

Is the Thailand epilepsy service adequate to help patients?

¹Somsak Tiamkao, ²Somchai Towanabut, ²Kanlaya Dhiravibulyn, ³Sineenard Pranboon, ¹Kittisak Sawanyawisuth, The Epilepsy Society of Thailand, ⁴Integrated Epilepsy Research Group, Khon Kaen University

¹Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen; ²Prasat Neurological Institute, Bangkok; ³Nursing Division, Srinagarind Hospital, Khon Kaen; ⁵Integrated Epilepsy Research Group, Khon Kaen University, Khon Kaen, Thailand

Abstract

Background: Epilepsy is a common disease but to achieve successful seizure control in developing countries is still a challenge. This study aimed to investigate the epilepsy services in Thailand.

Methods: This was a survey by questionnaires on epilepsy service sent to 1,033 public hospitals all over Thailand. **Results:** The response rate was 54.1%. The results show that most of physicians that provide care for persons with epilepsy were General Practitioners (91.5%). Epileptologists and Neurologists accounted for only 11.1% and 14.4%. There were only 52 EEG, 54 CT Scan, and 6 MRI instruments in the entire country of 65 million. Standard antiepileptic drugs (AEDs) were widely available, phenobarbital (99.9%), phenytoin (96.0%), carbamazepine (97.9%), and valproic acid (89%) of institutions. The availability of new AEDs were: gabapentin (77.6%), topiramate (63.9%), levetiracetam (46.0%), lamotrigine (45.3%), pregabalin (33.6%), were also available in 77.6%, 63.9%, 46.0%, 45.3%, 33.6%, vigabatrin (14.5%), and oxcarbazepine (14.3%) of institutions. Intravenous AEDs used for status epilepticus patients include phenytoin (54.2%), phenobarbital (33.9%), and sodium valproate (12.1%). Therapeutic drug monitoring could be done in 45.7% of the responding hospitals.

Conclusion: There is limited human and material resources for the care of epilepsy in Thailand. There is a need to develop a model of epilepsy care that is appropriate with the limited resources in the country.

INTRODUCTION

Epilepsy is a major public health problem impacting on people of all ages, nationalities, social and ethnic groups. There are estimated 50 million persons with epilepsy (PWE) worldwide; 85% are in the developing countries.¹ In Thailand, the incidence of epilepsy is 7.2 per 1,000 population, therefore the estimated number of PWE in Thailand with 65 million population is 468,000.²

Epilepsy has good prognosis; two-thirds of PWE can achieve seizure freedom.³ Nevertheless, it is estimated that up to 80-90% of PWE in developing countries do not receive adequate treatment due to limited access.^{1,4}

In Thailand, there are three healthcare insurances for Thai people including universal coverage or basic health insurance (UC), social security system policies (SSS), and government officer insurance (GOI). These three types of health insurance cover 95.94% of the Thai

population (73.25% UC, 14.95% SSS, and 7.74% GOI). The other 2,607,032 Thais (4.07%) do not have health insurance coverage. Physicians may have to choose the appropriate antiepileptic drugs (AEDs) limited by the specific health insurance coverage. The aim of this study was to survey the facilities of epilepsy services, to facilitate better strategy to improve epilepsy care in the country.

METHODS

This is a survey on facilities of epilepsy service from public hospitals all over Thailand performed in 2007. The survey was conducted by using questionnaires, which were sent to 1033 public hospitals. The questionnaire included questions on the types of physicians that provided care for PWE, types of AEDs used in the hospitals, facilities for therapeutic drug monitoring (TDM), diagnostic facilities available including electroencephalography (EEG), computed

tomography (CT scan), and magnetic resonance imaging (MRI). All information was provided by attending physicians at each hospital.

Definitions of terms

A *center hospital* is a hospital with over 500 beds providing tertiary level services. A *general hospital* is a provincial level hospital with 150 to 500 beds. A *community hospital* is a district level hospital has 10 to 150 beds providing service is at a secondary level. *Other hospitals* are hospitals affiliated with Bangkok Metropolitan, the Ministry of Defense, the Ministry of the Interior and State Enterprises.

Data Analyses

The data were analyzed by the SPSS program and presented by descriptive statistics.

RESULTS

The response rate was 54.1% with 559 questionnaires returned. Most respondents were from the community hospitals (467/559, 83.5%) as shown in Table 1. Overall, there were no Epileptologists or Neurologist at community hospitals. The PWE were mainly cared for by the General Practitioners (91.5%). In the general hospitals, Epileptologists were found in only 5.7%, and Neurologists 0.4% of general hospitals. PWE were cared for by General Practitioners (35.1%), Internists (29.8%), and Pediatricians (23.7%). At center hospitals, Epileptologists were found in 6.5%; PWE were cared for by Neurologists (32.2%), General Physicians (25.8%), and Pediatricians (16.1%). At university hospitals, Epileptologist was found in 13.0%. PWE were were cared for by Neurologists (21.9%),

Pediatricians (17.4%), and General Physicians (17.4%). At hospitals affiliated to the Mental Health Department, PWE were cared for by General Practitioners (40.7%), Psychiatrists (28.9%), and Neurologists (20.0%). In other hospitals, there were more epileptologists at 33.3%. The details are as shown on Table 2.

Hospitals affiliated with universities had the greatest number of diagnostic facilities (Table 3). These included MRI (57.1%), EEG (85.7%) and CT scan (85.7%). None of the hospitals affiliated with Mental Health Departments have MRI. But they have EEG (100%), and CT scan (66.7%). None of the community, general hospitals and center hospitals has MRI. But CT Scan was available in centre hospitals (100%) and general hospitals (35%). Close to two thirds of center hospitals have EEG (63.5%).

As for the capacity for TDM, this was available in all university hospitals. The capacity is less at the center hospitals (66.7%), hospitals under Mental Health Department (66.7%), general hospitals (14.5%), community hospitals (2.6%). The detail results are shown in Table 4.

Standard AEDs commonly used were phenobarbital, phenytoin, carbamazepine, and valproic acid. Most hospitals had available AEDs at 87%, while at community hospitals, valproic acid was available only 45.1% (Table 5). The new AEDs that were most frequently used were gabapentin and topiramate. Hospitals under universities, the Mental Health Department, Department of Medical Services, center hospitals and other hospitals had higher coverage of the new AEDs than community and general hospitals. This is shown in Table 6. It was also found that community hospitals have lack of intravenous AEDs for status epilepticus, with the availability

Table 1: Numbers of hospitals questionnaire was sent to and response by type of hospital.

Hospital level	Numbers of hospital sent the questionnaire	Numbers of responded hospital (%)
Center hospitals	26	12 (46.2%)
General hospitals	96	57 (59.4%)
Community hospitals	734	467 (63.6%)
University hospitals	12	7 (58.3%)
Hospitals under Department of Medical service	27	9 (33.3%)
Hospitals under Department of Mental Health	16	3 (18.8%)
Others*	122	4 (3.3%)
Total	1,033	559 (54.1%)

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

Table 2: Percentage of types of physicians responsible for epilepsy patients per hospital category

	Center hospitals (n=12)	General hospitals (n=57)	Community hospitals (n=467)	University hospitals (n=7)	Hospitals under Department of Medical service (n=9)	Hospitals under Department of Mental Health (n=3)	Others* (n=4)
General Practitioners	9.7	35.1	91.5	8.7	27.3	40.7	0.0
Internists	25.8	29.8	3.7	17.4	27.3	0.0	50.0
Epileptologists	6.5	5.7	0.0	13.0	9.1	10.4	33.3
Neurologists	32.2	0.4	0.0	21.9	9.1	20.0	16.7
Pediatricians	16.1	23.7	2.0	17.4	13.6	0.0	0.0
Neurosurgeons	9.7	3.5	0.0	13.0	13.6	0.0	0.0
Psychiatrists	0.0	1.8	1.6	4.3	0.0	28.9	0.0
Others	0.0	0.0	1.2	4.3	0.0	0.0	0.0

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

of the different AEDs being: phenytoin (47.8%), phenobarbital (29.0%), and sodium valproate (5.8%).

DISCUSSION

This study reflected the status of facilities for epilepsy services in Thailand and showed that few PWE were cared for by Epileptologists generally, 13% in university hospitals, about 6% in center and general hospitals, and none at community hospitals. Most of the PWE in the community hospitals were cared for by General Practitioners (91.5%); with the General Practitioners, Internists and Pediatricians mainly caring for the PWE in general hospitals; and only 6% were looked after by Neurologists or Epileptologists. These findings was similar to the previous study of the facilities of epilepsy services in the Northeast Thailand⁵, where 55 hospitals were surveyed and there were Epileptologist only at 5% of facilities, with Neurologists and General Practitioners being the majority of physicians providing care.

A previous report of epilepsy care in South East Asia found that two thirds of Neurologists in Philippine, Malaysia and Thailand worked in the national capital cities of Manila, Kuala Lumpur and Thailand.⁶ Almost two decades later in Thailand, from 1995, the distributions of Neurologists and Epileptologists remains to concentrate in the big cities. The hospitals categorized as “others”, with the highest concentration of Epileptologists and Neurologists is also concentrated in Bangkok (Table 2). When comparing the number of neurological specialists, Thailand was in fact better placed in terms of Neurologists, Neurosurgeons and Psychiatrists. There were 305 Neurologists⁷, 252 Neurosurgeons⁸, and 546 Psychiatrists⁹ in Thailand in 2007 (Table 7). Nevertheless, as the majority of PWE are cared for by the non-Neurologists or Epileptologists, there is urgent need to place greater emphasis in the training of non-Neurologists (General Practitioners, Internists and Pediatricians) in the care of PWE in Thailand. The “Epilepsy Managers Program”

Table 3: Percentages hospitals with equipment for diagnosing epilepsy available in different hospital categories

	Center hospitals (N=12)	General hospitals (N=57)	Community hospitals (n=467)	University hospitals (n=7)	Hospitals under Department of Medical service (n=9)	Hospitals under Department of Mental Health (n=3)	Others* (n=4)
EEG	63.6	5.4	3.6	85.7	55.6	100.0	75.0
CT Scan	100.0	35.1	1.3	85.7	55.6	66.7	75.0
MRI	0.0	0.0	0.0	57.1	11.1	0.0	25.0

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

Table 4: Percentages of hospitals with therapeutic drug monitoring (TDM) capacity

	Center hospitals (n=12)	General hospitals (n=57)	Community hospitals (n=467)	University hospitals (n=7)	Hospitals under Department of Medical Service (n=9)	Hospitals under Department of Mental Health (n=3)	Others*
Can conduct TDM	66.7	14.5	2.6	100.0	44.5	66.7	25.0
Cannot conduct TDM	25.0	54.5	77.6	0.0	33.3	0.0	75.0
Send samples to hospitals nearby	8.3	30.9	19.8	0.0	22.2	33.3	0.0
Total TDM capacity	75.0	45.4	22.4	100.0	66.7	100.0	25.0

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

Table 5: Percentage of hospitals having standard antiepileptic drugs available classified by hospital types

	Center hospitals (n=12)	General hospitals (n=57)	Community hospitals (n=467)	University hospitals (n=7)	Hospitals under Department of Medical Service (n=9)	Hospitals under Department of Mental Health (n=3)	Others*
Phenobarbital	100.0	100.0	99.1	100.0	100.0	100.0	100.0
Phenytoin	100.0	94.5	88.5	100.0	88.9	100.0	100.0
Carbamazepine	100.0	98.2	86.9	100.0	100.0	100.0	100.0
Valproic acid	100.0	89.1	45.1	100.0	87.5	100.0	100.0

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

Table 6: Percentage of hospitals having new antiepileptic drugs available classified by hospital types

	Center hospitals (n=12)	General hospitals (n=57)	Community hospitals (n=467)	University hospitals (n=7)	Hospitals under Department of Medical Service (n=9)	Hospitals under Department of Mental Health (n=3)	Others*
Topiramate	83.3	13.7	0.3	100.0	50.0	100.0	100.0
Gabapentin	83.7	66.0	6.3	100.0	87.5	100.0	100.0
Lamotrigine	36.4	5.9	0.0	85.7	25.0	100.0	66.7
Vigabatrin	0.0	0.0	0.0	42.9	25.0	0.0	33.3
Levetiracetam	25.0	2.0	0.3	57.1	37.5	100.0	100.0
Pregabalin	36.4	7.7	1.1	85.7	37.5	0.0	66.7
Oxcarbazepine	0.0	0.0	0.0	100.0	0.0	0.0	0.0

*Hospitals affiliated with Bangkok Metropolitan, the Military, the Police, and State Enterprises.

Table 7: Number and types of physicians that providing care for persons with epilepsy in Thailand and other countries

	Number (persons)				
	Thailand	Laos ⁶	Mongolia ⁸	Angola ⁹	Zambia ⁹
Populations, million*	69.5	6.3	2.8	19.6	13.5
Neurologists	305 ¹³	1	200	3	2
Neurosurgeons	252 ¹⁴	1	NA	3	–
Psychiatrists	546 ¹⁵	NA	NA	2	10

*Populations based on report of 2011 (Source: <http://www.worldbank.org/>);
NA = Not available

in the Philippines may be one possible solution.¹⁰ These Managers are General Practitioners who are trained to care for the epilepsy patients in the rural area. Another option is to provide an online consultation service to the community hospitals. There is also need to create epilepsy service networks that can facilitate referrals for the PWE who are diagnostic challenge or drug resistant.

There is no formal study to determine the epilepsy treatment gap in Thailand. The epilepsy treatment gap in Asia is estimated to vary from 50% to 80%.¹¹ For example, epilepsy treatment gap is estimated to be 62.6% in China¹¹, 84.7% in Vietnam¹² and 97% in Tibet.¹³ Lack of knowledge by the health care professionals is probably an important reason contributing to large treatment gap. We have earlier shown in a study in Northeast Thailand, that 49.1% of medical professionals lacked knowledge on epilepsy⁵, especially knowledge related to AEDs prescribing.¹⁴ Thus, other can caring for the PWE who are diagnostic challenge or drug resistant, the epilepsy specialist plays a major role in the education of other health care professionals who are non-Neurologists, and the public at large on epilepsy, thus contributing to overcoming the epilepsy treatment gap in the

community.

When compared to other developing countries, e.g., Laos PDR¹⁵, Nepal¹⁶, Mongolia¹⁷, and Zambia¹⁸, Thailand has better availability of the diagnostic tools for epilepsy (Table 8). In terms of epilepsy services provided for PWE in the Northeast⁵, there were 10.9% of CT Scan, 1.8% of EEG, but no MRI. This is similar to other provincial parts of Thailand outside of Bangkok. General Practitioners are the main physicians taking care of PWE with limited facilities. Epilepsy care in Thailand outside Bangkok is still lacking in investigatory facilities as well as specialist services. There is urgent need to make all these facilities available at the community hospitals, if not at least at the general hospitals.

Overall, there is lack of capability to conduct TDM, with only 2.6% of the community hospitals and 14.5% of the general hospitals able to conduct TDM. A world wide survey of the diagnostic services by WHO¹⁹ showed that TDM is available at 74.7% of the responding countries. The African continent had the lowest capacity of 45.1%, followed by countries in Southeast Asia at 55.6%. American and European continents had the highest capacity of 95.8 and 93.3%. TDM is an essential tool in the care of PWE particularly

Table 8: Number of epilepsy diagnostic devices in Thailand and other countries

Diagnostic devices	Number				
	Thailand*	Laos ⁶	Nepal ⁷	Mongolia ⁸	Zambia ⁹
Populations, million*	69.5	6.3	30.5	2.8	13.5
CT Scan	54	5	10	13	3
MRI	6	0	3	2	1
EEG	52	1	4	10	1

*Populations based on report of 2011 (Source: <http://www.worldbank.org/>);
Information from 559 hospitals

Table 9: Percentages of hospitals with specific antiepileptic drugs available in Thailand and other countries

AEDs	Percentage (%)		
	Thailand	Mongolia ⁵	India ¹⁰
Phenytoin	96.0	-	49
Carbamazepine	97.9	86.2	67.6
Valproic acid	88.8	4.3	-
Phenobarbital	99.9	3.3	-
Topiramate	63.9	0.5	-
Gabapentin	77.6	-	8.7
Lamotrigine	45.7	-	-
Levetiracetam	46.0	-	-
Vigabatrin	14.5	-	-
Pregabalin	33.6	-	-
Oxcarbazepine	14.3	-	-

when using the standard AEDs. It should be made more widely available.

The standard AEDs used in the Thai hospitals were phenobarbital, phenytoin, carbamazepine, and valproic acid. Most hospitals had availability of these drugs. Only 45.1% of community hospitals, however, have valproic acid available. Hospitals affiliated with universities, the Mental Health Department, the Department of Medical Service, center hospitals and other hospitals possess new AEDs more than community and general hospitals. When comparing AED availability in Thailand with Mongolia²⁰ and India²¹, both the standard AEDs and new AEDs are more widely available in Thailand. Over 89% of hospitals reported having the standard AEDs available. As for the new AEDs, gabapentin (77.6%) and topiramate (63.9%) are the most widely available, as shown in Table 9. It is good that a variety of AEDs are made available for use in Thailand. The priority is thus to formulate clinical practice guidelines and further education of AED use particularly to the non-Neurologists.

Community hospitals lacked intravenous AEDs for status epilepticus, i.e., only 47.8% had intravenous phenytoin, 29.0% had phenobarbital and 5.8% had sodium valproate. These findings were correspond to the previous study on facilities of epilepsy services in the Northeast¹¹ which also found that community hospitals lack intravenous AEDs for treatment of status epilepticus. In view of high mortality and morbidity of status epilepticus, and the requirement for urgent treatment, intravenous AEDs should be regarded as essential drugs and made more widely available.

In conclusion, this study has revealed that treatment of epilepsy in Thailand, a developing country, still faces numerous challenges. There is lack of medical professionals, especially epileptologists. Essential diagnostic facilities, EEG, CT scan, MRI and TDM are still not widely available. To further improve epilepsy care in the country, there is urgency to train more epilepsy specialists, develop and create epilepsy service network that are accessible to all; enhance the training of the General Practitioners, General Physicians and Pediatricians who are the main physicians managing the PWE in the community and general hospitals; and create clinical practice guidelines that are applicable locally.

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