An Assessment on Thai Emergency Medical Services Performance: The Patient Perspective

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Background: *Emergency medical services (EMS) have been steadily developed in Thailand. However, the patient perspective has not been explicitly considered in performance assessment thus far although it is a key consideration for quality improvement in public organizations.*
Objective: *To investigate the Thai patient experience in EMS and emergency departments (ED) and help Thai leaders guide future improvements.*
Material and Method: *The present study was a survey of selected ED of 14 public hospitals in four geographical regions. Five hundred fifty patients from each hospital were interviewed between June and July 2009. The data were collected by medical records review and face-to-face interview.*
Results: *Six thousand four hundred forty four patients [average age of 36.01 years (range: 0-98), almost 50% female, 95% local residents] participated in the survey. Ambulances staffed with paramedics or trained volunteers transported 7.28% of the patients. Of those, 80% to 95% were satisfied, rating the service as 'safe'. Volunteer transfers had lower satisfaction scores. Patients spent an average of 63.8 minutes in the ED. Almost all patients were satisfied and would recommend the services to their friends or relatives. The most common factors contributing to dissatisfaction were with waiting time for consultation and pain management.*
Conclusion: *There is high patient satisfaction with emergency services in public hospitals. Nonetheless, the lower satisfaction for volunteer ambulance service, the concern about waiting time, and pain management highlights opportunity for improvement. The rapid, low-cost patient surveys combined with paper-based medical record review can yield useful information for quality improvements*

Keywords: *Emergency medical service, Performance, Emergency department, Thailand, Assessment, Survey, Patient satisfaction*

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Emergency medical service (EMS) of the US has been considered a role model for many developing countries. The 911 dial number is not only well known among the American public but also pioneers in EMS development in Thailand.

However, the American EMS system has been struggling to cope with many challenges such as incoherent communication and data sharing, unreliable service quality, unpreparedness for disasters and lack of knowledge to sustain quality improvement[1]. The American emergency departments (ED), a major component of the EMS system, have suffered from overcrowding, difficulties in patient admission, denial of patients transported by ambulance[2].

To policy makers in developing countries, EMS was regarded inappropriate to the purchasing power of the country albeit the facts that effective EMS could be established at low cost[3]. For instance, lay people could be trained to appropriately respond to trauma cases in a high density area where a taxi or a small truck could be used for patient transport[3]. Service needs beyond the capacity of well-trained lay people could be met using paramedics with basic life saving skills resulting in significant live saving. Difficulties in case differentiation by severity encountered by a dispatch center could be readily overcome so that appropriate level of pre-hospital care could be mobilized to the scene[4].

In addition, timeliness of EMS provision is a key success factor in many emergency conditions.

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Time indicators for pre-hospital care constitute time of call received, time to scene, operating time at scene and during transport. A study has shown that with one medical rescue team per 50,000 populations, it is possible to keep time to scene within 4-6 minutes[3].

According to an unpublished report, ED workload of public hospitals under the Ministry of Public Health of Thailand could be as high as 13 million visits per year with 3% of emergent and 28% of urgent cases[5]. These hospitals shared 66% of total hospital beds, half of the total number of doctors and 60% of the total number of nurses[6]. An estimated figure of annual death tolls from emergency conditions was at least 60,000 with 23% from road traffic injury, 22% from other traumatic conditions and 53% from non-traumatic conditions[5]. Within each referral network of public hospitals, provincial and district hospitals shared 80% of service load for in-patient trauma cases. During the year 2003-2007, aggregated data on service load of in-patient trauma cases (ICD-10 codes: V01-Y98 and S00-T98) registered the figures as high as half a million, annually[7].

On the part of solution, ED and pre-hospital care of the country have been systematically developed over the last decade through capital investment (in buildings for referral hospitals and ambulances for referral and district hospitals), personnel training (physicians, nurses and paramedics), provincial dispatch centers and establishing payment mechanisms for ED services and pre-hospital care[8,9]. At operational level, performance indicators for pre-hospital care were established in certain areas to guide quality improvement[10].

Nonetheless, patient perspective has not been considered in performance assessment of the Thai EMS system albeit the fact that it is a key component of Thailand Quality Award, a national benchmark for quality improvement of public organization[8]. This report aimed at conducting a rapid and low cost assessment on performance of ED services and pre-hospital care taking into account patient perspective.

Material and Method

Sampling

The present study was a cross-sectional interview survey of selected ED of public referral hospitals of regional provinces with a variation of case-mix. Three or four referral hospitals in each of the selected four geographical regions of the country were chosen on a voluntary basis, the central region and Bangkok were not included. From each hospital, approximately 500 patients were chosen according to the following protocol through consultation with Heads of ED. Within two adjacent weeks in June and July 2009, six working days and two weekends were purposively selected. On each day, a fixed number of patients visiting EDs in each work shift were selected (20 for morning or evening work shift and 10 for nighttime work shift).

Data collection

Two techniques were used to collect data *i.e.*, (1) extraction of data from medical records with a standard form including demographic profile, health insurance entitlement, residential area, diagnoses, specialty of attending physicians, discharge status from ED, arrival and exit time; (2) face-to-face interview with patients or proxy respondents to obtain information about mode of transport to ED, contact with a dispatch center, experiences and suggestions about ambulance services, dispatch center, medical consultation and nursing care.

A trained nurse was assigned in each work shift to extract the data and conduct an interview using the interview schedule lasting 5 to 10 minutes for each subject. A proxy respondent was used for patients whose medical conditions could potentially compromised accuracy of an interview.

The survey protocol was approved by the ethics committee of each participating hospital. The investigators declared no conflict of interest in emergency room services. The present study was funded by the Health Systems Research Institute.

Data analysis

Point estimates were calculated in percentage or mean (SD, range) with 95% confidence interval (IC) or median according to scale of measurements.

Results

Sample characteristics

Six thousand four hundred forty four patients were recruited from 14 referral hospitals with an average age of 36.01 years old (range: 0-98) (Table 1). Of those patients, 47.8% were females and 70.3% were under the universal health insurance coverage. Ninety-five percents of the patients lived in the same province of the referral hospital. Two most common conditions leading to ED visit were medical (43.4%) and traumatic (23.3%). The least common conditions according to the nature of medical

consultation were obstetrics-gynecology or Eye-Ear-Nose-Throat-Psychiatry (3% each). Proxy respondents were used in 50.6% of patients during the interview.

Ambulance transport

Overall, only 7.28% of the patients were transported to hospital EDs by ambulances. Taking into account discharge status, patients discharged home were transported to ED by ambulances at the lowest proportion (5.49%) and those with referred to other hospitals at the highest proportion (12.77%) (Table 2). The proportions for other groups were similar.

Patient flow

Regarding discharge status from ED in each work shift, 65.5% were back home, 32.8% hospitalized, 0.7% waiting for doctor decision, 0.7% referred and 0.3% deceased (Table 3).

On average, a patient spent 63.8 minutes for ED services with a median of 45 minutes (Table 3). Patients referred to other hospitals spent the longest period for ED services (mean 134 minutes, median 100 minutes). The time spent for deceased patients was the next longest (mean 86 minutes, median 57 minutes). The median duration of ED services for those discharged to home or in-patient care were similar at 45 minutes with mean of 64 and 69 minutes, respectively.

The duration of patient flow from ED to admission differed no more than 30 minutes among beneficiaries of different health insurance schemes (the mean duration for beneficiaries under the Universal Coverage Scheme, Social Security Scheme and Civil

Table 1. Demographic profile, health insurance entitlement, and types of medical consultations from EDs of patients (n = 6,440)

Variables	%	95% CI
Sex (female)	47.8	46.53-48.98
Age in years (mean, SD)	36.01, 23.1	35.4-36.6
Health insurance entitlement		
Universal health insurance	70.3	68.52-70.78
Social security scheme	6.5	6.39-7.64
Civil servant medical benefit scheme	10.4	9.66-11.16
Others	12.8	10.87-12.44
Type of medical consultation		
Non traumatic surgery	8.2	7.77-9.13
Traumatic surgery	23.3	22.38-24.45
Orthopedics	6.8	6.08-7.3
Medicine	43.4	42.35-44.78
Obstetrics and gynecology	3.0	2.55-3.38
Pediatric	12.6	11.24-12.83
EENT/Psychiatry	2.8	2.36-3.16
Transported by ambulance	7.28	6.63-7.92

EENT = Eye-Ear Nose Throat

Table 2. Ambulance transport by discharge status

Discharge status	Total patients (n)	Percentage of ambulance transport (%)	95%CI
Home	4,134	5.49	4.80-6.19
Referred to other hospitals	47	12.77	2.86-22.67
Admitted	2,076	10.60	9.27-11.92
Deceased	19	10.53	1.67-25.72
Pending on medical decision	47	10.64	1.49-19.79
Total	6,323	7.28	6.63-7.92

Table 3. Discharge status and duration (minutes) of patient flow at ED (mean, median)

Discharge status from ED	Number of patients	%	Duration of patient flow at ED (minutes)		
			Mean	Median	95% CI
Home	4,167	65.5	64	45	62-67
Referred to other hospitals	47	0.7	134	100	91-177
Admitted	2,085	32.8	69	45	66-73
Deceased	19	0.3	86	57	36-135
Pending on medical decision	46	0.7	68	55	51-84
Total	6,361	100	63.8	45	61.9-65.6

Servant Medical Benefit Scheme was 64, 72 and 73 minutes, respectively). Those requiring orthopedic care spent the longest period in ED (mean 74 minutes and median 60 minutes). To the contrary, pediatric patients spent the shortest time (mean 48 minutes, median 35 minutes). There was a sizable variation in duration of ED services across the 14 hospitals, which ranged from 37 minutes to 116 minutes.

Patient perspectives

Out of 577 patients transported on ambulances operated by professional paramedics or trained volunteers, 80 to 95% were satisfied with the lowest figure for those transported by the volunteers (Table 4) similarly, 71 to 97% of them perceived the service safe with the lowest figure for those transported by the volunteers. When asked whether they would recommend a friend or relative to use the service, 70 to 99% said yes. Likewise, the lowest figure came from those transported by the volunteers.

Almost all of the patients were satisfied with ED services and would recommend the services to their friends or relatives (Table 4). Probing into further details about physician communication, it was found that 83% of the patients found physician's diagnosis clear enough and 66% for medications or other advice. To those with an appointment to another ED visit, 80% reported a clear understanding. However, broken down by discharge status, a variation in responses to each of these issues was observed among different groups. For the majority (66%) of patients, *i.e.*, those discharged home, a similar pattern of responses was observed (Table 4). The next big group, those admitted, lower figures were observed as follows: 78% for diagnosis, 44% for medications, and 49% for other advice.

Concerning expectation of ED improvement (Table 4), the most common suggestion (37%) was a reduction of waiting time for medical consultation. The next two common suggestions were pain treatment (12.6%) and physician consultation (9%).

Discussion

With the adoption of patient perspectives, the present study demonstrated a rapid and low cost method to provide some meaningful findings for improvement of ED services and pre-hospital care. It also revealed certain limitations of using ED survey in this regard.

Since 2006, the National Health Security Office (NHSO) started financing pre-hospital care provision and development with 5.7 to 14.3 million USD annually. In 2009, this ED survey revealed a meager coverage of 10% for ED visits. This figure was rather below those estimates (17-19%) by the NHSO in 2008 using a reimbursement data set for nationwide pre-hospital care operation[11]. The lower figures found in this survey might reflect a selection bias toward less severe patients. Nonetheless, this finding was in support of the notion that there is still a big gap for coverage of pre-hospital care.

Apart from a limited coverage, analysis of the presented data also raised a concern about equity distribution of ambulance services. To a certain extent, it could be argued that discharge status from ED could reflect severity of patients. With this regard, the survey results also suggested a somewhat inappropriate priority setting in ambulance dispatch given a small difference in proportions of patients of different severity being transported by ambulance (Table 2).

Improving access to ambulance services for severe emergency cases was not only rational but also feasible in the country setting. It was evident that in urban setting patients with ST elevated myocardial infarction had a lower case-fatality rate if they got access to reperfusion therapy through a well-organized network of ambulance and community

Table 4. Percentage of patients' responses to specific topics related to ED services by discharge status

Topics (n)	Discharge status					Overall	95%CI
	Home	Referred	Admitted	Deceased	Pending		
Ambulance service dispatched by call centers (288)							
Satisfaction[a]	95.1	100	95.8	100	100	95.5	92.6-98.59
Safety[b]	95.7	100	99.2	100	100	97.2	95.45-100
Recommend to friends or relatives[c]	99.4	100	100	100	100	99.6	98.37-100
Ambulance service dispatched not by call centers (145)							
Satisfaction[a]	87.3	100	94.0	100	NA	91.6	82.96-93.35
Safety[b]	92.7	100	96.4	100	NA	95.1	91.03-98.3
Recommend to friends or relatives[c]	96.4	100	97.6	100	NA	97.2	95.68-99.27
Volunteer ambulance (144)							
Satisfaction[a]	79.6	100	81.8	50	NA	79.9	72.76-86.97
Safety[b]	71.0	100	70.6	50	NA	70.8	68.2-81.5
Recommend to friends or relatives[c]	70.4	100	73.5	50	NA	71.0	68.04-75.11
Emergency department services (5,995)							
Satisfaction[a]	94.5	92.9	94.2	83.3	89.1	94.3	93.21-95.8
Recommend to friends or relatives[c]	96.0	97.6	94.5	83.3	84.8	95.4	94.7-98.2
Clear perceptions of physician messages (5,991)							
Diagnosis	86.6	85.7	77.6	50.0	53.3	83.3	82.39-85.11
Medications	77.9	53.7	43.6	38.9	37.2	66.0	65.52-68.77
Other advice	74.4	70.7	49.4	38.9	44.2	66.6	65.19-70.4
Appointment	80.0	NA	NA	NA	NA	80.0	75.4-88.16
Most desirable aspects for ED improvement (5,830)							
Physician consultation	7.4	7.1	11.9	27.8	26.7	9.0	8.06-9.46
Nursing care	5.5	4.8	5.8	NA	6.7	5.6	4.76-5.87
Pain management	12.2	9.5	14.0	NA	NA	12.6	12.13-13.79
Rapid patient flow	37.8	33.3	34.7	16.7	53.3	36.8	35.17-37.55
Communication	4.1	4.8	3.1	NA	2.2	37.0	3.4-3.95
Don't know or not sure	18.9	28.6	15.9	50.0	4.4	18.0	17.52-19.45
Others	14.1	11.9	14.7	5.6	6.7	14.2	13.75-1550

NA = no information available; CI = confidence interval

[a] Answers: Yes = very satisfied or satisfied; No = very unsatisfied or unsatisfied or neutral or not sure

[b, c] Answers: Yes = yes; No = no or not sure

hospitals[12]. The networks, so far, covered 29 high populated urban districts (17% of the total) throughout the country.

The duration of patient flow reported in the present study was clearly shorter than that of some developed countries. For example, in Australia admission of a patient from ED to in-patient care took 6.6 hours, six folds longer than the figure from the present study. In other words, a bottleneck condition was not an issue for EDs of regional referral hospitals in the present study. However, a lack of bottleneck in ED could mean shifting workload from ED to inpatient care. This raises a concern about compromising quality of in-patient care if over admission from ED is the case.

Concerning inter-hospital transfer, a long duration of flow for patients transferred to other hospitals indicated a room for improvement of referral network especially for emergency cases. Recently in Thailand, lessons learnt from the 29 referral networks on fast track services for ST elevated myocardial infarction demonstrated that shortening time of access to reperfusion therapy leading to a reduction of case-fatality[12]. Under common protocols, a team of specialists, general practitioners, nurses and paramedics worked in a concerted manner to detect and transfer eligible cases to reperfusion therapy within each network of referral hospitals, community hospitals, and ambulance services. Using information sharing (of patient outcomes and other clinical tracers)

and on-going brainstorming sessions, quality of care and patient flow had been continuously improved.

Nonetheless, a lower satisfaction percent for volunteer ambulance service as compared to professional ambulance service indicated a room for capacity building and personnel management of the volunteers. Given a high turnover rate of volunteers, it is challenging to design a system to ensure sustainable quality of services of the volunteers. So far, a success story from Khon Kaen EMS network using a simple checklist to keep track of pre-hospital care for both groups and to provide ongoing immediate feedbacks revealed a continuous improvement in performance of selected procedures such as airway care, immobilization of fractured limbs, stopping bleeding[13], etc.

Because of patients' concern of ED service, further shortening of the flow was the most common issue for improvement that patients requested. In practice, given a limitation of labor in ED and the core function of ED, priority in this issue had already been given to severe cases using triage in all of the study hospitals. Continuous improvement of triage skills, hence, should be a key component to effectively assist the priority setting.

Although pain management is not as crucial as airway care, stopping bleeding or maintaining circulation, suggested improvement of pain management by 13% of patients in this survey highlights its relevance from the patients' point of view. In developed countries, albeit availability of clinical practices guidelines and personnel training, a study revealed a failure in provision of pain management during pre-hospital care among 40% of eligible patients[14].

Limitation

A high proportion (over 90%) of patient satisfaction found in the present study could be due to selection bias towards less severe cases. However, the 32% admission rate shown in the present survey was close to that of 38% reported one year earlier using reimbursement data set for nationwide pre-hospital care operations[11]. In this respect, selection bias might not be the case. Another concern is courtesy bias resulting from conducting interviews in hospital settings. This bias could contribute to a high satisfaction report from patients. In addition, the present survey was focused on the referral hospitals.

Conclusion

With some limitations, this report of an ED survey demonstrated certain benefits of using rapid and low cost method to feedback on quality of care for EMS (pre-hospital care and ED services) from patient perspectives. The design and conduct of the present study highlights the importance of participatory approach involving frontline health personnel, the Heads of EDs in the authors' case, which enhances relevance of the information. Employing nurses to collect the information in a short time span helps keep down the cost of data collection. Given a high demanding work condition of ED in a referral hospital, a survey method based on extraction of medical records and a brief patient interview as demonstrated in the present study might be feasible tools to provide some relevant and reasonably reliable information to assist quality improvement of ED service and pre-hospital care in low and middle-income countries.

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Potential conflicts of interest

None.

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การสำรวจระบบบริการการแพทย์ฉุกเฉินในประเทศไทย

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***ภูมิหลัง**: แม้ว่าระบบการแพทย์ฉุกเฉินของประเทศไทยได้ถูกพัฒนาอย่างมากในกว่าทศวรรษที่ผ่านมา แต่ข้อมูลจากมุมมองของผู้ป่วยซึ่งเป็นตัวชี้วัดคุณภาพที่สำคัญ รวมถึงการนำข้อมูลจากเวชระเบียนทางอิเล็กทรอนิกส์ หรือ ฐานข้อมูลผู้ป่วยมาวิเคราะห์เพื่อพัฒนาคุณภาพของการระบบบริการในหน่วยงานภาครัฐนั้นยังมีน้อยมาก*

***วัตถุประสงค์**: การศึกษานี้มีวัตถุประสงค์เพื่อสำรวจข้อมูลประสิทธิภาพการบริการของห้องฉุกเฉินและระบบเคลื่อนย้ายผู้ป่วยฉุกเฉิน และวิเคราะห์เพื่อใช้ประโยชน์ในการพัฒนาระบบบริการ โดยเก็บข้อมูลภาคตัดขวางจากเวชระเบียน และการสัมภาษณ์ผู้ป่วยที่ใช้บริการห้องฉุกเฉินของโรงพยาบาลรัฐ 14 แห่งใน 4 ภูมิภาค จำนวนแห่งละ 500 คน ในระหว่างเดือนมิถุนายนและกรกฎาคม พ.ศ. 2552*

***ผลการศึกษา**: พบว่าจากกลุ่มตัวอย่าง 6,444 ราย อายุเฉลี่ย 36.01 ปี (พิสัย 0-98 ปี) เพศชายต่อเพศหญิงสัดส่วนใกล้เคียงกัน ส่วนใหญ่ใช้สิทธิบัตรทอง (ร้อยละ 70.3) และเกือบทั้งหมด (ร้อยละ 95) อาศัยในจังหวัดเดียวกันกับโรงพยาบาล ซึ่งกลุ่มตัวอย่างมาใช้บริการร้อยละ 7.28 ของผู้ป่วยมาโรงพยาบาลโดยรถพยาบาลที่มีพยาบาลได้รับการฝึกอบรมระดับกู้ชีพพื้นฐานหรือหน่วยกู้ชีพโรงพยาบาล ความพึงพอใจและรู้สึกปลอดภัยต่อการบริการของรถโรงพยาบาลสูงร้อยละ 80-95 ซึ่งมากกว่ากลุ่มที่ถูกเคลื่อนย้ายโดยอาสาสมัครกู้ภัย เมื่อมาถึงห้องฉุกเฉินใช้เวลาเฉลี่ยในการรับบริการ 63.8 นาที (มัธยฐาน 45 นาที) ผู้ป่วยเกือบทุกรายพึงพอใจ และอยากแนะนำให้ญาติหรือเพื่อนใช้บริการหน่วยกู้ชีพของโรงพยาบาล ส่วนประเด็นความไม่พึงพอใจที่พบบ่อย ได้แก่ ระยะเวลาการรอพบแพทย์ และการบรรเทาอาการปวด*

***สรุป**: ผู้ป่วยมีความพึงพอใจอย่างมากต่อการบริการแพทย์ฉุกเฉิน แต่อย่างไรก็ตาม ประเด็นการให้บริการของมูลนิธิฯ โดยอาสาสมัคร ระยะเวลาให้รอคอยพบแพทย์รวมถึงการบรรเทาความเจ็บปวดของผู้ป่วยนั้นล้วนเป็นโอกาสในการพัฒนาของระบบการแพทย์ฉุกเฉินที่สำคัญ จะเห็นว่าการสำรวจมุมมองของผู้ป่วยร่วมกับการวิเคราะห์เวชระเบียนนั้นให้ข้อมูลอันเป็นประโยชน์ในการปรับปรุงคุณภาพการบริการได้อย่างมีประสิทธิภาพ*