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Original Research Article

The Introduction of a Mass Casualty Life Support Management Course in Shizuoka

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Abstract: In the present study, we introduce an education program in Japan targeting first responders to mass casualty incidents, a management course that is based on the mass casualty life support (MCLS) course. The first MCLS management course, which contains two parts and seven modules (a lecture and a simulation drill), was held at a firefighter school in Shizuoka Prefecture on November 10, 2016. A questionnaire survey that assessed the participants' satisfaction with each module was distributed. Their general satisfaction with the course was expressed by a score of 0 to 100. The results of the questionnaire surveys were divided into an emergency medical technician (EMT) group and an "Other" group, based on the occupation of the respondent. We investigated the ages of the respondents and the scores for each module in the two groups. There were 5 participants in the EMT group and 13 in the Other group. The respondents in the EMT group were significantly younger than that those in the Other group. The scores for each of the 7 modules and the general satisfaction scores did not differ between the two groups to a statistically significant extent. The questionnaire survey showed that 17 of the 18 (94%) participants were highly satisfied with the MCLS management course. The educational methods that were applied in the MCLS management course might be effective for all fire department staff members.

Keywords: mass casualty; education; Shizuoka.

INTRODUCTION

The large number casualties caused by the 1995 Great Hanshin and Awaji Earthquake created a massive demand for medical care. Thus, the Japanese government decided to establish Disaster Medical Assistance Teams (DMATs), as "mobile, trained medical teams that can be rapidly deployed during the acute phase of a sudden-onset disaster[1]" [1]. Effective cooperation among local governments, police, emergency fire response teams, military services and DMATs are essential for reducing preventable disaster deaths. However, it has been difficult to achieve cooperation because there has been little mutual understanding between DMATs and other organizations, and a lack of common knowledge, theory, and language in relation to disasters. Accordingly, in 2011, the Japanese Association for Disaster Medicine developed the mass casualty life support course (MCLS) for people who could be first responders to disasters [2].

Shizuoka prefecture is located approximately 130 km from Tokyo. According to a report from the National Research Institute for Earth Science and Disaster Prevention, part of Shizuoka prefecture is located on the border between the Philippine Sea and the Eurasian plate [3]. In this area, huge earthquakes, called Tokai earthquakes, have occurred every 100 to 150 years. In addition, the historical literature shows that great Nankai Trough earthquakes occur in western Japan—including Shizuoka prefecture—with an interval of approximately 100 years. These earthquakes have the potential to cause thousands of deaths, hundreds of thousands of injuries, and extensive damage to buildings, leaving cities, including Shizuoka, devastated [4]. In this background, an MCLS management course was held for the first time at a firefighter school in Shizuoka. We hereby report the results of the course, which were obtained using a questionnaire survey.

METHODS

The standard MCLS course contains four parts and ten modules (a lecture, simulation drill, skill training and a test) [2]. The MCLS is a one-day course of approximately 9 hours in during in which 12-30 people can participate. Participants with certification from the Japan Prehospital Trauma Evaluation and Care program are preferred[5]; however, this is not essential. While the MCLS course mainly applies to first responders in a disaster setting, and personnel involved in management and decision-making in command posts at the disaster scene, the education program is also suitable for commanders of fire departments, such as rescue personnel or firefighters, who may not have medical skill or knowledge. Accordingly, the management course was developed for these fire department staff members. Some of the modules that require medical skill and knowledge (such as triage), were removed from the standard MCLS course for the management course. As a result, the MCLS management course contains two parts and seven modules (a lecture and a simulation drill) (Table 1, Figures 1 and 2).

Table 1: The curriculum of the mass casualty life support course established by the Japanese Association for Disaster Medicine

1. Lecture
   - Disaster medicine and mass casualty management
   - Command and control of mass casualties
     - 1) Introduction to mass casualty management
     - 2) Principles of mass casualty management
     - 3) What is a Disaster Medical Assistance Team (DMAT)?
   - Medical activities for multiple injured patients at a treatment area on the scene
     - 4) Medical activities on the scene (3T: triage, treatment, transportation)
2. Simulation drill (desk-based)
   - 5) The role of the first responder to a disaster scene
   - 6) Principles of mass casualty management
   - 7) Operation of the treatment area
3. Answers to queries, questionnaire survey

Table 2: The results of the questionnaire survey

	EMT (n=5)	Others (n=13)	p-value
Age	42.0 ± 2.0	49.3 ± 1.0	p=0.01
Lecture 1)	4 (4-5)	5 (4-5)	n.s.
Lecture 2)	4 (4-5)	4 (4-5)	n.s.
Lecture 3)	4 (4-5)	4 (3-5)	n.s.
Lecture 4)	4 (4-5)	5 (3-5)	n.s.
Simulation 1)	5 (4-5)	5 (3-5)	n.s.
Simulation 2)	4 (4-5)	5 (3-5)	n.s.
Simulation 3)	4 (4-5)	5 (4-5)	n.s.
Score	94.0 ±4.0 (80-100)	94.6 ± 2.9 (80-100)	n.s.

Mean ± standard error or Median (Range), EMT, emergency medical technician; n.s., not significant.

Fig-1: A lecture: The participants learn the principles of disaster medicine and mass casualty management

Fig-2: The desk-based simulation drill: The participants are divided into 2-5 groups. Each group discusses the management of the same mass casualty scenario and presents the results of the discussion to the other groups

The first MCLS management course was held at a firefighter school in Shizuoka Prefecture on November 10, 2016. A questionnaire survey regarding the participants' satisfaction with each module was distributed; a five-grade scale was used (1, not at all effective; 2, slightly effective; 3, moderately effective; 4, very effective; 5, extremely effective). General satisfaction with the MCLS management course was expressed as a score from 0 (not at all effective) to 100 (extremely effective). A score of ≥80 points was considered to reflect a high degree of satisfaction. The results of the questionnaire surveys were divided into an emergency medical technician (EMT) group and an "Other" group, based on the occupation of the respondent. The Other group included respondents who were not EMTs, such as firefighters, and rescue or communication personnel. The ages of the respondents and the scores for each module were investigated in the two groups. The participants gave their verbal consent for us to perform these analyses.

The data were analyzed using the non-paired Student's *t*-test or Mann-Whitney U test, as appropriate. P values of < 0.05 were considered to indicate a statistically significant difference.

RESULTS

There were 18 male participants who belonged to fire departments in Shizuoka prefecture, and 14 veteran instructors of the standard MCLS course (7 emergency physicians, 1 nurse and 7 emergency medical technicians) (Figure 3). Five of the participants were classified into the EMT group and 13 were classified into the Other group. The participants in the EMT group were significantly younger than those in the Other group. The scores for each of the 7 modules and general satisfaction were not did not differ between the two groups to a statistically significant extent. The questionnaire survey showed that 17 of the 18 (94%) participants were highly satisfied with the MCLS management course. The general satisfaction score of the other participant was 70 points.

Fig-3: The completion of the mass casualty life support course (MCLS): The photograph shows the instructors and participants

DISCUSSION

We reported the contents of the MCLS management course and described the satisfaction of the participants who completed the course. The respondents' occupations did not affect their satisfaction scores. As such, the educational methods that were applied in the MCLS-CBRNE program were considered to be effective for all participants.

Subbarao *et al*. reported on a simulation-based mass casualty course that aimed to educate participants on the recognition, triage, and resuscitation of contaminated victims using high-fidelity mannequin-based simulations and clinical video vignettes [6]. They found statistically significant differences in the pre- and post-training scores at all levels of learning. Unfortunately, we did not assess the pre-training scores of the participants in the MCLS management course; thus, a direct comparison of the effects of the course could not be performed. However, the most important point of the training was to teach the first responders how to avoid self-injury and appropriate actions to reduce disaster-related death and disability when they encounter an unexpected MCLS event [7]. The degradation of skill and knowledge after participating in a course is common, even when high-fidelity patient simulators are used [8]. However, the evaluation of participants a short time after training has been shown to yield favorable results with regard to the preservation of skill and knowledge, and the reported satisfaction among students is usually high, similar to the present findings [9-11]. Accordingly, to prevent the degradation of skill and knowledge related to the mass casualty incidents, it is considered essential that remedial training be provided at the learner's place of work as often as required.

A standardized 'blueprint' of role-specific competency criteria for mass casualty incidents is needed for all emergency healthcare personnel [7, 12]. The results of the questionnaire survey in the present study suggest that the MCLS management course might be useful in this respect.

CONCLUSION

Identifying an effective means of educating fire department staff members on appropriate first responses and command post management in the disaster setting is important. However, the optimal strategy for implementing such education remains under debate. The MCLS management course was designed to train fire department staff members on the principles of first response and command post management in the disaster setting. Participants in the course reported a high degree of satisfaction. These results suggest that the MCLS management course might be effective for training fire department staff members on appropriate first responses and command post management in the disaster setting.

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REFERENCES

1. Kondo H, Koido Y, Morino K, Homma M, Otomo Y, Yamamoto Y, Henmi H. Establishing Disaster Medical Assistance Teams in Japan. Prehosp Disaster Med. 2009;24(6):556-564.
2. Yanagawa Y, Morino K, Iwama N, Takayama H, Kondo H, Koido Y, Hommna M, Otomo Y. Mass Casualty Life Support Training in Japan. EMS World, FEB 27, 2012 (http://www.emsworld.com/article/10634261/mass-casualty-life-support-training-in-japan)
3. Home page of National Research Institute for Earth Science and Disaster Prevention. (http://www.bosai.go.jp/e/)
4. Satake K. Geological and historical evidence of irregular recurrent earthquakes in Japan. Philos Trans A Math Phys Eng Sci. 2015;373.
5. Mashiko K. Trauma systems in Japan: history, present status and future perspectives. J Nihon Med Sch. 2005;72(4):194-202.
6. Subbarao I, Bond WF, Johnson C, Hsu EB, Wasser TE. Using innovative simulation modalities for civilian-based, chemical, biological, radiological, nuclear, and explosive training in the acute management of terrorist victims: A pilot study. Prehosp Disaster Med. 2006;21(4):272-5.
7. Yanagawa Y, Anan H, Oshiro K, Otomo Y. An evaluation of a mass casualty life support course for chemical, biological, radiological, nuclear, and explosive incidents. Sch Acad Sci J Med. 2016;2(5):110-4.
8. Settles J, Jeffries PR, Smith TM, Meyers JS. Advanced cardiac life support instruction: do we know tomorrow what we know today? J Contin Educ Nurs. 2011;42(6):271-9.
9. Hirose T, Iwami T, Ogura H, Matsumoto H, Sakai T, Yamamoto K, Mano T, Fujino Y, Shimazu T. Effectiveness of a simplified cardiopulmonary resuscitation training program for the non-medical staff of a university hospital. Scand J Trauma Resusc Emerg Med. 2014;22:31.
10. Nishiyama C, Iwami T, Kitamura T, Ando M, Sakamoto T, Marukawa S, Kawamura T. Long-term retention of cardiopulmonary resuscitation skills after shortened chest compression-only training and conventional training: a randomized controlled trial. Acad Emerg Med. 2014;21(1):47-54.
11. Heinrichs WL, Youngblood P, Harter P, Kusumoto L, Dev P. Training healthcare personnel for mass-casualty incidents in a virtual emergency

department: VED II. Prehosp Disaster Med. 2010;25(5):424-32.
12. SteelFisher GK, Blendon RJ, Brulé AS, Lubell KM, Jackson Brown L, Batts D, Ben-Porath E. Physician Emergency Preparedness: A National Poll of Physicians. Disaster Med Public Health Prep. 2015;9(6):666-80.