

短 報

Development of a triage system for vulnerable people in evacuation shelters: Evaluation of teaching materials

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Abstract

Aim : Preventing disaster-related deaths within the first week after the disaster requires triage of vulnerable people to clarify levels of need and priority in terms of medical and nursing care. The aim of this paper was to examine teaching materials aimed at developing triage for vulnerable people in evacuation shelters in times of disaster.

Method : Content of teaching materials: 1) Learners are ordinary residents living in the local community. 2) Learning content is a triage training program implemented at the entrance to an evacuation shelter. 3) Attainment targets are for residents themselves to be able to implement triage in the absence of specialists at disaster prevention training events after participating in local triage training study meetings. 4) Teaching materials and tools include: (1) A sheet showing the four categories of triage with decision criteria and target destination. (2) 30 simulated patient cases for triage of vulnerable people. Implementation of simulation experiments: From November 2012 to March 2013, simulation experiments were conducted using “four categories of triage and decision criteria” and “30 simulated patient cases” as teaching materials and tools. The experiment was repeated a total of three times, with issues being clarified each time, and improvements being made.

Result : Usefulness as teaching materials: The following four points were examined for the improvement of teaching materials and teaching tools as they arose as issues during the simulation experiment. First, to improve cases in which there was a large gap between experiment results and model triage, additional information was provided on the cases, and stratified triage was carried out. This is likely to lead to more accurate decisions. This shows the need to create triage training content that provides clear knowledge and information necessary for local residents to make triage decisions, as the teaching materials are aimed at learners who are not specialists. In particular, basic information about levels of disability and the types of conditions that are treated in people's own homes is necessary. Second, there are cases where triage decisions are difficult even with additional information. In cases where gaps in specialist knowledge and experience affect the decisions, it is necessary to carefully select what specialist knowledge is required for triage decisions, and to create learning opportunities for local residents who will take the role of leaders to acquire this knowledge. Study meetings and development programs for local residents who are willing to take a leadership role in disaster situations are increasingly important. Third is the point that triage categories change as time passes. The situation in evacuation shelters shifts constantly as the hours and days pass. Information is constantly updated. Finally, participants in this simulation experiment evaluated that they had understood well the difficulty of triage decisions and the need for and ease of understanding simulation experiences. In terms of evaluation of teaching materials, there seems to have been a certain level of learning effectiveness.

Conclusion : Development of triage for vulnerable people in evacuation shelters in times of disaster is an important issue that needs to be addressed without delay. Disasters can occur at any time and in any place. It is necessary to discuss countermeasures as early as possible in educational situations as well as to deal head on with the issues that will certainly arise as soon as they happen. The teaching materials developed in this study have been refined as teaching materials through repeated simulation experiments. In the future, these teaching materials need to be improved to be even more effective through use in a wide range of educational and practical settings. In particular, it is recommended that voluntary disaster prevention organizations and designated shelter personnel among local residents receive training in this method of triage for vulnerable people. Municipal government personnel in charge of disaster prevention and response, as well as local residents themselves, should be made aware of the importance of local residents performing triage in times of disaster.

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Table 1 Triage decision criteria

Triage category	Decision criteria	Example of destination
1	<ul style="list-style-type: none"> • Wound with bleeding • Not feeling well 	<ul style="list-style-type: none"> • Hospital
2	<ul style="list-style-type: none"> • Bedridden, wheelchair user • No accompanying family, requires care 	<ul style="list-style-type: none"> • Welfare evacuation shelter (extra care room required)
3	<ul style="list-style-type: none"> • Wheelchair user, difficulties in daily living (with family members who provide care) (room that can be isolated, etc.) • Mental conditions (dementia, wandering, depression etc.) • Children aged 3 or under 	<ul style="list-style-type: none"> • Small room
4	<ul style="list-style-type: none"> • Able to walk • Healthy • Does not require care 	<ul style="list-style-type: none"> • Large room (Gymnasium etc.)

I. Introduction

A large number of people were affected by disaster-related deaths after the Great East Japan Earthquake of March 2011. After saving people's lives in the immediate wake of a disaster, it is important to take measures to deal with victims who need support in order to protect them from disaster-related deaths (i.e., deaths caused by fatigue from life as an evacuee or deteriorating environment). Preventing disaster-related deaths within the first week after the disaster requires triage of vulnerable people to clarify levels of need and priority in terms of medical and nursing care. The aim of this paper was to examine teaching materials aimed at developing triage for vulnerable people in evacuation shelters in times of disaster.

II. Development of simulation teaching materials

1. Aim of teaching materials

Who: Local residents themselves

When: In times of disaster

Where: Local evacuation shelters

What: Identify people who need medical and nursing care

How: By implementing a triage system based on judging the level of support needed

2. Content of teaching materials

1) Learners are ordinary residents living in the local community.

2) Learning content is a triage training program im-

plemented at the entrance to an evacuation shelter.

3) Attainment targets are for residents themselves to be able to implement triage in the absence of specialists at disaster prevention training events after participating in local triage training study meetings.

4) Teaching materials and tools include:

(1) A sheet showing the four categories of triage with decision criteria and target destination (Table 1)

(2) 30 simulated patient cases for triage of vulnerable people (excerpt) (Table 2)

3. Process of development of teaching materials

1) Implementation of simulation experiments

From November 2012 to March 2013, simulation experiments were conducted using "four categories of triage and decision criteria" and "30 simulated patient cases" as teaching materials and tools. The experiment was repeated a total of three times, with issues being clarified each time, and improvements being made.

2) Procedure for simulation experiments

(1) An explanation of the aim of the experiment and the procedure of the desk-based experiment was given to participants.

(2) The simulated patient case kit layout plan of the evacuation shelter, and triage decision criteria were distributed.

(3) The setting for the triage was the entrance to an evacuation shelter, such as a gymnasium, at the time of a disaster.

(4) The contents presented for the simulated cases were age, sex, nationality, accompanying people, ability to walk, physical condition/mental symptoms, and use of medical equipment.

Table 2 Triage of vulnerable people (30 simulated cases)

No.	Age	Sex	Nationality	Condition on arrival at evacuation shelter				Triage category				Additional information
				Accompanying persons	Walking ability	Physical symptoms/ mental symptoms	Medical equipment	1	2	3	4	
1	70	Male	Japanese	Wife, daughter, son-in-law	Can walk independently	—	None					Diabetes, has 5-day supply of insulin
2	75	Female	Japanese	Son, daughter-in-law, grandchild	Can walk independently	—	None					Cataract surgery scheduled
3	17	Female	Japanese	Parents, younger brother	Can walk independently	Listless, cannot stay standing	None					Cold, has 3-day supply of antibiotics
4	57	Male	Japanese	None	Can walk independently	—	None					HIV, has medication
5	38	Male	Japanese	Wife, child	Can walk independently	—	None					Has pacemaker, has 3-day supply of arrhythmia medication
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮					⋮
28	27	Male	Japanese	Parents	Came by station wagon	—	None					Muscular dystrophy, total care, has suction device and diapers
29	60	Female	Japanese	Husband, daughter, son-in-law	Can walk independently	—	None					Kidney failure (on CAPD), no dialysis equipment
30	55	Male	Japanese	Wife	Can walk independently	—	Oxygen tank					COPD, oxygen tank arranged

(5) Additional information on the simulated cases included medical conditions and disabilities, and medications in possession.

(6) After the triage simulation experiment was completed, results of the experiment were confirmed.

3) Analysis of experiment results

(1) Comparison of triage results in experiment and model triage

There was a need for improvement of case content where there was a large gap between model triage by specialists and experiment results from the ordinary local residents.

(2) Analysis of features of triage by local residents

There was a notable bias toward visual information in triage decisions in cases where people were able to walk “independently”.

(3) Measures to deal with issues that need to be resolved in the developed triage categories and criteria

It is necessary to clarify the scope of information that can be observed by local residents for triage decisions.

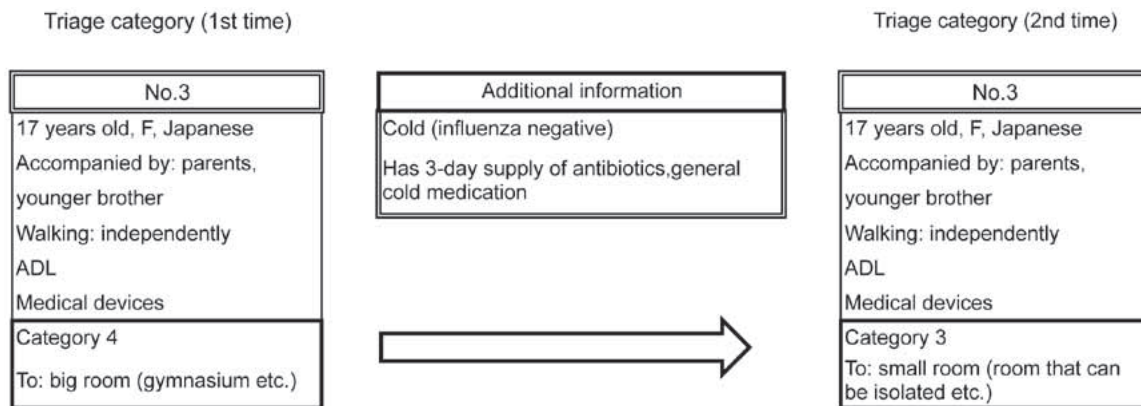


Fig. 1 Example of stratified triage

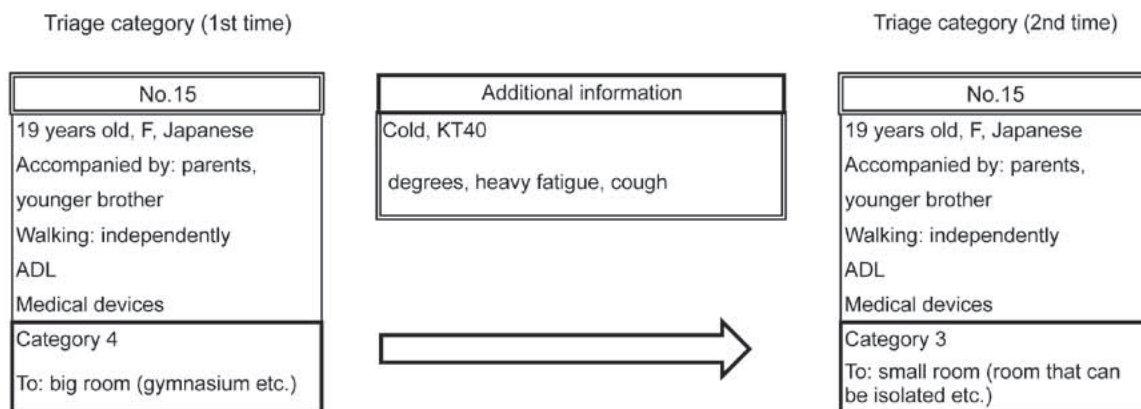


Fig. 2 Example of stratified triage

(4) Validity of attainment targets

The objectives were not attained in these experiments. Further experiments are required using improved triage teaching materials.

(5) Potential for implementation of learning (training) for establishing countermeasures

By setting stratified learning attainment targets, the implementation potential for considering practice methods for each target can be increased.

(6) Effectiveness of learning

One point from the participants' evaluation was that the learning was effective in terms of ease of understanding and the need to actually experience events, and that this was meaningful content as an opportunity to learn about disaster preparation.

The simulation experiment was conducted after approval from the Japanese Red Cross College of Nursing Ethics Committee.

Results of the experiments have been presented in previous studies^{1)~3)}.

A report and DVD entitled, "Triage for Vulnerable People in Evacuation Shelters Immediately after a Di-

saster" have been produced as results of the study.

III. Usefulness as teaching materials

The following four points were examined for the improvement of teaching materials and teaching tools as they arose as issues during the simulation experiment.

First, to improve cases in which there was a large gap between experiment results and model triage, additional information was provided on the cases, and stratified triage was carried out. This is likely to lead to more accurate decisions.

For example, as shown in Fig. 1, Fig. 2 and Fig. 3, in cases where walking was "independent", triage decisions opting for Category 4 were striking. However, when triage was performed a second time using additional information, the cases in both Fig. 1 and Fig. 2 changed from Category 4 to Category 3. The grounds for the triage decision in both stratified cases were consideration of contagion.

In the case in Fig. 3, the "man with chronic obstruc-

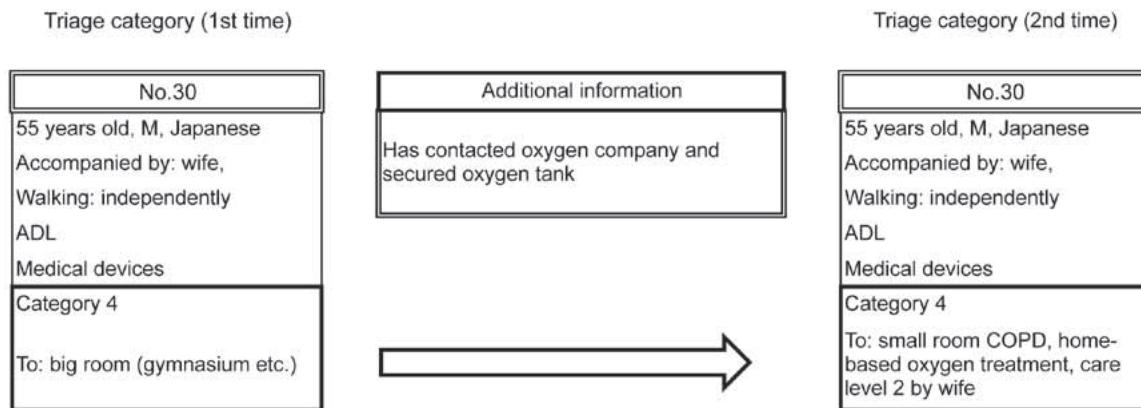


Fig. 3 Example of stratified triage

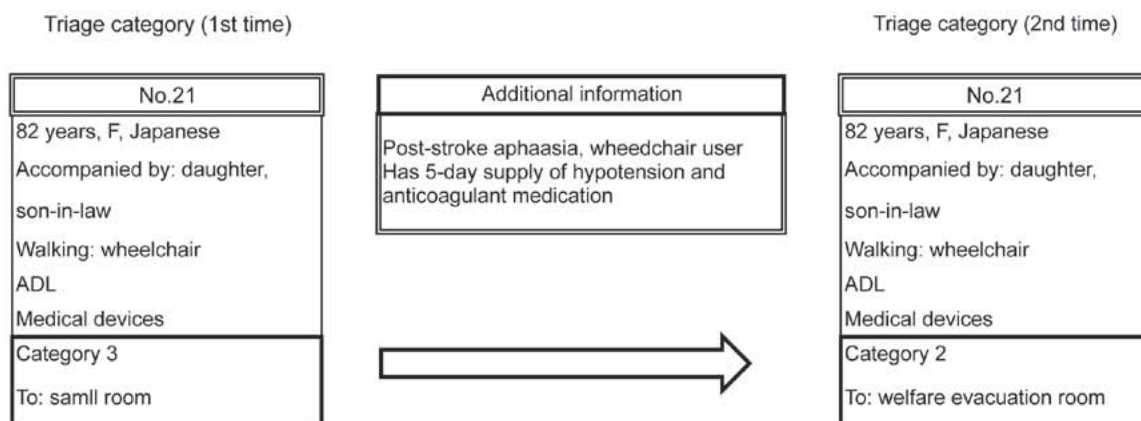


Fig. 4 Example of stratified triage

tive pulmonary disease (COPD) who can walk independently”, the dilemma was whether to prioritize the information that he can walk independently or the information that he has COPD when making the decision. However, the additional information that he has “arranged to obtain an oxygen tank” helps to facilitate a more valid and more accurate triage category decision.

On the other hand, while additional information leads to more accurate decisions, triage is multifarious. In cases such as that shown in Fig. 4, where people cannot walk and arrive at the evacuation shelter in a wheelchair, the decision criterion shifts to whether the person is accompanied. In this case, additional information produced a split in opinions between Category 3 and Category 2 of being sent to a welfare evacuation room. The grounds for the Category 2 decision seemed to be that it was more appropriate to send this person to a welfare evacuation room due to the functional disability of post-stroke aphasia.

This shows the need to create triage training content that provides clear knowledge and information neces-

sary for local residents to make triage decisions, as the teaching materials are aimed at learners who are not specialists. In particular, basic information about levels of disability and the types of conditions that are treated in people’s own homes is necessary. If people can understand essential medical information that should not be overlooked, they are able to perform stratified triage; for example, in the simulated case, “an elderly woman complained of stomach pain”, additional information is provided that “pre-existing conditions are epigastric pain and angina”.

Similarly, in the “case of a person who arrived being carried on someone else’s back, having difficulty walking, with lower limb injury and pain in the right leg”, being able to consider “degree of pain” as additional information would make reassessing the triage category of the case possible.

Likewise, in the case of “a person who was brought in on a stretcher, with head injuries but breathing”, the additional information that the person is “unconscious” would enable an immediate decision to send to hospital urgently.

Second, there are cases where triage decisions are difficult even with additional information. For example, there are cases where triage decisions are affected by specialist knowledge and experience, such as the following simulated cases: “person with cancer pain (has a 7-day supply of morphine)”, “person who needs management of urostomy (with sufficient changing supplies)”, “person in a wheelchair with post-stroke aphasia”, “person with lymphatic edema after breast cancer surgery”, “person with hearing impairment who uses a hearing aid”, and “102-year-old lady who walks unsteadily, accompanied by her family”.

In cases where gaps in specialist knowledge and experience affect the decisions, it is necessary to carefully select what specialist knowledge is required for triage decisions, and to create learning opportunities for local residents who will take the role of leaders to acquire this knowledge. Study meetings and development programs for local residents who are willing to take a leadership role in disaster situations are increasingly important.

Third is the point that triage categories change as time passes. The situation in evacuation shelters shifts constantly as the hours and days pass. Information is constantly updated. There may also be a need to change triage categories due to the physical environment or social environment of the evacuation shelter when conducting triage. Accordingly, it is necessary to find ways of developing and using simulation teaching materials that reflect awareness of the passage of time as triage decisions are made.

Finally, participants in this simulation experiment evaluated that they had understood well the difficulty of triage decisions and the need for and ease of understanding simulation experiences. In terms of evaluation of teaching materials, there seems to have been a certain level of learning effectiveness. By setting stratified learning attainment targets and considering training methods appropriate to each target, it is possible to increase the usefulness of the teaching materials.

IV. Conclusion

Development of triage for vulnerable people in evacuation shelters in times of disaster is an important issue that needs to be addressed without delay. Disasters can occur at any time and in any place. It is necessary to discuss countermeasures as early as possible in educational situations as well as to deal head on with the issues that will certainly arise as soon as they happen. The teaching materials developed in this study have been refined as teaching materials through repeated simulation experiments. In the future, these teaching materials need to be improved to be even more effective through use in a wide range of educational and practical settings.

In particular, it is recommended that voluntary disaster prevention organizations and designated shelter personnel among local residents receive training in this method of triage for vulnerable people. Municipal government personnel in charge of disaster prevention and response, as well as local residents themselves, should be made aware of the importance of local residents performing triage in times of disaster.

Conflict of interest

We declare that we have no conflict of interest.

Acknowledgments

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避難所における要援護者トリアージの開発：教育教材の評価

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目的：震災直後から1週間以内の災害関連死を防ぐための避難所における要援護者トリアージの開発にむけた教育教材を検討することである。

方法：2012年11月～2013年3月の期間に、教材教具の「トリアージ4区分と判断基準」と「模擬患者30事例」を用いたシミュレーション実験を行った。実験内容は地域住民が避難所入口で行うトリアージ訓練である。

結果：1. 実験結果と模範トリアージ結果との差が大きかった事例の改善には、事例に関する追加情報を提供し、段階的トリアージを行うことにより判断がよりの確になる。2. 知識や経験の違いにより、トリアージの判断が難しい場合がある。3. トリアージ区分は時間経過とともに変更される。4. シミュレーションの体験によりトリアージの必要性やわかりやすさ、判断の難しさが理解できたという参加者からの評価が得られた。

結論：地域住民自ら実施するトリアージ教育教材として一定の学習効果が得られたものと思われる。

キーワード：要援護者， トリアージ， 判断基準， 教育教材， 地域住民