Original Article

Pre-Hospital Care: The New Perspective in the International Rotational Program of Emergency Medicine Residents

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Background: Cooperation between Japan (Tsukuba University), Laos (The University of Health Sciences), and Thailand (Khon Kaen University) had been established in order that the teaching of doctors in the Emergency Medicine Training Program in Laos could be developed so that these doctors could have the opportunity to be the observers of EMS in Thailand. However, as of this time, no studies related to the pre-hospital care perspective in the International Rotational Program for residents of Emergency Medicine have been conducted.

Objective: To survey the perspectives of pre-hospital care for residents from Laos, who were participating in the International Rotational Program of Emergency Medicine.

Materials and Methods: This was a retrospective cross-sectional study conducted between January and March 2020 with third-year residents in Emergency Medicine from Laos, who had come to gain practice at the EMS of Srinagarind Hospital in Thailand. Before starting the session, data was collected from all participants, which consisted of responses to a multiple-choice test, demographic data, and satisfaction surveys.

Results: A total of eight emergency medicine residents were enrolled and were then divided into three groups. Under normal conditions, the EMS duration time was thirty-two hours for each group. During the first week of the course, knowledge was disseminated through lectures. During the second week, the participants were placed on duty. After that, they received calls from the 1669 center and were dispatched with the EMS operation team. Finally, over the duration of a two-week period, they were placed in the role of being observers on ambulance duty. When comparing the Pre-test and Post-test assessment of their EMS knowledge, a significant increase in their scores from 3.4 to 8.5 (p = 0.010) was found. In addition, the medical oversight had increased from 2.4 to 8.4 (p = 0.005), while the EMS systems had significantly increased from 4.2 to 8.6 (p = 0.014).

Conclusion: The International Rotational Program for Emergency Medicine residents, which had focused on the EMS aspects with EMS knowledge, Medical Oversight, and on the EMS systems, was found to be successful for the doctors from Laos.

Keywords: Emergency medicine, Internship and Residency, Emergency Medical Services, Learning

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The Emergency Medical Services (EMS) were created to increase access to the public health system for emergency patients at home or at the scene of an accident or incident. In each country, this system differs according to the country's specific social, economic, and cultural conditions.

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In the context of treatment, EMS differs from hospital services in terms of personnel and medical equipment both of which are more limited than in hospitals. Previous studies on the treatment of sepsis patients have found that understanding the definitions and guidelines for treatment in the EMS system is different than treatments received in hospitals[1,2]. In addition, it was found that the use of online media in EMS learning was less effective than receiving training in real-life situations based on both the pressure from the patients and the limited amount of space found on ambulances[3].

In the setting of the low-income to middle-income countries (LMIC), there is still a lack of experience in the area of developing EMS and pre-hospital care systems. It has been found that having an opportunity to receive practical experience or to be an observer will increase confidence when working in the EMS[4,5]. For this reason, trilateral cooperation between Japan (Tsukuba University), Laos (The University of Health Sciences), and Thailand (Khon Kaen University) was established for the purpose of teaching and helping to

develop the skills of the doctors in the Emergency Medicine Training Program by having the opportunity to become an EMS observer in Thailand. By coming to practice at the Emergency Department (ED) of Srinagarind Hospital in Thailand for a four-week period, the doctors were able to gain more experience about how to care for emergency patients. During their training, the participants received 32 hours of knowledge, practiced in the ED for 96 hours, and received 32 hours of EMS knowledge. The expectation from the training was to be able to pass on the knowledge they had received to others and to better understand the factors, which affect the operations of the EMS[6-12]. The Emergency Medicine residents from Laos also received training in the Thai curriculum for Emergency Medicine. However, no studies have yet been conducted, which have focused upon the EMS perspective in the International Rotational Program for Emergency Medicine residents. Therefore, this study has been conducted to fill that gap.

Materials and Methods

Study population and design

Between January and March 2020, this retrospective cross-sectional study was conducted with third-year Emergency Medicine residents from Laos, who had come to practice at the EMS of Srinagarind Hospital in Thailand. The exclusion criteria were those participants, who suffered from motion sickness while in the ambulance. The ethical approval was provided by the Khon Kaen University Ethics Committee for Human Research (HE631310).The requirement for informed consent from the participants was waived since confidentiality protection had already been guaranteed, given that the participants were not identified by name, but instead by a unique study number.

Statistical analysis

Statistical analysis was performed using SPSS for Windows version 17.0 (SPSS Inc., Chicago, IL, USA). The categorical data was presented as percentages, while the continuous data was presented using means and standard deviations. Univariable analysis was performed using a two sample t-test for the numerical data and a Chi-squared test or Fisher's exact test for the data comparison between the two groups.

Gathering the data

Before starting the sessions, the data consisted of the responses from a multiple-choice test, the demographic data, and satisfaction surveys, which were completed for all participants. The questions were divided into three domains: General Knowledge of EMS (10 questions), Medical Oversight (10 questions), and EMS Systems (10 questions). After the lectures and observations on the EMS operations, individual exams were given using the multiple-choice test for Thai Emergency Medicine residents. Then the results of the examination were analyzed.

Results

A total of eight Emergency Medicine residents from Laos were enrolled in the program between January and March 2020 (Table 1). According to the schedule, there were four weeks of training for each group. However, the last group only received three weeks of training. Under normal conditions, the EMS duration time was thirty-two hours.

The activities consisted of attending the EMS and participating in the pre-hospital care with the time for each day of the week being from 08.30 to 16.30. In the first week, the course dispensed knowledge through lectures. In second week, the participants were on duty to receive calls from the 1669 center and were dispatched on the EMS operations team (Table 2). Finally, over the duration of a two-week period, they assumed the role of observers on the ambulances. An analysis of the assessments revealed that the participants' EMS knowledge had significantly increased from the Pre-test to the Post-test with scores increasing from 3.4 to 8.5 ($p = 0.010$; Table 3). In addition, the medical oversight had increased from 2.4 to 8.4 ($p = 0.005$), while the EMS systems had significantly increased from 4.2 to 8.6 ($p = 0.014$).

Discussion

This study was the result of cooperation between three countries (Japan, Laos, and Thailand), who have participated in the development of an Emergency Medicine Residency Training Program by bringing the 3rd year Emergency Medicine Residents from Laos to the International Rotational Program at Srinagarind Hospital in Thailand. During the training period for residency in Emergency Medicine, there is much complexity due to the need to circulate and to work in many rotations. EMS is one of rotations that the Emergency Medicine residents must have a knowledge and an understanding of. For EMS, studying for a period of only 32 hours is considered to be very small because still falls well below the appropriate time, which should be 240 hours[10,13]. As planned, each group that came to practice in EMS practiced for 32 hours. However, due to

Table 1. Time periods for the participants

Groups	Periods in 2020	Overall duration	EMS duration (hours)
A	6th to 31st January	4 weeks	32
B	3rd to 28th February	4 weeks	32
C	2nd to 20th March	3 weeks	24

Table 2. The schedule for Emergency Medicine residents from Laos attending EMS

Weeks	Times	Activities
1	08.30 to 10.30	Introduction to EMS
	10.30 to 12.00	EMS system design
	13.00 to 16.30	Medical oversight
2	08.30 to 16.30	Call taking and dispatch duty
3	08.30 to 16.30	Observer of EMS operations
4	08.30 to 16.30	Observer of EMS operations

Table 3. A comparison between the means of the multiple-choice tests

Evaluation subjects (scores)	Pre-test, mean ± SD	Post-test, mean ± SD	*p*-value
Knowledge of EMS (10)	3.4±1.2	8.5±1.1	0.010*
Medical Oversight (10)	2.4±0.9	8.4±1.3	0.005*
EMS systems (10)	4.2±1.5	8.6±1.2	0.014*

* Statistically significant
SD = standard deviation, EMS = emergency medical services

the COVID-19 situation, the last week of training had to be cancelled for the last group. Therefore, 24 hours of practice are left. The educational content, which is related to EMS knowledge, Medical Oversight, and EMS systems, is still considered to be an important part of the EMS even with the limited time[14]. After participating in the process, it was found that students had been able to score significantly higher.

Thailand's EMS consist of Emergency Medical Responders (EMRs), Emergency Medical Technicians (EMTs), Advanced Emergency Medical Technicians (AEMTs), paramedics, nurses, and doctors in pre-hospital care. In Laos, operations are carried out with EMRs and volunteer EMTs, who come from abroad and wish to provide help. For this reason, when developing the EMR training for next year, we will be able to provide increased knowledge of and capabilities of the EMTs system from the doctors, who have already received this training, along with staff members from both Japan and Thailand.

The present study was limited based on the fact that the laws of Thailand state that foreign doctors are not allowed to treat patients. Therefore, simulated practices must be carried out or foreign doctors must only observe. Moreover, because some medicines are not available in Laos, there can be some confusion when it comes to teaching[15-19].

Conclusion

The International Rotational Program for Emergency Medicine residents in EMS, which had focused on the aspects of EMS knowledge, Medical Oversight and EMS systems had been successful for the Doctors from Laos.

What is already known on this topic?

Emergency Medical Services (EMS) were created to increase access to the Public Health system for emergency patients at home or at the scene of an accident or an incident.

What this study adds?

The International Rotational Program at Srinagarind Hospital in Thailand, which was carried out with third-year Emergency Medicine residents from Laos, will assist in developing EMS in Laos.

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Conflicts of interest

The authors declare no conflict of interest.

References

1. Ghazal HS, Alkhunein AA, Alkhazi AA, Aldeheshi SA, Alhusain FAM, Al Jerian N. Understanding the knowledge and attitude of prehospital sepsis care among emergency medical service personnel. J Emerg Trauma Shock 2019;12:123-7.
2. Park J, Hwang SY, Shin TG, Jo IJ, Yoon H, Lee TR, et al. Emergency medical service personnel need to improve knowledge and attitude regarding prehospital sepsis care. Clin Exp Emerg Med 2017;4:48-55.
3. Bucher J, Donovan C, McCoy J. EMS providers do not use FOAM for education. Int J Emerg Med 2018;11:27.
4. Howard I, Cameron P, Castren M, Wallis L, Lindstrom V. Knowledge, attitude and practices of clinical quality and performance assessment among emergency medical services personnel in South Africa: A mixed methods study. Emerg Med Australas 2019;31:1024-36.
5. Nicholson B, McCollough C, Wachira B, Mould-Millman NK. Emergency medical services (EMS) training in Kenya: Findings and recommendations from an educational assessment. Afr J Emerg Med 2017;7: 157-9.
6. Andersson U, Maurin Soderholm H, Wireklint Sundstrom B, Andersson Hagiwara M, Andersson H. Clinical reasoning in the emergency medical services: an integrative review. Scand J Trauma Resusc Emerg Med 2019;27:76.
7. Holmberg M, Fagerberg I, Wahlberg AC. The knowledge desired by emergency medical service managers of their ambulance clinicians - A modified Delphi study. Int Emerg Nurs 2017;34:23-8.
8. Li T, Munder SP, Chaudhry A, Madan R, Gribko M, Arora R. Emergency medical services providers' knowledge, practices, and barriers to stroke management.

Open Access Emerg Med 2019;11:297-303.
9. Drennan IR, Verbeek PR. The role of EMS in regionalized systems of care. CJEM 2015;17:468-74.
10. Aljerian N, Omair A, Yousif SA, Alqahtani AS, Alhusain FA, Alotaibi B, et al. Evaluation of change in knowledge and attitude of emergency medicine residents after introduction of a rotation in emergency medical services and disaster medicine. J Emerg Trauma Shock 2018;11:42-6.
11. Pouraghaei M, Sadegh Tabrizi J, Moharamzadeh P, Rajaei Ghafori R, Rahmani F, Najafi Mirfakhraei B. The effect of start triage education on knowledge and practice of emergency medical technicians in disasters. J Caring Sci 2017;6:119-25.
12. Brice JH, Perina DG, Liu JM, Braude DA, Rinnert KJ, MacDonald RD. Development of an EMS curriculum. Prehosp Emerg Care 2014;18:98-105.
13. Kotora JG, Clancy T, Manzon L, Malik V, Louden RJ, Merlin MA. Active shooter in the emergency department: a scenario-based training approach for healthcare workers. Am J Disaster Med 2014;9:39-51.
14. Katzer R, Cabanas JG, Martin-Gill C; SAEM Emergency Medical Services Interest Group. Emergency medical services education in emergency medicine residency programs: a national survey. Acad Emerg Med 2012;19:174-9.
15. Apiratwarakul K, Srimookda N, Phungoen P, Ienghong K, Tiamkao S, Bhudhisawasdi V. Presepsin levels in emergency patients with bacterial and viral infection. Open Access Maced J Med Sci 2020;8:20-3.
16. Apiratwarakul K, Jumroenketpratheep K, Ienghong K, Ruttanaseeha W, Buranasakda M, Bhudhisawasdi V. Hand hygiene of emergency medical service healthcare providers. J Med Assoc Thai 2020;103:8-10.
17. Apiratwarakul K, Ienghong K, Gaysonsiri D, Buranasakda M, Bhudhisawasdi V, Tiamkao S. Role of motorcycle-based ambulance (motorlance) in major sporting events. J Med Assoc Thai 2020;103:15-7.
18. Ienghong K, Ussahgij W, Kanthachat K, Apiratwarakul K, Phungoen P, Bhudhisawasdi V. Factors associated with severe intracranial pathology in acute non-traumatic headache patients in the Emergency Department. J Med Assoc Thai 2020;103:47-50.
19. Apiratwarakul K, Pumiyoch P, Ienghong K, Phungoen P, Gaysonsiri D, Bhudhisawasdi V. Endotracheal intubation on a stationary vs. Moving ambulance. J Med Assoc Thai 2020;103:18-21.