An Epidemiologic Study of the Thai Stroke Rehabilitation Registry (TSRR): A Multi-Center Study

Vilai Kuptniratsaikul MD*, Apichana Kovindha MD**,
Pornpimon Massakulpan MD***, Krisna Piravej MD****,
Sumalee Suethanapornkul MD*****, Piyapat Dajpratham MD*,
Nuttaset Manimmanakorn MD******, Wutichai Permsirivanich MD*******,
Yingsumal Archongka MD********, Patcharawimol Srisa-an Kuptniratsaikul MD*********

** Rehabilitation Medicine Department, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok*
*** Rehabilitation Medicine Department, Faculty of Medicine, Chiang Mai University, Chiang Mai*
**** Physical Medicine and Rehabilitation Department, Prasat Neurological Institute, Ministry of Public Health, Bangkok*
***** Rehabilitation Medicine Department, Faculty of Medicine, Chulalongkorn University, Bangkok*
****** Rehabilitation Medicine Department, Phramongkutklao Hospital and College of Medicine, Bangkok*
*******Rehabilitation Medicine Department Faculty of Medicine, Khon Kaen University, Khon Kaen*
******** Department of Orthopaedic Surgery and Rehabilitation Medicine, Prince of Songkla University, Songkhla*
********* Sirindhorn National Medical Rehabilitation Center, Ministry of Public Health, Bangkok*
********** Rehabilitation Medicine Department, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok*

Objective: *To perform the registry of stroke patients receiving the in-patient comprehensive rehabilitation program at main tertiary hospitals from March to December 2006.*
Material and Method: *Demographic data including medical history and pathology of stroke were recorded. All subjects received a comprehensive rehabilitation program until they reached their rehabilitation goals or discharge criteria.*
Results: *Three hundred twenty seven patients met the inclusion criteria. The mean age was 62 +/- 12 years, and 59% were males. Most of the patients were married (73.1%), lived in an urban area (62.1%), and had an education level of primary school or lower (58.7%). The median duration from onset to admission for rehabilitation was 24 days. The major medical history was hypertension (74.9%), followed by dyslipidemia (54.4%), diabetes mellitus (26.6%), and ischemic heart disease (18.0%). Fifty-one (15.6%) patients had a history of previous stroke. Cerebral infarction was found in 71.9%, including thrombosis (45.3%), lacuna infarction (15.3%), and emboli (8.0%) and 28.1% had hemorrhagic stroke. On admission, more than half (51.8%) had cognitive impairment and one-third (31.5%) had bowel-bladder problems. Almost all of the patients (99.4%) had family support. Either their spouse or siblings had undertaken the main caregiver role (46.5% and 40.4% respectively). However, more than 80% of the patients were discharged to their own homes or immediate family's house.*
Conclusion: *This was the first multi-center registry of inpatient stroke rehabilitation in Thailand. It presented the epidemiologic aspects in order to become national data of stroke patients receiving medical rehabilitation services.*

Keywords: *Stroke, Epidemiology, Registry, Rehabilitation, Multi-center study*

J Med Assoc Thai 2008; 91 (2): 225-33
Full text. e-Journal: *http://www.medassocthai.org/journal*

Corresponding to : Kuptniratsaikul V, Department of Rehabilitation Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University, 2 Prannok Rd, Bangkok 10700, Thailand. Phone: 0-2419-7508, 0-2419-8627. Fax: 0-2411-4813, E-mail: sivkp@mahidol.ac.th

Stroke is a leading cause of long-term disability[1]. It is one of the public health concerns throughout the world. The consequences after stroke are not only persistent neurological impairment, but also life-time disability that needs medical rehabilitation to enable optimal function that will overcome the patient's disability. In 2000, a systematic review on an economic evaluation of stroke concluded that rehabilitation was more efficient than other interventions[2]. Later, two studies concluded that therapeutic exercises are effective for stroke patients by producing functional gains beyond those attributable to spontaneous recovery and usual care[3,4]. However, the rehabilitation processes are time-consuming and costly. One study agreed that management in a stroke rehabilitation unit confers survival benefits for 10 years after a stroke, probably because long-term survival is related to early reduction in disability[5]. In addition, there is evidence that rehabilitation techniques enhance learning-related changes after stroke, and contribute to recovery[6]. Another study reported an association between earlier admission for rehabilitation and better outcomes, and the likely relationship between therapy intensity and improvements in functional outcomes[7]. Clinically, greater intensity of stroke rehabilitation has been associated with improved outcomes.

During the past 10 years, stroke has been increasingly recognized as an important medical and societal problem[8]. Many developed countries have performed stroke registration[9-19] and some paid more attention to stroke rehabilitation[20,21] to improve stroke survivors' ability and to decrease burden to their family and society. However, so far there have been very few data from developing countries where comprehensive rehabilitation has been available not so long ago. Thailand was among such and needed to have more epidemiologic data of stroke rehabilitation to help policymakers to develop appropriate strategic plans and budgeting for rehabilitation services in the country. Therefore, the authors performed this first Thai Stroke Rehabilitation Registry(TSRR) to report the epidemiologic data of the inpatient post-acute stroke rehabilitation at main tertiary hospitals in the country.

Material and Method

The present study was conducted from March to December 2006 at 9 main tertiary hospitals in Thailand: seven teaching hospitals, one National Rehabilitation Center and one Neurological Institute. Six were in the capital - Bangkok and its suburbs, one in the north - Chiang Mai, one in the north-east - Khon Kaen and one in the south - Songkhla. After receiving an ethical approval on human research complied with the Declaration of Helsinki, all sites started recruiting patients admitted for comprehensive stroke rehabilitation. The inclusion criteria were stroke patients aged more than 18 years with stable vital signs for 48 hours, who could sit without vertigo or dizziness for at least 30 minutes, and follow at least a one-step verbal command. They were co-operative and had never received a comprehensive rehabilitation program after a stroke attack. Those with severe medical conditions including dementia, uncontrolled heart disease, schizophrenia or multiple disabilities were excluded. Informed consent was obtained from all participating subjects and family members.

On admission, demographic data, co-morbidity, medical history, stroke risk factors and pathology of stroke were recorded. The Thai Mental State Examination (TMSE) was used to assess cognitive functions[22]. Bowel and bladder problems were evaluated. Thereafter, all received comprehensive conventional rehabilitation programs, i.e. range of motion (ROM) exercises, strengthening exercises, balance training, tilting and progress to ambulation, self care training, speech training, and psychosocial support, as needed, until they achieved the discharge criteria: fulfilled rehabilitation goals or a stable Barthel Index score[23] for 2 consecutive weeks. At the end of the present study, the burden on the patients' family was assessed. Family support, principal caregiver, as well as type of discharge and discharge location were also recorded.

Statistical analysis

Data collected in the TSRR database were checked to ensure the quality by using the validated computerized data management system at the Data Management Unit, Faculty of Tropical Medicine, Mahidol University. In analysis of the registry, data were described in terms of characteristics of the patients who were enrolled into the rehabilitation program as well as the caregivers of the patients. The pathology of the stroke and the discharge status were also examined using descriptive statistics. The prevalence of cerebral infarction (CI), cerebral hemorrhage (CH) and the ratio of CI/CH in the present study were calculated and presented with similar information from other countries.

Results

Of 376 stroke patients, 327 (87.0%) met the inclusion criteria. The flow at the end of the present

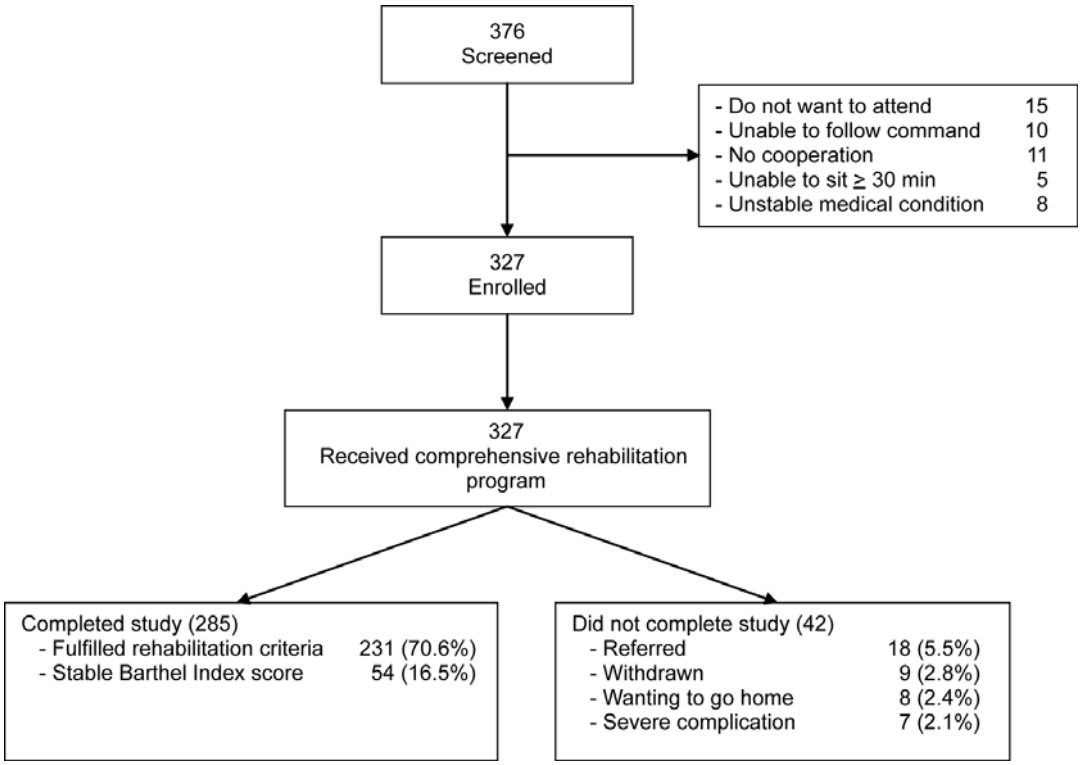

Fig. 1 Flow of the Thai stroke rehabilitation registry

study, including patient status, is depicted in Fig. 1. Two-hundred and eighty-five patients (87.2%) completed the present study. The remainder were referred to another department/hospital (5.5%), withdrawn from the study (2.8%), demanded to go home (2.4%) or experienced severe complications (2.1%), such as gastrointestinal bleeding, hypokalemia, pleural effusion, and recurrent stroke.

The demographic data are presented in Table 1. The mean age was 62 $\pm$ 12 years, and 59% were males. Most of the patients were married (73.1%), living in urban areas (62.1%), and had had an education of primary schools or lower (58.7%). The median duration from onset to admission for rehabilitation was 24 days (min = 1, max = 1456). Among these, 16 (4.89%) patients were admitted one year after their stroke. There were 64 (19.6%) patients with a history of smoking and 98 (30.0%) patients with alcohol consumption. The major medical history was hypertension (74.9%), followed by dyslipidemia (54.4%), diabetes mellitus (26.6%), and ischemic heart disease (18.0%).

Table 1. Demographic data of 327 subjects

Demographic data	No	%
Age (mean, SD) (min, max = 21, 93 yrs)	62.2	12.1
Sex: male	193	59.0
Marital status: married	239	73.1
Living place: Urban	203	62.1
Education: Primary school or lower	192	58.7
Secondary school	55	16.8
Bachelor degree or higher	58	17.7
Smoking: yes	64	19.6
Alcohol consumption: yes	98	30.0
Medical history[a]:	308	94.2
Hypertension	245	74.9
Dyslipidemia	178	54.4
Diabetes mellitus	87	26.6
Ischemic heart disease	59	18.0
History of stroke/TIA	51	15.6
Surgical treatment before admission for rehabilitation	37	11.3

Note: (a) some patients had more than 1 medical history

Fifty-one (15.6%) patients had a history of previous stroke. Only 37 (11.3%) patients had had surgical treatment before admission for rehabilitation.

Almost all (97.9%) of the patients were diagnosed by imaging (CT and/or MRI). Cerebral infarction (CI) was found in 71.9%: thrombosis (45.3%), lacunar infarction (15.3%), and emboli (8.0%). Only 28.1% had cerebral hemorrhage (CH) (Table 2). The ratio of CI/CH was 2.55. On admission more than half (51.8%) the patients had cognitive impairment assessed by TMSE (score < 23) and one-third (31.5%) had bowel-bladder problems: 24.5% with urinary incontinence, 8.6% with urination difficulty and 11.9% with fecal incontinence.

More than 80% of the patients were discharged from the present study to their own homes, 16 (4.9%) were transferred to another department or hospital and only 3 (0.9%) were discharged to a nursing home. Twenty-seven patients (8.3%) continued their stay at the hospital for special reasons (Table 3).

Ninety-nine percent were supported by their family, where the spouse and/or siblings became the main caregivers (46.5% and 40.4% respectively). Table 4 shows the principal caregivers and the burden on the patients' family. Seventy percent rated their feeling of burden as moderate to high degree.

Table 2. Pathology of stroke

Pathology	No	%
Infarction	235	71.9
Thrombosis	148	45.3
Lacunar	50	15.3
Emboli	26	8.0
Multiple infarction	4	1.2
Other	7	2.1
Hemorrhage	92	28.1

Table 3. Discharge locations of stroke patients

Discharge locations	No	%
Own home	215	65.8
Own home with modification	53	16.2
Other house	10	3.1
Other house with modification	3	0.9
Nursing home	3	0.9
Referred to another department	3	0.9
Referred to another hospital	13	4.0
Continued to stay at the hospital for special reasons	27	8.3

Table 4. Principal caregivers and burden on the patients' family

	No	%
Principal caregivers		
None	2	0.6
Parents	6	1.8
Spouse	152	46.5
Siblings	132	40.4
Relatives	23	7.0
Others	12	3.7
Burden on the family		
Low	96	29.4
Moderate	166	50.8
High	65	19.9

Discussion

Thai Stroke Rehabilitation Registry was the multi-centered, hospital-based study at the nine main tertiary hospitals in the country. The hospital-based stroke registry is a well-established method useful for understanding diverse clinical characteristics of stroke related to geographical, racial or environmental differences. In present study during 10 months, 376 stroke patients were admitted for in-patient rehabilitation and 327 (87.0%), who fitted the criteria, were recruited in the present study. In this registry, males predominated, the mean age of the patients was 62 years and more than half had low education. These data are the same as the previous stroke study conducted in the year 2003 in Thailand[24]. The main medical history and risk factors of the present results, like other studies[16,25-28] were hypertension, dyslipidemia, diabetes and previous stroke: three-quarters of the presented subjects had hypertension, followed by dyslipidemia and diabetes mellitus. Modification of such major cardiovascular risk factors including smoking is very cost-effective and recommended[29].

In Thailand, smoking in public areas such as work places, restaurants, hospitals and airports is prohibited. In addition, cigarette and alcohol advertising in the mass media is controlled. According to results one-fifth of the presented stroke patients smoked and about one-third were addicted to alcohol. Therefore, public concern of stroke prevention by modifying lifestyle behavior (e.g. less smoking, regular exercise, and less in-take of salt, alcohol, and fat) should be strongly emphasized. In addition physiatrists should

emphasize on not only continuation of the home rehabilitation programs, but also the importance of behavioral modification.

Concerning the pathology of stroke, about three-quarters of the presented patients had cerebral infarction (CI), less with cerebral hemorrhage (CH). Table 5 presents the prevalence of CI, CH and the ratio of CI/CH from various countries. The ratios in Western countries are higher[13,14,16,17, 20,21] when compared with those of Asian countries[9-11,18,19] including the present study in Thailand which mean that hemorrhagic stroke seems more common among Asians than Caucasians. Intracerebral hemorrhage (ICH) is a devastating form of stroke, with a lack of treatment options, high mortality rate and tendency to severely disable, resulting in a high social and economic burden[30]. However, the present study recruited post-acute stroke patients on admission to rehabilitation, such lower CI/CH ratio may support that ICH leads to severe disability and needs rehabilitation. Moreover, it may reflect that the presented hemorrhagic strokes did survive from acute phase and reached rehabilitation.

Data from the Cochrane review, in 2005, revealed that urinary incontinence can affect 40-60% of people admitted to hospital after acute stroke, with 25% still having problems on hospital discharge and around 15% remaining incontinent at one year[31]. Average duration from onset to rehabilitation admission in the present study was about a month. On admission one-quarter of the presented patients had urinary incontinence, 10% with urination difficulty and 12% reported fecal incontinence. Both cognitive impairment and communication disability may relate to incontinence.

In the presented data, there were 16 patients who were admitted very late - more than one year after the stroke attack. Late admission may be due to lack of knowledge about availability and benefits of medical rehabilitation or no accessibility to such services. At present, only 14 tertiary hospitals in the public sector of the country could provide an in-patient comprehensive rehabilitation program, with all of them situated in urban areas. This could be the reason why the authors found that more than 60% of the stroke patients recruited in the presented study lived in urban areas. However, two-thirds of the country's population lives in rural regions[32]. It reflects that urban population has more opportunity to access rehabilitation services than those living in rural areas. Therefore, in future the government should distribute rehabilitation personnel and facilities throughout the country.

Judging from an estimated 62.8 million Thai population in 2000, of which 9.2% were aged over 60 years[32], and a stroke prevalence rate of 1.12 per cent among the elderly in 1998[33], it is estimated that more than 60,000 of the country's elderly are disabled by stroke. When comparing such estimates with the number of stroke patients in the present study, the current availability of less than 400 beds for in-patient rehabilitation is far less than the demand. So far the numbers of rehabilitation personnel in the public sector are also limited with about 400 rehabilitation physicians, 1,250 physical therapists, and 450 occupational therapists. According to the 9th National Health

Table 5. The prevalence of cerebral infarction (CI), cerebral hemorrhage (CH) and the ratio of CI/CH among countries

Country	Year	No	Settings	CI (%)	CH (%)	CI/CH ratio
Japan[19]	1987	2,168	Acute	55.0	30.0	1.83
France[14]	1991	984	Post-acute	62.3	8.8	7.08
New Zealand[21]	1992	192	Rehabilitation	88.0	12.0	7.33
China[11]	1992	777	Acute	68.3	27.1	2.52
Korea[18]	1993	3,021	Post-acute	48.4	31.4	1.54
Taiwan[10]	1998	995	Post-acute	67.9	22.9	2.96
Turkey[16]	1998	2,000	Acute	77.0	19.0	4.05
Norway[20]	2001	125	Rehabilitation	81.6	18.4	4.43
Italy[12]	2002	797	Acute	67.0	30.1	2.23
Poland[13]	2003	11,107	Acute	63.4	11.0	5.76
Korea[15]	2005	1,654	Acute	94.4	5.3	17.81
India[9]	2005	801	Post-acute	49.6	50.4	0.98
Israel[17]	2006	2,174	Acute	89.0	7.0	12.71
Thailand	2007	327	Rehabilitation	71.9	28.1	2.56

Development Plan (2002-2006), one of the major transformations was rehabilitation care reform to have better management of rehabilitation services all over the country[34]. However, the TSRR reflects us that the authors are still far from the national target in regards to rehabilitation services.

Regarding rehabilitation outcomes, nearly 90% of the presented stroke patients could complete the study by reaching their goals or having stable Barthel Index scores for 2 consecutive weeks. Among those completing the present study, nearly three-quarters reached their highest rehabilitation potential/goals. These data reflect the fact that if stroke patients have an opportunity to receive medical rehabilitation, he/she will receive the chance to reach his/her rehabilitation potential. For those who did not complete the present study, the common causes were referred to another department for treatment of co-morbidity or complications, followed by withdrawal from the present study. Interestingly, no patients died during rehabilitation in the present study. This may be due to the authors' proper selection criteria and prompt referral system to other departments or hospitals when patients had severe complications.

Concerning the discharge location of stroke patients, many previously reported less than half of their stroke patients returning home[35,36]. Admission FIM score, age, no previous history of stroke and male sex were the variables found to most strongly predict discharge to home[35] while factors predicting institutionalization after stroke were Barthel ADL Index score at discharge and old age[37]. Interestingly, more than 80% of the presented stroke patients could return home and less than 10% had to stay in a hospital or nursing home. The high rate of returning home in Thailand may be due to very few nursing homes in the country, and such services are not freely supported by the government.

Regarding home modification, at discharge, less than 20% of the presented stroke patients reported that they had modified their living places to match their level of disability. This may be due to home modification not being necessary or the patient could not afford modification. Fortunately, almost all of the presented stroke patients had family support and only two reported no caregiver. The spouses as well as siblings were the major caregivers. This reflects the strong Thai family relationship and support. Although people in the country have become more westernized, this strong family relationship is still common, especially in rural areas.

At discharge, care givers rated moderate to high burden of stroke. Therefore, rehabilitation physicians and teams should not only aim at the stroke patients, but also their family and caregiver. In addition, not all stroke patients can be functionally independent and some still need a caregiver to provide physical help and psychosocial support. However, the level of burden associated with the characteristics of the patients and the caregivers themselves[38]. Due to this, the authors are now conducting a follow up study on long-term burden of the stroke survivors on their family or caregiver. At present, some hospitals in the country provide holiday relief care so that the strokes can have a chance to receive a re-conditioning program and, at the same time, their caregivers can take a short break to resume the energy and strength needed for physical and psychological support. Moreover, rehabilitation teams should not forget to teach the caregivers how to manage and handle their strokes properly in order to avoid musculoskeletal trauma caused by improper handling.

The present study did reflect us the real situation of stroke rehabilitation in Thailand. Although the number of stroke patients recruited in the present study was less than expected, it was a national multicenter and prospective study. The rehabilitation outcomes were acceptable although there were many limitations of rehabilitation services that need reformation nationwide. In addition to prove the benefit of stroke rehabilitation, the authors are now continuing a one year follow-up study to show their functional ability, difficulty, psychological health and the quality of life of the strokes and their caregivers.

Conclusion

This first epidemiologic data of stroke rehabilitation registry in Thailand shows success of comprehensive rehabilitation at tertiary hospitals due to proper selection criteria. Higher return home rate found may be due to strong family support and relations found in Thais. Such support and relationship is one key success factor of rehabilitation for both independent and dependent stroke survivors. To keep such relationship, burden on the family should be concerned and minimized.

Acknowledgements

The authors wish to thank the Royal College of Physiatrists of Thailand and the Thai Rehabilitation Medicine Association for their support, and the Thai Health Promotion Foundation, the Healthy Systems

Research Institute, the Office of the National Research Council of Thailand, and the Clinical Research Collaboration Network for the research grant. The authors also wish to thank Professor Visanu Thamalikitkul, Office for Research and Development, Faculty of Medicine Siriraj Hospital, Mahidol University for comments on research methodology and also Assistant Professor Jaranit Kaewkungwal and his team from Data Management Unit, Faculty of Tropical Medicine, Mahidol University for statistical analysis. The authors are grateful to all the rehabilitation staff at the nine main tertiary hospitals/centers, and last but not least, our stroke patients and their families for their co-operation.

References

1. Shah MV. Rehabilitation of the older adult with stroke. Clin Geriatr Med 2006; 22: 469-89.
2. Evers SM, Ament AJ, Blaauw G. Economic evaluation in stroke research: a systematic review. Stroke 2000; 31: 1046-53.
3. Duncan P, Studenski S, Richards L, Gollub S, Lai SM, Reker D, et al. Randomized clinical trial of therapeutic exercise in subacute stroke. Stroke 2003; 34: 2173-80.
4. Smidt N, de Vet HC, Bouter LM, Dekker J, Arendzen JH, de Bie RA, et al. Effectiveness of exercise therapy: a best-evidence summary of systematic reviews. Aust J Physiother 2005; 51: 71-85.
5. Drummond AE, Pearson B, Lincoln NB, Berman P. Ten year follow-up of a randomised controlled trial of care in a stroke rehabilitation unit. BMJ 2005; 331: 491-2.
6. Krakauer JW. Arm function after stroke: from physiology to recovery. Semin Neurol 2005; 25: 384-95.
7. Teasell R, Bitensky J, Salter K, Bayona NA. The role of timing and intensity of rehabilitation therapies. Top Stroke Rehabil 2005; 12: 46-57.
8. Dion JE. Management of ischemic stroke in the next decade: stroke centers of excellence. J Vasc Interv Radiol 2004; 15(1 Pt 2): S133-41.
9. Banerjee TK, Choudhury D, Das A, Sekhar A, Roy D, Sen S. Analysis of hospital-based stroke registry in a neurological centre in Kolkata. J Indian Med Assoc 2005; 103: 665-8.
10. Jeng JS, Lee TK, Chang YC, Huang ZS, Ng SK, Chen RC, et al. Subtypes and case-fatality rates of stroke: a hospital-based stroke registry in Taiwan (SCAN-IV). J Neurol Sci 1998; 156: 220-6.
11. Kay R, Woo J, Kreel L, Wong HY, Teoh R, Nicholls MG. Stroke subtypes among Chinese living in Hong Kong: the Shatin Stroke Registry. Neurology 1992; 42: 985-7.
12. Silvestrelli G, Corea F, Paciaroni M, Milia P, Palmerini F, Parnetti L, et al. The Perugia hospital-based Stroke Registry: report of the 2nd year. Clin Exp Hypertens 2002; 24: 485-91.
13. Ryglewicz D, Milewska D, Lechowicz W, Roszkiewicz M, Czlonkowska A. Factors predicting early stroke fatality in Poland. Preliminary report of the Polish National Stroke Registry. Neurol Sci 2003; 24: 301-4.
14. Giroud M, Milan C, Beuriat P, Gras P, Essayagh E, Arveux P, et al. Incidence and survival rates during a two-year period of intracerebral and subarachnoid haemorrhages, cortical infarcts, lacunes and transient ischaemic attacks. The Stroke Registry of Dijon: 1985-1989. Int J Epidemiol 1991; 20: 892-9.
15. Lee BC, Hwang SH, Jung S, Yu KH, Lee JH, Cho SJ, et al. The Hallym Stroke Registry: a web-based stroke data bank with an analysis of 1,654 consecutive patients with acute stroke. Eur Neurol 2005; 54: 81-7.
16. Kumral E, Ozkaya B, Sagduyu A, Sirin H, Vardarli E, Pehlivan M. The Ege Stroke Registry: a hospital-based study in the Aegean region, Izmir, Turkey. Analysis of 2,000 stroke patients. Cerebrovasc Dis 1998; 8: 278-88.
17. Tanne D, Goldbourt U, Koton S, Grossman E, Koren-Morag N, Green MS, et al. A national survey of acute cerebrovascular disease in Israel: burden, management, outcome and adherence to guidelines. Isr Med Assoc J 2006; 8: 3-7.
18. Korean Neurological Association. Epidemiology of cerebrovascular disease in Korea - a Collaborative Study, 1989-1990. J Korean Med Sci 1993; 8: 281-9.
19. Suzuki K, Kutsuzawa T, Takita K, Ito M, Sakamoto T, Hirayama A, et al. Clinico-epidemiologic study of stroke in Akita, Japan. Stroke 1987; 18: 402-6.
20. Samuelsson SM, Mahonen M, Hassaf D, Isaksen J, Berg G. Short-term functional outcome of hospitalised first-ever strokes in Finnmark, Norway in 1998-1999. Results from the Finnmark Stroke Register. Int J Circumpolar Health 2001; 60: 235-44.
21. Friedman PJ. Ischaemic stroke and intracerebral haematoma in the Waikato Stroke Registry. N Z Med J 1992; 105: 171-3.
22. Train the Brain Forum Committee. Thai Mental State Examination (TMSE). Siriraj Hosp Gaz 1993; 45: 359-74.

23. Mahoney FI, Barthel DW. Functional evaluation: The Barthel Index. Md State Med J 1965; 14: 61-5.
24. Piravej K, Wiwatkul W. Risk factors for stroke in Thai patients. J Med Assoc Thai 2003; 86(Suppl 2): S291-8.
25. Lee BI, Nam HS, Heo JH, Kim DI. Yonsei Stroke Registry. Analysis of 1,000 patients with acute cerebral infarctions. Cerebrovasc Dis 2001; 12: 145-51.
26. Bornstein NM, Aronovich BD, Karepov VG, Gur AY, Treves TA, Oved M, et al. The Tel Aviv Stroke Registry. 3600 consecutive patients. Stroke 1996; 27: 1770-3.
27. Silvestrelli G, Paciaroni M, Caso V, Milia P, Palmerini F, Venti M, et al. Risk factors and stroke subtypes: results of five consecutive years of the Perugia Stroke Registry. Clin Exp Hypertens 2006; 28: 279-86.
28. Nilsson PM. Reducing the risk of stroke in elderly patients with hypertension: a critical review of the efficacy of antihypertensive drugs. Drugs Aging 2005; 22: 517-24.
29. Ebrahim S. Cost-effectiveness of stroke prevention. Br Med Bull 2000; 56: 557-70.
30. Nadeau JO, Phillips S, Shi HS, Kapral MK, Gladstone DJ, Silver FL, et al. Intracerebral hemorrhage: outcomes and eligibility for factor VIIa treatment in a National Stroke Registry. Cerebrovasc Dis 2006; 22: 271-5.
31. Thomas LH, Barrett J, Cross S, French B, Leathley M, Sutton C, et al. Prevention and treatment of urinary incontinence after stroke in adults. Cochrane Database Syst Rev 2005; 3: CD004462.
32. National Health Security Office. Progress and achievement annual report 2005: universal coverage of health care implementation in fiscal year 2005. Nonthaburi: National Health Security Office; 2005.
33. Viriyavejakul A, Senanarong V, Prayoonwiwat N, Praditsuwan R, Chaisevikul R, Poungvarin N. Epidemiology of stroke in the elderly in Thailand. J Med Assoc Thai 1998; 81: 497-505.
34. Wibulpolprasert S. Thailand health profile 2001-2004. Nonthaburi: Bureau of Policy and Strategy, Ministry of Public Health; 2005.
35. Teasell RW, Foley NC, Bhogal SK, Chakravertty R, Bluvol A. A rehabilitation program for patients recovering from severe stroke. Can J Neurol Sci 2005; 32: 512-7.
36. Fan CW, McDonnell R, Johnson Z, O'Keeffe S, Crowe MJ. Hospital-based stroke care in Ireland: results from one regional register. Ir J Med Sci 2000; 169: 30-3.
37. Portelli R, Lowe D, Irwin P, Pearson M, Rudd AG. Institutionalization after stroke. Clin Rehabil 2005; 19: 97-108.
38. van Heugten C, Visser-Meily A, Post M, Lindeman E. Care for carers of stroke patients: evidence-based clinical practice guidelines. J Rehabil Med 2006; 38: 153-8.

ระบาดวิทยาของทะเบียนโรคการฟื้นฟูอัมพาตหลอดเลือดสมองไทย: การศึกษาสหสถาบัน

วิไล คุปต์นิรัติศัยกุล, อภิชนา โฆวินทะ, พรพิมล มาศสกุลพรรณ, กฤษณา พิรเวช, สุมาลี ซื่อธนาพรกุล, ปิยะภัทร เดชพระธรรม, ณัฐเศรษฐ มนิมนากร, วุฒิชัย เพิ่มศิริวาณิชย์, ยิ่งสุมาลย์ อาจองค์, พัชรวิมล ศรีสอ้าน-คุปต์นิรัติศัยกุล

วัตถุประสงค์*: เพื่อศึกษาทะเบียนโรคของผู้ป่วยอัมพาตหลอดเลือดสมองที่มารับบริการฟื้นฟูสภาพในโรงพยาบาลระดับตติยภูมิระหว่างเดือน มีนาคม – ธันวาคม 2549*

วัสดุและวิธีการ*: บันทึกข้อมูลพื้นฐานของผู้ป่วยซึ่งประกอบด้วยโรคประจำตัวและการวินิจฉัยโดยใช้ภาพถ่ายรังสีและอาการทางคลินิก ผู้ป่วยทุกรายจะได้รับโปรแกรมการฟื้นฟูในทุกด้านจนกระทั่งบรรลุเป้าหมายที่ตั้งไว้ หรือตรงตามเกณฑ์การจำหน่าย*

ผลการศึกษา*: มีผู้ป่วยจำนวน 327 รายที่มีลักษณะตรงตามเกณฑ์คัดเลือก โดยมีอายุเฉลี่ย 62 +/- 12 ปี และเป็นเพศชายร้อยละ 59 ส่วนใหญ่แต่งงานแล้ว (ร้อยละ 73.1) อาศัยในเขตเมือง(ร้อยละ 62.1) และได้รับการศึกษาระดับชั้นประถมศึกษาหรือต่ำกว่า (ร้อยละ 58.7) มัธยฐานของระยะเวลาตั้งแต่เป็นโรคจนถึงเข้ารับการฟื้นฟู คือ 24 วัน โรคประจำตัวที่พบบ่อยเรียงตามลำดับคือ ความดันโลหิตสูง (ร้อยละ 74.9) โรคไขมันในหลอดเลือดสูง (ร้อยละ 54.4) โรคเบาหวาน (ร้อยละ 26.6) และโรคหัวใจขาดเลือด (ร้อยละ 18.0) ผู้ป่วย 51 ราย (ร้อยละ 15.6) มีประวัติของโรคหลอดเลือดสมองมาก่อน พบผู้ป่วยที่มีสมองขาดเลือดร้อยละ 71.9 ซึ่งรวมหลอดเลือดอุดตัน (ร้อยละ 45.3) สมองขาดเลือดเป็นหย่อม ๆ (ร้อยละ 15.3) และลิ่มเลือดอุดกั้นหลอดเลือด (ร้อยละ 8.0) ผู้ที่มีภาวะเลือดออกในเนื้อสมอง ร้อยละ 28.1 ขณะแรกรับมีผู้ป่วยมากกว่าครึ่ง (ร้อยละ 51.8) ที่มีภาวะการรับรู้บกพร่อง และหนึ่งในสามของผู้ป่วย (ร้อยละ 31.5) มีปัญหาการขับถ่าย ผู้ป่วยเกือบทั้งหมด (ร้อยละ 99.4) ได้รับการสนับสนุนจากครอบครัว โดยผู้ดูแลหลัก คือ คู่สมรสและบุตรหลาน (ร้อยละ 46.5 และ 40.4 ตามลำดับ) อย่างไรก็ตามผู้ป่วยมากกว่าร้อยละ 80 สามารถจำหน่าย กลับบ้านตนเองหรือบ้านของครอบครัวได้*

สรุป*: การศึกษานี้เป็นการศึกษาทะเบียนโรคที่เกี่ยวกับการฟื้นฟูสภาพผู้ป่วยในหอผู้ป่วยแบบสหสถาบัน ชิ้นแรกในเมืองไทยได้นำเสนอมุมมองด้านระบาดวิทยาเพื่อเป็นข้อมูลระดับชาติสำหรับผู้ป่วยอัมพาตหลอดเลือดสมองที่มารับบริการด้านการฟื้นฟูทางการแพทย์*