

✧ RESEARCH PAPER ✧

# *Evaluating a community-based stroke nursing education and rehabilitation programme for patients with mild stroke*

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## **Evaluating a community-based stroke nursing education and rehabilitation programme for patients with mild stroke**

This study evaluated whether mild stroke patients who received a community-based stroke nursing intervention had better stroke knowledge, behaviour and self-efficacy than those who were exposed to traditional education programmes. The intervention group consisted of sixty five stroke patients randomly selected from seven communities who received three 2-hour stroke interventions per week for 8 weeks. The normal care group consisted of sixty two stroke patients randomly selected from a medical centre who received a general stroke education programme. The stroke patients in two groups were assessed at baseline, after intervention and at the 6-month follow-up. At the 6-month follow-up, the intervention group demonstrated an improvement in the knowledge of stroke risk factors compared with the normal care group. Three months after education, the intervention group exhibited changes in the knowledge of stroke, social participation and self-efficacy compared with those at baseline. Also, self-efficacy was correlated with the knowledge of stroke risk factors after intervention and at the 6-month follow-up; self-efficacy was correlated with social participation after the 6-month follow-up. A community-based stroke nursing intervention might have effects on changes in the knowledge of stroke risk factors, social participation and self-efficacy.

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**Key words:** community based, education, rehabilitation, stroke.

## INTRODUCTION

Stroke, in Taiwan and in most developed countries,<sup>1,2</sup> is one of the top three leading causes of death and a major cause of long-term disability. It is well known that successful management of recognized stroke risk factors can reduce the risk of stroke.<sup>3</sup> Hypertension,<sup>3-5</sup> cigarette smoking<sup>3,6</sup> and heavy alcohol consumption<sup>7</sup> have all been identified as risk factors for stroke. Stress is also associated with increased atherosclerosis and high blood pressure that can lead to strokes in general and to ischaemic strokes in particular.<sup>8</sup> Diet is a major risk factor; a diet consisting of low cholesterol,<sup>9</sup> low sodium,<sup>10</sup> high potassium,<sup>11,12</sup> high calcium<sup>11,12</sup> and high fibre<sup>12</sup> might help to prevent strokes. In addition to behavioural risk reductions, patients with stroke should know the benefits of thrombolysis within 3 hours after the onset of symptoms.<sup>13</sup> Treatment with intravenous recombinant tissue plasminogen activator within 3 hours of the onset of an acute ischaemic stroke can improve the neurological outcome.<sup>14,15</sup>

Stroke survivors have mental as well as physical sequelae. They might be reluctant to attend social activities due to a feeling of social isolation,<sup>16</sup> which can further restrict rehabilitation and recovery. Rehabilitating activities can enhance the physiological and psychological condition of patients with stroke.<sup>17</sup> For proper rehabilitation, increasing self-efficacy as well as stroke-related knowledge is necessary. Although a person's self-efficacy is high and when he or she feels in control during threatening situations, the capability to manage different situations is enhanced.<sup>18</sup> It is thus imperative to offer patients with stroke not only techniques for rehabilitation but also encouragement for increasing self-efficacy, which includes the confidence in dealing with emotions, symptoms and coping self-efficacy.

A community-based stroke nursing education and rehabilitation programme for patients with mild strokes was conducted in seven municipal communities of central Taiwan. The strategy for this community-based stroke programme included the application of stroke knowledge training to improve the self-care of patients with stroke and instructing stroke rehabilitation techniques to induce more effective recovery. In this study, we evaluated whether patients with mild stroke who received a community-based stroke nursing education and rehabilitation programme

had better knowledge, behaviour and self-efficacy compared with those who were exposed to traditional education programmes in hospital settings.

## METHODS

### Study population

In this study, participants included 170 patients with mild stroke (96 men and 74 women) between 41 and 84 years of age who were recruited from central Taiwan, Taichung, from August 2007 to June 2008. These cases were separately from a medical centre and seven municipal communities, who were confirmed by positive findings on computed tomography or magnetic resonance imaging (or both) of the head. Patients who had experienced multiple strokes were excluded. The normal care group, 85 of patient participants, was defined as patients with mild stroke who had received hospital-based poststroke education and rehabilitation programmes. These patients were recruited from outpatients of the neurology department of Chung Shan Medical University Hospital. Another half ( $n = 85$ ) of patient participants were selected as the intervention group in seven municipal communities. Patient participants in these seven communities were selected by random cluster sampling from 21 townships in Taichung County. All of participants had to score  $\geq 20$  on the Mini Mental State Examination,<sup>19</sup> had to be without a history of psychiatric illness and had to score  $\geq 65$  on the Barthel Index, which references performance of the basic activities of daily living.<sup>20</sup> Participants could not have severe language and hearing impairments that could interfere with evaluation interviews. Informed consent was obtained from each patient. The study protocol was approved by the ethics committee of Chung-Shan Medical University Hospital.

### Intervention and counselling programme

A community-based stroke nursing education and rehabilitation programme was provided at each township health station of seven communities in central Taiwan. Patients in the intervention group got the same stroke education and rehabilitation as the normal care group in hospitals. The intervention and counselling programme was comprised of two stroke educational sessions, communication seminars, alternating with patient support

**Table 1** Contents of community-based stroke nursing education and rehabilitation programme

Content	Objectives	Methods/strategies
Education section 1		
(1) Warning signs	To increase the knowledge of reoccurring stroke To seek medical treatment within 3 hours	Lecture
(2) Risk factors	To increase the risk awareness of stroke To change the lifestyle	Lecture
(3) Diet	To increase the food knowledge in preventing stroke To select Mediterranean-style diet	Lecture
Education section 2		
(1) Social activities	To increase the knowledge of attending social activities To break down the isolation for attending social activities and rehabilitation	Lecture/demonstration
(2) Rehabilitation	To increase the techniques of rehabilitation	Demonstration
Communication section	To share each experience in rehabilitation and prevention of reoccurring stroke	Discussion/sharing
Support group section	To increase the knowledge of daily living skills	Lecture/discussion

groups. The contents of the two-session stroke education consisted of lectures regarding warning signs, clinical manifestations, risk factors of stroke, diet, social activities and rehabilitation. The communication section included discussions and sharing classes, which conversed about each rehabilitation experience in order to teach each other to recall the material taught in the session as well as observe others in similar situations engage in rehabilitation. The section of patient support groups comprised of inviting therapists, nurses and people in the community to talk with patients in order to instruct and transfer techniques for better methods of daily living (see Table 1).

This programme was scheduled three times per week for 8 weeks, each session lasting 2 hours. At each location, there were different educators, who were consistently trained in this programme, provided the same intervention for each location. The participants could have no prior experience in this kind of education programme.

### Evaluation at three points

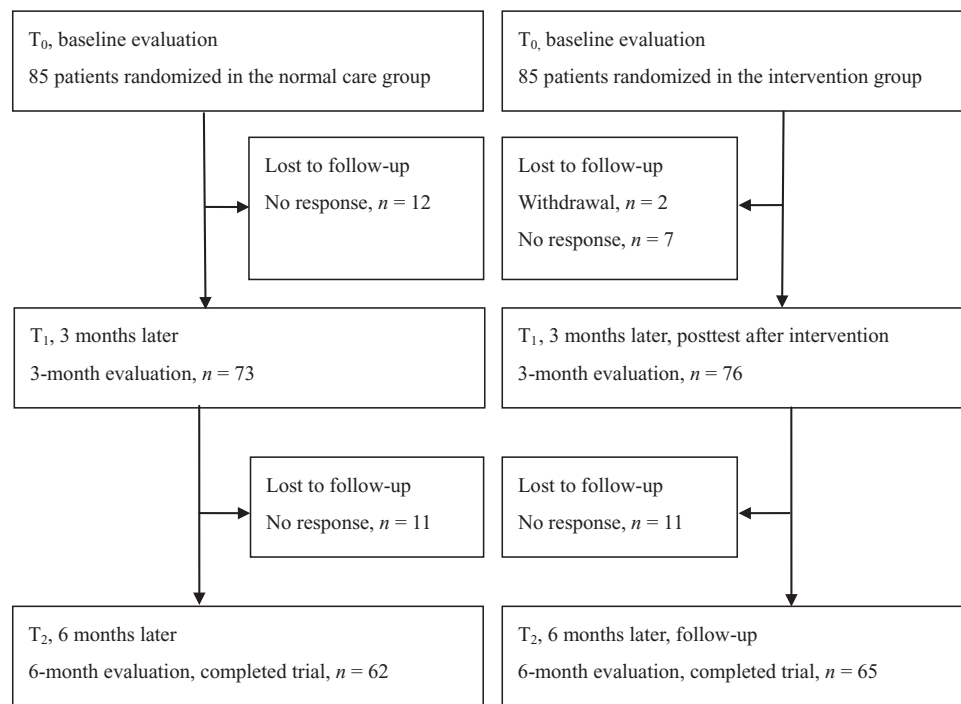
Pretest evaluation (baseline,  $T_0$ ) was conducted before the intervention. The posttest evaluation (3-month follow-up,  $T_1$ ) was conducted within 2 weeks after the 8-week intervention. Six months after baseline, the follow-up evaluation (6-month follow-up,  $T_2$ ) was conducted. Also, the normal care group was scheduled by similar time intervals for evaluation as the intervention group.

Two patients in the intervention group withdrew during the intervention period, and 18 patients in the intervention group and 23 patients in the normal care

group failed to participate in the second and third follow-up interviews. A total of 127 patients (the intervention group  $n = 65$ ; the normal care group  $n = 62$ ) completed the final evaluation (see Fig. 1).

### Instruments and measures

The questionnaire contained questions that covered demographic characteristics and lifestyle (habits of cigarette smoking and alcohol drinking) as well as personal chronic diseases. Current cigarette smoking was defined as smoking of cigarettes at least 6 months prior to pretest evaluation ( $T_0$ ). Habitual alcohol drinking was defined as alcohol consumption at least once a week. The evaluation was focused on knowledge, behaviour and self-efficacy towards stroke prevention. To assure content validity in knowledge and behaviour, the questionnaires were reviewed by four stroke prevention experts in the fields of neurology, rehabilitation and health education. There were 16 questions on knowledge related to stroke, including four items on stroke warning signs and medical treatment, eight items on the risk factors of stroke and four items on dietary knowledge. The content validity (correlation coefficient) was 0.90, and the test–retest reliability was 0.92 in knowledge section. The items regarding the warning signs of stroke and medical treatment included items related to the 3-hour interval of the onset of a stroke for greatest successful medical treatment, stroke warning signs, stroke rehabilitation and following physician's instructions. For knowledge concerning the risk factors of stroke, there were items about the



**Figure 1.** Flow chart of the evaluation of stroke nursing education and rehabilitation programme.

possibility of secondary strokes, alcohol consumption, smoking, exercise, controlling blood pressure, controlling blood lipid levels, keeping warm during cold weather and stress management in daily life. The items concerning dietary knowledge included questions that related to low cholesterol, low sodium, high calcium and high fibre diets. The participants selected 'true', 'false' or 'uncertain' as answers. One point was awarded for every correct answer, whereas 0 points were awarded for incorrect or uncertain answer.

A total of 12 questions were included to assess the behaviour of patients with stroke. The content validity (correlation coefficient) was 0.89, and the test–retest reliability was 0.93 in behaviour section. Three items related to behaviour towards the warning signs of stroke included: immediately seek medical treatment when suspected to have stroke precursors, take medication following a physician's instructions and regular visits to medical facilities for rehabilitation. Seven items regarding behaviours related to the risk factors of stroke. Seven items included drinking moderately, controlling body weight, smoking cessation, keeping warm during cold weather, regulating life patterns, conducting simple daily exercises and avoiding stress. There were two items on the behaviour of social participation, including participation in

social activities and willingness to engage in a conversation. The five-point Likert scale was used to evaluate these parts from 1, strongly disagree, to 5, strongly agree. A higher score represented a more positive behaviour.

There were six items under the heading of self-efficacy, including dietary control, continuous rehabilitation, physical activities, exercise, positive attitude in social participation and stress management. The content validity (correlation coefficient) was 0.87, and the test–retest reliability was 0.86 in self-efficacy section. Four items addressed the ability to perform relevant self-care activities, and two items concerned confidence in coping with stroke aftermath and managing stress. The Likert scale was used to evaluate self-efficacy. The answers were divided into strongly agree, agree, do not agree or disagree, disagree and strongly disagree ranging from 1 point to 5 points. A higher score in each item represented a higher self-efficacy.

## Analysis

All statistics were calculated using the software SPSS17.0 (SPSS, Chicago, IL, USA). Baseline and clinical characteristics were compared between the normal care group and the intervention group using *t*-test for continuous data and  $\chi^2$  test for discrete data. The repeated measure analysis of

variance (ANOVA) was applied to test within-group differences. Repeatedly measured ANOVA with Tukey's post hoc comparisons were used to analyse the differences in scores of each knowledge, behaviour and self-efficacy variable of patients with stroke at baseline, at 3-month follow-up and after the 6-month follow-up. Between the intervention and the normal care groups, unpaired *t*-tests were conducted to test the score differences in mean change of knowledge, behaviour and self-efficacy between the baseline and after the 6-month follow-up. Correlations between self-efficacy and each variable in knowledge and behaviour were evaluated at three points of time in the intervention group using Spearman's rank correlation coefficient. All *P*-values were calculated from two-tailed statistical tests, and statistical significance was assigned to *P*-values <0.05.

## RESULTS

Initially, there were 170 patients with mild stroke recruited in this study. After the 6-month follow-up, 127 patients, 83 males and 44 females, (intervention group *n* = 65; normal care group *n* = 62) completed the final evaluation. Our included patients with stroke in the final evaluation had to attend at least 12 of the 16 educational sessions. Participants' ages were an average of 67.2 ± 11.6 (standard deviation) years. Baseline and clinical characteristics were not significantly different between the normal care group and the intervention group except for current smoking behaviours (*P* < 0.01,  $\chi^2$  test, Table 2).

Scores of knowledge, behaviour and self-efficacy in the normal care group and the intervention group were shown in Table 3. Knowledge scores concerning stroke prevention in the normal care group did not change from the baseline. There was a significant improvement in knowledge scores including warning signs and medical treatment (ANOVA, *P* < 0.001), risk factors of stroke (*P* < 0.001) and dietary factors in the intervention group following the intervention. A significant difference was found that knowledge score of warning signs and medical treatment at baseline was compared with the score after the 6-month follow-up in the intervention group (*P* = 0.03, Tukey's post hoc test). A similar trend was observed in the knowledge scores of risk factors in the intervention group over all three evaluations. Furthermore, the intervention group had a significantly different mean knowledge score of risk factors, increasing at the

**Table 2** Baseline and clinical characteristics of stroke participants in normal care and intervention group

	Normal care group	Intervention group
Characteristics	<i>n</i> = 62	<i>n</i> = 65
Age of baseline; years, mean ± SD	67.2 ± 10.4	67.3 ± 12.8
Sex; <i>n</i> (%)		
Male	40 (64.5)	43 (66.2)
Female	22 (35.5)	22 (33.8)
Stroke type; <i>n</i> (%)		
Ischaemic stroke	45 (72.6)	50 (76.9)
Haemorrhagic stroke	17 (27.4)	15 (23.1)
Chronic disease history; <i>n</i> (%)		
Hypertension	21 (33.9)	22 (33.8)
Diabetes	7 (11.3)	11 (16.9)
Hyperlipidaemia	19 (30.6)	13 (20.0)
Education level; <i>n</i> (%)		
≤ 6 years	32 (51.6)	36 (55.4)
7–12 years	24 (38.7)	22 (33.8)
≥ 13 years	6 (9.7)	7 (10.8)
Smoking; <i>n</i> (%)	19 (30.6)	8 (12.3) <sup>a</sup>
Alcohol drinking; <i>n</i> (%)	13 (21.0)	7 (10.8)
Age at stroke onset, mean ± SD	66.8 ± 10.5	66.9 ± 12.7

Comparison was made with *t*-test for continuous data and  $\chi^2$  test for discrete data. <sup>a</sup> *P* < 0.01, compared with the normal care group.

6-month follow-up in comparison with the baseline and scores in the normal care group (0.9 vs. 0.2; *P* = 0.04, *t*-test).

In the behaviour section, there were significant differences in behaviour scores of social participation during baseline, postintervention and the 6-month follow-up in the intervention group (ANOVA, *P* < 0.001). A significant difference was observed between baseline and after the 6-month follow-up (*P* < 0.001, Tukey's post hoc test). In the self-efficacy section, there were gradually increasing self-efficacy scores during baseline, postintervention and the 6-month follow-up in the intervention group (ANOVA, *P* < 0.001).

Self-efficacy did not correlate with the variables of knowledge and behaviour before our intervention. However, self-efficacy was correlated significantly with knowledge of risk factors after the intervention (*r* = 0.31,

**Table 3** Scores for knowledge, behaviour and self-efficacy in the normal care ( $n = 62$ ) and intervention ( $n = 65$ ) groups of stroke patients over three time points

	Normal care group			Intervention group			Difference <sup>†</sup>		
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	D (T <sub>2</sub> -T <sub>0</sub> )	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	D (T <sub>2</sub> -T <sub>0</sub> )	P
<b>Knowledge</b>									
Warning signs and medical treatment	3.1 (1.0)	3.2 (0.9)	3.2 (0.8)	0.1 (1.2)	3.0 (1.0)	3.6 (0.8) <sup>a</sup>	3.3 (0.7) <sup>c</sup>	0.3 (1.0)	0.46
Risk factors of stroke	6.3 (1.6)	6.3 (1.6)	6.5 (1.2)	0.2 (1.8)	6.1 (1.7)	7.1 (1.0) <sup>a</sup>	7.0 (1.0) <sup>a</sup>	0.9 (1.9)	0.04 <sup>d</sup>
Dietary	3.4 (1.0)	3.6 (0.7)	3.6 (0.6)	0.2 (1.1)	3.6 (0.8)	3.9 (0.4) <sup>b</sup>	3.8 (0.4)	0.2 (1.0)	0.91
<b>Behaviour</b>									
Warning	9.9 (0.6)	10.0 (0.5)	10.0 (0.7)	0.1 (0.6)	9.8 (1.6)	10.1 (1.6)	10.1 (1.7)	0.3 (2.1)	0.67
Risk factors of stroke	18.3 (1.3)	18.4 (1.4)	18.6 (1.4)	0.3 (1.3)	18.0 (2.8)	18.9 (2.2)	19.2 (2.2)	1.2 (3.5)	0.50
Social participation	5.7 (1.2)	5.9 (1.4)	5.8 (1.4)	0.1 (2.0)	5.4 (1.3)	6.2 (1.3) <sup>a</sup>	6.1 (1.2) <sup>a</sup>	0.7 (1.6)	0.07
Self-efficacy	19.7 (2.7)	20.1 (3.0)	20.2 (2.9)	0.5 (3.2)	19.5 (4.1)	21.1 (4.4) <sup>a</sup>	21.2 (3.8) <sup>a</sup>	1.7 (3.5)	0.06

Data are expressed as mean (standard deviation). <sup>a</sup>  $P < 0.001$ ; <sup>b</sup>  $P = 0.04$ ; <sup>c</sup>  $P = 0.03$ ; significant differences from T<sub>0</sub> group, using analysis of variance with Tukey's post hoc tests; <sup>d</sup>  $P < 0.05$  by unpaired  $t$ -test. <sup>†</sup> Difference in mean change between the intervention and the normal care group.

$P = 0.02$ ) and knowledge of risk factors after the 6-month follow-up ( $r = 0.42$ ,  $P < 0.01$ ) in the intervention group. Self-efficacy was also correlated with social participation after the 6-month follow-up ( $r = 0.29$ ,  $P = 0.04$ ) in the intervention group.

## DISCUSSION

This study evaluated the potential for a community-based stroke nursing education and rehabilitation programme. Compared with those patients with stroke who received general stroke education in a hospital setting, this study showed an improvement in stroke knowledge, which might be consequential to self-efficacy. We also observed that patients with stroke made progress in behaviour towards social participation after the intervention (3-month follow-up) and 3 months after the intervention (6-month follow-up). At the point of 6-month follow-up evaluation, our intervention group revealed a correlation between behaviour towards social participation and self-efficacy.

The community-based stroke programme reached its objective of improving stroke knowledge. Before intervention, the summed scores of correct responses in the knowledge of stroke risk factors of our intervention group patients were  $\approx 79\%$  of the total scores. After the intervention, the summed correct responses were 91% of the total scores. However, correct responses in the knowledge of stroke risk factors did not change significantly in our normal care group through 3 months postprogramming. Knowledge gaps between our intervention group and normal care group might reflect the efficacy of this community-based stroke programme. For patient with stroke, it is very important to know the warning signs of stroke and medical treatment within 3 hours.<sup>13</sup> This programme has been identified to achieve this object by increasing the knowledge scores of these two items at the point of after intervention and 6-month follow-up in the intervention group. Dietary knowledge also was significantly improved after the intervention in comparison with the baseline in the intervention group. Dietary control should be emphasized for patients with stroke because of the direct and indirect influence of diet on the occurrence and severity of strokes.<sup>9,21,22</sup>

With respect to warning signs, medical treatment and risk factors in behaviour, no significant changes were found in the intervention group. This result was contrasted with the consequences of evaluating knowledge of warning signs, medical treatment and risk factors. A

possible explanation was that substantial effects on behaviours were not achieved or that the duration of the programming did not last long enough to change patients' behaviours with respect to warning signs and medical treatment and risk factors.

Participating communities offered social support during this community-based stroke programme, which encouraged patients with stroke to take part in these activities, thus helping to reduce their potential social isolation. Interestingly, the behaviour score of the intervention group for social participation in daily living had a significant increase after the intervention. Most patients with stroke cannot maintain prestroke social status because of their physical disability, difficulty in mobility or difficulties in communication. For this reason, patients with stroke tend to develop signs of social isolation and introverted behaviours during the period immediately after the stroke.<sup>16</sup> Moreover, socially isolated patients with stroke might be at particular risk for poor future outcomes.<sup>23</sup> After discharge from medical facilities, many patients with stroke might face the predicament of social isolation, and this in turn might be an obstacle to the process of rehabilitation. This community-based stroke programme and the previous qualitative study<sup>24</sup> have been illustrated to work effectively on social participation and rehabilitation in patients with mild stroke.

Patients with stroke usually reveal lower levels of self-efficacy after being discharged from the hospital. During the process of rehabilitation, self-efficacy of patients with stroke can be improved by mastering previous activities, observing others' performance of these activities and verbal persuasion and encouragement.<sup>25</sup> In order to minimize dependence on others for activities of daily living in patients with the aftermath of stroke, rehabilitation interventions should incorporate prolonged self-efficacy enhancement.<sup>26</sup> In this study, self-efficacy was observed to be positively correlated with the knowledge of stroke risk factors in our intervention group. Knowledge must be reinforced in patients with stroke and in doing so there might be spontaneous increases in self-efficacy.

Previous studies have indicated that the level of health knowledge varies among subjects based on their level of education.<sup>27,28</sup> However, no difference existed in this study with respect to education levels between the normal care group and the intervention group. Therefore, differences in the knowledge scores of our patients with stroke between the normal care group and the intervention group cannot be explained by their education level. There

were, however, some limitations in our study. One of the more important limitations was small sample size, due to the difficulty of recruiting community-based patients with stroke. Some elderly patients with stroke also failed to participate in all three facets of evaluation.

## CONCLUSION

In general, most patients with stroke receive stroke education through doctors and nurses before leaving the hospital, or as outpatients of the neurology department in the hospital. However, hospitals usually restrict time to further offer more stroke education and rehabilitation programme in hospitals. On the other hand, without transport, patients of stroke would be bound in the area of their living, not capable of receiving the materials offered by hospitals or other organizations. Actually, this community-based nursing education and rehabilitation programme is a low-cost intervention,<sup>29</sup> which can be held in the neighbourhoods of community centres or health stations around stroke patients. If patients with stroke have enough information on the risk factors of stroke, the reoccurrence of stroke might be greatly reduced. Thus, it is imperative to schedule a combined community-based nursing education and rehabilitation programme for patients with stroke when they are ready to be discharged from the hospital.

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