Quality of Life after Stroke Rehabilitation among Urban vs. Rural Patients in Thailand

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Background: *Stroke patients who live in different areas might have different adjustments for their impairment and disability after stroke attack. These factors should be evaluated in Thai patients.*
Objective: *To compare functional outcome, psychological outcome and quality of life of stroke patients who live in urban vs. rural areas, before and after an in-patient rehabilitation program.*
Study design: *A multi-center, prospective, analytical study.*
Material and Method: *Urban and rural stroke patients admitted to the rehabilitation ward received a rehabilitation program. Pre- and post-rehabilitation, patients were measured using the Barthel index, the Hospital Anxiety and Depression scale (HADS) and the WHO BREF QOL questionnaire. The data were collected from nine rehabilitation centers in Thailand.*
Results: *Significant improvement in functional outcome, psychological condition and quality of life score was achieved via the rehabilitation program in both groups. There was no statistically significant difference between urban vs. rural patients.*
Conclusion: *Previous living areas (urban vs. rural) before admission had no effect on functional outcome, psychological outcome and quality of life among stroke patients after an in-patient rehabilitation program conducted in Northeast Thailand.*

Keywords: *Functional outcome, Psychological condition, Quality of life, Rehabilitation program, Stroke, Thailand, Urban, Rural*

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Stroke is the most common neurological problem in the world. In Thailand, the prevalence of stroke is 690 per 100,000[1]. Surviving stroke patients have impairments and disabilities that affect their quality of life. Quality of life is defined using a multidimensional evaluation of physical, psychological, social and environmental aspects. Even though some parts of Thailand, particularly the large urban centers of Bangkok and Chiang Mai are prospering, rural areas in the Northeast remain underdeveloped as the rural population comprises subsistence farmers or laborers with inadequate education. Thus, when rural people are sick and have disabilities, their quality of life might be lower than urban people. On the upside, the cultural fabric in rural areas still includes the extended family and close family relationships which might positively affect the quality of life of stroke disabled patients. The present study was, therefore, performed to compare the functional outcome, psychological outcome and quality of life of stroke patients who live in urban vs. rural areas.

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Material and Method

Subjects

Stroke sufferers in the recovery phase who met the following criteria were included in the present study: over 18 years of age, in a stable medical condition, the ability to follow a one-step command and able to sit without dizziness for at least 30 minutes. All patients gave informed consent before beginning the present study. The exclusion criteria were: severe medical conditions such as uncontrolled heart and lung disease, uncontrolled psychosis, dementia and multiple disabilities.

Method

The present study was part of the Thai Stroke Rehabilitation Registry (TSRR), which was a multicentered national, hospital-based registry of rehabilitation of stroke patients, running from March to December 2006[2]. The stroke patients in the recovery phase, admitted to the Rehabilitation Ward, received a full rehabilitation program from the authors' rehabilitation team. The patients were classified according to their home situation: urban vs. rural. Demographic and neurological data were collected. The functional outcome was measured using the Barthel index, the psychological condition was evaluated using the hospital anxiety depression scale (HADS), and the quality of life was scored using the WHO BREF QOL. Data were analyzed and presented as percentage (%) categorical variables and mean $\pm$ standard deviation (SD) for continuous variable. The student t-test was used to compare means $\pm$ SD between urban and rural group. Chi-square test was used to compare the categorical variables where appropriate. A p-value less than 0.05 was considered as statistically significant difference.

Results

There were 327 patients: 203 urban (including 123 males; 80 females) vs. 124 rural (including 70 males, 54 females). The mean age of the urban group was 60.99 $\pm$ 12.02 vs. 64.30 $\pm$ 12.07 years in the rural group. Most of the patients in the respective groups were married, 69 vs. 79.8 percent. The number of singles was greater in the urban group. The majority of both groups had completed primary school (48.8 vs. 68.5 percent), but more patients in the urban group had completed secondary or higher education (Table 1).

Risk factors

The most common risk factor in both groups was hypertension, 80.3% in the urban *vs.* 66.1% in the rural group. Notably, the percentage of hypertension, diabetes, smoking and history of alcohol consumption was higher in the urban than the rural group but the percentage of cardiac disease was higher in the rural group than the urban group (Table 2).

Pathology

The most common pathology in both the urban and rural areas was infarction; however, the percentage of hemorrhage was higher in the urban vs. the rural group (Table 3). Thrombosis was the most common cause of infarction in both groups, followed by lacunar infarction, emboli and others (Table 4).

Table 1. Demographic data

	Urban (n = 203) n (%)	Rural (n = 124) n (%)
Sex		
Male	123 (60.6)	70 (56.5)
Female	80 (39.4)	54 (43.5)
Age (year)	60.99 $\pm$ 12.02	64.30 $\pm$ 12.07
Marital status		
Single	21 (10.3)	2 (1.6)
Married	140 (69.0)	99 (79.8)
Divorce/Separate	42 (20.7)	23 (18.5)
Education		
None	9 (4.4)	9 (7.3)
Primary school	89 (43.8)	85 (68.5)
Secondary school	42 (20.7)	13 (10.5)
Diploma	14 (6.9)	4 (3.2)
Bachelor or more	47 (23.2)	11 (8.9)
Others	2 (1.0)	2 (1.6)

Table 2. Risk factors

	Urban (n = 203) n (%)	Rural (n = 124) n (%)
Diabetes mellitus	61 (30.0)	26 (21.0)
Hypertension	163 (80.3)	82 (66.1)
Hypercholesterolemia	111 (54.3)	67 (54.0)
Cardiac disease	33 (16.3)	26 (21.0)
Transient ischemic attack	3 (1.5)	0 (0)
Previous stroke	32 (15.8)	16 (12.9)
History of Smoking		
Ever	49 (24.1)	37 (29.8)
Smoking	43 (21.2)	21 (16.9)
History of alcohol	71 (35.0)	27 (21.8)

Neurological condition

The percentage of left side vs. right side weakness was comparable and there was relatively little bilateral weakness. The percentages of neurological deficits in both groups are presented in Table 5.

Functional outcome

Prior to the rehabilitation program, the Barthel index score for the urban vs. rural patients was 7.30 ± 3.91 vs. 7.77 ± 4.04 (no significant difference). The Barthel index score post-rehabilitation was 13.45 ± 4.83 vs. 12.97 ± 4.92, respectively (no significant difference between the two groups although it was significant within group differences p = 0.000 in both group) (Table 6).

Psychological outcome

The respective anxiety and depression scores pre-rehabilitation were 7.60 ± 3.94 vs. 7.82 ± 3.93 and 9.18 ± 3.93 vs. 8.46 ± 4.59 (no significant difference between two groups). After treatment, the respective anxiety and depression scores were 5.90 ± 3.40 vs. 5.79 ± 3.03 and 7.13 ± 3.85 vs. 7.12 ± 4.01. There is an overall statistically significant improvement between the pre- and post-rehabilitation status (p = 0.000 for urban and p = 0.000 for rural), but no significant difference between the urban vs. rural groups (Table 7).

Quality of life outcome

The quality of life scores post-rehabilitation were higher than prior to the program in all domains: physical, psychological, social and environment. There was a statistically significant difference between the pre- and post-rehabilitation program in all domains for both groups (p = 0.000 for urban and p = 0.000 for rural). The comparison of the pre- and post-program between groups yielded no statistically significant differences (Table 8).

Discussion

Regarding the risk factors for stroke, the patients in urban areas had a higher percentage of hypertension, diabetes, smoking and alcohol consumption even though the rural patients had a higher percentage of cardiac disease. Indeed, the authors found the percentage of hemorrhage higher in urban vs. against rural patients correlating with their higher percentage of hypertension and alcohol consumption. The results of the present study are similar to a previous Thai study conducted by the interASIA collaborative group, which showed the mean levels of hypertension,

Table 3. Type of stroke

	Urban (n = 203) n (%)	Rural (n = 124) n (%)
Infarction	139 (68.5)	95 (76.6)
Hemorrhage	63 (31.0)	29 (23.4)
Not known	1 (0.5)	-

Table 4. Type of infarction

	Urban (n = 203) n (%)	Rural (n = 124) n (%)
Thrombosis	89 (64.0)	59 (62.1)
Emboli	12 (8.6)	14 (14.7)
Lacunar infarction	29 (20.9)	21 (22.1)
Other	9 (6.5)	1 (1.1)

Table 5. Neurological condition

	Urban (n = 203) n (%)	Rural (n = 124) n (%)
Side of weakness		
Left	110 (54.19)	66 (53.2)
Right	85 (41.87)	57 (46.0)
Bilateral	6 (2.95)	1 (0.8)
Missing data	2 (0.98)	-
Supine to sitting ability	119 (58.62)	73 (58.87)
Hemianopia	12 (5.9)	14 (11.3)
Visual neglect	11 (5.4)	12 (9.7)
Positive double simultaneous test	45 (22.2)	12 (17.7)
Proprioceptive sensation		
Loss	25 (12.3)	12 (9.7)
Impaired	56 (27.6)	45 (36.3)
Dysphagia	28 (13.8)	21 (16.9)
Urinary incontinence	48 (23.6)	32 (25.8)
Fecal incontinence	26 (12.8)	13 (10.5)

Table 6. Functional evaluation

	Urban (n = 203)	Rural (n = 124)	p-value
Pre rehabilitation			
Barthel index	7.30 ± 3.91	7.77 ± 4.04	0.303
Post rehabilitation			
Barthel index	13.45 ± 4.83	12.97 ± 4.92	0.382

Table 7. Anxiety and depression score

	Urban (n = 203)	Rural (n = 124)	p-value
Pre rehabilitation			
Anxiety	7.60 ± 3.94	7.82 ± 3.93	0.661
Depression	9.18 ± 3.93	8.46 ± 4.59	0.176
Post rehabilitation			
Anxiety	5.90 ± 3.40	5.79 ± 3.03	0.809
Depression	7.13 ± 3.85	7.12 ± 4.01	0.987

Table 8. Quality of life score

	Urban (n = 203)	Rural (n = 124)	p-value
Pre rehabilitation			
Physical	18.13 ± 3.86	18.13 ± 3.89	0.996
Psychological	17.82 ± 3.88	18.63 ± 3.97	0.080
Social	8.91 ± 2.40	9.19 ± 2.15	0.319
Environmental	24.08 ± 4.37	24.96 ± 4.06	0.080
Post rehabilitation			
Physical	21.41 ± 3.61	21.41 ± 3.76	0.989
Psychological	20.11 ± 3.63	20.66 ± 3.10	0.180
Social	9.56 ± 2.08	9.82 ± 1.88	0.290
Environmental	25.98 ± 4.34	26.65 ± 3.53	0.169

hypercholesterolemia, overweight and diabetes were worse in urban *vs.* rural areas[3]. The authors found the percentage of infarction was higher than hemorrhagic stroke as did a previous Thai study[4]; thus, ischemic stroke is persistent cause of stroke among Thai patients.

In the present study, there was an improvement of functional outcome after rehabilitation program as was also seen in previous studies[5-7]; however, there was no significant difference between the urban vs. rural groups, which can perhaps be explained by the apparent non-difference in the severity of the neurological condition between groups.

Impairment might be caused by psychological problems after stroke. Moreover, organic brain dysfunction also has an important role in post-stroke affective disorder such as anxiety and depression[8]. Regarding psychological outcomes, the present study showed an improvement in the Hospital Anxiety and Depression scores after rehabilitation in both groups. The psychological improvement likely reflects an improvement in physical activity, the ability to recover the previous lifestyle *cum* activities, understanding of stroke, and clarity of expectations functioning on admission to rehabilitation[9]. Patients who live in different areas (urban *vs.* rural) might have different levels of education, understanding of disease and expectations. These factors should also influence psychological adaptation; notwithstanding, the present study showed no differences between the two areas.

An improvement in the quality of life score, after the in-patient rehabilitation program, was detected by the present study. Other studies also showed an improvement in quality of life scores after rehabilitation[5,7,10]. A previous study reported a correlation between improved quality of life and improved self-care ability and decreased depression[5]. Normally, quality of life measurements comprise 4 domains; including physical, psychological, social and environmental as patients who live in different areas, with different socio-economic status and different environments might have differences in their post-stroke expectations. Even though the present study showed improvements in quality of life scores, in all domains after rehabilitation program, there was no significant difference between the two groups. The first explanation may be due to the quality of the rehabilitation program provided both groups in the same way (*i.e.*, there was no special taking care given urban patients). The second explanation might be that the present study was performed as an in-patients program wherein both groups of patients have the same in-hospital social relationships and environment.

In a future study, the psychological condition and quality of life measurements should be performed after discharge from hospital and after having to adapt to the home environment, where the social and environmental factors will be different between urban and rural domiciles. Related factors should then be explored for detail to derive a greater understanding about the quality of life among Thai stroke patients.

Conclusion

An improvement in functional outcomes, psychological outcomes and quality of life scores were found after a post-stroke, in-patient rehabilitation program. Notwithstanding, no differences between urban vs. rural patients were found.

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คุณภาพชีวิตของผู้ป่วยอัมพาตครึ่งซีกจากโรคหลอดเลือดสมองที่อาศัยในเมืองและในชนบทของประเทศไทย

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***ภูมิหลัง**: ผู้ป่วยอัมพาตจากโรคหลอดเลือดสมองที่รอดชีวิตที่อาศัยในเขตเมืองและชนบท น่าจะมีการปรับตัวต่อความพิการแตกต่างกัน ปัจจัยเหล่านี้ ซึ่งน่าจะนำมาศึกษาในคนไทย*

***วัตถุประสงค์**: เพื่อศึกษาความสามารถในการช่วยเหลือตนเอง สภาพจิตใจ และคุณภาพชีวิตของผู้ป่วยอัมพาตจากโรคหลอดเลือดสมอง ผู้ซึ่งอาศัยในเขตเมือง และเขตชนบท ก่อนและหลังได้รับโปรแกรมการฟื้นฟู*

***รูปแบบ**: การศึกษาไปข้างหน้าเชิงวิเคราะห์ แบบ multi-center*

***วัสดุและวิธีการ**: ศึกษาจากผู้ป่วยที่เข้ารับการรักษาในหอผู้ป่วยเวชศาสตร์ฟื้นฟู หลังจากได้รับโปรแกรมการฟื้นฟู โดยแบ่งผู้ป่วยเป็น 2 กลุ่ม กลุ่มที่อาศัยในเขตเมือง และ ในชนบท เครื่องมือที่ใช้วัดผลการฟื้นฟู ได้แก่ Barthel Index, Hospital Anxiety and Depression Scale (HADS) และ WHO BREF QOL โดยวัดก่อนและหลังได้รับโปรแกรมการฟื้นฟูสมรรถภาพ เก็บข้อมูลจากสถาบันที่เข้าร่วมโครงการ 9 แห่ง*

***ผลการศึกษา**: ผลของโปรแกรมการฟื้นฟูสมรรถภาพ ช่วยให้ความสามารถในการช่วยเหลือตนเอง สภาพจิตใจ และคุณภาพชีวิตของผู้ป่วยดีขึ้น ทั้ง 2 กลุ่ม กลุ่มที่อาศัยในเขตเมือง และ ในชนบท อย่างไรก็ตาม ไม่พบความแตกต่างของความสามารถในการช่วยเหลือตนเอง สภาพจิตใจ และคุณภาพชีวิตของผู้ป่วยดีขึ้นทั้ง 2 กลุ่ม ทั้งก่อนและหลังการรักษา*

***สรุป**: การอาศัยในเขตเมืองและในชนบทของผู้ป่วยอัมพาตจากโรคหลอดเลือดสมองพบว่าไม่มีผลต่อความสามารถในการช่วยเหลือตนเอง สภาพจิตใจ และคุณภาพชีวิตภายหลังได้รับการฟื้นฟูสมรรถภาพ*