Great Hanshin (Kobe) Earthquake. These events had heightened their awareness of the capability of disasters to disrupt their lives in the country. Others were made aware of disaster risk in Japan before moving into the country. For example, one participant (P2) said, “Before I arrived here, my Japanese teacher back home gave us a lecture on how to prepare

Table 4 Themes, categories, and illustrative quotes

Themes and categories	Illustrative quotes
Attitudes regarding disaster preparedness and risk	
Risk perception for disaster	<p>"I know how to prepare because in my country we always study the climate and about disaster. I think my friends know a little about it, too." (P1)</p> <p>"Before I arrived here, my Japanese teacher back home gave us a lecture on how to prepare for a disaster in Japan." (P2)</p> <p>"My friend... experienced the Hokkaido earthquake is really prepared. His car, house and storage area are packed with stuff." (P3)</p>
Past experience with disasters	<p>"During a typhoon, eight [foreign resident] coworkers and I stayed together in the house and were on alert. We didn't get too much sleep." (P1)</p> <p>"Earthquakes are scary because they're unpredictable compared to typhoons. If there is a typhoon coming, we can at least anticipate from TV information." (P3)</p> <p>"We don't have natural disasters in my country... people [from my country] will not have baseline knowledge on what to expect." (P3)</p> <p>"Where I come from, there are no earthquakes or typhoons." (P4)</p> <p>"I used to live on the fifth floor, when an earthquake hit. I ran downstairs and went outside." (P7)</p> <p>"I lived in Tokyo, during the 3/11 disaster. Tokyo had many stranded people unable to board trains. Many areas opened in nearby parks to hand out food for them." (P8)</p> <p>"I experienced power outage for 2-3 days from a typhoon." (P10)</p> <p>"I lived in [Japan] when the Tohoku Earthquake hit. Many foreigners were not prepared and went shopping the next day to find nothing." (P11)</p> <p>"A bad typhoon knocked down a tree and damaged the electric line. We lost power for three days and the road closed. It caused a lot of inconvenience." (P15)</p>
Communal linkages	
Reliance on Japanese-speaking coworkers and neighbors	<p>"[Colleagues from my country] have been here longer and I can learn from them." (P2)</p> <p>"My work president always keeps us informed when there is a disaster." (P2)</p> <p>"I will ask my Japanese neighbors if I need help." (P5)</p> <p>"My Japanese neighbors check in on me regularly." (P6)</p> <p>"I make sure to become friends with neighbors because people around will help." (P9)</p> <p>"I am going to follow the Japanese people in such an event [disaster]." (P13)</p>
Influence of school children on disaster preparedness	<p>"People who have children have information about disaster preparedness, but if you don't have kids, it will be hard to obtain information." (P5)</p> <p>"My son made a disaster kit after learning about preparedness in school." (P7)</p> <p>"If you went to school in Japan, you know what to do [in a disaster], because [disaster preparation] it is embedded from a young age." (P8)</p>
Respect for Japanese society's stance on disaster preparedness	<p>"From elementary school, middle school and up to high school they practice disaster preparedness frequently, so that is amazing." (P3)</p> <p>"Japan's disaster preparedness is impressive, compared to where I came from." (P4)</p> <p>"There are many [disaster preparedness] events going on ... Maybe people [from my country] will participate in the winter when there is not much to do." (P5)</p> <p>"Emergency preparedness in Japan is superb." (P8)</p> <p>"When I worked in Tokyo, the office building had disaster drills regularly." (P8)</p>
Perceived ability to prepare for disasters	
Self-responsibility for disaster preparedness	<p>"The Japanese government helps too much." (P5)</p> <p>"Everyone should be aware of circumstances at an individual level." (P5)</p> <p>"The Japanese government will not reject me." (P6)</p> <p>"During a disaster everybody needs help, so no one will help [me]... It's better to know what to do beforehand and prepare." (P9)</p> <p>"Guidance on how to survive on your own may be necessary." (P11)</p>
Personal resilience to disasters	<p>"We have a lot of floods in my country, so I know what to do." (P1)</p> <p>"People in my country experienced inflation, so I think we tend to stock up on food." (P10)</p> <p>"My family lived... where there was nothing, so we will survive because we know what to do when there is nothing." (P11)</p>

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Themes and categories	Illustrative quotes
Language barriers	<p>“[Emergency] information is in Japanese on TV. Sometimes it is difficult to understand. It would help to have it in English so I can understand better.” (P1)</p> <p>“If you don’t know Japanese, you can’t even get the information on where to locate [foreign] language information.” (P3)</p> <p>“I get papers from school. I can’t read it so I just throw it away.” (P7)</p> <p>“I can somewhat comprehend written Japanese. It will be harder for me to understand if it were in ‘Yasashii Nihongo.’” (P8)</p> <p>“People who don’t understand Japanese will not know what to do.” (P9)</p> <p>“Emergency alerts in Romaji will help at least for people who cannot read Japanese.” (P10)</p> <p>“It would be nice to have information that people can listen to. Even if people cannot read, many can understand easy-spoken Japanese.” (P11)</p> <p>“When I get emergency information on the phone in Japanese, it makes me worry so I immediately ask my friends what it says.” (P12)</p> <p>“I wish there was information in my native language. I know I should study more Japanese but it would be nice to at least have some in English or [my native language].” (P12)</p> <p>“I’m sure there is [disaster preparedness] information ... but I do not understand Japanese well, so I don’t really get the information.” (P13)</p> <p>“Japanese is difficult.” (P14)</p>
Cultural differences in disaster preparedness	<p>“I was confused why we had to wear helmets during the drill.” (P1)</p> <p>“What is common sense in Japan is not necessarily the same in other countries. A small detailed explanation can be beneficial.” (P3)</p> <p>“I didn’t understand [that] I had to stay away from buildings when an earthquake hit.” (P7)</p>
Disaster preparedness behaviors	<p>“We taught my kids to meet at the nearby park if they get lost.” (P3)</p> <p>“I used to have a disaster kit in my car with money, clothes, and batteries but... there hasn’t been a disaster, so I slowly started to use what was in my bag.” (P5)</p> <p>“I don’t think about [disaster preparedness] too seriously.” (P6)</p> <p>“We have a rope on the second floor to help us get down in an emergency.” (P9)</p> <p>“I have 10-20 days’ worth of water and food (dry and frozen) to prepare when power is out. I also have a gas burner, candles and LED lights.” (P10)</p>

P#, participant number.

for a disaster in Japan.”

Past experience with disasters

Participants who had personal experience with disasters had a high risk perception of disasters. These individuals emphasized the importance of disaster preparedness. In addition, participants who said they were from disaster-prone countries explained that their experience with many types of disasters before arriving in Japan had shaped their thoughts on how to prepare for disasters once in-country. In contrast, persons who said they originated from countries with fewer natural disasters expressed concern that people from their countries were at a disadvantage because they were less likely to be aware of the risks disasters pose. For example, a participant (P3) who experienced a disaster after arriving in Japan stated, “We don’t have natural disasters in my country... people [from my country] will not have baseline knowledge on what to expect.”

Slightly over half ($n = 8$) of the participants recalled

influential experiences with disasters in Japan. Natural disasters such as typhoons, torrential rains, and mudslides had occurred in many areas in Japan during the time that participants were residents of the country, heightening their perception of the potential for disaster in the area in which they lived. For example, one participant (P11) stated, “I lived in [Japan] when the Tohoku Earthquake hit. Many foreigners were not prepared and went shopping the next day to find nothing.” Another participant (P1) said “During a typhoon, eight other [foreign resident] coworkers and I stayed together in the house and were on alert. We didn’t get too much sleep.”

Communal linkages*Reliance on Japanese-speaking coworkers and neighbors*

The degree of connectedness to the community was commonly cited by participants as an important factor influencing disaster preparedness behaviors. Few participants identified connections with local Japanese persons

that they could rely upon if a disaster were to occur. Instead, most would rely upon people from the same country-of-origin, such as their coworkers, to receive help. This was particularly common among participants who were newcomers to the country or possessed limited Japanese language proficiency. One participant (P2) said, “[colleagues from my country] have been here longer and I can learn from them.” Another participant (P9) stated the importance of getting to know a native Japanese neighbor in the event of a disaster: “I make sure to become friends with neighbors because people around will help.” Another participant (P6) who lives alone stated, “My Japanese neighbors check in on me regularly.”

Influence of school children on household disaster preparedness

Four participants were parents of school children in Japan. These individuals revealed the strong influence that their children’s education had on their household disaster preparedness. For example, one participant (P7) said, “My son made a disaster kit after learning about preparedness in school.” Another person (P5) belonging to a family with school-aged children expressed concern that, “People who have children have information about disaster preparedness. But if you don’t have kids, it will be hard to obtain information.”

Respect for Japanese society’s stance on disaster preparedness

All participants expressed respect for the emphasis on emergency preparedness that Japanese society demonstrates. There was a general feeling of trust that the Japanese government prepares households and communities well for natural disasters. One participant (P8) stated, “Emergency preparedness in Japan is superb.” Another (P4) stated, “Japan’s disaster preparedness is impressive, compared to where I came from.” Participants discussed their surprise regarding the frequency of disaster drills in the workplace and at school. One participant (P8) stated, “When I worked in Tokyo, the office building had disaster drills regularly.” Another participant (P5) commented that although he noticed a lot of activity regarding disaster preparedness in his community, he does not participate, stating, “There are many [disaster preparedness] events going on... Maybe people [from my country] will participate in the winter when there is not much to do.” To encourage greater participation among people from his country, he recommended holding such events during colder seasons and making community disaster preparedness fun and children-

friendly.

Perceived ability to prepare for disasters

Self-responsibility for disaster preparedness

Participants who had lived in Japan for > 10 years ($n = 6$) considered disaster preparedness to be an individual responsibility. One person (P9) stressed the importance of preparing her household for disasters before a disaster occurs emphasizing that, “During a disaster everybody needs help, so no one will help [me]. . . It’s better to know what to do beforehand and prepare.” This person noted that fellow foreign residents who lack Japanese-language ability would be at a major disadvantage because they may have no idea what to do to prepare themselves for disasters. Another participant (P5) stated, “The Japanese government helps too much,” discouraging foreign residents from assuming personal responsibility for disaster preparedness. He emphasized taking action on their own behalf, adding “Everyone should be aware of circumstances at an individual level.” Conversely, other participants explained that they would rely on the Japanese government if they needed help during a disaster. One participant (P6) expressed confidence that the government would not turn away people during disasters, stating, “The Japanese government will not reject me.”

Personal resilience to disasters

Participants who had experienced disasters or other hardships in their home country, or had experience living in remote areas, expressed confidence in their ability to prepare for and survive natural disasters in Japan. Multiple participants provided examples of calamities they had endured in their home countries that had taught them valuable lessons on how to mitigate the impact of disasters on their households. For example, one participant (P1) said, “We have a lot of floods in my country, so I know what to do.” Disasters, according to this individual, are a part of life and something that can be overcome. Another individual (P10) experienced financial hardship due to extreme economic instability in her country. Out of this experience, she developed a habit of stockpiling household necessities, stating “People in my country experienced inflation, so I think we tend to stock up on food.” Another participant (P11) had been raised in a very rural area, which gave her confidence that she could survive any disaster event where resources are limited, stating, “My family lived... where there was nothing, so we will survive because we know what to do when there is nothing.”

Language barriers

Most participants ($n = 8$) expressed frustration with the limited amount of disaster preparedness information provided in their native languages, inhibiting their ability to prepare their households for disasters. Brochures or handouts brought home from work or school containing information printed in Japanese were discarded. One person (P7) said, "I get papers from school. I can't read it so I just throw it away." Participants also described receiving emergency alert phone calls or text messages composed entirely in the Japanese language. These alerts had the effect of causing a sense of panic because the recipients perceived the importance of the information but were not able to understand it. One participant (P12) explained, "When I get emergency information on the phone in Japanese, it makes me worry so I immediately ask my friends what it says."

Multiple participants suggested ways to address the language barrier foreign residents experience when trying to access emergency information. Some comments focused on communicating information in ways more accessible to foreign residents, such as providing translated materials in English or their native languages. One participant said (P1), "[Emergency] information is in Japanese on TV. Sometimes it is difficult to understand. It would help to have it in English so I can understand better." Another participant (P10) suggested communicating emergency alerts in *Romaji* (spelling out Japanese words using the English alphabet), stating "Emergency alerts in Romaji will help at least for people who cannot read Japanese." Another common suggestion given was to communicate emergency information in easier-to-understand terms, or have important messages communicated orally at a slower pace. One participant (P11) felt that foreign residents would better comprehend information this way, explaining, "It would be nice to have information that people can listen to. Even if people cannot read, many can understand easy-spoken Japanese." Others explained that currently available resources should be easier to access. One participant (P3) expressed frustration that disaster preparedness information resources available to foreign residents on Japanese government websites are very difficult to find, stating, "If you don't know Japanese, you can't even get the information on where to locate [foreign] language information." Another stated (P13), "I'm sure there is [disaster preparedness] information ... but I do not understand Japanese well, so I don't really get the information." One participant (P14) simply expressed that, "Japanese is difficult."

Not all participants experienced language barriers to the same degree. Participants from China mentioned that

they can partially comprehend written Japanese because the two languages share similar characters (known as *Kanji* in Japan). These individuals expressed the difficulty of comprehending text when the information is written in what is called '*Yasashii Nihongo*', a form of Japanese written language that uses less kanji. The participant (P8) stated, "I can somewhat comprehend written Japanese. It will be harder for me to understand if it were in *Yasashii Nihongo*."

Cultural differences in disaster preparedness

Participants observed cultural differences in the way that people in Japan and their home countries prepare for natural disasters. For example, one participant (P1) shared how during his first experience attending a disaster drill in Japan he was "confused about why we had to wear helmets during the drill," stating this was not something common in his home country. An interpreter needed to explain to him the risk of falling objects during an earthquake. Without such explanations, he said it would be difficult to understand how to properly prepare for disasters in Japan. Another participant (P7) shared that she was confused after experiencing her first earthquake in Japan by stating, "I didn't understand [that] I had to stay away from buildings when an earthquake hit," because this was not something that was taught in her home country. One participant (P3) summarized these cultural differences in disaster preparedness, stating, "What is common sense in Japan is not necessarily the same in other countries. A small detailed explanation can be beneficial."

Disaster preparedness behaviors

Nearly half ($n = 7$) of participants had some emergency supplies in their homes. Only one individual (P10) mentioned stockpiling adequate emergency supplies, stating, "I have 10–20 days' worth of water and food, dry and frozen, to prepare when power is out. I also have a gas burner, candles, and LED lights." Another (P9) stated, "We have a rope on the second floor to help us get down in an emergency." Another participant (P5) shared, "I used to have a disaster kit in my car with money, clothes, and batteries but... there hasn't been a disaster, so I slowly started to use what was in my bag." Only two individuals had a designated emergency family meeting place. One person (P3) stated, "We taught my kids to meet at the nearby park if they get lost." Nearly all ($n = 13$) participants were not aware of evacuation routes or the location of emergency shelters.

Business owners and parents of school children were more likely to engage in community disaster prepared-

ness activities. Most participants ($n = 8$) stated that they keep up to date regarding the weather forecast on television, especially during the rainy and typhoon seasons. Over half of the participants ($n = 8$) stated that they would go to their City Hall if they needed information regarding disaster preparedness. Others mentioned that they retrieve information from social media regarding disasters and how to prepare for them. Among those who did not prepare for disasters, two stated that disasters are in God's hands, so they will not worry. Others explained they did not prepare for disasters because they lacked knowledge on how to do so, or were unconcerned regarding disasters. For example, one person (P6) said "I don't think about [disaster preparedness] too seriously."

DISCUSSION

This pilot study examined disaster preparedness among foreign residents living in two small cities in Japan. Few studies to date have examined this topic in depth. Findings from this study illustrate the voice of these individuals and shed light on the various factors influencing foreign residents' household disaster preparedness behaviors.

Findings from this study demonstrated that foreign residents living in Japan establish social connections among people from their country-of-origin for support, and tend to lean heavier upon this network, rather than seek help from local Japanese residents when preparing for disasters. This has been reported in previous studies (Gomez, 2013; Green et al., 2020). Weaker connections to the local community may preclude foreign residents from taking appropriate actions during a disaster or being linked to appropriate aid post-disaster. To minimize impact during and after disaster events, foreign residents need opportunities to network and build connections with Japanese locals to strengthen relationships within the community. Connectivity in daily life can lead to stronger ties within the communities (Usugami, 2016). Sumida et al. (2016) noted that community disaster drills can provide opportunities for local and foreign residents to strengthen ties over disaster preparedness. Ikeda and Ozanne (2016) suggested that the host society should seek to integrate foreign residents into disaster management and planning in Japanese communities to decrease the vulnerability of this population. Findings from this study suggest that foreign residents are willing to participate in their community's disaster preparedness activities if such events take into consideration the preferences of the foreign resident population in terms of

scheduling and types of interactions.

Another finding from this study is that school children are highly influential in foreign resident households' disaster preparedness activities. This may be one contributing factor as to why the presence of children in foreign resident households is positively associated with disaster preparedness behaviors (Green et al., 2020). Children of foreign resident households in Japan are exposed to disaster preparedness education in the school setting, such as frequent earthquake and evacuation drills. The experiences of these school children, in turn, influence their households' attitudes and behaviors regarding disaster preparedness. It is known that children can serve as catalysts for disseminating disaster preparedness information to their families and communities (Pfefferbaum et al., 2018). Foreign resident households without school-aged children may be at a disadvantage because they may not receive the same exposure to disaster preparedness information.

Findings from this study illustrate how language barriers serve as major impediments to disaster preparedness among foreign residents in Japan, reflecting what has been reported in the limited research available on this subject (Green et al., 2020; Kawasaki et al., 2018). Participants of this study noted how language barriers contribute to a lack of awareness for how to prepare for or respond to a natural disaster, an inability to locate resources, and a lack of knowledge regarding where to evacuate to in the event of a disaster. Persons who lacked Japanese language skills attempted to overcome such barriers in various ways, mainly by seeking out others to assist them. The inability to access critical information, and the need to rely on others for important disaster preparedness information, may preclude foreign residents from taking action to prepare their household for disasters, leaving them highly vulnerable.

Implications for PHN practice

Public health nurses play key roles in preparation, response, and recovery from disasters and public health emergencies (American Nurses Association, 2013; Iguchi et al., 2018). In Japan, PHNs have provided vital services to disaster-struck communities, including counseling, health education, care coordination, public health surveillance, health check-ups, and mental health care (Goto et al., 2014; Kako et al., 2014; Kanbara et al., 2017; Kawasaki et al., 2020). In the wake of disasters affecting the country, PHNs have provided care for various vulnerable populations, such as pregnant women, children, older adults, and persons with chronic diseases or mental health problems (Kayama et al., 2014; Sato et al.,

2014; Yamashita et al., 2019). With the intimate knowledge gained through caring for vulnerable populations in disaster situations, PHNs are well-positioned to serve as a trusted source of information for educating people in Japan, including foreign residents, about how to best prepare for emergencies.

Findings from this pilot study highlight areas where PHNs can contribute to enhanced preparedness for public health disasters among the foreign resident population in Japan. At the individual household level, helping foreign residents effectively access disaster preparedness information is of major importance. Disseminating disaster preparedness information in a way that people from different cultural and linguistic backgrounds can understand may require various approaches, a conclusion reached by other studies on this topic (Green et al., 2020; Adu-Gyamfi & Shaw, 2021). PHNs can tailor their approach when working with different foreign resident groups to link them with existing resources, such as disaster preparedness information in their native languages. Disaster preparedness information is becoming increasingly available in multiple foreign languages in Japan. Furthermore, innovative ways of distributing information are being developed, such as smartphone apps for foreign residents (Arita, 2019; Watanabe, 2021). PHNs can serve as a hub of information, assuring such resources are known and accessible to the foreign resident populations they are meant to benefit. PHNs can also conduct a thorough assessment of the current state of disaster preparedness among foreign residents in their communities to determine what interventions are most needed. A survey of self-reported household disaster preparedness could be deployed to gather such data. Checklists have been developed for other at-risk populations in the country (Nakai et al., 2016), and these could be adapted to be used with foreign resident communities.

PHNs may also work at the community and organizational levels to promote disaster preparedness in areas with foreign resident populations. To bolster community and local government agencies' capacity to serve the needs of foreign residents living in their regions, PHNs can conduct assessments to ascertain the readiness of these facilities to provide community support to foreign residents during emergencies. An assessment of the extent of translated disaster preparedness information in communities with large foreign resident populations can be done using the "4-A" approach: Availability, Accessibility, Acceptability, and Adaptability (O'Brien et al., 2018). Knowing community capacity to serve foreign residents during disaster situations may serve to better

align existing services to support broader groups of people. Similar assessments have been conducted to determine the disaster health needs of other vulnerable groups (Tsukasaki et al., 2016).

Findings from this pilot study suggest that cultural barriers exist that impede foreign residents from adopting disaster preparedness behaviors. PHNs can assist community agencies to mitigate such cultural barriers by expanding partnerships with schools, local government agencies, businesses, and other groups that interact with or are composed of foreign residents in their districts. By serving as liaisons between foreign residents and community agencies, PHNs can help foster greater collaboration in developing community disaster plans that incorporate cultural perspectives of the various foreign resident populations inhabiting their districts. Such efforts may also contribute to enhancing communal linkages between foreign residents and members of the greater community. Communal connections have been noted in this and other studies as being an important factor influencing disaster preparedness behaviors.

Limitations and strengths

This pilot study was limited by its small number of participants, and its focus on a limited geographical area of Japan. A larger study involving more participants, foreign residents of different regions of Japan, and persons from different countries of origin is recommended. Despite these limitations, this pilot study provides important baseline knowledge regarding disaster preparedness knowledge, attitudes, and practices of foreign residents in Japan. The qualitative approach used by the study gave members of this population the ability to express their households' disaster preparedness attitudes and behaviors in their own words, providing robust evidence to enhance what is currently known on this topic. Information obtained from this study can form the basis for larger studies on this topic. Findings can also be used to inform PHNs, community organizations, and government agencies on the types of preventative measures and services essential to keeping foreign residents in Japan safe during disasters. Encouraging greater readiness for disasters among members of this group will strengthen community disaster response, and build upon overall community resilience to disaster events.

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AUTHOR CONTRIBUTIONS

M.N., and G.G. contributed to the conception and design of this study; M.N. conducted the participant recruitment and key informant, focus group interviews; M.N. and G.G. performed the qualitative analysis; M.N. drafted the manuscript; G.G. review the manuscript and supervised the whole study process.

DISCLOSURE

The authors declare that they have no conflicts of interest.

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