An Emergency Medical Service System in Thailand: Providers' Perspectives

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Background: *Emergency medical services (EMS) in Thailand have been established for more than 20 years. However, evaluation of EMS is limited. The present study aimed to determine providers' perspectives on EMS in Thailand.*
Material and Method: *The present study was conducted at the tenth Academic Annual Meeting of Emergency Medicine between February 9 and 13, 2009 at Rajavithi Hospital, Bangkok. All participants at the meeting were eligible and randomly selected for the survey. Subjects were physicians, nurses, or paramedics who worked in Emergency Department/Room at hospitals in Thailand. The survey was performed by self-rated questionnaire.*
Results: *Four hundred fifty questionnaires were distributed and 425 were returned completed (94.4%). Of those, 365 subjects (85.9%) were female, 359 (84.5%) were nurses, 103 (24.5%) worked at the ER for more than 10 years, and 284 (67.6%) worked at the community hospitals. The most three common issues of EMS system were insufficient medical personnel, insufficient medical devices, and lack of knowledge of medical personnel. At the ER, overcrowding was the most common issue, while problems with medical devices, collaborations with other organizations, and communication devices were main problems at the pre-hospital EMS. The average satisfactory score of EMS was 2.86 out of 5.*
Conclusion: *EMS in Thailand requires improvement in terms of numbers of medical personnel, well-equipped ambulance, and collaborations among organizations.*

Keywords: *Emergency medical services, Providers, Perspective, Survey*

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Emergency medical services (EMS) include pre-hospital acute medical care, patient transportation, and treatment at the emergency room. The pre-hospital cares can be provided by emergency physicians, nurses, emergency medical technicians (EMT), paramedics, or volunteers[1]. Acute medical cares and transfer of patients emergency rooms (ER) are crucial and may improve survival rate of the patients. The needs for EMS are increasing significantly. In England, it increased by 16%[2].

It has been shown that pre-hospital care may involve in some particular diseases such as acute coronary syndrome, stroke, or disaster[3-5]. The pre-hospital activities and personnel may vary among countries. In Iran, most EMS activities or about 80% are related to non-urgent medical care or transportation[6]. In low- and middle-income countries, layperson or volunteers may work as paramedics in EMS[7]. Thailand has established emergency medicine in 1989 at Rajavithi Hospital. However, the EMS has been functioned since 1937 by the Pohtecktung Foundation, a private, non-profit organization. Currently, EMS can be activated nationwide by calling 1669 all over Thailand and the services are provided by governmental hospitals. In the current study, we aimed to evaluate the EMS performance in Thailand. The results may be useful to improve the EMS quality in Thailand.

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Material and Method

The study conducted at the Tenth Academic Annual Meeting of Emergency Medicine between February 9 and 13, 2009 at Rajavithi Hospital, Bangkok. All participants at the meeting were eligible for the survey. Sampling technique was non-probability sampling. Subjects were physicians, nurses, or paramedics who worked in Emergency Department/Room at hospitals in Thailand. The survey was performed by self-rated questionnaires. The

questionnaires were tested for content validity index by five experts in emergency medicine. The index was 0.85.

The survey questionnaires comprised of four parts including personal data, hospital data, issues regarding EMS, and satisfaction of medical personnel on EMS. The satisfaction was rated by satisfaction on income, responsibility, career path, EMS system, and EMS team. The survey questions were constructed as checklist or rating scales. The Likert rating scale was used with five rating scales, strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. The scales were scored from 1 to 5, respectively. The rating scale questions were tested with 31 personnel at the Department of Emergency Medicine, Ramathibodi Hospital. The reliability index was 0.68.

Operational definitions used in the questionnaire were as follows:

1. Community hospitals were district hospitals with 10 to 150 beds.
2. General hospitals were provincial or district hospitals with 200 to 500 beds.
3. Center hospitals were provincial hospitals with more than 500 beds.
4. University hospitals were hospitals affiliated with medical schools.
5. Intern referred to physicians who worked during the first year after graduation and under supervision.
6. General practitioners referred to physicians who already completed the internship.
7. Resident referred to physicians who were training at medical school.
8. Specialists referred to physicians who were board qualified in any specialty.
9. EMT referred to medical personnel who completed acute care course for at least 110 hours or a two-year course.

Statistical analyses

Seven hundred one participants attended the meeting. The number of study population was calculated by Taro Yamane formula for exact study population with error of 5% and 95% confidence. The study population was 255 subjects. Due to non-probability sampling, the response rate may be only 50 to 60%. Therefore, the total estimated study population was 450.

Data were presented as mean (SD) or numbers (percentage). The correlations among parameters were calculated by Chi-square. The rating scale questions were computed for means (SD). Each mean for the rating scale question was compared among groups by one-way ANOVA. Statistical analyses were analyzed by the SPSS (Statistical Package for the Social Science for Windows) version 15.0.

Ethical approval

The study protocol was approved by the Ethical Clearance Committee on Human Rights Related to Researches Involving Human Subjects, Faculty of Medicine, Ramathibodi Hospital, Mahidol University (MURA2009/1786).

Results

There were 450 distributed questionnaires and 425 returned (94.4%). Summaries of part I (personal data) and part II (hospital data) were shown in Table 1 and 2. Of all 425 subjects, 365 subjects (85.9%) were female, 359 (84.5%) were nurses, 103 (24.5%) worked at the ER for more than 10 years, and 284 (67.6%) worked at the community hospitals.

Only two subjects (0.5%) indicated that the ER was not in service 24 hour per day. Physicians were on duty at the ER in 56.7% while only 17.8% were emergency physicians. If no physicians were on duty at the ER, nurses functioned at the ER for 50.6% (Table 2). Ambulance service was available in 95%

Table 1. Baseline characteristics of participants in the emergency medical service survey (n = 425)

Factors	Number (%)
Female gender	365 (85.9)
Age groups (years)	
20-30	148 (34.8)
30-40	199 (46.8)
40-50	74 (17.4)
50-60	4 (0.9)
Education levels	
Bachelor degree	376 (88.5)
Master degree	38 (8.9)
Board certified	4 (0.9)
Occupations	
Physicians	56 (13.2)
Nurses	359 (84.5)
Emergency medical technicians and staff	10 (2.3)
Experiences in emergency room	
<1 year	39 (9.3)
1-5 years	159 (37.8)
5-10 years	120 (28.5)
10-15 years	66 (15.7)
>15 years	37 (8.8)

Table 2. Hospital characteristics of participants in the emergency medical service survey (n = 245)

Factors	Number (%)
Types of hospital	
Ministry of Public Health	368 (86.8)
Ministry of Education	29 (6.8)
Ministry of Interior	7 (1.7)
Ministry of Defence	7 (1.7)
Private hospital	13 (3.1)
Levels of hospital	
Community hospitals	284 (67.6)
General hospitals	66 (15.7)
Center hospitals	48 (11.4)
University hospitals	22 (5.2)
24 hour emergency room	418 (99.5)
Physicians on duty at emergency room	238 (56.7)
Nurses on duty at emergency room in cases of no physicians on duty	87 (50.6)
Emergency physicians on duty at emergency room	43 (17.8)
Ambulance service available	395 (95.0)
Physicians on duty with ambulance service	100 (24.2)
Emergency physicians on duty with ambulance service	35 (34.3)
Nurses on duty with emergency medical service	393 (94.9)
Emergency phone call (contact number available)	415 (98.1)

and nurses were with the ambulance in 94.9%. Physicians were on duty with the ambulance in only 24.2%.

Seven issues related with EMS system were identified by 413 participants (97.2%). The three most common issues were insufficient medical personnel, insufficient medical devices, and lack of knowledge of medical personnel. Among these seven issues, three issues were different among three groups of occupations including insufficient medical personnel, insufficient medical devices, and unclear emergency medical service workflow (Table 3).

At the ER, overcrowding was the most common issue, while two issues were significantly different among three groups of occupations including lack of physicians at the ER, and patients provided wrong information (Table 4).

Five issues were rated at the pre-hospital services as shown in Table 5. EMT had significant problems with medical devices, collaborations with other organizations, and communication devices than physicians and nurses (90%, 70%, and 70%, respectively; *p*-value 0.004, 0.027, and 0.013, respectively). EMT also had problems communicated with hospital and lack of ambulance and medical service while transporting patients (70%) as shown in Table 6.

In overall, participants had average satisfactory score of 2.86 out of 5 for EMS. Physicians had somewhat higher average score at 2.91, while EMT had lowest score at 2.75 (Table 7).

Discussion

From the survey, nurses play several important roles in EMS in Thailand from the outside hospitals, patient transportation, and at the ER. Medical personnel, worked with EMS, had satisfactory score overall of 57.2% (2.86 out of 5). Several issues related with EMS in Thailand were addressed and needed to be solved.

Regarding the EMS system in Thailand, physicians, nurses, and EMT agreed that insufficient EMS personnel was the main problem (71.4-89.1%)

Table 3. Issues regarding system of emeregency medical service in Thailand identified by participants in the emeregency medical service survey by occupations

Issues	Physicians (n = 56)	Nurses (n = 358)	EMT (n = 10)	*p*-value
Insufficient medical personnel	40 (71.4)	319 (89.1)	8 (80.0)	0.001
Insufficient medical devices	25 (44.6)	242 (67.6)	9 (90.0)	0.001
Lack of knowledge in medical personnel	24 (42.9)	205 (57.3)	4 (40.0)	0.083
Insufficient budget	19 (33.9)	180 (50.3)	5 (50.0)	0.074
Unclear emergency medical service work flow	24 (42.9)	124 (34.6)	7 (70.0)	0.047
Lack of collaboration with other organizations	21 (37.5)	127 (35.5)	6 (60.0)	0.277
Conflicts in the emergency medical service	12 (21.4)	89 (24.9)	5 (50.0)	0.156

EMT = emergency medical technicians
One subject was missing in nurse group

Table 4. Issues regarding emeregency medical service at emergency room in Thailand identified by participants in the emeregency medical service survey by occupations

Issues	Physicians (n = 56)	Nurses (n = 359)	EMT (n = 10)	*p*-value
ER overcrowding	39 (69.6)	251 (69.9)	6 (60.0)	0.797
Patients have inappropriate behaviors	29 (51.8)	206 (57.4)	6 (60.0)	0.718
Lack of physicians at emergency room	9 (16.1)	218 (60.7)	7 (70.0)	<0.001
Patients informed wrong information	16 (28.6)	171 (47.6)	7 (70.0)	0.008
Patients did not corporate	21 (37.5)	156 (43.5)	5 (50.0)	0.632
Lack of consultants	20 (35.7)	151 (42.1)	4 (40.0)	0.666
Lack of collaboration among medical personnel	19 (33.9)	124 (34.5)	3 (30.0)	0.954
Patients refuse treatment	14 (25.0)	111 (30.9)	3 (30.0)	0.668

EMT = emergency medical technicians; ER = emergency room

Table 5. Issues regarding emeregency medical service at emergency site or pre-hospital service in Thailand identified by participants in the emeregency medical service survey by occupations

Issues	Physicians (n = 56)	Nurses (n = 356)	EMT (n = 10)	*p*-value
Lack of medical devices	21 (37.5)	191 (53.7)	9 (90.0)	0.004
Lack of collaboration with other organizations	17 (30.4)	161 (45.2)	7 (70.0)	0.027
Medical personnel lack of knowledge/skill	21 (37.5)	141 (39.6)	2 (20.0)	0.444
Lack of communication devices	13 (23.2)	121 (34.0)	7 (70.0)	0.013
Lack of clinical guidelines for patient care	9 (16.1)	95 (26.7)	4 (40.0)	0.137

EMT = emergency medical technicians
Three subjects were missing in nurse group

Table 6. Issues regarding patient transportation in Thailand identified by participants in the emeregency medical service survey by occupations

Issues	Physicians (n = 56)	Nurses (n = 357)	EMT (n = 10)	*p*-value
No contact to the hospital before patient transfer from ambulance	30 (53.6)	195 (54.6)	6 (60.0)	0.299
Lack of communication device/system between ambulance and hospital	15 (26.8)	149 (41.7)	7 (70.0)	0.016
Problems with transportation route	20 (35.7)	136 (38.1)	6 (60.0)	0.340
Lack of ambulance or medical device	12 (21.4)	137 (38.4)	6 (60.0)	0.015
Refuse to accept patients from hospitals	9 (16.1)	73 (20.4)	1 (10.0)	0.552

EMT = emergency medical technicians
Two subjects were missing in nurse group

as shown in Table 3. Lack of medical devices and knowledge level of personnel were the other two problems. The critical problems of patients require prompt treatment from well-trained and knowledgeable persons[4]. From providers' perspectives, EMS system in Thailand requires improvement to provide better cares.

At the ER, the main problems were overcrowding and lack of medical personnel (Table 4). Physicians did not recognize lack of medical personnel as an issue. Only 16% of physicians agreed that the numbers of physicians were not enough for patients, while nurses and EMT required more personnel for EMS (60.7% and 70.0%). Reducing overcrowded ER may improve patients' outcomes, and reduce length of stay of hospitalized patients[8]. One interesting finding is that medical personnel (all three groups) reported inappropriate behaviors of patients (51.8%-60%).

Table 7. Satisfaction to emergency medical service by occupations in the emeregency medical service survey; maximum of 5

Occupations	Number	Mean	SD	F value	*p*-value
Physicians	55	2.91	0.52	0.566	0.568
Nurses	347	2.86	0.46		
EMT	10	2.75	0.29		
All	412	2.86	0.46		

EMT = emergency medical technicians
Twelve subjects were missing in nurse group and one subject was missing in physician group

These behaviors may be aggressive or non-respectful behaviors of patients and relatives during the critical periods.

EMT recognized that lack of medical devices and collaboration with other organizations were main issues at the pre-hospital situations (90% and 70%), while physicians and nurses did less (30-50%) as shown in Table 5. Currently, several non-profit, volunteer organizations are available and active for pre-hospital care. To make the effective pre-hospital care, all organizations should work together and not be overlapped. Ambulance should also be ready, and well-equipped.

For the patient transportation from the scene to the hospital, communication between ambulance and hospital is still the main issue, mostly reported by EMT. One reason may be from lack of communication device or system (Table 6). Once again, collaboration between hospitals and volunteer organization should be promptly established and discussed.

The present study had some limitations. Most statistical significances were mainly driven by EMT rating. The numbers of EMT in the study were quite low though. Physicians' perspective may be different from nurses or EMT. The reliability index of Likert scale questions was 0.68, which was acceptable. The rating scale was subjective on five different scales and collected from several careers resulting in a low reliability index.

In conclusion, EMS in Thailand requires improvement in terms of numbers of medical personnel, well-equipped ambulance, and collaborations among organizations.

What is already known on this topic?

There is limited data on perspective of emergency health care providers in Thailand on the emergency medical service (EMS).

What this study adds?

EMS in Thailand requires improvement in terms of numbers of medical personnel, well-equipped ambulance, and collaborations among organizations. Health care providers had overall satisfaction score on EMS of 2.86 out of 5.

Acknowledgement

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Potential conflicts of interest

None.

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ระบบบริการสุขภาพฉุกเฉินในประเทศไทย มุมมองของผู้ให้บริการ

ยุวเรศมคฐ์ สิทธิชาญบัญชา, ธิดาทิต ประชานุกูล, ประกิจ สาระเทพ, กิตติศักดิ์ สวรรยาวิสุทธิ์

ภูมิหลัง: *ระบบการให้บริการสุขภาพฉุกเฉินในประเทศไทยได้มีการเริ่มให้บริการมาเป็นเวลานานมากกว่า 20 ปี แต่มียังขาดข้อมูลในด้านการประเมินระบบการให้บริการสุขภาพฉุกเฉิน การศึกษานี้ต้องการทราบมุมมองของผู้ให้บริการสุขภาพฉุกเฉินต่อระบบการให้บริการสุขภาพด้านนี้*

วัสดุและวิธีการ: *การศึกษานี้ได้ดำเนินการระหว่างการประชุมทางวิชาการประจำปีของการแพทย์ฉุกเฉินครั้งที่ 10 ที่จัดขึ้นระหว่างวันที่ 9 ถึง 13 กุมภาพันธ์ 2552 ที่โรงพยาบาลราชวิถี กรุงเทพมหานคร ผู้เข้าร่วมประชุมวิชาการที่เป็นบุคลากรที่ให้บริการสุขภาพฉุกเฉินจะถูกสุ่มให้เข้าร่วมโครงการโดยให้ตอบคำถามในแบบสอบถามด้วยตนเอง*

ผลการศึกษา: *มีการแจกแบบสอบถามจำนวน 450 ฉบับ และได้รับคืนมาจำนวน 425 ฉบับ (ร้อยละ 94.4) ในจำนวนนี้เป็นผู้หญิงจำนวน 365 ราย (ร้อยละ 85.9) เป็นพยาบาลจำนวน 359 ราย (ร้อยละ 84.5) มีประสบการณ์ทำงานในห้องฉุกเฉินมากกว่า 10 ปี จำนวน 103 ราย (ร้อยละ 24.5) และทำงานที่โรงพยาบาลชุมชนจำนวน 284 ราย (ร้อยละ 67.6) ปัญหา 3 ลำดับแรกที่ผู้เข้าร่วมการศึกษาเห็นว่าเป็นปัญหาของระบบการบริการสุขภาพฉุกเฉินได้แก่ การขาดแคลนบุคลากร การขาดแคลนเครื่องมือทางการแพทย์ และบุคลากรที่ปฏิบัติงานยังขาดความรู้ความชำนาญ ที่ห้องฉุกเฉินปัญหาหลักคือ ความคับคั่งของห้องฉุกเฉิน ส่วนการบริการฉุกเฉินก่อนถึงโรงพยาบาลมีปัญหาหลักได้แก่ การขาดแคลนเครื่องมือทางการแพทย์ การประสานงานระหว่างองค์กรที่ปฏิบัติงาน และปัญหาด้านเครื่องมือสื่อสาร ผู้เข้าร่วมการศึกษามีความพึงพอใจต่อการบริการสุขภาพฉุกเฉิน 2.86 คะแนน จากคะแนนเต็ม 5 คะแนน*

สรุป: *การบริการสุขภาพฉุกเฉินในประเทศไทยยังต้องการการพัฒนาในด้านจำนวนบุคลากร รถพยาบาลที่มีอุปกรณ์ที่พร้อม และการประสานงานระหว่างองค์กรที่ปฏิบัติงาน*
