Past evacuation behavior and intended shelter selection of Japanese considering presence of foreign tourists

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Introduction

Japanese government is targeting the growth of tourism in Japan, and set the tourism industry as a key policy (MLIT, 2012). The Japan Tourism Agency announced that 31.9 million foreign visitors came to Japan in 2019, hitting a new record with an increase of 2.2% from 2018 (Nippon.com, 2020). On the other hand, Japan is a country prone to several natural disasters like earthquake, typhoon, flood etc. In particular, a Tonankai Earthquake by the Nankai Trough and an earthquake in the Tokyo metropolitan region is predicted to occur within the next 30 years. (Cabinet Office, 2013)

In light of this vulnerability, the central government and local municipalities have worked towards creating disaster prevention measures. However, the current countermeasures mainly target local residents, and measures that apply to transient population as tourists who are unfamiliar with the area, have only just begun in recent years (Sato et al. 2014). A government survey shows that only 11 percent of Japan's municipalities plan disaster evacuation manual for foreign tourists (Japan Times, 2020). Therefore, it can be assumed that large numbers of tourists will be affected if any disaster occurs in tourist destinations (Sato et. al. 2014). For tourist destination cities, the safety of tourists is a factor that cannot be ignored, and it can be stated that protection of their safety is the responsibility of the tourism destinations.

There is a national level discussion regarding inadequacy of evacuation shelter planning even for Japanese population (Cabinet Office, 2013). Issues related to capacity constraint by the government has come to light in the recent years. Several shelters in the flooded region reached the maximum capacity during Typhoon 19 in 2019 so that affected people were not able to enter evacuation shelter (NHK, 2020). Furthermore, it has been postulated that there will be not be enough shelters covering expected evacuees in case of the Tokyo Metropolitan Earthquake (Cabinet Office, 2020).

On the other hand, there has been some troubles and difficulties in sharing the same facility with foreign tourists were raised in the past disaster experience. Furthermore, misunderstanding and discrimination on foreigners' behaviors by Japanese locals was also highlighted in past disasters (Ministry of International Affairs and Communications, 2019). There were also reports of inadequate information provision for foreign tourists in addition to worries regarding food, religion etc. in the evacuation shelter during 2016 Kumamoto earthquake (Yagi, 2017). It is evident that Japanese government's evacuation shelter planning for foreign tourists is at a preliminary stage.

Therefore, it is imperative to understand the perception of Japanese residents towards foreign tourists and include diverse preferences in expected shelter use during emergency. This study aims to develop suggestions for better regional tourism evacuation shelter planning in future targeting both Japanese and foreign tourists and their needs. The main goals of this study are to understand 1) evacuation behavior and experience of Japanese during past disasters; 2) intended evacuation behavior and preference of Japanese under Tokyo Metropolitan Earthquake scenario; and 3) impact of presence of foreign tourists on evacuation shelter choice of Japanese in case of an

emergency. We conduct a local resident survey to identity the need of dedicated evacuation shelter planning as a part of disaster preparedness for foreign tourists in Japan.

Literature Review

Foreign tourists in the destination are usually considered more vulnerable than residents. Matyas et al. (2011) addressed the importance of reflecting aspect of foreign tourists in the study on risk perception and evacuation decisions in Florida since they may have less knowledge on risks of hurricane, less familiarity with the region as well as network support. Henry and Kawasaki (2014) overviewed the heterogeneity and homogeneity of foreigners in Japan considering international students as vulnerable population due to their foreignness and transience. The study argues that the required support after a disaster strikes may be different from Japan's assumptions which regard foreigners as a homogeneous group. Leelawat et al. (2017) examined the evacuation process for Thai citizens in Kumamoto Earthquakes in the affected areas through semi-structured interviews with relevant organization in Japan. It emphasized the importance of information provision and provided guidelines for tourists to prepare information related to weather, transportation, and evacuation rule in the destination country. Furthermore, risk awareness and intended tsunami evacuation behavior of international tourists were examined through interviews and questionnaires by Arce et al., (2017) as a case study in Kamakura city in Japan. The study confirmed that international tourists have a relatively high willingness to evacuate however there seemed to be some confusion in which direction they should evacuate, which transportation mode to be used and location of the evacuation areas in the region. Although relevant studies in tourism crisis management have attempted to understand the evacuation process and risk perception of foreign tourists, there are few studies focusing on perception of residents in the destination on the needs and importance of evacuation for foreigners. This study addresses this gap in the literature to provide information and assist in policy implications for evacuation planning for foreign tourists in Japan.

Data and Method

This study uses online survey as a method to collect data using a combination of close-ended and open-ended questions. The online survey was conducted from January 5th to January 7th, 2021 in Japan through a professional survey company with Japanese respondents. We asked 9 screening questions to extract respondents who meet the selection criteria for this study.

Table 1. Summary of survey on past evacuation shelter experience and expected shelter usage

Survey Target	Japanese with experience in staying in the evacuation shelters. Japanese without experience in staying in the evacuation shelters.
Nationality	Japan
Survey Method	Internet based survey
Survey Content	Past experience on disasters Past experience on evacuation shelters Needs and priorities for expected use of evacuation shelters Selection of evacuation shelters Demographics
Samples	50 samples with past evacuation shelter experience 50 samples without past evacuation shelter experience Total 100 samples
Survey Period	January 5th, 2021 – January 7th, 2021

The selection criteria used for respondent selection was based on whether or not they have prior evacuation and evacuation shelter experience. The total sample size is 100 with 50 respondents with previous experience in staying in evacuation shelter and 50 respondents without such experience. The survey questionnaire was prepared in Japanese to ensure ease of understanding by the respondents. A brief summary of the survey is provided in Table 1. A total of 100 respondents with diversity in terms of gender, age, marital status, income, family structure, occupation, housing structure, education level, familiarity with foreigners in their daily life and their English proficiency level responded the survey questionnaire.

Results

Past experience of disasters

All respondents were asked to reply questions related to their past experience of disasters on the basis of the most serious disaster they have experienced in their life. 38% of the respondents replied earthquakes as the most serious disaster they have encountered, 18% replied typhoon, and 13% replied heavy rain. We also asked whether there was human or material damage around them. 27.7% of them replied that there was human damage and 53% of them mentioned that there was material damage around them. Regarding the time when they experienced it, 53% of respondents replied as others and 32.5% of them replied as 1~2 years ago. Respondents who replied as others included major past disasters such as Great East Japan Earthquake in 2011 as well as Hanshin Earthquake in 1993.

We also asked respondent's reasons for evacuation where multiple choices were allowed. In Figure 1, 40% of respondents said that they followed people nearby, 34% of them evacuated because there was an announcement by the administration. The 32% of respondents said that they followed evacuation guidance of people or officers. The initial place where they encountered the disaster is an important information in evacuation studies. As shown in Figure 2, half of the respondents replied that they were at home followed by 22% in school and rest of the respondents in different places. We asked the responded where they evacuated after encountering the disaster. In Figure 3, 62% of respondents stated that they evacuated to shelters such as schools and parks and 16% of them evacuated to stores and restaurants.

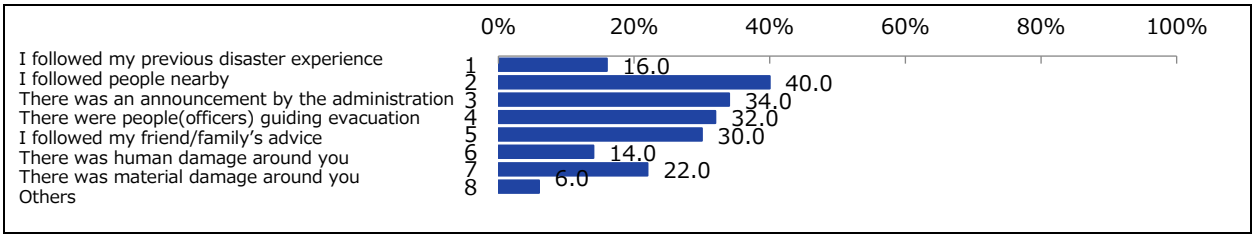

Figure 1. Reason for evacuation

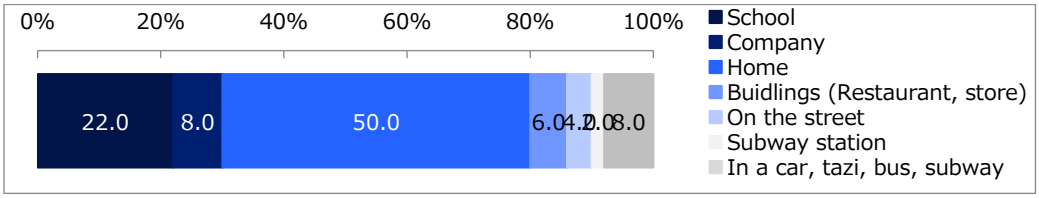

Figure 2. The initial place when encountered the disaster

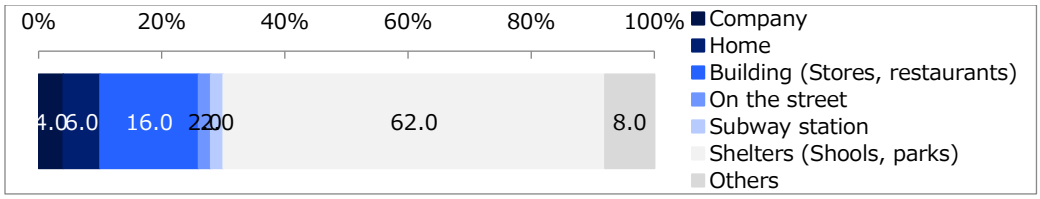

Figure 3. The evacuated place when encountered the disaster

The main mode for evacuation used by the respondent in previous disasters is explained in Figure 4. 70% of respondents stated that they walked and the second highest choice was private car (26%). It took less than 5 minutes for 24% of the respondents and from 5 minutes to 10 minutes for 34% of the respondents to reach the evacuation shelter. The respondent's length of stay in the evacuated place is illustrated in Figure 5. Nearly 80% of respondents stayed less than half a day. Regarding accompanies during evacuation, the larger proportion of the respondents (58%) evacuated with family members followed by evacuation alone, with friends, with colleagues or others.

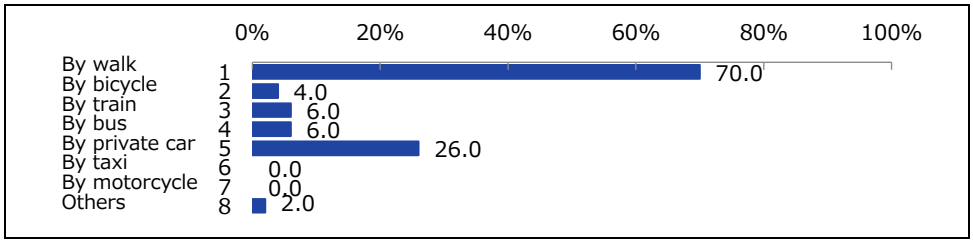

Figure 4. Mode of evacuation in previous disaster

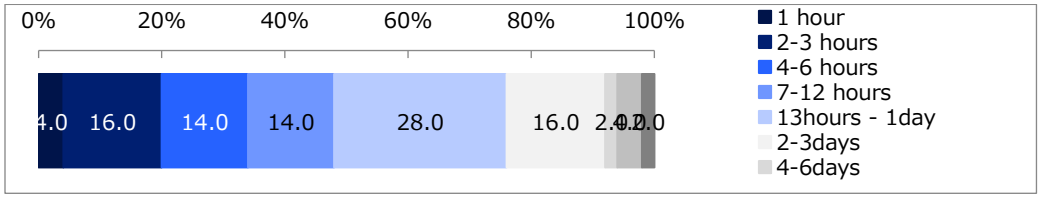

Figure 5. Length of stay in evacuated place in previous disaster

Past experience on shelters in disasters

In this section, we asked respondents to evaluate their past experience staying in evacuation shelters based on their satisfaction level on features of shelters and the services they received. Figure 6 shows respondent's evaluation of their stay in the evacuation shelter on range of different factors. More than 70% of the respondents thought their stay was not comfortable. In terms of safety more than 60% of the respondents stated that they felt safe in the evacuation shelter. More than 70% of the respondents did not think their stay was relaxing and more than 40% thought they were upset when in the evacuation shelter. More than 60% stated that they were stressed and more than 50% felt worried. Overall, there is room for improvement to make sure that the evacuees feel comfortable and relaxed not feeling upset, stressed or worried during their stay in the evacuation shelters.

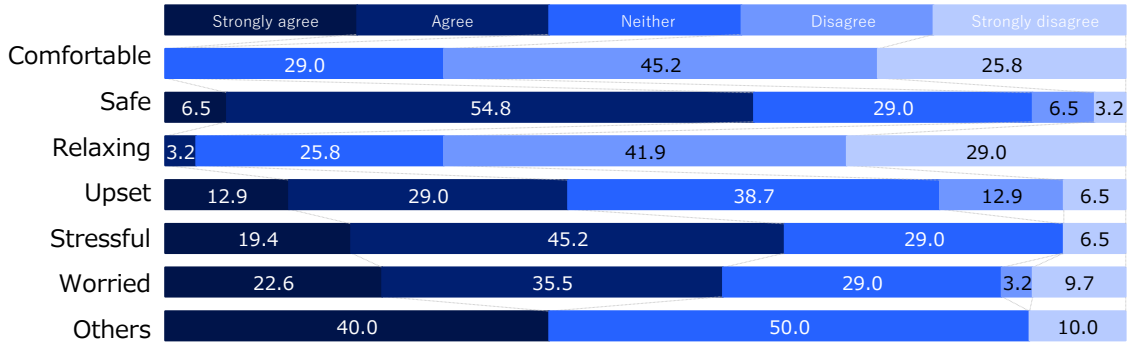

Figure 6. Evaluation of stay in the evacuation shelter

We asked respondents to elicit their satisfaction on seven aspects during their stay in the evacuation shelter. We found that majority of the respondents were neither satisfied nor dissatisfied with key aspects shown in Figure 7. A significant dissatisfaction was observed internet access (>50% respondents) and privacy and personal space (>60% respondents) signifying the need to enhance these aspects.

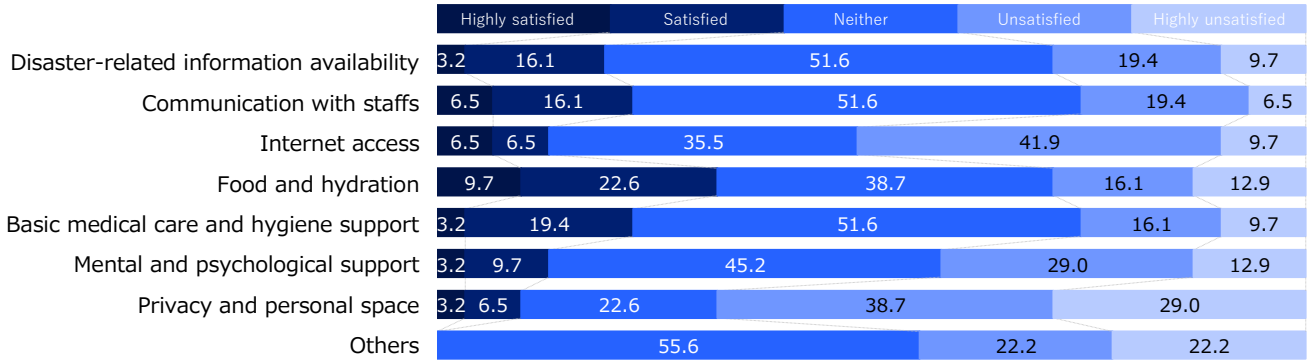

Figure 7. Satisfaction during stay in the evacuation shelter

Furthermore, we specifically asked if they encountered foreigners during their stay in the evacuation shelter. 22% of the respondents said they encountered foreigners, 38% did not encounter foreigners and remaining respondents stated that they do not remember foreigners' presence or absence.

Scenario Analysis under Tokyo Metropolitan Earthquake

We conducted a scenario analysis to understand respondent's expected needs and priorities in case of having to evacuate to a shelter. We assumed a disaster scenario of Tokyo Metropolitan Earthquake. In Japan, Cabinet Office (2'23") has conducted a simulation movie assuming a high possibility of Tokyo Metropolitan Earthquake in 30 years with M7.3 class for central southern metropolitan area. The earthquake is expected to lead to cracks in the buildings with a possibility of collapsing, lifeline services like water, electricity and gas supply are expected to stopped, wind will be strong and there is risk on consecutive fires, and a high possibility of disruption to trains which is the main mode of public transport is anticipated. We asked the respondents to assume that an evacuation request is issued by the administration under the given scenario and respondents are requested to move to the evacuation shelter where they will have to stay for at least one week.

Expected needs and priorities of evacuation shelters in disaster scenario

To elicit expected needs and priorities of the respondents on the use of evacuation shelter during the disaster, respondents were asked to rank different items in order of their preference and priorities. A list of expected needs of evacuees while at the evacuation shelter are prepared from the literature and practice which is shown in Table 2. We asked respondents to rank the list of items from 1st to 9th. To calculate the overall needs, we allocated score 9 as the weight of the 1st rank item and to 1 to the 9th rank item. The cumulative value of item is calculated by summing of each respondents' ranking and weight assigned to each item.

In Table 2, respondents' expected needs when staying in evacuation shelter is summarized. Among the nine items in the list, food and hydration obtained the highest score (785 points), disaster-related information availability scored second highest (670 points) and privacy and personal space obtained third highest score (602 points) followed by basic medical care and hygiene support, internet access, communication with staffs, mental and psychological support, and religious consideration in the descending order of importance.

Table 2. Expected needs when staying in evacuation shelter

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	NA	Total
Disaster-related information availability	24%	11%	17%	27%	11%	4%	3%	2%	1%	-	670
Communication with staffs	5%	16%	4%	5%	16%	21%	26%	7%	-	-	487
Internet access	7%	4%	20%	13%	18%	21%	13%	4%	-	-	534
Food and hydration	51%	16%	11%	13%	7%	2%	-	-	-	-	785
Religious consideration	-	-	2%	5%	8%	1%	7%	58%	19%	-	244
Privacy and personal space	6%	22%	18%	14%	11%	21%	7%	1%	-	-	602
Basic medical care and hygiene support	3%	24%	22%	11%	11%	12%	11%	6%	-	-	587
Mental and psychological support	3%	4%	5%	11%	15%	18%	28%	14%	2%	-	421
Others	1%	3%	1%	1%	3%	-	5%	8%	14%	64%	106

A list of priorities when selecting the evacuation shelter are prepared from the literature and practice and respondents are asked to rank all items in order of priorities and preferences. We asked respondents to rank the list of items from 1st to 5th. To calculate the overall needs, we allocated score 5 as the weight of the 1st priority item and 1 to the 5th priority item. The cumulative value of item is calculated by summing of each respondents' ranking and weight assigned to each item.

Table 3 summarizes the results of the priority selection. Distance from the current location scored highest (584 points) followed by availability of privacy and personal space (459 points), crowdedness (388 points), and presence of foreigners (191 points). It can be observed that the presence of foreigners does not have higher priority as other items when selecting the evacuation shelter.

Table 3. Priorities when selecting evacuation shelter

	1st	2nd	3rd	4th	5th	NA	Total
Distance from your location	63%	19%	13%	4%	1%	-	584
Availability of privacy and personal space	20%	43%	30%	7%	-	-	459
Crowdedness	8%	35%	46%	8%	3%	-	388
Presence of foreigners	-	2%	6%	72%	19%	1%	191
Others	9%	1%	5%	9%	22%	54%	123

Impact of presence of foreign tourists on evacuation shelter choice

To understand the impact of presence of foreign tourists on evacuation shelter choice, we asked the respondents to select their choice of evacuation shelter among two options in each scenario as in Figure 8. Four scenarios with two options each under Tokyo Metropolitan Earthquake scenario was created using hypothetical features of evacuation shelters as shown in Table 4. To enhance understanding of respondents, pictures were included in each scenario.

For each scenario the difference between two shelter options is presented as shown in Table 4. In scenario 1, 44% of the respondents selected shelter 1 and 56% percent selected shelter 2 with no foreign evacuees. In scenario 2, 45% of the respondents chose shelter 3 whereas 55% of them chose shelter 4. In scenario 3, 34% of respondents selected shelter 5 and 66% selected shelter 6. In scenario 4, 42% selected shelter 7 and 58% selected shelter 8.

	Shelter 1	Shelter 2
Distance	Less than 1.5km 	Less than 1.5km 
Privacy and availability of partition	Unavailable 	Unavailable 
Presence of foreign evacuees	Yes 	No 

Figure 8. Expected selection of evacuation shelter

Table 4. Expected selection of evacuation shelter in scenarios

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Shelter 1	Shelter 2	Shelter 3	Shelter 4	Shelter 5	Shelter 6	Shelter 7	Shelter 8
Distance	Less than 1.5km	Less than 1.5km	Less than 1.5km	Less than 1.5km	More than 1.5km	More than 1.5km	More than 1.5km	More than 1.5km
Privacy and availability of partition	Unavailable	Unavailable	Available	Available	Unavailable	Unavailable	Available	Available
Presence of foreigners	Yes	No	Yes	No	Yes	No	Yes	No
Selection Rate	44%	56%	45%	55%	34%	66%	42%	58%

Conclusion and Discussion

Through this study we found that almost half of the respondents have some kind of connection with foreigners in Japan, however only a few of them encountered foreigners in the evacuation shelter. In terms of past evacuation shelter experience, a significant dissatisfaction was observed in aspects such as internet access and privacy and personal space signifying the need to enhance these aspects. In terms of expected needs when staying in evacuation shelter, food and hydration, disaster-related information availability and privacy and personal space were selected as the top three needs. Distance from the current location and availability of privacy and personal space were selected as the highest priority items for evacuation shelter selection. We observed that the presence of foreigners does not have much significance when selecting evacuation shelter. Consequently, the preliminary results show that Japanese people are not very sensitive to the presence of foreign tourists in the evacuation shelter.

As the study is still in its preliminary stage, concrete conclusions cannot be drawn for policy suggestions. Therefore, extension of the study will focus on reflecting Japanese perception toward foreigners and their acceptance of foreigners in emergencies. The pre-survey in the study could not distinguish foreign residents and foreign tourists so further research will be conducted with this consideration and attributes for evaluation.

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