

Research on awareness of the population about disaster preparation in an area affected by disasters:

A case study in Kinpo Elementary School district, Akashi City, Japan

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Abstract

On 1 January 2024, the 2024 Noto Peninsula Earthquake occurred in Japan, and also information released by the JMA in August 2023 indicated that the risk of a Nankai trough earthquake occurring within the next 30 years is 70-80 %. Awareness of this threat of disaster has led to plans being made at the citizen level, and in Akashi City, a plan has been formulated to enhance local disaster prevention schemes by educating and preparing the residents. This study shows the results of a questionnaire survey designed to measure public awareness of the need for strategies to mitigate and recover from the effects of a disaster. The study is significant in that it was conducted in an affected area approximately 19 years after the Great Hanshin-Awaji Earthquake, and approximately three years after the Great East Japan Earthquake, and targets an area where the threat of a Nankai trough earthquake is imminent. The aim is to identify differences in disaster preparation between communities 19 years after a disaster, as well as attitudes towards vulnerable people with high mortality rates compared to healthy people, and also how local people react to being introduced with the feedback of the results. These results indicate that 19 years after the disaster, awareness of those who have experienced a disaster is higher than the national average immediately after the disaster, while awareness of those who have not experienced a disaster declines over time. In addition, the results show that the presidents of citizens' associations and members of associations for promotion of regional development feel the results of the disaster prevention consciousness questionnaire survey to be meaningful and believe that it has potential for use as a resource for formulating future disaster prevention measures.

Keywords

disaster prevention awareness, disaster experience, vulnerable disaster victims, questionnaire survey, effectiveness of feedback

1. Introduction

Japan has experienced a great number of natural disasters such as earthquakes, tsunamis, and landslides due to its geographical and climatic conditions, its largely mountainous terrain, monsoon rainfall, and typhoons. More recently, Japan was hit by the Noto Peninsula Earthquake at 16:06 on 01 January 2024 and the effects are still being dealt with [Japan Meteorological Agency, 2024]. However, as the years go by, people's memories of disasters fade. Thus, when a disaster occurs later, people react to what they perceive as an unprecedented event, and experience is not utilized. To minimize the damage caused by natural disasters, it is important to carefully consider what measures can be taken within the range of capacity. In the 1995 Great Hanshin-Awaji Earthquake, many people who had been trapped under collapsed houses were rescued by neighbours [Tokyo Fire Department, 2023]. From these experiences, people learned lessons about the limitations of public assistance and gained a greater awareness of the importance of self-help and mutual aid. There is a concern that a large-scale earthquake will occur along the Nankai trough, with a probability of approximately 70-80 % within the next 30 years [Ministry of Education, Culture, Sports, Science and Technology, 2023]. Therefore, Akashi City, a designated area, has adopted a citizen-centered disaster risk reduction goal under the philosophy

of "Improving local disaster risk reduction capabilities based on citizens' strengths," suggesting the expectation of developing a resident-oriented disaster risk reduction system in the future [Akashi City, 2023].

There are many existing studies on disaster awareness, not only in Japan, which is a disaster-prone country, but also in other countries. However, most of them focus on disaster awareness gained during disasters, disaster drills, and through disaster education, and there are few examples of studies targeting the awareness of local residents' decades after the disaster [Ozkazanc and Yuksel, 2015; Iwami, 2016; Maminta, 2019; Kimura et al., 2020; Ministry of Land, Infrastructure, Transport and Tourism, 2022; Sugii et al., 2023].

The aim of this study was therefore to understand the disaster preparation of residents, who are still wary of a Nankai trough earthquake, some 20 years after the Great Hanshin-Awaji Earthquake, and three years after the Great East Japan Earthquake. This study also aims to clarify the effects on citizens of the feedback of the survey results on awareness of disaster risk reduction and mitigation to the community. This prompted a questionnaire survey of all households in Akashi City's Kinpo Elementary School district to investigate the citizens' awareness of the need for disaster risk reduction and mitigation and the status of countermeasures to natural disasters to be able to clarify whether there are differences among community associations within a single school district.

2. Survey of residents' awareness of disaster preparation

2.1 Overview of the target area

The Kinpo Elementary School district (target area) has 6,779 householders and a population of 15,409. Of these, 2,087 people are aged 0-14, 9,939 are aged 15-64, and 3,292 people are aged 65 and over. In addition, the surveyed elementary school district faces the sea. Figure 1 shows the study area.

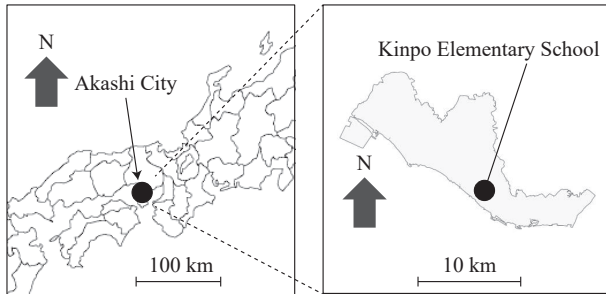


Figure 1: Study area (Kinpo Elementary School district, Akashi City)

2.2 Outline of questionnaire survey to all households

Figure 2 shows a discussion on the questionnaire items with the community development councils (community association chairpersons), while Table 1 shows an overview of the ques-



Figure 2: Discussion on the questionnaire items

tionnaire on the importance of disaster management. The three main questionnaire items consist of 'Citizen Attributes,' 'Citizen Awareness of Disaster Prevention' and 'Natural Disaster Preparation.'

The attributes part of the survey includes questions about citizens' age, family composition, and so on to understand the characteristics of the respondents. To gain an insight into the status of their awareness and the characteristics of the community, this study asked questions about the respondents' hazard awareness in the community, and to what degree they were in touch with other citizens (hereinafter 'communication status'). This study also inquired about countermeasures to natural disasters they had put in place at their homes and how they knew about evacuation centers and hazard maps to allow for an understanding of the status of countermeasures to natural disasters taken in the target area. There are 6,779 total households in the target area, but the survey sheets were distributed to only 4,224 households.

2.3 Residents' awareness of disaster risk reduction and mitigation and countermeasures to natural disasters

2.3.1 Differences in hazard awareness by type of disaster

Figure 3 shows those who responded, "Earthquakes" to the question, "Which disaster (sectional map of community associations) are you most worried about in your community?" (See sectional map of community associations).

Figure 4 shows those who responded, "Tsunamis and storm surges." There are also 16 municipalities in the Kinpo Elementary School district which are shaded in the area. Furthermore, the legend divides the maximum and minimum values into five equal parts.

Figure 3 shows that people living in inland areas are more worried about earthquakes than those living near the sea or a river. Figure 4 shows that those in community associations close to the sea or rivers are more concerned about tsunamis and storm surges than those living inland.

From the above, it was confirmed that although evacuation centers are set up by elementary school districts in the event

Table 1: Summary of the questionnaire survey

Subjects	All households in the Community Associations in the Kinpo Elementary School district
Distribution and collection period	October 26-December 31, 2014
Distribution and collection methods	Handing over and receiving between community association officers and citizens
Number of sheets distributed and collected	4,224 sheets were distributed, and 2,361 sheets were collected (55.9 % collection rate)
Survey item	Respondent attributes (age group, gender)
	Types of disasters that are most worrisome
	Presence or absence of disaster experience
	Natural disaster preparation
	Degree of communication with neighbors
	Whether or not they are able to evacuate on their own in the event of a disaster
	Recognition of information about the elderly and disabled
	Whether or not to support the elderly and people with disabilities in the event of a disaster etc.

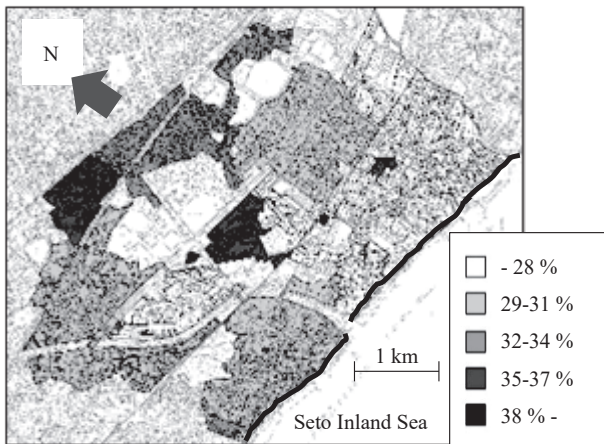


Figure 3: Percentages of people worried about earthquakes (Sectional map of community associations)

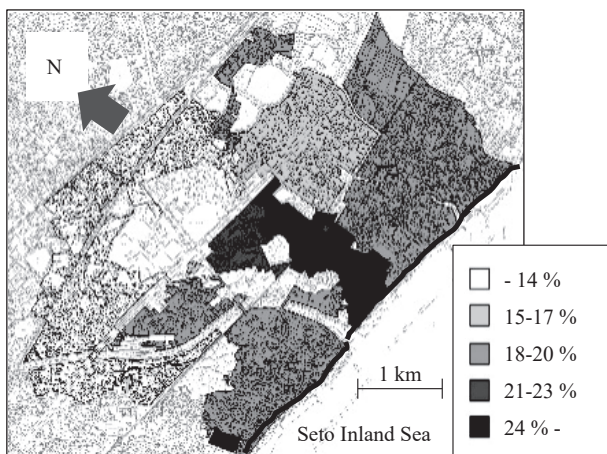


Figure 4: Percentages of people concerned about tsunamis and storms (Sectional map of community associations)

of a disaster, even within the same elementary school district, the hazards to be worried about differ depending on the topography and the location of the house. Therefore, in the future, it will be necessary to prepare in advance and understand each other's residents in response to their concerns.

2.3.2 Questionnaire survey results and considerations

Table 2 shows the age groups of the respondents to this survey, Table 3 shows whether they have experienced a disaster, and Table 4 shows the frequency of participation in disaster drills. Table 5 shows the frequency of communication with neighbors, Table 6 shows interest in the elderly and disabled in the school district, and Table 7 shows awareness of self-help against disasters. Table 8 also shows awareness of support for the elderly and disabled in the event of a disaster.

Table 2 shows that, except for teenagers, respondents are almost evenly distributed. Table 3 also shows that approximately 40 % of respondents experienced a disaster in the past. Although Akashi City experienced the Great Hanshin-Awaji Earthquake approximately 19 years ago at the time of the survey, Table 4 shows that the most common response to the fre-

Table 2: Age groups of respondents

Age groups	Number of Respondents	Shares
10s	5	0.2 %
20s	48	2.0 %
30s	212	9.0 %
40s	373	15.8 %
50s	385	16.3 %
60s	621	26.3 %
70s	471	19.9 %
80s or older	181	7.7 %
No answer	65	2.8 %
Total	2,361	100.0 %

Table 3: Respondents' experience of disaster

	Number of Respondents	Shares
Experienced disaster	988	41.8 %
No experience of disaster	1,255	53.2 %
I don't know	38	1.6 %
No answer	80	3.4 %
Total	2,361	100.0 %

Table 4: Frequency of participation in disaster drills

	Number of Respondents	Shares
Participate every time	62	2.6 %
Almost always participating	166	7.0 %
Sometimes participate	358	15.2 %
Rarely participated	585	24.8 %
Not participating at all	899	38.1 %
No answer	291	12.3 %
Total	2,361	100.0 %

Table 5: Degree of communication with neighbors

	Number of Respondents	Shares
Very often	21	0.9 %
Often	91	3.9 %
Sometimes	588	24.9 %
Almost never	949	40.2 %
Not at all	452	19.1 %
No answer	260	11.0 %
Total	2,361	100.0 %

quency of participation in disaster drills is "not at all," followed by "hardly at all," indicating that more than 60 % of residents currently do not participate in disaster drills to any great extent. And, although the importance of self-help and mutual aid is recognized as a lesson from the Great Hanshin-Awaji Earthquake, Table 5 shows that approximately 60 % of respondents rarely communicate with their neighbors in their daily lives.

Table 6: Awareness of elderly people and disabled people in the community

	Number of Respondents	Shares
I know them very well.	77	3.3 %
I know them.	952	40.3 %
I've heard of them.	363	15.4 %
I don't know any.	639	27.0 %
No answer	330	14.0 %
Total	2,361	100.0 %

Table 7: Whether or not it is possible to evacuate on one's own

	Number of Respondents	Shares
Self-powered evacuation possible.	1,586	67.2 %
Evacuation on one's own is impossible.	117	5.0 %
I don't know	432	18.3 %
No answer	226	9.5 %
Total	2,361	100.0 %

Table 8: Awareness of support for the elderly and persons with disabilities during disasters

	Number of Respondents	Shares
I would actively help them.	482	20.4 %
I would want to help, but would probably not be able to.	1,061	44.9 %
I wouldn't help.	53	2.2 %
I don't know.	484	20.5 %
No answer	281	12.0 %
Total	2,361	100.0 %

Furthermore, Table 6 shows that about 40 % of respondents were aware of the presence of elderly or disabled people in their neighborhood. Table 7 shows the results of a question about whether it would be possible to evacuate on one's own in the event of a disaster. About 20 % of the respondents said they did not know, and 5 % said it would be impossible. And, Table 8 shows that approximately 20 % of respondents would actively support the elderly and disabled in an emergency. At the same time, about half of respondents would like to support them but consider it difficult.

2.3.3 Assessing the actual situation regarding the attitudes of residents

From the previous section, it was found that about 40 % of respondents had experienced a disaster and about 40 % of respondents were aware of the presence of elderly and disabled people in the neighborhood. It was also confirmed that about 60 % of the residents do not participate in disaster drills and that about 60 % of the respondents do not communicate with

other residents on a regular basis. The results reveal the current situation in the affected areas and where the threat of a Nankai trough earthquake exists.

And, Chapter 3 of the 2003 White Paper on Disaster Reduction, 'People's Activities for Disaster Reduction', presents the results of a public opinion poll conducted by the Government Information Office, Cabinet Office ($N = 3,000$). This is a survey on 'disaster preparation' in three time periods and shows trends based on the results of surveys conducted in 1991, immediately after the Hanshin-Awaji Earthquake in September 1995 and in 2002 [Cabinet Office, Government of Japan, 2003].

Furthermore, the three questions above are the same as those in this study. This study therefore examines the differences between immediately after the disaster and 19 years later, as well as the differences in attitudes associated with whether people have experienced a disaster, including the results of public opinion polls.

Table 9 shows the relationship between the presence or absence of disaster experience and disaster preparation before and after a disaster. This table shows the results of the current survey in the upper row and the results of a survey conducted by the Cabinet Office in 2002 in the lower row. Table 10 shows the relationship between the presence or absence of disaster experience and the frequency of daily communication. And, Table 11 shows the relationship between awareness of elderly and disabled people in the neighborhood and whether they would go to help in a disaster.

The results of the survey conducted by the Cabinet Office in Table 9 show that, nationwide, immediately after the Great Hanshin-Awaji Earthquake, the highest values were recorded for all the following: stockpiling food and water, communicating with family members, and preparing medical supplies. Then, looking at the disaster preparation 19 years after the Great Hanshin-Awaji Earthquake, it was found that disaster victims exceeded the figures of those who had never experienced a disaster in all categories, including securing food and water, communication with family members, and preparation of medical supplies.

In addition, a comparison of the disaster preparation of all citizens immediately after the Great Hanshin-Awaji Earthquake and those who experienced a disaster 19 years later confirmed that those who experienced the disaster 19 years later had higher disaster preparation in all categories. On the other hand, disaster awareness after the Great Hanshin-Awaji Earthquake was low for all items in 2002, seven years after the disaster, and an even more marked decline was observed among those who had not experienced a disaster 19 years later in 2014.

These results indicate that 19 years after a disaster, the disaster awareness of those who have experience is higher than the national average immediately after the disaster, while the awareness of those who have not experienced a disaster declines over time.

Table 10 also shows that about half of the respondents, regardless of whether they had experienced a disaster, communicated with their neighbors occasionally, with similar results for

Table 9: Relationship between disaster experience and disaster preparation

	Securing food and drinking water				Total	
	Have in stock		Not prepared			
	Number of respondents	Shares	Number of respondents	Shares		
Experienced disaster	345	34.9 %	643	65.1 %	988	100.0 %
No experience of disaster	39	3.1 %	1,216	96.9 %	1,255	100.0 %
Public opinion poll in 1991			10.8 %		–	–
Public opinion poll in September 1995 (immediately after the earthquake)			23.5 %		–	–
Public opinion poll in 2002			18.6 %		–	–
	How to contact family members				Total	
	Have decided		Not decided			
	Number of respondents	Shares	Number of respondents	Shares		
Experienced disaster	402	40.7 %	586	59.3 %	988	100.0 %
No experience of disaster	457	36.4 %	798	63.6 %	1,255	100.0 %
Public opinion poll in 1991			9.7 %		–	–
Public opinion poll in September 1995 (immediately after the earthquake)			16.3 %		–	–
Public opinion poll in 2002			12.8 %		–	–
	Pharmaceutical preparation				Total	
	Preparation		Not prepared			
	Number of respondents	Shares	Number of respondents	Shares		
Experienced disaster	790	80.0 %	198	20.0 %	988	100.0 %
No experience of disaster	197	15.7 %	1,058	84.3 %	1,255	100.0 %
Public opinion poll in 1991			40.7 %		–	–
Public opinion poll in September 1995 (immediately after the earthquake)			59.1 %		–	–
Public opinion poll in 2002			46.6 %		–	–

other frequencies, regardless of whether they had experienced a disaster. This result means that awareness of the importance of daily communication with neighbors, a lesson learned from the Great Hanshin-Awaji Earthquake, is waning, as is awareness of the importance of mutual aid. The results show that a high level of daily concern for older people and people with disabilities leads to support and the development of strong mutual aid communities.

However, approximately twice as many elderly and disabled people as able-bodied people died in the Great East Japan Earthquake [Nikkei Business Publications, 2012]. The results in Table 10 confirm that communication can help, but based on the results in Table 11, there are significant barriers to protecting the lives of vulnerable disaster victims.

3. Effects of feedback of questionnaire results on disaster preparation awareness

3.1 Overview of feedback on the results of the questionnaire on disaster preparation awareness

The results of the citizens' awareness survey on the importance of disaster prevention and mitigation were provided in

the form of a report and debriefing session as implementation feedback to the chairperson of each local government association. Table 12 shows a summary of the questionnaire survey conducted during the feedback and the report and a view of the debriefing session.

3.2 Questionnaire survey results and considerations

Table 13 shows the need for feedback on the results of the disaster management questionnaire. Table 14 shows the changes in disaster management behavior and awareness according to the results of the questionnaire survey. And, Table 15 shows the need for advance preparation for natural disasters by local associations. Table 16 shows the need for assistance for those unable to evacuate on their own.

Tables 13 and 14 show that the feedback of the survey results is very meaningful to residents and community chairpersons and effective in raising disaster awareness. In addition, Tables 15 and 16 were found to be effective in reminding people of the need to be prepared in advance for natural disasters and the need to support the elderly and disabled who cannot evacuate on their own.

Table 10: Experience of disaster and frequency of daily communication

	Very often		Often		Sometimes		Almost never		Not at all		No answer		Total	
	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares		
Experienced disaster	51	5.2 %	181	18.3 %	487	49.3 %	183	18.5 %	38	3.8 %	48	4.9 %	988	100 %
No experience of disaster	58	4.6 %	230	18.3 %	613	48.8 %	245	19.5 %	52	5.3 %	57	4.5 %	1255	100 %
I don't know	0	0.0 %	2	5.3 %	14	36.8 %	14	36.8 %	7	18.4 %	1	2.6 %	38	100 %
No answer	1	1.3 %	5	6.3 %	11	13.8 %	4	5.0 %	0	0.0 %	59	73.8 %	80	100 %
Total	110	-	418	-	1,125	-	446	-	97	-	165	-	2,361	-

Table 11: Perceptions of elderly and disabled people living in the neighborhood and awareness of support during disasters

	I would actively help them.		I would want to help, but would probably not be able to.		I wouldn't help.		I don't know.		No answer.		Total	
	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares	Number of respondents	Shares		
I know them very well.	42	52.5 %	30	37.5 %	6	7.5 %	0	0.0 %	2	2.5 %	80	100 %
I know them.	262	26.7 %	529	53.8 %	18	1.8 %	142	14.4 %	32	3.3 %	983	100 %
I've heard of them.	64	17.0 %	196	52.0 %	8	2.1 %	93	24.7 %	16	4.2 %	377	100 %
I don't know any.	105	15.7 %	280	41.9 %	19	2.8 %	234	35.0 %	31	4.6 %	669	100 %
No answer	9	3.6 %	26	10.3 %	2	0.8 %	15	6.0 %	200	79.4 %	252	100 %
Total	482	-	1061	-	53	-	484	-	281	-	2361	-

Table 12: Summary of the questionnaire survey and debriefing session conducted during feedback

Subjects	Participants in a regular meeting of the Kinpo Elementary School district United Neighborhood Association
Distribution and collection period	December 18, 2015
Distribution and collection methods	Direct distribution and collection
Number of sheets	17 sheets
Survey item	The need for feedback on the results of the disaster management questionnaire Changes in disaster management behaviour and awareness according to the results of the questionnaire survey The need for advance preparation for natural disasters by local associations The need for assistance for those unable to evacuate on their own

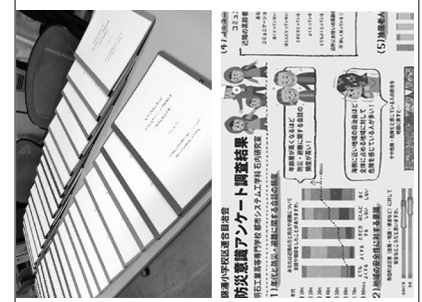


Table 13: Need for feedback on the results of the disaster awareness management questionnaire

	Number of respondents	Shares
Very meaningful	4	23.5 %
Meaningful	13	76.5 %
Neither	0	0 %
Not very meaningful	0	0 %
Not at all meaningful	0	0 %
Total	17	100 %

Table 14: Changes in disaster management behaviour and results of the questionnaire survey

	Number of respondents	Shares
It was raised a lot	1	5.9 %
It's now somewhat higher	13	76.5 %
No change	3	17.6 %
Not very high	0	0 %
It didn't heighten at all	0	0 %
Total	17	100 %

Table 15: Need for advance preparedness for natural disasters by local associations

	Number of respondents	Shares
Very necessary	4	23.5 %
Slightly necessary	10	58.8 %
Neither	2	11.8 %
Not necessary	0	0 %
No response	1	5.9 %
Total	17	100 %

Table 16: Need for assistance for those unable to evacuate on their own

	Number of respondents	Shares
Very necessary	8	47.1 %
Slightly necessary	9	52.9 %
Neither	0	0 %
Not necessary	0	0 %
Not feeling it at all	0	0 %
Total	17	100 %

4. Conclusion

The four main outcomes of the study are as follows.

- In elementary school districts facing the coast, the disasters that residents are concerned about differ from district to district, and as a single elementary school, it is necessary to prepare in advance based on these current conditions.
- The results of a nationwide survey conducted by the Cabinet

Office and the findings of this study indicate that 19 years after an earthquake, the disaster preparation of those who experienced a disaster was higher than the national average immediately after the disaster, while the disaster preparation of those who had not experienced a disaster declined over the 19 years.

- Daily communication was found to be important in assisting the elderly and disabled. However, about half of the respondents thought that it is difficult to help vulnerable people in a disaster, indicating that it is difficult to save lives in disasters with a high number of fatalities.
- It was confirmed that the identification and feedback of disaster preparation awareness among local residents in the affected areas will be an important resource for the next earthquake of concern.

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