

SHORT COMMUNICATION

INPATIENT REHABILITATION SERVICES FOR PATIENTS AFTER STROKE IN THAILAND: A MULTI-CENTRE STUDY

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Objective: To set a baseline for measuring the development of medical rehabilitation services and outcomes for patients after stroke and promoting rehabilitation medicine in Thailand.

Design: Multi-centre, prospective study.

Subjects: Patients after stroke in Thai Stroke Rehabilitation Registry (TSRR), aged ≥ 18 years, with stable medical signs, able to follow a 1-step command and sit for at least 30 min.

Methods: Rehabilitation services were recorded daily as units of treatment (1 unit = 20 min). Length of stay and treatment costs were calculated.

Results: Of 327 patients enrolled in the study, 285 (87.2%) completed their treatment programme. Mean length of stay was 29.4 (standard deviation 17.9) days. The average number of total treatment units for stroke rehabilitation was 319.5 (range 27–1674 units), with 205 units of nursing, 40 units of physical therapy and 34 units of occupational therapy as the top 3 services provided. The mean total cost for all treatments during rehabilitation was 28,399 (standard deviation 22,511) baht (approximately USD 789). The ratio of costs not related to rehabilitation to those related to rehabilitation was approximately 2:1.

Conclusion: This study reports the baseline for measuring the development of rehabilitation services for patients after stroke with a mean length of stay of one month, and for estimating the reasonable costs.

Key words: stroke, rehabilitation, health services, costs, multi-centre study, length of stay.

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INTRODUCTION

Stroke is a leading cause of long-term disability and healthcare costs worldwide. There is increasing awareness of the importance of rehabilitation and long-term care in reducing the costs of such services (1–3). Following the Year for the Disabled in 1980, medical rehabilitation was first recognized in Thailand as an important healthcare service. According to European guidelines,

rehabilitation is necessary to enable patients with impairments and activity limitations after stroke to reach and maintain optimal functional recovery in physical, intellectual, psychological and/or social domains (4). However, in Thailand, such comprehensive rehabilitation services by an interdisciplinary team are provided mainly at tertiary public sector hospitals in Bangkok and in a few of the larger provincial hospitals. Due to the limited number of various rehabilitation professionals, not all patients with significant disabilities after stroke have an opportunity to receive intensive rehabilitation, either as inpatients or outpatients.

There are currently fewer than 12 public hospitals/centres in Thailand that can provide inpatient rehabilitation services for stroke patients, with less than 400 beds in total. According to the Thai *Rehabilitation for Disabled Act*, passed in 1981, all registered disabled persons should have access to free medical, educational, vocational and social rehabilitation services. The prevalence of stroke in elderly people in Thailand was 1.12% (5), while, according to the 2005 annual report of the National Health Security Office (NHSO), the Thai population was 62.8 million (6), of which 9.2% were aged over 60 years. With these figures, we estimate that there are approximately 60,000 stroke patients in Thailand per year. Therefore, there is an urgent need to increase rehabilitation services nationwide so that as many disabled people as possible have an opportunity to receive medical rehabilitation services.

Although stroke rehabilitation services have been provided for more than 20 years in Thailand, there has been no study examining their benefits, costs and outcomes. To expand the healthcare system to cover rehabilitation services, the Royal College of Psychiatrists of Thailand decided to implement the Thai Stroke Rehabilitation Registry (TSRR) (7) to provide data on rehabilitation services in public sector hospitals to assist in analysis of the national healthcare system with regard to rehabilitation services policy. The aim of this study was to set a baseline for measuring the development of medical rehabilitation services and outcomes for patients after stroke and for promoting rehabilitation medicine in Thailand.

METHODS

This study was a part of the establishment of the TSRR, which was the first multi-centre and tertiary hospital-based study of stroke victims among 9 sites in Thailand (7). A total of 376 patients after stroke were screened and only the 327 eligible were enrolled prospectively during

a 10-month period in 2006. After all sites received ethical approval for human research, which complied with the Declaration of Helsinki, they started recruiting patients admitted for comprehensive stroke rehabilitation. Informed consent was sought from patients or care-giver/relatives/spouses in writing or by other mean. Patients after stroke recruited in the TSRR, were aged ≥ 18 years, had stable medical signs, and were able to follow a 1-step command and sit for at least 30 min. The 1-step command means asking patients to do one thing at a time.

After initial assessments and goal setting, all patients received comprehensive rehabilitation programmes provided by an interdisciplinary team composed of rehabilitation specialists, nurses, physiotherapists, occupational therapists, social workers, etc. Each specialist was asked to record the number of treatment units provided daily over a 5-day week. The treatment unit was defined as a 20-min treatment period using any mode of treatment. The programmes were ended when one of 2 conditions were met: *complete study*, designated as when the patient fulfilled the rehabilitation goals or had a stable Barthel Index score (8) for 2 consecutive weeks; and *incomplete study*, which encompassed withdrawal or becoming ill or having a serious medical complication that required transfer to another department or hospital. After the programme ended, the length of stay (LOS) and costs of the treatments were calculated. The latter were divided into those related to and not related to the rehabilitation programmes. The rehabilitation costs included nursing care, physical therapy, occupational therapy, speech therapy, psychotherapy, gait aids and assistive devices, while the not-related costs included drugs, laboratory costs and hospital bed charge.

Statistical analysis

Data were collected and analysed for LOS and average cost per case. Descriptive statistics were reported. Units of treatments were classified by different groups involved in the rehabilitation process. Comparisons were made between those patients who completed and those who did not complete the study.

RESULTS

Among 376 patients after stroke, 327 were eligible, and 285 completed the study in the TSRR. Fifty-nine percent were male, with a mean age of 62.1 (standard deviation (SD) 12.1) years. The median duration from onset to admission interval (OAI) was 24 days (minimum = 1, maximum = 1456). Sixteen (4.89%) patients were admitted one year or more after their stroke. Fifty-one (15.6%) patients had a history of previous stroke. Cerebral infarction (CI) was found in 71.9% (data not shown). In addition, the clinical outcomes, including functional score (Barthel index score), depression and anxiety scores, quality of life score and complications during rehabilitation, were reported elsewhere (9, 10).

The mean LOS for 285 patients after stroke among the 9 study centres was 29.4 (SD 17.9) days (range 3–74 days). The mean total treatment units from all hospitals/centres was 319.5 (range 27–1674), for which rehabilitation nurses provided most of the care to the patients (61.0 units/week), followed by physiotherapy (10.5 units/week), occupational therapy (9.6 units/week) and rehabilitation physicians (4.2 units/week). Overall, the patients had less contact with speech therapists, social workers, psychologists, and recreational therapists (data not shown). The treatment costs varied between hospitals/centres. The mean total costs were 28,399 (SD 22,511) baht (range 2114–180,479). The costs related to rehabilitation and to those not related were 9425 (SD 7747) (range 720–51,840) and 18,974 (SD 19,383) (range 954–167,769) baht, respectively.

However, the cost related to the rehabilitation procedure was only 33.2% of the total cost of treatments. All costs were paid by government (58.9%), followed by the National Insurance (21.1%), own payment (13.3%) and other insurance (6.7%).

DISCUSSION

The mean LOS for each of the 9 hospitals participating in the TSRR were not the same. This may be due to the fact that some hospitals in the TSRR have early discharge planning, with needs assessment of the patients and their families. The average LOS of our TSRR study was 29.4 days, which was comparable with other studies (31.3 days in a study from Ireland (11), 31.2 days in a study from Switzerland (12), 37.1 days in a Chinese study (13) and 21.9 days in a Texas study (14)). The last-mentioned had a shorter average LOS, perhaps due to the high economic burden from stroke. Moreover, in the USA, there are various well-established types of rehabilitation setting available, including inpatient rehabilitation hospitals, skilled nursing facilities, home care and outpatient services. However, in Thailand, nursing homes with a comprehensive rehabilitation setting for stroke are in limited supply in the public sector. The government should therefore give a high priority to increasing the number and size of rehabilitation facilities and to training more personnel in every provincial hospital, as well as in the community hospitals.

Regarding the average total treatment units, the rehabilitation team spent approximately 300 units per patient for the complete study group. When multiplied by 20 min per unit, the approximate time of rehabilitation services provided was more than 6000 min, or 100 h, per patient to complete his or her programme. Rehabilitation nurses spent more contact time with the patients during rehabilitation: 15 times more than rehabilitation physicians, 7 times more than occupational therapy specialists and 6 times more than physiotherapy specialists. That rehabilitation nurses had significantly more contact time with patients is not surprising, as patients after stroke are usually old with poor cognitive functions and significant physical impairments, causing functional dependency requiring regular nursing assistance. In addition, the role of rehabilitation nurses is not only providing nursing care, such as assisting in self-care activities and bowel and bladder care, but also providing patient and care-giver education. However, available data do not allow for recommendations on minimum or maximum therapy times. It seems that greater duration and intensity of rehabilitation predicts functional improvement, with a likely dose-response relationship (4).

According to our data, few treatment units of psychotherapy, speech therapy or recreational therapy were provided to patients after stroke due to the lack of such professionals in the country. Therefore, psychotherapy or related support is provided as best as possible by the rehabilitation team and the family. Only 4 out of 9 tertiary hospitals/centres in this registry have speech therapists in the team, and only one medical university in the country provides speech therapy in the curriculum, and this only has room for a very limited number of students. Due to the limited number of facilities and properly trained professional care-givers working in the public sector, only a limited number of stroke victims can access such services.

Concerning the cost of treatment in our TSRR, the mean total cost was 28,399 (SD 22,511) baht (approximately USD 789; 1 USD=36 baht) for the complete study group and the range of costs varied widely. The ratio between costs not related to rehabilitation and the costs of rehabilitation was 2:1. This means that the rehabilitation cost is only one-third of the total cost. The Erlangen Stroke Project conducted in Germany reported that the rehabilitation cost alone accounted for 37% of the overall costs of treatment (15), nearly the same percentage as our rehabilitation cost during inpatient rehabilitation. Data from European guidelines showed that costs of stroke treatment consisted of 43% hospital costs, 32% nursing home costs, 13% rehabilitation centre costs, and 13% extramural costs (4). In addition, we also determined the ratio of cost to Gross National Income Per Capita (GNIPC) of each country evaluated. We found that the ratio of cost of stroke treatment to GNIPC in Thailand was the lowest (23.2%) (Table I), thus we considered it to be reasonable cost for stroke patients during the rehabilitation phase.

However, there is not only the rehabilitation cost during the first year after stroke to consider, but also the lifetime costs for stroke survivors and their families, such as the cost of non-family care-givers, special services and equipment, etc. According to the epidemiological report of our TSRR published elsewhere (7), nearly 90% of subjects were discharged to their own home or to a family member's house and 70% of care-givers rated caring for a stroke patient as a moderate to high burden. Our TSRR was a hospital-based, multi-centre project aiming at studying the post-stroke rehabilitation phase, not a long-term study. The aim of our next project will therefore be to follow all patients after stroke in the TSRR and to study the long-term outcomes, including costs, of stroke survivors after comprehensive rehabilitation.

In conclusion, our study has proved that the evaluated services are beneficial to stroke survivors, with an average LOS of one month, using the treatment units of approximately 300 (equal to 100 h), and at a cost of less than USD 1000. Thus, patients after stroke can gain enough functional ability to continue living at home with their family.

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Table I. Ratio of cost of stroke treatment to Gross National Income Per Capita (GNIPC) of each country

Country	Year	Cost		GNIPC* (USD)	Ratio of cost to GNIPC (%)
		Reported currency	USD		
Germany (15)	2006	18,517 EUR	24,072	38,860	61.9
Scotland (16)	2008	14,051 GBP	19,755	42,740	46.2
Australia (17)	2001	18,956 AUS	14,361	35,960	39.9
Sweden (18)	1994	12,300 USD	12,300	46,060	26.7
Thailand	2009	28,399 BHT	789	3,400	23.2

*World Development Indicators Database, World Bank, revised 17 October 2008.