

## **A Medical Experiential Learning Seminar for Elementary and Junior High School Students in Shizuoka Hospital, Juntendo University**

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### **Original Research Article**

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**Abstract:** There have been no reports on medical experiential learning seminars on physician-staffed helicopter emergency medical services for elementary and junior high school students. We investigated whether a seminar would be effective for improving the recognition of the importance of helicopter emergency services among students and whether it influenced their impression of the job. We held a medical experiential learning seminar for elementary and junior high school students named the “Code Blue seminar”, was held. The seminar contained five modules (one tour and four skill experiences), including tour of the helicopter emergency service (HEMS) in our hospital and four medical skill experiences. The Code Blue seminar was a one-day seminar of approximately 4 hours in length, in which 24 students and their parents participated. The participants in the Code Blue seminar were in the fourth grade of elementary school to the third grade of junior high school. A questionnaire survey was distributed to assess the students’ satisfaction with each of the five modules using a five-grade scale was used. General satisfaction with the Code Blue seminar was calculated as the sum of each module multiplied by 4; a score from 0 (not at all fun) to 100 (extremely fun). The students ranked the five modules, based on their satisfaction with the experiences, from one to five (best). Finally, the attending students were asked whether or not they would like to be medical practitioners. Eleven male and 13 female students attended the seminar. Some patients indicated that they were highly satisfied with each module. The median general satisfaction score was 100 points, while the minimum score was 80 points. The HEMS tour, followed by the suturing module was the most highly rated experience. In contrast, the automated external defibrillation of a mock cardiac arrest patient and the broken bone stabilization modules were rated lower. Twenty-one of 24 attending students (87.5%) indicated that they would like to be medical practitioners after the Code Blue seminar. The Code Blue seminar might be effective for promoting the recognition of the importance of the HEMS among the elementary and junior high school students, and might influence the attending students’ choice of occupation in the future.

**Keywords:** medicine; seminar; junior high school; elementary; experience.

### **INTRODUCTION**

Shizuoka Prefecture is located approximately 130 km from Tokyo. Eastern Shizuoka Prefecture includes Izu Peninsula. This region, of approximately 4,090 km<sup>2</sup> in area and with a population of approximately 2 million, is mountainous, with only a few hospitals. A physician-staffed helicopter emergency medical service (HEMS) was introduced to Eastern Shizuoka in 2004. The standard HEMS staff includes one pilot, one mechanic, one physician and one nurse; this can be increased to up to three physicians and two nurses in the case of a mass casualty event. The HEMS covers the whole of Eastern Shizuoka, including Izu Peninsula, with an arrival time of within 20 min, and provides early medical intervention and transportation for patients with

various critical diseases [1-7]. Our facility (Juntendo University Shizuoka Hospital, Izunokuni), serves as the base hospital and is responsible for Eastern Shizuoka (population: approximately 1,100,000); it is also a leader of the Medical Control Council (MCC), which oversees the activities of the fire department as members of the Japanese Medical Association [8]. Due to the medical resource limitations of Eastern Shizuoka, the Eastern Shizuoka HEMS transports over 1000 patients per year, which places it third among the 52 HEMS bases in Japan [5]. When picking up patients, the HEMS often uses the grounds of public elementary and junior high schools as a rendezvous zone to contact patients who are transported by ambulance.

Experiential learning is a process through which students develop knowledge, skills, and values from direct experiences outside of a traditional academic setting [9]. Experiential learning encompasses various activities, including internships, service learning, undergraduate research, overseas study programs, and other creative and professional work experiences [9]. Well-planned, supervised, and assessed experiential learning programs can stimulate academic inquiry by promoting interdisciplinary learning, civic engagement, career development, cultural awareness, leadership, and other professional and intellectual skills [9]. As our hospital is a leader of the MCC system and manages the HEMS in Eastern Shizuoka, which has many chances to use school grounds, in March 31, 2018 we held a medical experiential learning seminar for elementary and junior high school students to promote the of the importance of early medical intervention, transportation, and the HEMS. This was the first time that we held this seminar and to the best of our knowledge, there have been no reports concerning such events for elementary and junior high school students. Accordingly, we present the results of the evaluation by the students who attended the seminar.

**METHODS**

This study protocol was approved by the review board of Juntendo Shizuoka Hospital.

The medical experiential learning Seminar for elementary and junior high school students, which was named the “Code Blue seminar”, was held at our hospital on March 31, 2018. The Code Blue seminar contained five modules (one tour and four medical skill training sessions) including a tour of the HEMS in our hospital and four medical skill experiences (Table-1 and Figure-1), The Code Blue seminar was a one-day seminar of approximately 4 hours in length, during which 24 students and their parents could participate. The Code Blue seminar mainly applied to students from the fourth grade of elementary school to the third grade of junior high school. The twenty-four attending students were divided into 4 groups and each group separately experienced one tour and four medical skill training sessions. In the seminar, four emergency physicians who were also members of the HEMS, five orthopedic specialists, four medical residents, four emergency critical care center nurses, one operating room nurse, 7 clerks, and one security guard attended as instructors, tutors, and stagehands. The purpose of this study was to investigate whether the seminar would be effective for promoting the recognition of the importance of the HEMS among students influencing their impression of the occupation.

**Table-1: The curriculum of the medical experiential learning seminar that was held for elementary and junior high school students in Shizuoka Hospital, Juntendo University**

1. The introduction of the medical experiential learning seminar and self-introductions
2. The tour of the heliport of the physician-staffed helicopter, the helicopter control room and an emergency visit.
3. Medical skills experiences
1) Basic life support and how to use automated external defibrillator
2) How to use ultrasound
3) Skin incision, suture and remove stitches training in an gown in an operation room
4) How to use triangular bandage, experience of plaster slab fixation and external fixation by instruments
4. Completion ceremony
5. Questionnaire survey

A questionnaire survey was distributed to assess the students’ satisfaction with each module; a five-grade scale was used (1, did not understand at all; 2, slightly understood; 3, moderately understood; 4, understood very well; 5, understood extremely well) or (1, not at all fun; 2, slightly fun; 3, moderately fun; 4, very fun; 5, extremely fun). The students’ general satisfaction with the Code Blue seminar was calculated as the sum of each module multiplied by 4; a score from 0 (not at all fun) to 100 (extremely fun). The general satisfaction was evaluated according to sex and age and the one tour and four skill experiences were ranked from one to five (in order of preference) by the attending students. Finally, the attending students were asked whether or not they would like to be medical practitioners.

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 statistical significance.

**RESULTS**

The attending students included 11 boys and 13 girls in the following grades: (elementary school) 4<sup>th</sup> grade, n=2; 5<sup>th</sup> grade, n=11; 6<sup>th</sup> grade, n=8; (junior high school) 1<sup>st</sup> grade, n=1; 2<sup>nd</sup> grade, n=1; 3<sup>rd</sup> grade, n=1.

The results of the analysis of each module are shown in Table 2. The students were highly satisfied with each module. The median general satisfaction score was 100 points and the minimum was 80 points.

The general satisfaction scores evaluated according to sex and age are shown in Table 3. The general satisfaction did not differ according to sex or age.

The results of the analysis of the grading of the modules are shown in Table-4. The experience of the HEMS tour was most highly rated (Figure-2), followed by the suture module (Figure-3). The

experiences of performing automated external defibrillation (AED) for a mock patient with cardiac arrest or stabilization of a broken bone using a drill were the lowest rated of the five modules.

Finally, 21 of 24 attending students (87.5%) responded that they would like to be medical practitioners after the Code Blue seminar.

**Table 2. The results of the analysis of each module**

	Median	Interquartile range	Minimum
AED	5	5	4
Ultrasound	5	5	4
Suturing	5	5	4
Stabilization	5	5	4
HEMS	5	5	4
Satisfaction	100	(93, 100)	80

AED: automated external defibrillator, HEM: physician-staffed helicopter emergency medical service

**Table 3. The general satisfaction according to sex and age**

	Male	Female	p value
Sex	96.0 ± 6.7	98.1 ± 3.1	n.s.

General satisfaction score = 114.0 - 1.4\*age (R<sup>2</sup> = 0.11, p=0.11)  
n.s., not significant; mean ± standard deviation

**Table 4. The results of the analysis of the grading of the modules**

	Median	Interquartile range	Minimum
AED	2	(1,3)	1
Ultrasound	3	(2,4)	1
Suturing	4	(4,5)	1
Stabilization	2	(1,3)	1
HEMS	5	(3,5)	1

AED, automated external defibrillator

HEMS, physician-staffed helicopter emergency medical service



**Fig-1: The pamphlet cover. A medical experiential learning program for elementary and junior high school students was held in Shizuoka Hospital, Juntendo University in 2018.**



**Fig-2: The tour of the heliport of the physician-staffed helicopter.**



**Fig-3: A scene from the suture module, with the attendees wearing gowns in an operating room**

## DISCUSSION

We reported the contents of the Code Blue seminar and described the satisfaction of the students who attended the seminar. Learning that is considered 'experiential' contains all of the following elements: 1) reflection, critical analysis and synthesis; 2) opportunities for students to take initiative, make decisions, and be accountable for their results; and 3) opportunities for students to engage intellectually, creatively, emotionally, socially, or physically [9]. The Code Blue seminar provided information about the HEMS and medical skills training and therefore met definition number 3 (as proposed by the University of Colorado, Denver) [9]. The questionnaire survey

revealed that the students were highly satisfied with the HEMS tour and medical skill training that they received in seminar; thus, the experiential methods that were applied in the Code Blue seminar were considered to have been effective for allowing all of the attending students to engage intellectually, creatively, emotionally, and socially.

In the Code Blue seminar, the HEMS tour, followed by the suture module were the most highly rated experiences, while the AED and broken bone stabilization modules received lower ratings. The title of the Code Blue seminar imitated a popular Japanese television drama about the HEMS

[https://en.wikipedia.org/wiki/Code\\_Blue\\_\(TV\\_series\)](https://en.wikipedia.org/wiki/Code_Blue_(TV_series))). This title would have led to a bias among the students who attended the seminar. In addition, the AED and stabilization components involved the use of machines. Furthermore, there was a female predominance among the attendees. This background might affect the evaluation of the Code Blue seminar [10].

There may be some doubt as to whether learning experiences for young students such elementary or junior high school students will influence their future will professional work. It is difficult to prove the efficacy of this study because the students were not medical practitioners; thus, we did not evaluate the development of their skills or their final choice of occupation. In the state of Victoria in Australia, secondary school students (generally in years 9 and 10, corresponding to the 3<sup>rd</sup> grade of junior high school and 1<sup>st</sup> grade of high school in Japan) take part in a short-term work experience program, in which students are placed with employers to gain insights into the industry and the workplace in which they are placed [11]. The Victorian Government concluded—based on their experience—that this program provides students with a valuable opportunity to develop ‘employability skills’, explore possible career options, understand employer expectations, and increase their self-understanding, maturity, independence and self-confidence. As 21 of 24 attending students (87.5%) showed that they would like to be medical practitioners after the Code Blue seminar, we believe that the Code Blue seminar will have an influence on the student attendees when they chose their occupation in the future.

## CONCLUSION

The Code Blue seminar might be effective for improving the recognition of the importance of the HEMS among elementary and junior high school students, and might influence the career decisions of the attending students in the future.

## Conflict of interest statement

The authors declare no conflicts of interest in association with this study.

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