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**Effectiveness of disaster preparedness education in helping older people prevent
isolation**

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Author Note

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Conflict of Interest:

We have no conflicts of interest to disclose.

Data Availability Statement:

The participants in this study did not agree for their data to be shared publicly for privacy. The data are not publicly available due to privacy or ethical restrictions.

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Effectiveness of disaster preparedness education in helping older people prevent isolation

Abstract

Objective

This study intends to clarify the effect of regional disaster preparedness education on efforts to prevent isolation of older people in the event of a disaster.

Design and Sample

This quasi-experimental study involved participants aged 65 and above. The intervention group (n=35) and the comparison group (n=61) were compared in the first survey and another one month later.

Measurements

The survey items assessed aspects such as awareness of and actions related to isolation preparedness, and awareness of support needed by others in the event of a disaster. The results were compared between the two groups.

Intervention

The educational program was based on the transtheoretical model of health behavior change and focused on preventing isolation in the event of a disaster, by connecting vulnerable people with their neighbors. Puppet shows and group work were used as part of the program.

Results

A month after the program implementation, the intervention group had significantly higher awareness of and actions related to isolation preparedness than the comparison group.

Conclusions

Disaster preparedness education invokes a responsibility towards the prevention of isolation in the disaster and perceives it as a community issue and encourages individuals to support to others.

Keywords: disaster preparedness education, isolation, mutual help, mutual aid, social connection, older people

Background

The magnitude of damages to older people during a disaster has been raised as an important issue for the international community (Naito et al., 2020). Older people are more likely to be affected due to age-related functional restrictions and a higher prevalence of disability (Loke et al., 2012). The *Guidelines for Evacuation Behavior Support for Persons Requiring Evacuation Behavior* issued in 2013 indicate that public health nurses (PHNs) play a central role in identifying and providing support to people requiring special attention during a disaster and in conducting and evaluating evacuation drills (Cabinet Office, 2013). However, only 12.1% of municipalities in Japan have formulated individual plans that provide specific evacuation methods for the elderly, infants, persons with disabilities, and other groups who need assistance, especially in the event of a disaster (Fire and Disaster Management Agency, 2019), and there is a limit to public assistance during large-scale disasters. Additionally, less than 25% of the older people take disaster countermeasures (Al-Rousan et al., 2014), and there is a lack of disaster preparedness. From these facts, it is considered that there are older people in the area who are at risk of being isolated in the event of a disaster.

Because of the limitations of public assistance and the lack of self-help, mutual help during a disaster is of vital importance. Mutual help in the event of a disaster is “mutual help in the local community, such as cooperating in the neighborhood to rescue people buried alive and guiding the evacuation of children and people requiring special care” (Cabinet Office, 2014). Good neighborhood relations are also one of the most important elements of evacuation behavior (Nonomura et al., 2020). According to a study, the motivation for mutual help was as high as 78.1%. However, 79.2% of the respondents in this study did not discuss disaster preparedness in the neighborhood (Ichimori et al., 2018). There is a gap between the mutual help's disaster

preparedness awareness and actions and thus, its functionality may be unreliable in the event of a disaster. Therefore, a practical method in which mutual help disaster preparedness awareness and actions are linked is required.

Older people can also utilize information, experience, and connections to make decisions about disasters (Reininger et al., 2013), and it is important to consider them as supporters. A message that encourages social connection with neighbors is important in disaster preparedness planning to strengthen community resilience (Plough et al, 2013). Based on the above, it is necessary to develop disaster preparedness education that prevents older people's isolation in the event of a disaster, by focusing on daily connections and mutual help.

Purpose of the Research

This study intends to clarify the effect of regional disaster preparedness education in helping older people prevent their own isolation and that of other vulnerable older people, in the event of a disaster.

Methods

Design

This study used a quasi-experimental approach. The survey was conducted in Japan. An intervention group and a comparison group were selected. Data collection occurred from June to August 2020 in the intervention group and from June to July 2020 in the comparison group. Because the intervention group was composed of several subgroups, data collection spanned two months. A self-administered questionnaire survey was conducted for both groups initially and then one month later. One month after the follow-up survey, the comparison group was mailed a

“Disaster Preparedness Connection Handbook,” which contained the same educational content as with the intervention group.

Setting and Sample

The participants in both groups were aged 65 and above. They participated actively in community activities, such as senior citizens' clubs and salons in the local area. A salon is a place where local older people can gather and engage in social activities, such as crafts and games. Figure 1 shows the process of selecting the target people. The intervention group participants requested that the local government provide operational support to elderly groups that carry out community activities. A total of 40 people participated in disaster preparedness education in the intervention group. The comparison group was randomly selected from a group of 500 people using the systematic sampling method (considering gender and age) from the Basic Resident Register that contains the name, age, and address of the residents managed by the local government. A total of 139 people cooperated with the follow-up survey.

The survey involved a self-administered questionnaire using paper and pen. Only the initial survey for the intervention group was conducted in person, while the other surveys were conducted by mail surveys.

Intervention

Purpose of Education

The purpose of disaster preparedness education is to make people aware that their daily connections with local residents will prevent their isolation and that of others in the event of a

disaster. In addition, we sought to enhance older people's role not only as support seekers but also support givers in the event of a disaster.

Theory Used in Disaster Preparedness Education

The disaster preparedness education in this study was planned with reference to the transtheoretical model of health behavior change (Prochaska et al., 1992). This model comprises 5 stages: pre-contemplation, contemplation, preparation, action, and maintenance. We assumed that the participants would be in one of three previous stages. These three stages represent a lack of awareness of the problem and a lack of or low willingness to take action to resolve it. We make this assumption based on prior research by Ichimori et al. (2018, p43) that indicated that although, local residents are highly motivated to help each other, there is a gap in their actions toward disaster preparedness awareness. Thus, participants who are low on awareness and action to prevent isolation in the event of a disaster, can be considered to be in one of these three stages. This model also includes the process theory, and there are intervening processes that correspond to the stages. Accordingly, the intervention program included aspects, such as "consciousness raising," "dramatic relief," "environmental reevaluation," "self-reevaluation," and "self-liberation," that corresponded to these three stages. Our intervention focused on the processes corresponding to the three stages prior to the action stage which work on the participants' cognition of the need for efforts to prevent isolation.

Self-efficacy is also a major factor influencing disaster preparedness intent (Adams et al., 2019). It is one of the concepts contained in the transtheoretical model and we thought to promote the behavior change stage. In this study, "performance accomplishments," "vicarious experience," and "verbal persuasion" were incorporated into the disaster preparedness education

content. The components of the intervention based on process theory and self-efficacy are shown in Figure 2.

How to Deploy Disaster Preparedness Education

A puppet show related to disaster preparedness education was performed live for each group to promote empathy and understanding of the model case. This method is known to enhance participants' learning process by improving concentration and involvement and is effective with people of all ages (Miller et al., 2019). In addition, we incorporated active learning elements and developed them to facilitate a deeper understanding based on the exchange of opinions and discussions among the participants.

Contents of the Disaster Preparedness Education

We introduced six model cases for the participants and dramatized situations of people and public institutions before and after the occurrence of a disaster. The content of the disaster prevention education concerned what to do in the event of an earthquake. This was implemented in a game and dramatic enactment format. The intervention took approximately 40 minutes. As shown in Figure 2, the specific content and aim of disaster preparedness education consisted of seven scenes.

Measures

The survey items assessed personal characteristics and isolation prevention efforts in the event of a disaster. Personal characteristics were collected only in the initial survey, and the same

items were used in the initial and follow-up surveys concerning isolation prevention efforts in the event of a disaster.

Personal Characteristics

Basic demographic information regarding participants' age, gender, family structure, whether they need care, employment status, presence or absence of leadership position within community activities, community activity preferences, frequency of participation in community activities, frequency of participation in community disaster preparedness activities, and neighborhood relationships was gathered. The response choices used in the survey are shown in Table 1.

Efforts to Prevent Isolation in the Event of a Disaster

Awareness of isolation preparedness (2 items), action to prevent isolation (2 items), and awareness of support for others (4 items) were the factors measured in this case. In total, there were 8 items that were rated on a four-point scale, where 1=strongly disagree and 4=strongly agree.

Awareness of isolation preparedness included "I am aware that the connection built with neighbors will help me prevent isolation in the event of a disaster" (hereafter, awareness to prevent my isolation) and "I am aware that the connection built with neighbors will help them prevent isolation in the event of a disaster" (hereafter, awareness to prevent isolation of others). Actions to prevent isolation included "I usually maintain a face-to-face relationship with my neighbors so that I will not be isolated in the event of a disaster" (hereafter, actions to prevent my isolation) and "I usually maintain a face-to-face relationship with my neighbors so that they

will not be isolated in the event of a disaster” (hereafter, actions to prevent isolation of others). Awareness of support for others included items like “I am expected to be able to do something more than usual, for the neighborhood from the surrounding” (hereafter, expected consciousness from the surrounding).

Survey items’ content validity was ensured by having the items professionally checked by two researchers with public health nursing experience and by a local official from the town planning department. Surface validity was ensured by conducting a preliminary survey of 10 persons aged 65 and above, who participated in community activities in the area.

Analytic Strategy

Basic attributes were compared between groups using descriptive statistics, unpaired t-test, Mann-Whitney U test, χ^2 test and Fisher’s exact test. To clarify the effect of disaster preparedness education on efforts to prevent isolation, descriptive statistics and the Mann-Whitney U test were used to compare the intervention group and the comparison group. IBM SPSS Statistics version 26 was used for statistical processing, and the significance level was set to 5%.

Ethical Considerations

This study was approved by the institution to which the researcher belongs. Both groups were provided with adequate information of research. The intervention group provided consent in writing, and the comparison group indicated consent by answering and replying to the questionnaire.

Results

Thirty-five respondents filled out the follow-up survey in the intervention group indicating an 87.5% response rate. The comparison group had 117 respondents (recovery rate 84.2%), and 61 people who participated in community activities from April 2019 to April 2020 were analyzed (valid response rate 43.9%).

Comparison of Personal Characteristics between the Intervention and Comparison Groups

Table 1 shows the comparison between the intervention and comparison groups based on the participants' personal characteristics. The participants' average age was significantly higher in the intervention group (Mean \pm SD: 78.91 \pm 5.61 years) than in the comparison group (73.94 \pm 5.21 years) ($P = 0.001$). There were no significant differences between the two groups in gender, family composition, the need for care, and employment status. As for community activities, the participation rate of the senior citizens' club ($P = 0.014$) and salon ($P = 0.046$) was significantly higher in the intervention group, and the comparison group was significantly higher in the hobby activity group ($P = 0.011$). The presence or absence of leadership position within community activities ($P = 0.019$) and the proportion of neighborhood relationships ($P = 0.010$) were significantly higher in the intervention group.

Initial Survey

The results from the initial survey are shown in Table 2.

Awareness of Isolation Preparedness

There was no significant difference between the two groups on either of the two items (“awareness to prevent my isolation” and “awareness to prevent isolation of others”).

Action to Prevent Isolation

In “actions to prevent my isolation,” the intervention group scored significantly higher (3.11 ± 0.80 points) than the comparison group (2.85 ± 0.68 points) ($P = 0.044$). In “actions to prevent isolation of others,” there was no significant difference between the two groups.

Awareness of Support for Others

There was no significant difference between the two groups for any of the items (“assistance consciousness,” “fulfillment of usefulness,” “self-efficacy” and “expected consciousness from the surrounding”).

Follow-up Survey

The results from the follow-up survey are shown in Table 3.

Awareness of Isolation Preparedness

The intervention group scored significantly higher than the comparison group on both “awareness to prevent my isolation” (3.20 ± 0.68 versus 2.85 ± 0.75 points, $P= 0.032$) and “awareness to prevent isolation of others” (3.29 ± 0.68 versus 2.95 ± 0.68 points, $P= 0.020$).

Action to Prevent Isolation

The intervention group scored significantly higher than the comparison group on both “actions to prevent my isolation” (3.20 ± 0.72 versus 2.80 ± 0.77 points, $P= 0.010$) and “actions to prevent isolation of others” (3.11 ± 0.76 versus 2.72 ± 0.78 points, $P= 0.017$).

Awareness of Support for Others

“Assistance consciousness,” “fulfillment of usefulness,” and “self-efficacy” were not found to be significantly different between the two groups. The intervention group scored significantly higher than the comparison group (2.63 ± 0.77 and 2.25 ± 0.79 points, respectively) ($P = 0.039$) on “expected consciousness from the surrounding.”

Discussion

Participant Characteristics

The participants in this study were a group that participated frequently in regional disaster preparedness activities and reported having close relationships with neighbors. Regarding participation in regional disaster preparedness activities, 60.1% of the intervention group and 41.7% of the comparison group mentioned having some experience of participating in such activities. According to a Japanese opinion poll (Cabinet Office, 2017), the participation or observation rate in disaster preparedness drills for people in their 70s and above is 46.7%. Thus, it can be inferred that the participant group displayed high awareness of and effective action toward disaster preparedness even before the intervention. For the degree of neighborhood relationships, 74.3% participants in the intervention group and 64% in the comparison group answered “there is some socializing in addition to general greetings” and “there is a close relationship.” According to the opinion poll (Cabinet Office, 2018), 59.6% of those aged 65 and above reported having a close relationship with their neighbors. Thus, the participants of this study already enjoyed a high degree of closeness with their neighbors.

From the result of the initial survey, about 80% of the respondents affirmed the two items of action for preventing isolation. Before the intervention, we assumed that the participants were

either in the pre-contemplation, contemplation, or preparation stages for preventing isolation in the event of a disaster. However, based on the findings, they had taken action to prevent isolation even before undergoing the intervention in this study. The action stage of the transtheoretical model is when individuals modify their behavior, experiences, or environment in order to overcome their problems. It appears more likely that the participants were in the action stage, which involved performing actions that showed consciousness of isolation prevention in the event of a disaster.

Changes to Efforts to Prevent Isolation in the Event of a Disaster through Disaster Preparedness Education

Awareness and Actions to Prevent Isolation for Oneself and Others

First, awareness of isolation preparedness will be described. The disaster preparedness education of the study focused on mutual help and ties between residents. Owing to the characteristic of mutual aid, which means voluntary mutual help between residents, there is an equal relationship between them (Ito et al., 2020). Disaster preparedness education showed public assistance limitations and the magnitude of damage to the older people. It revealed the extent of possible isolation for vulnerable people in the event of a disaster. We believe that older people in the intervention group recognized that isolation, in the event of a disaster, could occur to anyone and therefore, became more aware of the efforts needed to prevent isolation.

Furthermore, one of the characteristics of mutual aid is the experience of empathy for certain issues among residents (Ito et al., 2020). For the participants, emotional feelings towards those who were at risk of isolation seemed to grow and a sense of understanding and responsibility for others' isolation was established.

Mutual aid also includes the consciousness of taking action for others in the community (Ito et al., 2020). We considered that the intervention group broadly grasped the problem of isolation in the event of a disaster as a common issue for the region to be solved, thereby leading to greater awareness of the isolation of others and of this issue being solvable by the community itself.

Next, the actions to prevent isolation will be described. The actions taken to prevent isolation of others were significantly higher in the intervention group after education. Health behavior leads to behavioral change by way of changing consciousness (Prochaska et al., 1992). In the present study, the actions to prevent isolation correspond to health behavior. Based on the results, it can be said that the intervention group maintained and improved their actions for preventing isolation of others because they had gained greater consciousness or awareness regarding this than the comparison group.

Awareness of Support for Others

The intervention group scored significantly higher than the comparison group on "expected consciousness from the surrounding"; however, the percentage of those who agreed with this item, after the education, was still lower (57.1%) in comparison to other items. Older people feel that their usual activities are not socially recognized and they do not feel valued (Kuwashima et al., 2013). Additionally, many adolescents are unaware of the active role that older people can play in society (Oda, 2017). In other words, older people's negative feelings towards themselves, arising as a result of others' negative attitudes toward aging may have resulted in the low number of positive responses.

However, older people also have a consciousness that may contribute to helping others (Kuwashima et al., 2013). Through disaster preparedness education, we used verbal persuasion to encourage participants to assist others who were at risk of isolation in the event of a disaster and emphasized on how usual interactions and awareness of the neighborhood would lead to better preparedness against isolation. Through the disaster preparedness education, we think that older people objectively saw themselves the way their surroundings saw them: that they were positioned as a supporter for others and the community in the event of a disaster. Thus, the disaster preparedness education enhanced older people's awareness regarding their ability to contribute to others and the community; therefore older people raised expected consciousness from the surrounding.

Disaster Preparedness Education's Effect on Efforts to Prevent Isolation in the Event of a Disaster

The disaster preparedness education in this study was conducted in order to work toward cognition of the transtheoretical model of health behavior change. Older people are motivated to take disaster preparedness actions to protect others, but due to their age and physical limitations, they tend to only focus on their own preparedness (Ashida et al., 2016). However, as indicated by the findings of this study, recognizing the need for preparedness against isolation in the event of a disaster leads to a greater likelihood that older people will take actions to prepare against isolation and will also express a desire to focus on others' isolation preparedness. Additionally, the disaster preparedness education involved participants recognizing the effects of isolation and the importance of mutual help, by way of a puppet show that depicted a disaster situation. Puppet shows encourage participants to express their thoughts and emotions (Miller et al., 2019). The

puppet show in our study too allowed the participants to recognize the negative feeling of isolation of vulnerable neighbors in the event of a disaster and the positive feeling of helping others. Participants were also encouraged to express their thoughts and feelings about preventing isolation. It may have been useful to gain awareness of the need for isolation preparedness through puppet shows and the process of working on the cognition of the transtheoretical model. It is possible that working on cognition was effective in awareness and action to prevent isolation.

This study was effective in providing a mutual help-type of disaster prevention education (Hirata, 2011), which has been lacking until now. It has been difficult so far for disaster prevention education to have a ripple effect on those who do not participate in it. However, this study focused on people helping each other, and the results of the survey also showed an effect on the awareness and actions by others to prevent isolation. Thus, the disaster prevention education in this study is expected to have a ripple effect on prevention of isolation in the event of a disaster, not only for participants but also for others. In addition, this study helped elderly participants cultivate a new awareness of how to support each other.

Clinical Application

Improving the self-help ability of older people who are vulnerable to disasters is an important issue in crisis management conducted by PHNs. Additionally, it is also an important mission for PHNs to strengthen support within the community and ensure the presence of a greater number of supporters in the event of a disaster (Cabinet Office, 2006).

First, we describe the activities and relationships of PHNs as teaching materials for effective disaster prevention education from this study. The 40-minute disaster preparedness

education classes in this study were effective in expanding the awareness and actions of the older people to prevent isolation in the event of a disaster. Disaster preparedness education can inspire a sense of ownership of others' isolation among participants and strengthen the participants' ability to combat it as a collective and community issue. PHNs understand the characteristics and needs of the area through their daily activities and dialog with residents. In addition, the risks and needs of isolated persons are grasped through individual support for persons requiring special consideration in the event of a disaster. By projecting the needs of older people and regional characteristics, acquired by PHNs, into model cases of disaster preparedness education, older people will be able to experience sympathy regarding the risk of isolation in the event of a disaster, and their sense of being able to contribute to this issue will increase.

Second, PHNs can effectively disseminate information regarding disaster preparedness. The number of people who actively participate in disaster preparedness education and training is limited (Hirata, 2011). Therefore, even effective disaster preparedness education is difficult to impart to several participants. PHNs can offer a solution here as they may enter into existing activities and networks and disseminate disaster preparedness education to more places. The participants of this study were those who participated in community activities. It is therefore, effective to develop disaster preparedness education by utilizing the activities of existing organizations and activities, such as neighborhood associations, senior citizens' clubs, and salons. That is, in addition to training official supporters, such as volunteer groups, PHNs can enable older people to become supporters in the neighborhood through their daily activities by imparting disaster preparedness education to those participating in community activities.

Third, PHNs can potentially contribute to future development of disaster preparedness education. By disseminating disaster preparedness education to those who actively participate in

local activities, it is possible to expand it as a resident-centered activity. That is, it is possible that older people may take on an active leadership role in the community and disseminate disaster preparedness education to other groups that tend to require special support in the event of a disaster, such as mothers–infants and those with disabilities, among others. Thus, as older people carry out disaster preparedness education in various places, those in their surroundings are also likely to view them positively, and older people themselves might experience expectations from others. Therefore, PHNs should also create an environment in which older people can demonstrate their abilities. This can contribute to a rising awareness of mutual help among residents across generations.

Limitations

This study has two limitations. The first was setting up the intervention group and comparison group to measure the effect of disaster preparedness education. Multiple groups were selected for the intervention group, and random sampling was performed for the comparison group so that there would be no difference in individual characteristics between the two groups. However, there were some significant differences in individual characteristics. The intervention group had a significantly higher degree of closeness to their neighbors, and the types of community activities in which they participated were characterized by a large number of senior citizens' clubs and salons. The intervention groups, therefore, displayed greater awareness of and positive actions toward their neighbors due to the local activities available to them. Consequently, the intervention group may have been a group that was more likely to benefit from education.

The second limitation was that efforts to prevent isolation in the event of a disaster used in this study were a new concept. As for the survey items, the content validity by expert check and the surface validity by the pre-survey was secured, but there is no standard-related validity, which may not be sufficient.

Conclusion

In this study, disaster preparedness education maintained and improved awareness and actions to prevent isolation for oneself and others in the event of a disaster. Therefore, to raise awareness and implement actions to prevent isolation, it is important for older people to understand isolation as an issue that the community, as a whole, faces and to take responsibility towards its prevention.

In addition, after the education program, the scores within the intervention group on “expected consciousness from the surrounding” were higher than the comparison group, but positive responses, on the whole, were low in comparison to other items. Therefore, it is important for the older people to feel a sense of contribution through recognizing that isolation, and ways to combat it, are within their abilities. It is also important to create an environment in which the surroundings can easily draw out older peoples’ abilities. In the future, PHNs can play an important role in disseminating disaster preparedness education for older people, who participate in community activities and in helping older people improve their ability to help themselves and support others in the neighborhood.

Data Availability Statement

The participants in this study did not agree for their data to be shared publicly for privacy. The data are not publicly available due to privacy or ethical restrictions.

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Table 1*Comparison of Individual Characteristics Between Intervention and Comparison Groups (N=96)*

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
Age ^a	78.91±5.61			73.94±5.21			0.001
Gender ^b							
Men		17	48.6		30	49.2	0.954
Women		18	51.4		31	50.8	
Family structure ^b							
Living alone		9	25.7		9	14.8	0.185
Live together		26	74.3		52	85.2	
The need for care ^c							
Yes		4	11.4		2	3.3	0.126
No		31	88.6		59	96.7	
Employment status ^b							
Yes		2	5.7		12	19.7	0.062
No		33	94.3		49	80.3	
Presence or absence of leadership position ^b							
Yes		19	54.3		18	30.0	0.019
No		16	45.7		42	70.0	

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	N	%	Mean ± SD	n	%	
Unanswered		-	—		1		
Community activities							
Neighborhood association ^b		15	42.9		29	47.5	0.658
Senior citizens' club ^b		12	34.3		8	13.1	0.014
Salon ^c		8	22.9		5	8.2	0.046
Volunteer ^b		8	22.9		12	19.7	0.711
Sports ^b		7	20.0		19	31.1	0.237
Hobby ^b		9	25.7		32	52.5	0.011
Frequency of community activities ^d							
1. Not participating		1	2.9		9	15.3	0.266
2. Several times a year		2	5.7		10	16.9	
3. Once or twice a month		19	54.3		14	23.7	
4. About once a week		2	5.7		11	18.6	
5. 2-3 times a week		8	22.9		11	18.6	
6. 4 times a week or more		3	8.6		4	6.8	
Unanswered		-	—		2		

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	N	%	Mean ± SD	n	%	
Range (1-6)	3.66±1.24			3.29±1.51			
Frequency of community disaster preparedness activities ^d							
1. Not participating		14	40.0		35	58.3	0.063
2. Once every 3 years or more		1	2.9		2	3.3	
3. Once every two years		2	5.7		0	0.0	
4. Once a year		8	22.9		15	25.0	
5. More than twice a year		10	28.6		8	13.3	
Unanswered		-	—		1		
Range (1–5)	2.97±1.76			2.32±1.65			
Neighborhood relationships ^d							
1. Almost none		1	2.9		1	1.6	0.010
2. Greeting degree		8	22.9		21	34.4	
3. Some socializing in addition to general greetings		9	25.7		30	49.2	
4. A close relationship		17	48.6		9	14.8	

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	N	%	Mean ± SD	n	%	
Range (1–4)	3.20±0.90			2.77±0.72			

Note: a: Unpaired t-test, b: chi-square test, c: Fisher's exact test, d: Mann-Whitney U test

Table 2

Comparison of Initial Surveys of Anti-isolation Efforts During Disasters Between the Intervention and Comparison Groups (N=96)

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
Awareness of isolation preparedness							
Awareness to prevent my isolation							
1. Strongly disagree		1	2.9		4	6.6	0.481
2. Disagree		4	11.4		10	16.4	
3. Agree		25	71.4		38	62.3	
4. Strongly agree		5	14.3		9	14.8	
Range (1–4)	2.97±0.62			2.85±0.75			
Awareness to prevent isolation of others							
1. Strongly disagree		2	5.7		4	6.6	0.941
2. Disagree		2	5.7		6	9.8	
3. Agree		26	74.3		40	65.6	
4. Strongly agree		5	14.3		11	18.0	
Range (1–4)	2.97±0.66			2.95±0.74			
Action to prevent isolation							
Actions to prevent my isolation							
1. Strongly disagree		2	5.7		3	4.9	0.044
2. Disagree		3	8.6		10	16.4	

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
3. Agree		19	54.3		41	67.2	
4. Strongly agree		11	31.4		7	11.5	
Range (1–4)	3.11±0.80			2.85±0.68			
Actions to prevent isolation of others							
1. Strongly disagree		1	2.9		5	8.2	0.078
2. Disagree		3	8.6		10	16.4	
3. Agree		24	68.6		39	63.9	
4. Strongly agree		7	20.0		7	11.5	
Range (1–4)	3.06±0.64			2.79±0.76			
Awareness of support for others							
Assistance consciousness							
1. Strongly disagree		2	5.7		3	4.9	0.990
2. Disagree		7	20.0		13	21.3	
3. Agree		21	60.0		36	59.0	
4. Strongly agree		5	14.3		9	14.8	
Range (1–4)	2.83±0.75			2.84±0.73			
Fulfillment of usefulness							
1. Strongly disagree		3	8.6		4	6.6	0.831
2. Disagree		5	14.3		16	26.2	
3. Agree		21	60.0		27	44.3	

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
4. Strongly agree		6	17.1		14	23.0	
Range (1–4)	2.86±0.81			2.84±0.86			
Self-efficacy							
1. Strongly disagree		2	5.7		3	4.9	0.873
2. Disagree		6	17.1		12	19.7	
3. Agree		21	60.0		36	59.0	
4. Strongly agree		6	17.1		10	16.4	
Range (1–4)	2.89±0.76			2.87±0.74			
Expected consciousness from the surrounding							
1. Strongly disagree		2	5.7		10	16.4	0.482
2. Disagree		14	40.0		21	34.4	
3. Agree		17	48.6		25	41.0	
4. Strongly agree		2	5.7		5	8.2	
Range (1-4)	2.54±0.70			2.41±0.86			

Note: Mann-Whitney U test was conducted to compare the two groups

Table 3

Comparison of Follow-up Surveys of Anti-isolation Efforts During Disasters between the Intervention and Comparison Groups (N=96)

	Intervention group (n=35)			Comparison group (n=61)			Comparison
	Mean ± SD	n	%	Mean ± SD	n	%	p value
Awareness of isolation preparedness							
Awareness to prevent my isolation							
1. Strongly disagree		0	0.0		4	6.6	0.032
2. Disagree		5	14.3		10	16.4	
3. Agree		18	51.4		38	62.3	
4. Strongly agree		12	34.3		9	14.8	
Range (1–4)	3.20±0.68			2.85±0.75			
Awareness to prevent isolation of others							
1. Strongly disagree		0	0.0		3	5.0	0.020
2. Disagree		4	11.4		6	10.0	
3. Agree		17	48.6		42	70.0	
4. Strongly agree		14	40.0		9	15.0	
Unanswered		-	—		1		
Range (1–4)	3.29±0.67			2.95±0.68			
Action to prevent isolation							
Actions to prevent my isolation							
1. Strongly disagree		1	2.9		6	9.8	0.010

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
2. Disagree		3	8.6		7	11.5	
3. Agree		19	54.3		41	67.2	
4. Strongly agree		12	34.3		7	11.5	
Range (1–4)	3.20±0.72			2.80±0.77			
Actions to prevent isolation of others							
1. Strongly disagree		1	2.9		7	11.5	0.017
2. Disagree		5	14.3		8	13.1	
3. Agree		18	51.4		41	67.2	
4. Strongly agree		11	31.4		5	8.2	
Range (1–4)	3.11±0.76			2.72±0.78			
Awareness of support for others							
Assistance consciousness							
1. Strongly disagree		1	2.9		3	4.9	0.244
2. Disagree		7	20.0		17	27.9	
3. Agree		21	60.0		34	55.7	
4. Strongly agree		6	17.1		7	11.5	
Range (1–4)	2.91±0.70			2.74±0.73			
Fulfillment of usefulness							
1. Strongly disagree		1	2.9		2	3.3	0.399
2. Disagree		7	20.0		17	27.9	

	Intervention group (n=35)			Comparison group (n=61)			Comparison p value
	Mean ± SD	n	%	Mean ± SD	n	%	
3. Agree		22	62.9		35	57.4	
4. Strongly agree		5	14.3		7	11.5	
Range (1–4)	2.89±0.68			2.77±0.69			
Self-efficacy							
1. Strongly disagree		1	2.9		2	3.3	0.518
2. Disagree		7	20.0		12	20.0	
3. Agree		20	57.1		39	65.0	
4. Strongly agree		7	20.0		7	11.7	
Unanswered		-	—		1		
Range (1–4)	2.94±0.73			2.85±0.66			
Expected consciousness from the surrounding							
1. Strongly disagree		2	5.7		12	19.7	0.039
2. Disagree		13	37.1		23	37.7	
3. Agree		16	45.7		25	41.0	
4. Strongly agree		4	11.4		1	1.6	
Range (1–4)	2.63±0.77			2.25±0.79			

Note: Mann-Whitney U test was conducted to compare the two groups

Figure Legends

Figure 1

Flowchart of sample selection process

Figure 2

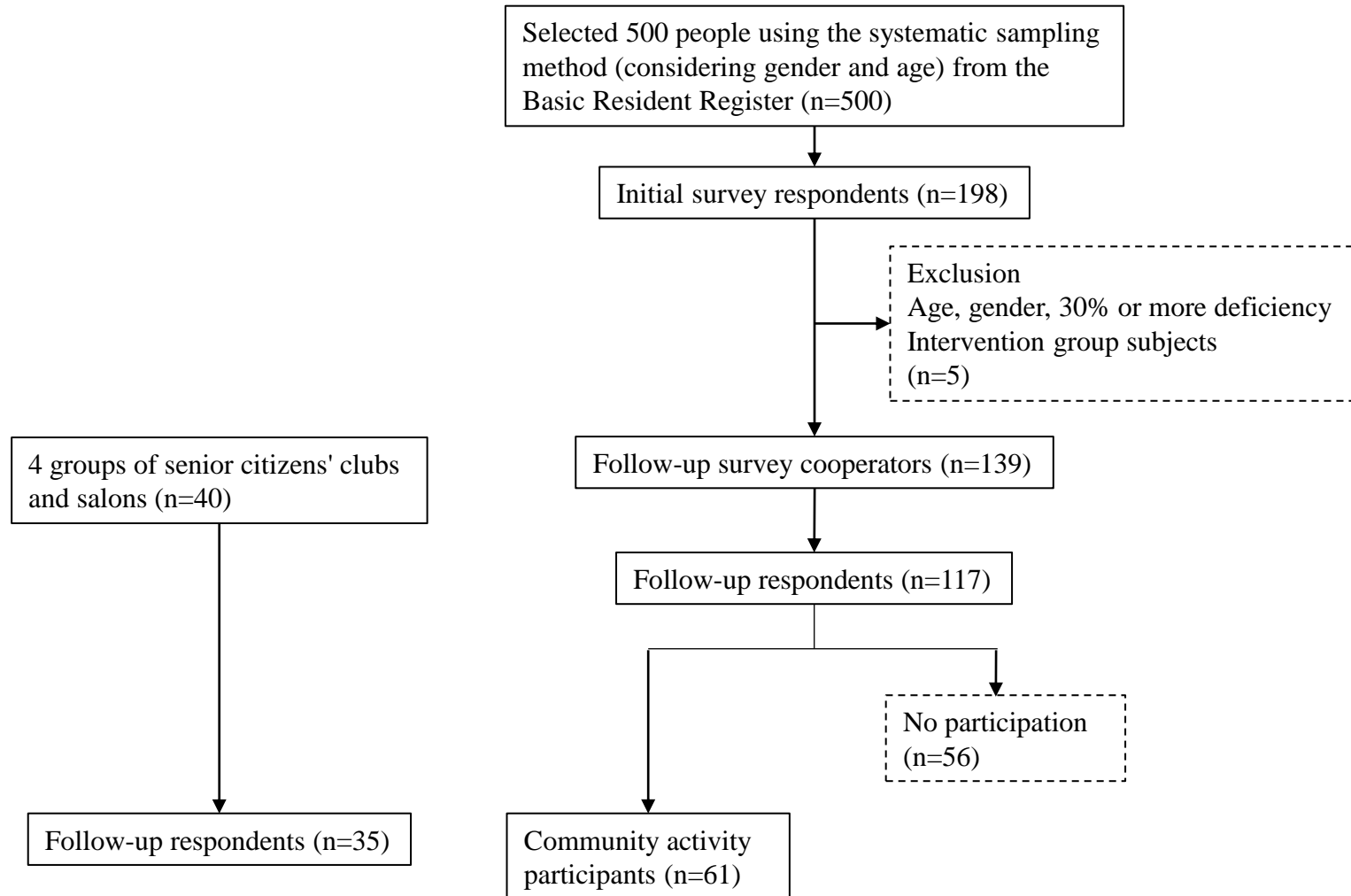
Contents and aim of disaster preparedness education


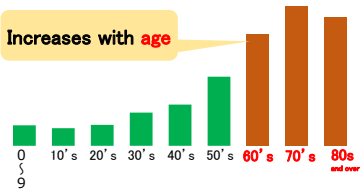



Fig.1

Intervention

Control

Final analysis target



Content	Aim
<p>1. Limitations of public assistance in the event of a large-scale disaster</p> <div style="display: flex; align-items: center;"> <div style="border: 2px solid yellow; padding: 10px; margin-right: 20px;"> <p>Massive earthquake ! Seismic intensity 7, Fire or collapse of house, Life line shutoff Fire and police cannot respond immediately!</p> </div> <div style="display: flex; flex-direction: column;"> <div style="display: flex; justify-content: space-around; font-size: 8px;"> Source : City of Kobe Source : National of Police Agency </div>  <div style="display: flex; justify-content: space-around; font-size: 8px;"> Collapse of city hall Tsunami damage to police premises </div> </div> </div>	<p>Eliminate administrative dependence bias in the event of a disaster.</p>
<p>2. Group work 1</p> <p style="text-align: center; font-size: 24px; color: blue;">Question ! ?</p> <div style="border: 2px solid yellow; border-radius: 50%; padding: 20px; text-align: center; margin: 20px auto; width: 80%;"> <p>Who can and cannot evacuate on their own immediately after a disaster?</p> </div>	<p>Answer: Model cases that take disaster preparedness measures on a daily basis enable quick action.</p> <p>Leads to “consciousness raising” through the acquisition of the need for self-help forces.</p>
<p>3. Challenges of disaster damage for older people</p> <div style="display: flex;"> <div style="flex: 1;"> <p>The death toll of the Great East Japan Earthquake</p>  <p>Increases with age</p> </div> <div style="flex: 1;"> <p>Abilities that decline with age</p> <div style="display: flex; justify-content: space-around; font-size: 8px;"> Sight / hearing Physical fitness judgement </div>  <p>May be an obstacle in the event of a disaster that requires quick judgment and action</p> </div> </div>	<p>A “dramatic relief” which causes older people to feel or become isolated in the event of a disaster, even if they usually lead an independent life.</p>
<p>4. Group work 2</p> <p style="text-align: center; font-size: 24px; color: blue;">Question ! ?</p> <div style="border: 2px solid yellow; border-radius: 50%; padding: 20px; text-align: center; margin: 20px auto; width: 80%;"> <p>Some people will be late to escape But ! Who can escape with a neighbor's help?</p> </div>	<p>Answer: Usually a person who has ties to the neighborhood already--those with poor connections in the neighborhood may be overlooked.</p> <p>Older people who have connections with neighboring residents can prevent isolation for themselves and their neighbors, in the event of a disaster--this is a means for “environmental reevaluation” and “self reevaluation.”</p>
<p>5. Example of mutual help between local residents in the event of an actual disaster</p> <p style="text-align: center; font-weight: bold;">You can rely on your neighbors !</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <p>Police, fire department, etc.</p> <p>20%</p> </div> <div style="text-align: center;">  <p>80%</p> </div> <div style="text-align: center; margin-left: 20px;"> <p>Neighboring residents, etc.</p> </div> </div> <p style="font-size: 8px; text-align: center;">People who rescued others in the Great Hanshin-Awaji Earthquake</p>	<p>Older people have a “vicarious experience” that it was possible for residents to help each other in the event of a disaster during the previous earthquake. Understand the experience of those who worked as supporters in the event of a disaster as the same residents.</p>
<p>6. Support for disasters that utilize the usual behavior of older people</p> <p>What is support in the event of a disaster?</p> <div style="display: flex;"> <div style="flex: 1;">  <p>I wonder if the wife next door is doing well lately</p> <p>I was also concerned. I will go and check on her.</p> </div> <div style="flex: 1; border: 1px solid blue; padding: 5px;"> <p>It is also important to acknowledge the existence of the person and to watch over and talk to them.</p> </div> <div style="flex: 1; background-color: #ffffcc; padding: 5px;"> <p>What I want to tell you</p> <p>In the event of a disaster, the trivial connections in everyday life will turn into a powerful force that will save you and those around you. You already have that power.</p> </div> </div>	<p>The target person will be asked to look back on their efforts to prevent isolation in the event of a disaster through close contact with their neighborhood and participation in local activities, making it a “performance accomplishment.”</p> <p>Through “Verbal persuasion” participants are told that the trivial connections play an important role in the efforts to prevent isolation in the local community.</p>
<p>7. Group work 3</p>	<p>They will be asked to express what they have recognized through disaster preparedness education and what they want to be aware of and act upon in the future, which is an opportunity for “self-liberation.”</p>