

Original Article

Nursing Students' Views Guiding Evacuee Placement in “HUG”, a Game about Evacuation Shelter Management

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Abstract - Objectives: Students in the nursing department of one Japanese university take Disaster Nursing in their fourth year of study. In this course, through a disaster-preparedness game about evacuation shelter management called “HUG”, they learn about the conditions of shelters and victims in times of disaster and how to place essential supporters appropriately and handle the type of incidents that can happen at such shelters. This study aimed to clarify the perspectives and attitudes guiding students' decisions about evacuee placement as they played this game. Methods: In May 2019, after playing HUG in the classroom, 78 fourth-year nursing students engaged in a group discussion in response to the prompt, “What perspectives did you consider as you were placing evacuees?” Afterwards, they were asked to write an open-ended report. These reports were subjected to content analysis. Results: Seven categories were identified via content analysis: disability due to illness or age; convenience for people living there; separating some evacuees out of a desire not to disturb others, unwittingly resulting in segregation; convenience in terms of operational aspects; privacy concerns; avoiding separation from familiar presences; and respect for nonsmokers when designating smoking areas. Discussion: These results reveal a need for nursing students to take broader perspectives, without prejudicial attitudes, when caring for disaster victims' health and to cultivate greater sensitivity to evacuees' emotions.

Keywords - Disaster nursing, Disaster-preparedness, Game, Evacuation shelter management, Nursing student.

1. Introduction

Japan's geographical and climatic conditions make it highly vulnerable to a wide array of extreme weather events and natural disasters, such as earthquakes, tsunamis, large storms, landslides and volcanic eruptions. Disaster preparedness measures, especially in response to major seismic events and flooding, are thus critically important, as this is one of the most disaster-prone countries in the world. The Basic Disaster Prevention Plan (BDPP), as outlined by the Central Disaster Management Council of the Cabinet Office of Japan, states: “These disasters sometimes unleash devastating forces beyond human comprehension, claiming many lives and inflicting extensive damage to the land and the properties of its citizens. While it is impossible to completely prevent disasters from occurring, it is essential to aim to minimize the damage resulting from them by gathering collective wisdom to devise effective disaster response measures and encouraging individual awareness and efforts to minimize the damage” [1]. The BDPP also stresses the importance of adopting proactive disaster prevention measures across all levels of society, as well as a mindset of preparedness and personal responsibility among residents: “It is imperative that the national government, public institutions, local governments, businesses, and

residents collaborate to adopt the best possible strategies for disaster prevention. This collaboration involves preparedness activities being carried out at the individual level by residents and at the community level by volunteer disaster prevention organizations and local businesses, all coordinated centrally by national and local public authorities” [2]. Shelter management remains a vital aspect of the emergency response during major disasters. While shelters may be run by municipal employees in some cases, there has been a shift towards community-led shelter management, especially since the 1995 Great Hanshin Earthquake [3]. The role of the community in disaster preparedness is clearly exemplified at University X. In the event of a disaster, the university's academic buildings and gymnasiums are designated as emergency shelters, and university staff and students are mobilized to manage these facilities and attend to evacuees. Nurses, in collaboration with professionals from other fields, play a critical role in promoting activities intended to protect lives and health, a responsibility that becomes particularly crucial during disasters. “Disaster Nursing” is a compulsory course for fourth-year students in the university's nursing department. The curriculum is intended to cultivate empathy for disaster victims and a readiness to tackle complex challenges, and it



seeks to develop future leaders in disaster resilience who will contribute significantly to their communities. As part of the course, students take part in a disaster-preparedness game that simulates shelter management called HUG, in which they learn about shelter operations and disaster victims, including special accommodations for groups requiring assistance, and how to handle various types of incidents that can happen in a shelter setting. This paper explores the considerations that fourth-year nursing students took into account in the shelter management simulation of HUG, especially when designating facilities and placing evacuees, using a content analysis approach.

2. HUG and Disaster Nursing

2.1. HUG: Game Overview

HUG (*hinanjō unei gēmu*: “shelter management game”) is a disaster preparedness card game designed and developed in 2007 by the Shizuoka Prefecture Crisis Management Office [3]. In this experiential simulation game, players are given “evacuee cards” on which are written the age, sex, nationality, and personal circumstances of fictional evacuees, whom they must decide where to place on a floor plan designed to resemble the layout of the school, including rooms such as the gymnasium and classrooms, which in the game has been repurposed as an evacuation shelter. They must also decide how to handle various incidents, which are triggered by “event cards”, as they happen at the shelter. Participants learn how to take the attributes of different types of evacuees into account when making room assignments. Players are also encouraged to freely express their opinions and discuss their decisions with one another when setting up the living environment (e.g., food distribution points, provisional toilets) and handling inspection visits and media interviews. The experience is meant to teach participants about how to run an evacuation shelter in a controlled yet enjoyable game setting.

2.2. Disaster Nursing Course Overview

HUG is played by fourth-year nursing students in a compulsory course titled Integrated Nursing – Disaster Nursing. The course objectives are to impart fundamental knowledge and skills pertinent to disaster assistance and explore the roles of nursing professionals across the entire disaster cycle. Students learn about the concept of disasters, the current state and contemporary challenges of natural and man-made disasters both domestically and internationally, as well as nursing activities directed towards individuals, communities, and regions throughout the disaster cycle. The course is designed to foster a civic-minded approach to disaster risk reduction and preparedness. Students acquire the knowledge, skills and abilities necessary to perform health, medical and welfare activities from the immediate aftermath of a disaster and through the acute, subacute, recovery, reconstruction and quiescent phases, and they consider the various roles of nursing professionals in disaster preparedness.

Specifically, through simulations and practical exercises, students learn fundamental decision-making and action-taking skills, nursing skills, preparedness, and the attitudes required for health, medical and welfare activities during disasters. The course also teaches students to conceptualize specific activities for regional disaster risk reduction and mitigation, using past lessons learned and advanced case studies to prompt them to consider scenarios such as natural disasters, nuclear incidents and infectious disease outbreaks. Finally, students consider the roles of nursing professionals in bolstering regional resilience to disasters through collaborative efforts that encompass self-help, mutual aid and public assistance aligned to the specific stages of the disaster cycle.

This course is conducted over 15 sessions (Table 1). The fourth session, titled “Health, Medical and Welfare Activities in Evacuation Shelters”, focuses on understanding the conditions of shelters and victims during disasters and learning about special accommodations for groups requiring assistance and how to handle the different types of incidents that can happen in a shelter setting. First, the instructor delivered a lecture called “Living Environments in Shelters and Temporary Housing After Heavy Rains”. Next, the students are organized into small groups of four to five to play HUG, which is followed by discussions within the groups.

3. Materials and Methods

3.1. Study Participants

Seventy-eight fourth-year students taking Disaster Nursing in the nursing department of a Japanese university who gave informed consent participated in the present study.

3.2. Study Period

The study was conducted in May 2019.

3. Data Collection

Students played HUG for approximately one hour during the fourth session of Disaster Nursing. After the game, they were asked to write an open-ended report, approximately 800 characters in length, describing what they considered as they were placing evacuees. The reports were completed individually and anonymously.

4. Data Analysis

The students’ reports were subjected to content analysis. The researchers meticulously reviewed all responses to identify content that specifically pertained to their decisions and considerations when placing evacuees, and they grouped excerpts based on similarity of content. To ensure the groupings were reliable and credible, the researchers first debated them amongst themselves and then requested supervision from an instructor specializing in disaster nursing. The data were analysed only after the students had completed all sessions of the Disaster Nursing course and their grades and academic credits had been finalized.

5. Ethical Considerations

Eligible students were informed both in writing and orally about the purpose and methods of the research and the voluntary nature of participation. They were assured that their decision to participate or not would not affect their grades or credit for course completion in any way. They were also told that they would not receive any benefit or suffer any disadvantage based on their participation (since data analysis

and publication would occur only after they had completed the course). Finally, they were assured that their privacy would be safeguarded by anonymizing the reports, and the collected data would not be used for any purpose other than the stated research objectives. Participants were considered to have consented to participate in the study when they submitted their reports. This study was conducted with the approval of the course instructor and the head of the authors' department.

Table 1. Course schedule of Integrated Nursing – Disaster Nursing (University X, Nursing Department)

Unit	Course objectives
① Basic Knowledge About Disasters	Understand different types of disasters, the disaster cycle, and relevant legal frameworks.
② Basic Knowledge of Health, Medical, and Welfare Activities During Disasters and Roles of Nursing Professionals in Each Stage of the Disaster Cycle	Understand the expected roles of nursing professionals in support activities during each phase of the disaster cycle.
③ Caring for Vulnerable Groups During Disasters and Health, Medical, and Welfare Activities to Support the Lives of Disaster Victims	Understand the health, medical, and welfare activities that support the lives of disaster victims.
④ Health, Medical, and Welfare Activities in Evacuation Shelters	Consider the situations faced by disaster victims through a shelter management simulation.
⑤ Psychology of Victims and Helpers During Disasters	Understand the stresses faced by disaster victims and supporters and related mental health care.
⑥ Disaster Triage	Acquire basic knowledge of primary and secondary triage.
⑦ Primary Triage Methods	Learn how to use triage tags and the START primary triage system.
⑧ Nursing Skills Needed During Disasters	Understand the nursing skills required during the acute phase of a disaster.
⑨ Features of Disaster Nursing for Specific Groups (1)	Understand the features of disaster nursing and related support for the elderly, people with disabilities, and patients with chronic diseases during disasters.
⑩ Features of Disaster Nursing for Specific Groups (2)	Understand the features of disaster nursing and related support for children and pregnant and postpartum women during disasters.
⑪ Judgment and Response Capabilities in Disaster Support	Take personal responsibility for disaster response to become aware of different opinions and values.
⑫ Roles and Collaborative Activities of DMATs and Hospitals in Disaster-Stricken Areas	Understand the collaborative activities between disaster medical assistance teams (DMATs) and hospitals in disaster-stricken areas.
⑬ Disaster Prevention Measures in City X	Understand the disaster prevention measures implemented by the local government to protect the region and its people from natural disasters.
⑭ Nuclear Disasters & Radiation Properties and Medical Radiation Exposure	Understand the health impacts of radiation (radiation exposure) in nuclear disasters and the corresponding countermeasures.
⑮ Routine Disaster Prevention/Mitigation Activities and Summary of Activities During a Disaster	Consider the preparations needed during normal times for activities needed in the event of disaster from the perspectives of self-help, mutual aid and public assistance.

Table 2. Nursing students' considerations when playing the evacuation shelter management game HUG

Category	Subcategory (Number of codes)
① Disability due to illness or age	<ul style="list-style-type: none"> ▪ Chronic illness or disability (15) ▪ Special needs of the sick, wounded and people requiring medical care (9) ▪ Special needs of the elderly (9) ▪ Infection prevention/control (8)
② Resident convenience	<ul style="list-style-type: none"> ▪ Ease of living for evacuees (15) ▪ Equitable and convenient toilet access (7) ▪ Strategies for widely disseminating information (6) ▪ Availability of spaces for caregiving (3)
③ Preventing separation from familiar presences	<ul style="list-style-type: none"> ▪ Keeping family members together (5) ▪ Permitting animal companions (pets) (4)
④ Segregating some evacuees to avoid disturbing others	<ul style="list-style-type: none"> ▪ Noise control measures for families with children (6) ▪ Allergy prevention/control (3) ▪ Non-Japanese evacuees (2)
⑤ Operational convenience	<ul style="list-style-type: none"> ▪ Making operations convenient for staff (7) ▪ Designating rooms not to be used by evacuees (3)
⑥ Privacy concerns	<ul style="list-style-type: none"> ▪ Providing changing rooms (5) ▪ Protecting people's privacy when using the toilet (4)
⑦ Respect for nonsmokers	<ul style="list-style-type: none"> ▪ Respect for nonsmokers when designating smoking areas (1)

6. Results

Seventy-eight students submitted open-ended reports after the group discussion session. From these, 126 sentences describing specific considerations and accommodations they made when assigning evacuees were extracted. These were split into 112 codes, which were classified into categories and subcategories based on content similarity. Below, categories and subcategories are denoted by bold and italic formatting, respectively; quotation marks enclose representative codes, and contextual clarifications by the authors are enclosed by square brackets. In total, seven categories were identified – (A) disability due to illness or age, (B) resident convenience, (C) preventing separation from familiar presences, (D) segregating some evacuees to avoid disturbing others, (E) operational convenience, (F) privacy concerns, and (G) respect for nonsmokers – which were further classifiable into 18 subcategories, as detailed below.

6.1. Disability Due to Illness or Age

This category reflects students' considerations for disabilities associated with disease or ageing among evacuees. It consists of four subcategories: (1) assigning evacuees with *chronic illness or disability* to more accessible rooms, (2) special needs of the sick, wounded, and people requiring medical care, (3) special needs of the elderly, and (4) infection prevention/control.

- “We placed completely blind evacuees in the gymnasium because it does not have any stairs.” (A1)
- “We put the health centre on the ground floor, and we placed pregnant women and injured people on the same floor.” (A2)
- “We placed elderly evacuees on the ground floor so they

would not need to navigate stairs.” (A3)

- “We tried to prevent the spread of infection by isolating individuals with a high fever and suspected of having an infectious disease in separate rooms.” (A4)

6.2. Resident Convenience

This category illustrates how students focused on enhancing the convenience of daily activities for evacuees living in the shelter. It consists of four subcategories: (1) *ease of living for evacuees*, (2) *availability of spaces for caregiving*, (3) *equitable and convenient toilet access* and (4) *strategies for widely disseminating information*.

- “We were mindful of people’s daily routines [so we] put the changing rooms near the showers and bathrooms.” (B1)
- “We designated the bus as a breastfeeding room.” (B2)
- “We designated the bus as a diaper changing area.” (B2)
- “We increased the number of women’s toilets.” (B3)
- “The bulletin board was put near the reception area, a location frequented by [and visible to] everyone.” (B4)
- “We set up TVs so lots of people could get news updates.” (B4)

6.2. Preventing Separation from Familiar Presences

This category demonstrates the students’ recognition of the importance of maintaining close relationships, such as those with family members, friends, and pets, during times of disaster. It consists of two subcategories: (1) *keeping family members together* and (2) *permitting animal companions (pets)*.

- “We put family members in the same room so they would not get scattered.” (C1)
- “Pet owners were assigned to the third floor.” (C2)

6.4. Segregating some Evacuees to Avoid Disturbing Others

This category contains strategies that targeted specific groups of evacuees and were intended to keep the living environment tranquil for others in the shelter. It consists of three subcategories: (1) *noise control measures for families with children*, (2) *allergy prevention/control* and (3) *non-Japanese evacuees*.

- “We put families with newborns in rooms separated from other evacuees.” (D1)
- “Households with small children were kept separate.” (D1)
- “Families with pets were put in separate rooms, taking allergies into account.” (D2)
- “Foreigners were put together [in the same room].” (D3)

6.5. Operational Convenience

This category represents decisions made to facilitate shelter operations for the staff’s benefit rather than from the point of view of the evacuees. It consists of two subcategories: (1) *making operations convenient for staff* and (2) *designating rooms not to be used by evacuees*.

- “We designated the ground floor as the operational headquarters.” (E1)
- “We set up the headquarters on the gymnasium stage so we could oversee the entire area.” (E1)
- “We closed off floors above the third floor of the school building.” (E2)

6.6. Privacy Concerns

This category represents considerations given to the privacy needs of evacuees during their stay in the shelter. It consists of two subcategories: (1) *providing changing rooms* and (2) *protecting evacuees’ privacy when using the toilet*.

- “Due to the lack of partitions in the gymnasium, we used tents to set up changing rooms.” (F1)
- “We split up the toilet facilities by gender.” (F2)

6.7. Respect for Nonsmokers

This category focuses on respect for nonsmokers. It consists of one subcategory: (1) *respecting nonsmokers when designating smoking areas*.

- “We placed the smoking area in a place away from the living quarters.” (G1)

7. Discussion

7.1. Students’ Views on Disability Due to Illness or Age

The nursing students who played HUG appear to have recognized the diverse attributes and individuality of the

evacuees featured on the game cards. In particular, the existence of the category Disability due to illness or age reveals that they paid attention to vulnerable groups in different stages of growth and development, such as the elderly and infants, as well as giving preferential consideration to individuals with physical health issues requiring medical attention. In Japan, the Sphere Handbook [4] is often referenced to improve the quality of shelters. This handbook aims “to improve the quality of humanitarian response in situations of disaster and conflict, and to enhance the accountability of humanitarian action to crisis-affected people.” During a disaster, stereotypical, “one-size-fits-all” approaches cannot meet the specific needs of vulnerable groups such as the elderly, children and people with disabilities. Ensuring that basic services are adequately provided to such vulnerable individuals is an international challenge. Further, as noted by Kanbara and colleagues [5]: “The first disaster responders in shelters play a vital role in the identification of high-risk factors leading to health problems in vulnerable populations. Their responsibilities include offering health services to the people in need in shelters and evacuation centres rather than rescue work or emergency care in hospitals.” Thus, nursing students should develop such discerning views, given their future status as healthcare professionals in the setting of evacuation shelters.

However, despite the explicit accommodations made for physical and functional vulnerabilities, mentions of psychological aspects were notably absent. Disasters and shelter life can affect not only individuals’ physical condition but also their mental and psychosocial state. Residents of disaster-stricken areas experience significant stress from the disaster itself and the displacement from their homes and lands. Moreover, the burden on evacuees’ health increases the longer they have to live at the shelter, adversely affecting their mental and physical well-being and significantly hindering their ability to rebuild their lives afterwards. For those with existing chronic diseases, the experience can exacerbate their condition and even cause new health issues. For instance, the earthquakes that struck the Kumamoto region in April 2016 were directly responsible for 50 deaths, but they were also recorded as being partially responsible for as many as 200 [6]. Evidently, the nursing students playing HUG did not take into consideration the evacuees’ emotions, stress, psychological problems, or the potential for damaging secondary health effects resulting from living in shelters for a prolonged period. Given their future as healthcare professionals entrusted with supporting the health of the population, such oversights are especially regrettable.

7.2. Students’ Views on Resident Convenience and Privacy Concerns

Shelters become the new living spaces of disaster victims who can no longer reside in their homes. For them, convenience means being provided with the essentials required to live safely and comfortably in their new

environment – i.e., clothing, food and shelter – making it a primary concern in shelter management. The students considered ways of minimizing travelling distances and improving the efficiency of information transmission within the limited space of the shelter. Further, they did not simply prioritize convenience but also considered it simultaneously with safety and privacy. While shelters must be safe places to live, secluded areas like private rooms located in less-trafficked parts of a shelter or areas without adequate lighting cause concerns about the potential for sexual assault, particularly against women. The student's decision to increase the number of women's toilets was probably informed by guidelines in the Sphere Handbook, which had been communicated in a previous lecture. Health management in shelters is critical: if the number of toilets is insufficient for the number of evacuees or if sanitary conditions are poor, evacuees may limit their fluid intake to avoid having to use the toilet, thereby increasing the risk of harm such as dehydration and deep vein thrombosis. Enhancing residents' convenience is expected to not only prevent disaster-related deaths but also contribute to psychological well-being.

It is also essential to provide important updates to evacuees in shelters, where sources of information are often limited. Some evacuees may not have access to communication tools, making it difficult for them to obtain new information. The convenience of shelter life is improved by the timely and appropriate dissemination of new information on disaster and weather updates, details of when food and shelter supplies will arrive, and information on the progress that has been made in restoring medical services and critical infrastructure. The students considered these elements to be part of enhancing convenience and creating a comfortable environment for the evacuees living there. Their recognition of shelters as not merely places of refuge but also spaces where life continues was clearly demonstrated by the fact that Resident convenience was the second-most-frequently coded category.

7.3. Students' Views on Preventing Separation from Familiar Presences and Segregating some Evacuees to Avoid Disturbing Others

Since people's need for friendly relations and emotional support from people such as family, neighbours, and pets are magnified during a disaster, the students did well to make arrangements to prevent separation from these comforting presences. However, their reports also revealed an underlying exclusionary mindset, which was reflected in decisions to segregate evacuees based on factors like nationality, allergies, and the tendency of infants to cry at night. These decisions were presumably well-intentioned: isolating allergen sources would be beneficial in terms of preventing health issues, especially given the limited medical resources in the shelter environment, and designating separate rooms for infants who cry at night would reduce stress caused by noise among other

evacuees, which might otherwise disrupt the peace and negatively affect their physical and mental wellbeing. Nevertheless, these arrangements could inadvertently create new problems in the form of exacerbated loneliness and isolation among parents, as their stress from the disaster itself could be compounded by subjective pressure to be more mindful of others than usual, psychologically distancing them from other evacuees and their community. Thus, careful consideration is necessary when deciding on location assignments and groupings: students should also focus on supporting parents, such as by giving parents ample opportunities for daytime interactions with other evacuees, as well as childcare support. Providing temporary assistance for families with infants – such as when a parent needs someone to watch their child while they use the restroom or collect food – can foster a mutual support system that benefits both the individual families and the wider community. However, it was evident that students' thought processes did not extend to these considerations.

The idea of segregating foreigners into separate rooms is particularly concerning. With increasing cross-border economic and social activities, greater numbers of foreigners are residing in and visiting Japan than ever. Particularly for those who may not be fluent in Japanese, it is essential to provide widespread dissemination of Japan-specific disaster preparedness knowledge, timely disaster-related information, evacuation guidance, and emergency relief. Further, residents and tourists have different characteristics and needs; the former need information on shelter life and getting their lives back in order in the disaster-stricken area, while the latter need information related to returning home. The students may have considered foreigners to be a group requiring special accommodation, but they lacked sufficient nuance in identifying their needs.

When disaster strikes, nurses are expected to base their decisions on the ethical principles related to emergencies and disasters, to be well-versed in approaches to allocating resources in response to a disaster, and to be capable of handling ethical dilemmas [7]. Ethical and legal challenges are particularly significant for nurses during such times, and ongoing education for nursing staff on these issues enhances their ability to engage in ethical practices during disasters [8] confidently. The Guidelines for Shelter Management in the Basic Act on Disaster Management emphasize “not neglecting accommodations for vulnerable groups” in emergency response efforts. As future healthcare professionals, it is crucial that nursing students broaden their understanding to adopt non-discriminatory views when managing the health of disaster victims and cultivate a compassionate attitude towards the affected individuals.

In light of lessons learned from recent disaster responses and policy advancements, the Basic Disaster Prevention Plan was revised in 2023 to include the provision that

“Municipalities and operators of designated shelters should strive to continuously secure a good living environment by engaging in regular information exchange with experts, NPOs, volunteers, etc., and by securing and nurturing local talent with knowledge and know-how in supporting life in shelters” [9]. Going forward, University X must also focus on developing individuals who can not only make shelters a good living environment but also become future leaders in regional disaster management. The nursing students’ self-reported justifications for their actions in the HUG simulation revealed that they lacked a full understanding of the diversity of disaster victims, including differences in race and religion. Ranse and colleagues have highlighted the need for research in disaster nursing that extends beyond education, training, and curriculum and includes exploration of related clinical and psychological issues [10]. Given the diversity and unique circumstances of disaster victims, the results of the present study call for further examination and refinement of teaching methods and content, not only to impart high-quality knowledge and nursing practices but also to teach students about specific accommodations for different groups, including those with mental health issues.

8. Conclusion

This study explored the beliefs and considerations that guided participants’ decisions about evacuee placement and shelter management when playing HUG, an evacuation shelter simulation game, as recounted in an open-ended report after the game. Seven categories were identified from 126 relevant sentences extracted from reports submitted by 78 fourth-year university students: disability due to illness or age, residential convenience, preventing separation from familiar presences, segregating some evacuees to avoid disturbing others, operational convenience, privacy concerns and respect for nonsmokers.

The results demonstrated HUG to be a valuable experiential learning tool for preparing nursing students to serve as disaster resilience leaders within their communities and society. However, the analysis also revealed a lack of understanding among the students regarding the diversity and individual realities of disaster victims, highlighting a need for

further review and improvement of teaching methods and content in disaster nursing.

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Author Contribution

Hirai Y and Watanabe K collaborated in designing the research study, conducting the research, and drafting the manuscript. Hirai Y took charge of data analysis. All authors have approved the final manuscript and agreed to be accountable for all aspects of the work.

Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and conducted with the approval of the course instructor and the head of the authors’ department.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The original contributions presented in the study are included in the article; further inquiries can be directed to the corresponding author.

Use of Artificial Intelligence

AI or AI-assisted tools were not used to draft any aspect of this manuscript.

Abbreviation List

HUG, Hinanjō unei gēmu: (shelter management game)
BDPP, The Basic Disaster Prevention Plan

Addendum

This study was presented in part at the 7th International Research Conference of the World Society of Disaster Nursing (Taipei, Taiwan) and has been expanded and revised with additional analysis for this submission.

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