

Brief Report

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Benefits and Drawbacks of Using Hotels as Shelters After a Landslide

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Abstract

Objectives: On July 3, 2021, a landslide occurred in part of Atami City, Shizuoka, Japan. **Methods:** The government of Shizuoka Prefecture requested the dispatch of Shizuoka Disaster Medical Assistance Teams (S-DMATs). **Results:** On day 2, the evacuees were evacuated into 2 hotels (A and B). Hotel A accommodated over 570 independent and dependent evacuees. Hotel B accommodated 44 dependent aged individuals, who lived in the same long-term health-care facility, together with their 11 caregivers. The evacuees in hotel B returned to the previous facility on day 10 without any specific medical problems. The evacuees in hotel A were managed in the guest rooms as family units. Individuals requiring care in guest rooms in hotel A became isolated because they could not call for help or walk. Furthermore, hotel guest rooms were not barrier-free. The S-DMATs supported the evacuees. **Conclusions:** Independent evacuees received the maximum benefits from the use of a hotel as a shelter. In contrast, it was difficult for dependent evacuees to benefit from the hotel as it is as a shelter when living alone in the hotel. Dependent evacuees required appropriate support to eat, walk, use the toilet, and keep themselves clean when using a hotel as a shelter.

Atami is located at the root of Izu peninsula, Japan. This hilly city is located in a hot spring resort area of Shizuoka Prefecture, approximately 100 km and 50 min by super express from Tokyo. There are more than 200 bathing facilities including hotels with hot springs. On Saturday, July 3, 2021, a landslide after torrential rain suddenly occurred at Izuyama in Atami (GLIDE#: LS-2021-000075-JPN). The landslide ran a distance of approximately 2 km to the sea, destroying 131 houses. As of July 29, 2021, a total of 25 people died and 2 people were missing due to the landslide (https://www.mlit.go.jp/river/sabo/jirei/r3dosha/210703_aizomegawa_07091800_taioujoukyou.pdf). A total of 28 people were rescued by firefighters, police, and military personnel after being stranded in their houses. The 28 rescued people were transported to 2 local medical hospitals, and 27 of these individuals survived. The government of Shizuoka Prefecture requested the dispatch of Shizuoka Disaster Medical Assistance Teams (S-DMATs). DMATs are mobile, trained medical teams that can be rapidly deployed during the acute phase of a sudden-onset disaster.¹

After large-scale disasters such as earthquakes or hurricanes, people, who lose houses, might spontaneously live in a hotel as a shelter at their own expense.^{2–4} However, Atami City compulsively evacuated evacuees from multiple official public temporary shelters into 2 hotels with hot springs at the public expense, even individuals with disabilities who required care. Our hospital dispatched the Juntendo S-DMATs to assist in the management of the 2 hotels. We herein report the benefits and drawbacks of hotels using as temporary shelters, especially for the individuals requiring care.

Report

The publication of this retrospective analysis of the disaster response to the Atami landslide was approved by our institutional review board (IRB #431).

On day 1 (Saturday, July 3, 2021), the government of Shizuoka Prefecture requested the dispatch of the S-DMATs and some members of the S-DMATs established a DMAT headquarters in a public health center (PHC) of Atami City (HQ-D-PHC). Then, the S-DMATs collected information on victims and evacuees at shelters from the headquarters for disaster control in Atami City. Over 570 residents in the hazard area near the landslide initially escaped to approximately 15 shelters, including a school gymnasium. On day 2 after the landslide, these people were compulsively re-evacuated by buses to 2 hotels (A and B) with hot springs based on the decision of the disaster control headquarters of Atami City. Initially, approximately 380 healthier evacuees who had lived independently in the area were moved to hotel A. Forty-four aging individuals, who had required care and lived in a long-term health-care facility with fear of

Table 1. Differences between hotels A and B

	Hotel A	Hotel B
Total number of guest rooms	348	247
Number of refugees	Over 570	55
Condition of refugees	Healthy individual and individual requiring care	Individual requiring care and caregiver
Meal pattern	Buffet style	Box lunch
Living style	Privacy is protected with individual rooms	No privacy, all on one floor
Accurately grasp the number of refugees	More difficult than expected	Easy
Need for medical care	Sometimes	None
Temporary establishment of a medical office	Yes	No
Continuous presence of nurse	Yes	No

collapse because it was close to the landslide, and their 11 caregivers moved into hotel B together. When all evacuees moved into the 2 hotels, the S-DMATs and physicians of the Atami Medical Association performed medical checks, and it was confirmed that no evacuees required emergency medical treatment. The characteristics of the management of evacuees in hotels A and B are shown in Table 1. Briefly, the evacuees in hotel A were managed in guest rooms within family units (1 family was accommodated separately in 1 guest room) as a measure to prevent coronavirus disease 2019 (COVID-19) transmission, and the evacuees in hotel B were managed together on the first floor. However, the disaster control headquarters of Atami City announced that the that hotel A with a hot spring was available for the accommodation of evacuees so that residents, who lived relatively near the landslide and felt unsafe, but did not actually need to be evacuated, also moved to hotel A during that night and the next morning. Among them, there were 16 aging individuals, who had required care and who lived in a long-term health-care facility. As a result, hotel A accommodated over 570 evacuees, including individuals requiring care on day 3. For the evacuees in the 2 hotels, PHC, S-DMATs, Disaster Psychiatric Assistance Teams (DPATs),⁵ Atami Medical Association, and Disaster Nursing Association worked together with guidance by the S-DMAT to support evacuees. Evacuees' health checks were conducted through daily medical checks, temporary clinics (13:00-14:00), mental support, and the continuous presence of a nurse. Evacuees at hotel A also underwent the measurement of their body temperature and ascertainment of safety at breakfast and dinner. COVID-19 antigen testing was performed for evacuees with a fever.

Concerning hotel B, the original caregivers lived with the 44 aging individuals requiring care together in hotel B. The 44 aging individuals were managed by these original caregivers for 24 h as if still living in their original long-term health-care facility. The condition of the 11 caregivers and 44 aging individuals was checked by nurses with the PHC daily. Starting on day 5, one medical team that was voluntarily participating in disaster relief stayed in hotel B to help manage the most dire individuals. However, there was no medical demand during the evacuation at hotel B. There were no nurses who continuously assessed the evacuees in hotel B. Through these medical activities, the benefits and drawbacks of using hotels as temporary shelters, especially for individuals

Table 2. Comparison of hotels and public facilities with regard to usefulness as a shelter

	Hotel	Public facility
Accurately grasp the number of refugees		>
Usable lifelines when lifelines are intact		>
Resistance to landslides compared with private houses		≡
Refugees can move to the upper floors using elevators		≥
Little risk of heat stroke by controlling indoor temperature		≥
Offering hot meals		≥
Offering beds for comfortable sleep		>
Preservation of personal hygiene		>
Refreshing mental status		>
Privacy and social distance		>
Able to obtain information from social network services using free Wi-Fi		>
Able to obtain information from televisions in guest rooms		>
Assessment of the names and numbers of refugees		>
Running costs		>, ≡, <
Reservations able to be cancelled		<
Pets allowed		≡
Broadcasting system throughout the entire building		≤
Crowding at meal times		≡
Able to provide care to individuals in need		≡
Barrier-free facilities		≡
Able to ascertain the safety of refugees		≡
Presence of the local community		≤

requiring care, were reported in a regular meeting. Based on the findings reported in these meetings, the usefulness of the hotels and public facilities as evacuation shelters was compared, and the results are summarized in Table 2. On day 10, lifelines were recovered, and the safety of the long-term health-care facility was confirmed, so that the 44 aging individuals who required care and their 11 caregivers returned to the previous facility. Regarding the remaining medical and life support for the evacuees in hotel A, the Atami Disaster Recovery Organization, which consisted of PHC, S-DMATs, DPATs, Disaster Nursing Association, Atami Medical Association, Atami Pharmacist Association, local hospitals in Atami City, the welfare section of Atami City, Atami Fire Department, Disaster Welfare Assistance Team, and Japan Rehabilitation Assistant Team (JRAT)—as a result of negotiation by S-DMATs—was established on day 11, and this organization continued to support them. There was no COVID-19 infection among the evacuees during the investigation period.

Discussion

To the best of our knowledge, this is the first report to describe the benefits and drawbacks of the use of hotels as temporary shelters, especially for individuals requiring care. In Japan, gymnastic halls of schools or community centers have been used as public temporary shelters in disaster situations. Atami City instituted a tsunami

evacuation project after the Great East Japan Earthquake and entered into contracts with several hotels for the hotels to be used as designated evacuation shelters in disaster situation. However, hotels A and B were not designated evacuation shelters. Due to the COVID-19 pandemic, most hotels in Atami City had few guests on weekdays and, thus, were deeply in the red. Accordingly, the disaster control headquarters of Atami City negotiated with the Hotel Association in Atami City to allow the long-term use of hotels as a shelter, and hotels A and B applied for the requests from the disaster control headquarters.

The benefits of using a hotel as temporary shelter, in comparison to public facilities, were mainly experienced by healthier independent evacuees. There have been many reports on the disadvantages of using public facilities as temporary shelters.⁵⁻⁷ Living long-term in public facilities as shelters also resulted in the occurrence of disaster-related death, indicating that death may not only be caused by a disaster itself but also by disaster-induced fatigue, psychological trauma, or the aggravation of existing chronic diseases.^{8,9} In addition, in most parts of Atami City, outside of the area damaged by the great landslide, life lines were intact, including hotels A and B. Accordingly, the healthier independent evacuees were able to live relatively normal lives in hotel A and might have been happy in comparison to evacuees in previous disasters.

One limitation of the present study was that it did not evaluate the actual satisfaction and complaints of individual evacuees concerning the environment. Even the independent evacuees, who lived in the hotel, might have experienced mental illness after disaster in association with the loss of their home or missing relatives.⁴ Accordingly, further study is needed to evaluate the satisfaction of healthier independent evacuees.

The drawbacks of using a hotel as a temporary shelter, in comparison to public facilities, are mainly associated with the management of dependent evacuees. Dependent evacuees require continuous living support; thus, staff were dispatched to hotel A to provide 24-h continuous nursing care. From the perspective of managing older individuals requiring care similar to that available in a welfare evacuation center, hotel B was considered to better facilitate management than hotel A. Accordingly, it might have been better to manage such needy individuals together in 1 place to perform frequent health checks and administer care by evacuating them to a hotel. In addition, the temporary use of instruments to create barrier-free conditions might have made it easier to provide care for older people, and the assistance from JRATs might have helped maintain older evacuees' ability to function in daily life. Keeping older individuals with handicaps on a single floor, may be allowed to continue to participate in their local community, although this will result in a lack of privacy. In Japan after the Great East Japan Earthquake, there was a system establishing temporary welfare evacuation shelters, which included caregivers and barrier-free spaces, for dependent evacuees to receive appropriate welfare.^{10,11} A temporary welfare evacuation shelter should be established and managed by the local government in the area damaged by a disaster. In an aging society like Japan's, flexible, adjustable, and affordable (sustainable) welfare evacuation centers are a beneficial model. While, in the landslide in Atami City in 2021, Atami City selected 3 intact long-term health-care facility facilities in Atami City as welfare evacuation shelter, and some dependent evacuees were transferred to these shelters. However, this system could not work well in this disaster due to miscommunication among the related organizations.

Regarding the prevention of COVID-19 transmission, the fact that the evacuees lived life within a family unit in each guest room in hotel A was appropriate for securing social distancing. In addition, the evacuees were prioritized for vaccination. Furthermore, evacuees with fever underwent COVID-19 antigen tests. As a result, there was no COVID-19 infection among the evacuees during the investigation period. A previous study also reported that living in a hotel guest room could be a useful measure to prevent COVID-19 infection.¹² The running costs of staying in a hotel might be considered a drawback. However, the landslide in Atami City was covered by the Disaster Relief Act in Japan. While hotels A and B were not designated shelters, the costs can be expected to be covered as expenditures during a disaster, and the hotels will also benefit from the income incurred by accommodating evacuees. The spread of COVID-19 was also able to be prevented by using hotels as shelters in the present study. Thus, the cost of treating infectious diseases was reduced, which might also be considered a benefit of using a hotel as a shelter.

There have been many disasters over the course of history; however, no disasters are exactly the same and each disaster has its own unique characteristics. In addition, there are numerous local governments that also have their own unique characteristics regarding their response to disasters. A flexible approach is needed to support evacuees in disaster situations. The S-DMATs worked as disaster medical coordinators¹³ among related disaster organizations.

Conclusions

The independent evacuees received the maximum benefits from the use of a hotel as a shelter. In contrast, it was difficult for dependent evacuees to obtain the maximum benefits of comfort in a hotel without any adjustments made. Proactive evacuation and accommodation plans will make hotels better evacuation centers able to provide appropriate support for older people who need special care.

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