FACTORS INFLUENCING PERCEIVED NEEDS FOR EMERGENCY MEDICAL SERVICES AMONG ELDERLY PATIENTS FROM FOUR PROVINCES IN THAILAND

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Abstract. Thailand has an aging population. This study aimed to determine factors affecting the perceived needs for emergency medical services (EMS) among elderly patients from 4 provinces in Thailand to better understand the emerging medical expectations based on services received and related factors affecting the study population. Study subjects were purposely selected from those who accessed EMS during the previous 6 months; 600 were selected randomly during the study period of March-May, 2016. For the study, we selected 4 provinces: 2 with the highest and 2 with the lowest use of EMS by the elderly in Thailand. Each subject was asked to complete a questionnaire using face-to-face interviews after providing informed consent. The total score for perceived needs for EMS were classified as high, moderate and low arbitrarily. The association between variables and perceived needs for EMS were assessed using the chi-square test. Ninety-two point two percent of study subjects were able to carry out daily routines without assistance, 83.9% had at least one chronic disease and 18.0% were disabled. Eighty-five percent of study subjects expected a high level of EMS; specifically, staff who knew the route, staff who understood the on-scene condition and safety in the emergency van. Being unemployed, residing in an urban area, being unable to dress one's self, having a disability and having health insurance were all significantly associated with having a higher perceived need for EMS ($p<0.05$). There was a great perceived need for EMS in the study subjects. The factors associated with a greater perceived need by the study subjects need to be taken into consideration by efforts to meet perceived EMS needs in this population.

Keywords: perceived needs, emergency medical services, elderly, Thailand

INTRODUCTION

There is an increase in the proportion of elderly in the population worldwide (WHO, 2011; United Nations, 2017). Thailand is second only to Singapore in the proportion of elderly in the population among Association of Southeast Asian Nations (ASEAN) (United Nations, 2012; IPSR, 2015). An aging population resulted from a variety of factors, such as decreasing fertility, a decreased birth rate, a decreasing mortality rate, advanced medical technology and the country's economic

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and social development; allowing people to live healthier and longer (Christensen *et al*, 2009). The proportion of the population aged ≥60 years is increasing worldwide (Olshansky *et al*, 2001; Crimmins, 2015). These trends suggest from 2015 to 2030 the Thai population will move from an "aged society" defined as the proportion age ≥60 years is >10% of the total population (or where the population age ≥65 years is >7% of the total) to a "completely aged society" defined as the proportion age ≥60 years is >20% of the total population (or where the population age ≥65 years is >14% of the total) (NSO, 2015a; TGRI, 2017). This means the proportion of the population with chronic diseases may also increase. This change may affect the demand for emergency medical services (EMS) in the population.

The Act on the Elderly, B.E. 2546 (2003 A.D.), which is a law on the elderly of Thailand states "the elderly are entitled to the protection, promotion and support of medical and public health services provided with special services in terms of convenience and time" (DOP, 2003). The potential need for greater EMS services in the population necessitates preparation.

In this study, we aimed to assess the perceived EMS needs and their contributing factors among elderly patients who have used EMS during the previous 6 months in four provinces of Thailand in order to understand the emerging medical expectations among the elderly in this population in order to improve EMS to better meet perceived needs.

MATERIALS AND METHODS

Our study was cross-sectional and was conducted in the following 4 provinces of Thailand: Kamphaeng Phet, Pathum Thani, Yasothon and Satun during March-May 2016. The 4 study provinces were selected by choosing the 2 provinces with the highest and 2 with the lowest use of EMS proportionally by the elderly. Two districts were selected from each study province for sampling, giving a total of 8 study districts from the 4 study provinces. The districts in each study province were divided in two groups: 1). the districts with number of the elderly higher than average, 2). the districts with number of the elderly lower than average. Study subjects were selected by simple random sampling. In each study district, 60-100 elderly who used the EMS during the previous 6 months were randomly selected following their patient registration. A total of 600 subjects were chosen for the study (120-180 per each study province) based on the calculation as follows (Wayne, 1995):

$$n = \frac{NpZ^2_{\alpha/2}\,(1-p)}{d^2\,(N-1) + pZ^2_{\alpha/2}\,(1-p)}$$

Where n is the minimum sample size needed for the study; N is the total number of people aged ≥60 years in Thailand in 2014 (10,014,699) (NSO, 2015b); $Z^2_{\alpha/2}$ is the standard value under the normal curve set at 1.96 (95% confidence interval); p is the proportion of elderly who used EMS (50.0%); d is the precision of the study (5.0%). The minimum sample size (n) was then multiplied by 1.5 to obtain the design effect number of subjects needed for our study.

Each subject was interviewed using a structured questionnaire. The questionnaire covered general demographics, the patient's health, family information, their social life, their environment and their perceived need for EMS. The perceived need was quantified based on their answers and a total score from 0 to 10 was given, where 0 represented the lowest

perceived need and 10 was the greatest perceived need. A high perceived need was considered a score ≥8, a moderate need was considered a score from 6-8 and a low need was a score <6. The coefficient alpha for reliability was 0.86.

Data were analyzed using Statistical Package for the Social Sciences version 18.0 (IBM, Armonk, NY). Studied variables were described using proportions, means and standard deviations and were analyzed for associations between study factors and perceived need for EMS using the chi-square test. A p-value<0.05 was considered statistically significant.

This study was approved by the Ethics Review Committee for Human Research, Faculty of Public Health, Mahidol University, COA. No. MUPH 2016-048.

RESULTS

The average age of the study subjects was 71.2 years; 49.5% were aged 60-69 years. Fifty-six point four percent of subjects were females. Fifty-five point seven percent of subjects were married, 71.6% were literate and 68.9% had a primary school education level. Forty-seven point four percent of subjects did not work and 42.2% stated they had enough income for daily expenses.

Seventy-four percent of study subjects lived in urban areas, 96.9% lived near their neighbors, 84.2% lived near the community center, 82.3% lived near a main road and 83.3% lived near a health care facility. Ninety-four point four percent of subjects stated there had been public communications regarding how to contact EMS and 71.3% stated there had been public communications regarding available public transportation. Eighty-six percent of subjects had caregivers. Ninety-one point three percent of subjects had a mobile phone to use in an emergency, 97.5% were able to obtain help from people in an emergency without having contact EMS, 98.0% were able to obtain help from a neighbor and 89.3% were able to obtain help from the community in an emergency (Table 1).

Ninety-two point two percent of subjects were able to carry out their daily routines without assistance, 94.8% were able to eat by themselves and 89.3% were able to dress themselves. Eighty-three point nine percent of subjects had at least one chronic disease, the most common being hypertension (57.8%) followed by diabetes mellitus (37.1%). Eighteen percent of subjects were disabled. Eighty-eight point eight percent of subjects had universal health insurance coverage (Table 2).

Eighty-five percent of study subjects had a high perceived need, 10.4% had a moderate perceived need and 4.6% had a low perceived need level for EMS (Table 3). They had a high perceived expectation of the staff to know the route to the site of need, understand the need on scene, provide safety in the emergency van, and be able to receive notifications for EMS or through other channels. Other subject expectations were having an emergency phone number that is easy to remember and access, having a short waiting period on the phone, having the person answering the phone to use simple language, clear speech and polite tone, providing seats for relatives in the ambulance, having staff who can assess the initial symptoms of the person needing assistance, having staff who know how to use the emergency devices correctly and quickly, being able to send the patient to the hospital in a timely manner, having a fast track for elderly patients and a specific area for elderly in the emergency room (Table 4).

Table 1
Selected characteristics of study subjects.

Characteristics	*n* (%)
Residence	
Urban area	425 (74.0)
Rural area	149 (26.0)
Residence location - multiple response possible	
Near neighbors	525 (96.9)
Near the center of the community	442 (84.2)
Near a main road	441 (82.3)
Near a health facility	459 (83.3)
Public notification	
Notified about how to access the EMS	553 (94.4)
Notified about available public transportation in the community	428 (71.3)
Caregiver	
Have a caregiver	510 (86.0)
Have no caregiver/live alone	83 (14.0)
Access to help in an emergency - multiple response possible	
Access via mobile phone	548 (91.3)
Have help from people apart from the EMS	582 (97.5)
Have help from neighbors	583 (98.0)
Have help from the community	524 (89.3)

Table 2
Selected health characteristics of study subjects.

Characteristics	*n* (%)
Activities of daily living	
Able to carry out daily routines	552 (92.2)
Able to eat unassisted	567 (94.8)
Able to dress unassisted	535 (89.3)
Chronic illnesses	
None	96 (16.1)
Have at least 1 chronic illness	502 (83.9)
Have hypertension	290 (57.8)
Have diabetes mellitus type 2	186 (37.1)
Have a disability	
Yes	106 (18.0)
No	484 (82.0)
Insurance	
Universal coverage	533 (88.8)
Other	67 (11.2)

Table 3
Level of perceived needs for emergency medical services among study subjects.

Perceived needs	*n* (%)
High level	480 (85.0)
Moderate level	59 (10.4)
Low level	26 (4.6)

Table 4
Expectations of study subjects about emergency medical services.

Expectations (potential score: 0-10)	Mean	SD
Explanation of available emergency medical services	8.7	1.7
Advertisement of how to access emergency medical systems	8.9	1.5
Emergency contact number is easy to use with short waiting period	8.9	1.6
Emergency operator use simple, clear, polite language	8.9	1.6
Emergency operator can give appropriate health advice for the elderly	8.8	1.6
Seating for relatives available in the ambulance	8.9	1.5
Emergency responders know how to get to the location of the emergency and how to correctly assess the situation	9.0	1.5
Staff understand the physical limitations of the elderly	8.7	1.5
Staff can assess the initial symptoms of elderly patients	8.9	1.5
Staff can use assistive devices skillfully and quickly	8.9	1.4
Staff can assess the symptoms of elderly patients	8.8	1.5
The emergency van is safe	9.0	1.5
Staff can send elderly patients to an appropriate hospital	8.9	1.4
Availability of a fast track for elderly patients	8.9	1.6
The emergency department has a specific location for elderly patients	8.9	1.5

SD, standard deviation.

Factors significantly associated with the perceived EMS need level were subject occupation, residential area, ability to dress themselves, having an underlying disability and having health insurance ($p<0.05$). Subjects with high levels of perceived EMS needs were significantly more likely to have no occupation, reside in an urban area, be unable to dress themselves, be disabled and have universal coverage insurance (Table 5).

DISCUSSION

In our study, study subjects had a high perceived EMS need level. This result is similar to previous studies (Shah *et al*, 2007; Platts-Mills *et al*, 2010). Several

Table 5
Characteristics of study subjects by perceived emergency medical services need level.

Characteristics	Perceived EMS need level		*p*-value
	High *n* (%)	Moderate and low *n* (%)	
Age in years			0.134
≥80	96 (85.7)	16 (14.3)	
70-79	154 (89.0)	19 (11.0)	
60-69	230 (82.1)	50 (17.9)	
Sex			0.089
Female	263 (82.7)	55 (17.3)	
Male	217 (87.9)	30 (12.1)	
Marital status			0.377
Single/divorced/widowed/ separated	195 (84.8)	35 (15.2)	
Married	258 (87.5)	37 (12.5)	
Education level			0.314
Primary school or lower	395 (84.2)	74 (15.8)	
Secondary school or higher	83 (88.3)	11 (11.7)	
Have an occupation			0.017*
No	236 (88.7)	30 (11.3)	
Yes	243 (81.5)	55 (18.5)	
Income adequacy			0.159
Not enough	138 (88.5)	18 (11.5)	
Enough	318 (83.7)	62 (16.3)	
Residential area			0.001*
Urban	368 (88.2)	49 (11.8)	
Rural	96 (76.2)	30 (23.8)	
Location of neighbors			0.867
Far	59 (84.3)	11 (15.7)	
Near	421 (85.1)	74 (14.9)	
Distance from community center			0.238
Far	131 (87.9)	18 (12.1)	
Near	349 (83.9)	67 (16.1)	
Distance from main road			0.803
Far	119 (85.6)	20 (14.4)	
Near	361 (84.7)	65 (15.3)	
Distance from a health facility			0.155
Far	97 (80.8)	23 (19.2)	
Near	383 (86.1)	62 (13.9)	
EMS contact information available			0.472
No	27 (90.0)	3 (10.0)	
Yes	445 (85.2)	77 (14.8)	

Table 5 (Continued)

Characteristics	Perceived EMS need level		*p*-value
	High *n* (%)	Moderate and low *n* (%)	
Availability of public transport			0.186
No	333 (83.7)	65 (16.3)	
Yes	147 (88.0)	20 (12.0)	
Have a caregiver			0.106
No	64 (79.0)	17 (21.0)	
Yes	410 (86.0)	67 (14.0)	
Have access to a mobile phone			0.409
No	41 (89.1)	5 (10.9)	
Yes	439 (84.6)	80 (15.4)	
Have access to help other than EMS			0.475
No	11 (78.6)	3 (21.4)	
Yes	469 (85.4)	80 (14.6)	
Neighbors will help in an emergency			0.592
No	10 (90.9)	1 (9.1)	
Yes	469 (85.1)	82 (14.9)	
Community will help in an emergency			0.465
No	52 (82.5)	11 (17.5)	
Yes	423 (86.0)	69 (14.0)	
Able to perform activities of daily living			0.091
No	43 (93.5)	3 (6.5)	
Yes	436 (84.2)	82 (15.8)	
Able to feed themselves			0.185
No	28 (93.3)	2 (6.7)	
Yes	450 (84.4)	83 (15.6)	
Able to dress themselves			0.005*
No	61 (96.8)	2 (3.2)	
Yes	418 (83.4)	83 (16.6)	
Have a chronic disease			0.378
Yes	406 (85.7)	68 (14.3)	
No	73 (82.0)	16 (18.0)	
Have a disability			0.012*
Yes	95 (93.1)	7 (6.9)	
No	379 (83.3)	76 (16.7)	
Type of health insurance			0.026*
Universal coverage	430 (86.2)	69 (13.8)	
Other	50 (75.8)	16 (24.2)	

*Significance at *p*-value <0.05; EMS, emergency medical services.

studies have reported those aged ≥65 years were significantly more likely to request EMS than those aged <65 years (Clark and FitzGerald, 1999; Svenson *et al*, 2000; Peacock *et al*, 2005; Burt *et al*, 2006). This may be because they are more likely to have chronic medical problem (Shah *et al*, 2007; Brown *et al*, 2009; Knapp *et al*, 2009).

Our study subjects also had expectations about the EMS they received in terms of accessibility, safety, communication, competency, courtesy and appropriateness for the elderly. This may be because elderly patients often present with more complex clinical conditions than younger patients (Ukkonen *et al*, 2019). Communication with elderly patients may also be difficult. Elderly patients may exhibit declines in hearing and cognition (Peterson *et al*, 2009). Therefore, emergency care for the elderly may requires more resources than for younger *ie*, trained EMS personnel to care for the elderly patients (Yim *et al*, 2009).

Subjects with high levels of perceived EMS needs are more likely to have no occupation. Subjects who has no occupation may lead to not enough income for daily expenses and this may be barrier to access to healthcare services (Jacobs *et al*, 2012). Thus, when they have a suddenly illness or injury, effective prehospital EMS system should be able to access.

Subjects resided in an urban area were more likely to have a high perceived EMS need level. This may be because an urban area has higher emergency rates than rural municipalities (Hegenberg *et al*, 2019). Population density in urban areas is higher in daytime, mostly because of inbound commuters. Another cause may be because in suburban/rural areas, neighbors and community will help in an emergency. EMS personnel are quite familiar with patients and location. Therefore, the EMS patients received in terms of accessibility and communication between patients and healthcare providers is not a barrier to care.

Subjects with high levels of perceived EMS needs are more likely to be unable to dress themselves and be disabled. This may be because physical function is an important predictor of health outcomes in elderly (Buford *et al*, 2014). Poor physical function is associated with several risk factors including risk of falling, cognitive decline and all-cause mortality (Cooper *et al*, 2010; Cooper *et al*, 2011; Viccaro *et al*, 2011). Elderly with deficiency in activities of daily living and poor physical functioning is more likely to request EMS assistance (Shah *et al*, 2003).

In our study, subjects with universal coverage health insurance had a high levels of perceived EMS needs. This could be because the service was free of charge. Frequent users of EMS were more likely to have health insurance (Pines *et al*, 2011).

In our study, there was a high perceived level for EMS among study subjects. The factors significantly associated with those perceptions were subject occupation, residential area, ability to dress themselves, having a disability and having health insurance. Further studies are needed to determine if these perceptions coincide with actual needs reflect only a psychological anxiety or fear. Further studies are also needed to determine the actual experience of the study subjects who accessed EMS to determine their impression of received services.

ACKNOWLEDGEMENTS

This study was supported by the National Institute for Emergency Medicine, Thailand. The study was partially

supported for publication by the Faculty of Public Health, Mahidol University, Bangkok, Thailand.

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