ผลของโปรแกรมการจัดการตนเองของบุคคลและครอบครัวต่อพฤติกรรมป้องกันกลับเป็นซ้ำในผู้ป่วยโรคหลอดเลือดสมอง
Effects of an Individual and Family Self-management Program on the Recurrence Prevention Behaviors among Stroke Patients

นิพนธ์ต้นฉบับ

Original Article

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2567;19(1):89-97.

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาผลของโปรแกรมการจัดการตนเองของบุคคลและครอบครัวต่อพฤติกรรมป้องกันกลับเป็นซ้ำในผู้ป่วยโรคหลอดเลือดสมอง **วิธีการศึกษา:** การวิจัยกึ่งทดลองทดสอบก่อนและหลังการทดลอง กลุ่มตัวอย่างคือผู้ป่วยโรคหลอดเลือดสมอง 64 คน คัดเลือกตัวอย่างโดยใช้วิธีการเลือกแบบเจาะจงตามคุณสมบัติที่กำหนด แบ่งเป็นกลุ่มทดลอง 32 คน และกลุ่มควบคุม 32 คน กลุ่มทดลองได้รับโปรแกรมการจัดการตนเองของบุคคลและครอบครัว เป็นเวลา 12 สัปดาห์ กลุ่มควบคุมได้รับการพยาบาลตามปกติ เครื่องมือที่ใช้ในการวิจัยประกอบด้วย 1) แบบบันทึกข้อมูลส่วนบุคคลของผู้ป่วยและญาติ 2) โปรแกรมการจัดการตนเองของบุคคลและครอบครัว 3) แบบสอบถามพฤติกรรมการป้องกันการกลับเป็นซ้ำโรคหลอดเลือดสมอง วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณาและสถิติที **ผลการศึกษา:** ภายหลังโปรแกรม กลุ่มทดลองมีค่าเฉลี่ยคะแนนพฤติกรรมป้องกันการกลับเป็นซ้ำโรคหลอดเลือดสมองโดยรวม (mean = 147.15, SD = 6.84) มากกว่าก่อนเข้าร่วมโปรแกรม (mean = 108.62, SD = 8.40) และกลุ่มควบคุม (mean = 107.09, SD = 8.32) อย่างมีนัยสำคัญทางสถิติ (P-value < 0.05) และค่าเฉลี่ยคะแนนพฤติกรรมรายด้าน คือ 1) ด้านการรับประทานอาหาร 2) ด้านการออกกำลังกาย และ 3) ด้านการจัดการความเครียด มากกว่าก่อนเข้าร่วมโปรแกรม และกลุ่มควบคุม อย่างมีนัยสำคัญทางสถิติ (P-value < 0.05) **สรุป:** โปรแกรมการจัดการตนเองของบุคคลและครอบครัวต่อพฤติกรรมป้องกันกลับเป็นซ้ำในผู้ป่วยโรคหลอดเลือดสมองเพิ่มคะแนนพฤติกรรมป้องกันการกลับเป็นซ้ำโรคหลอดเลือดสมอง

คำสำคัญ: การจัดการตนเองของบุคคลและครอบครัว; พฤติกรรมการป้องกันการกลับเป็นซ้ำโรคหลอดเลือดสมอง; โรคหลอดเลือดสมอง

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Abstract

Objective: To study the effects of an individual and family self-management program on recurrence prevention behaviors in stroke patients. **Methods**: This was quasi-experimental research with pre- and post-test design. The sample consisted of 64 stroke patients (32 each in test and control groups) selected by purposive selection according to the specified characteristics. The test group received the 12-week individual and family self-management program; while the control group received regular care. The research tools consisted of 1) personal data record form of patients and family, 2) individual and family self-management program, and 3) stroke recurrence prevention behavior questionnaire. Data were analyzed using descriptive statistics and t-statistics. **Results**: After the program, the test group had the mean overall stroke recurrence prevention behavior score (mean = 147.15, SD = 6.84) higher than before (mean = 108.62, SD = 8.40) and the control group (mean = 107.09, SD = 8.32) with statistical significance (P-value < 0. 05) and had mean scores for each aspect of the behavior, i.e., 1) diet, 2) exercise, and 3) stress management, at the end of the program higher than those before the program and those in the control group (P-value < 0.05) **Conclusion**: The individual and family self-management program improved scores of stroke recurrence prevention behaviors.

Keywords: individual and family self-management; stroke prevention behavior; stroke

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Introduction

Cerebrovascular disease or stroke is a major public health problem worldwide with the second most mortality rate.[1] In Thailand, the report of the Department of Disease Control revealed that in 2017 to 2021 rate of stroke was 278.49, 303.2, 318.89, 328.01 and 330.22 per 100,000 populations, respectively, with the mortality rate of 47.81, 47.15, 52.97, 52.80 and 55.53 per 100,000 populations, respectively.[2,3] The trend of disease rate and mortality rate has been upward. Stroke has been the number one cause of death among Thai people since 2015 to 2019.[4] In the Health Region 4 which included provinces of Nonthaburi, Pathumthani, Ayudthaya, Angthong, Singburi, Nakhonnayok, Lopburi, and Saraburi, mortality rate of stroke was 13.07% in 2019 to 13.65% in 2020. This region has the highest mortality rate of stroke in the country.[5]

Studies showed that 1 in 4 stroke patients who survived the incident had recurrence.[4] Of the 100 patients, recurrence was found in 7 – 9 patients annually.[5] Mortality rate with the second recurrence was as high as 56.2% or 1.5 times of that of the first recurrence.[8] Factors associated with recurrence of stroke include hypertension, dyslipidemia, diabetes, heart disease, obesity, atrial fibrillation.[9] In addition, poor behavior of the patients with stroke plays a crucial role promoting the recurrence.[10] The poor behaviors include diet inappropriate for the disease[10,11], lack of exercise[12,13], smoking[14], alcohol intake[15], and poor stress management.[16,17]

At present, behavioral modification modality, especially self-management, has been more popular for preventing recurrence of stroke.[18] The self-management program is to promote realization and self-care capability to control various factors of cerebrovascular incident recurrence such as avoiding deep-fried food, stir-fried food, and salty food,[19] increasing physical activities (walking, jogging, and exercise)[20], and having proper stress management (listening to music, and meditation).[21] In addition to avoiding sedentary lifestyle, family should be included in promoting cerebrovascular incident recurrence prevention. Patients surviving the first cerebrovascular incident have a trace of disability depending on the location of the incident in their brain.[22] They therefore need caregiver for daily living activities. As a result, in building self-management capability, caregivers of these cerebrovascular patients should be included.[23]

The individual and family self-management program is to have family members involve in improving health status of the patient.[24] Family members are considered influential in rehabilitation, encouragement, support and facilitation for behavioral change of the patient. Based on the concept of health management for an individual and families who have members with chronic diseases, belief, attitude, value and example of the desired behavior would drive the person to perform the behavior.[25] The main component are Context, Process, and Outcomes. For Context, predisposing factors that affect self-management are conditional factors, personal and family factors, and physical and environmental factors. These factors are the basis that facilitate the actual behavior. For Process, the factors involve knowledge, beliefs of the patient and his/her family, skills for self-control, and social support. The patients and their caregivers are offered social support in addition to family support. With Context and Process, the patient and their family members develop self-management behavior, and support and encouragement for improving health. This results in the Outcomes in the patient and their family members, both short- and long-term outcomes. Family is the center of self-care to help the patient have proper, continuous self-management. The program activities provide the patient and family members the knowledge about stroke, lead the belief of the patient and family to suit the disease, promote the behavior preventive for the cerebrovascular recurrence. The patient and family members are trained in self-management skill which could bring the patient better health. There has been an application of the individual and family self-management program for diabetic patients which lowered the HbA1c level when compared with the usual care.[24,26] In the elderly patients with hip fracture, the individual and family self-management program was found to improve physical functions of better than the usual care.[27]

The recurrence prevention for stroke is crucial as stated by the guideline for the prevention of stroke in patients with stroke and transient ischemic attack of the American Heart Association/American Stroke Association[28] and the Neurology Institute of Thailand.[29] Based on previous research, most behavioral modification program for stroke patients had only the patients as target and aimed at specific aspect of the behavior separately such as diet, living after the diagnosis of stroke[30], exercise promotion[31], and encouragement of cerebrovascular patients with depression.[16] To promoting proper behaviors, modification or control on all aspects of risk factors should be simultaneously promoted. [28,29] The program to promote behavioral modification should thus be comprehensive for all risk factors to prevent recurrence of cerebrovascular incidents. The program should be context specific to the patient and family members' living circumstances to be optimal for changes. The living circumstance of each patient and family members should be analyzed and possible solutions are identified. Activities should be designed to fit the need and desire of the patient and family members. A study in Thailand showed that knowledge for modifying risky behavior to effectively prevent recurrence must be specific to individual patient's risk factors.[18]

With a concern about the need for effective intervention to promote behavior to prevent recurrence of cerebrovascular incident using the promising individual and family self-management program as the guidance.[24] Based on the

program concept, all aspects of context of the patient and family members are analyzed so that specific activities could be designed to provide knowledge, modify belief, promote capability in preventing cerebrovascular incident recurrence. These activities for specific patient and family members could include diet, exercise, and stress management provided through skill training for self-management and social support. The ultimate target was the behavior to prevent recurrence of cerebrovascular incident.

This present study aimed to examine the effects of the 12-week individual and family self-management program as the intervention (test group) on preventive behavior of recurrence of cerebrovascular incident compared with the usual care (control group). The scores consisted of dietary, exercise, and stress management behaviors. Specifically, we aimed to compare scores of preventive behaviors between the test group and control group after the intervention. In addition, we also compared scores of preventive behaviors in the control group and the test group before and after the intervention.

Conceptually, based on the Individual and Family Self-Management Theory of Ryan and Sawin, the Context, Process of self-management, and Outcomes guided the training activities.[24] We applied Process of self-management to develop program activities. The Process allows for identifying self-management process for self-care which could promote continuous self-management behaviors to prevent the recurrence. The Process consists of a) knowledge and beliefs, b) skill and abilities, and c) social facilitation. For **knowledge and beliefs**, the patient and family members were provided with knowledge and their beliefs about the disease were identified. For **skill and abilities**, the patient and family members were trained with 6 skills of self-management to change their health behaviors to control the disease and prevent the complications. These 6 skills included setting the 1) shared target, 2) self-monitoring and reflection, 3) decision making, 4) planning and execution, 5) self-evaluation, and 6) modification according to the outcomes. These risk factors included diet for stroke, exercise to strengthen blood vessels, and stress management. For **social fac4ilitation**, support to facilitate self-management skill, and encouragement and follow-up were offered and built for continuous behavioral changes. Practically, the patient and family members were provided with a manual for self-management, diary of 12 weeks, videos for exercise, videos for stress management, telephone follow-up at weeks 1, 3, 5 7, and 9 to for encouragement, advice and problem solving, and encouragement for continuous practice. It was hypothesized that activities based on a) knowledge and beliefs, b) skill and abilities, and c) social facilitation could result in higher scores of behaviors of diet, exercise, and stress management.

Methods

In this quasi–experimental research, two-group pre-posttest design was used to evaluate benefits of the 12-week individual and family self-management program to prevent cerebrovascular incident recurrence on scores of behaviors of diet, exercise, and stress management of the patient with stroke. The study population was stroke patients with mild abnormality treated at Thammasat University Hospital. The participants were selected by purposive sampling. Once the researcher provided the usual care for all participants in the control group, the experimental training program was then started for those in the test group.

The study sample was those study population who were diagnosed with ischemic stroke for the first time. Compared with hemorrhagic stroke, these ischemic stroke patients were selected because they usually had a mild disease which allowed them to participate in the program. To be eligible, they had to be 20 years old or older, be neurologically stable within the first 24 hours after admission, have no dementia based on the Thai Mental-state Examination with a score of more than 23 points[32], have mild abnormalities, be able to walk with no help, have the Modified Rankin Scale score of 2 points or less[33], and have family member who were also eligible for the study. For family members, to be eligible, they had to be the main caregiver of the patient, be 20 years old or older, have a good conscience, have no problems in communication, be able to read, write and understand Thai language, and be able to be contacted by telephone.

The sample size was estimated based on Cohen's work.[34] An effect size of 0.8 was from a study in Thailand of a program to prevent recurrence in patients with stroke.[35] With a power of 80%, and a type I error of 5%, a sample size of 26 participants per group was needed. To compensate for a 20% drop-out rate, a total of 32 participants per group were required.

Research instruments

Research instruments consisted of the 12-week individual and family self-management program to prevent cerebrovascular incident recurrence, screening tool, and a set of questionnaires.

The **12-week individual and family self-management program** to prevent cerebrovascular incident recurrence was developed based on the concept of Ryan and Sawin as described previously. The researcher conducted the program. In the **first** of the 3 steps of the Process, knowledge was provided, and belief was identified. The **second step** was to train 6 skills of goal setting, self-monitoring and self-reflecting, decision-making, planning and executing, self-evaluating, modifying according to the outcomes, and telephone follow-up for skill evaluation and encouragement. In the **last step**, facilitating materials were provided which included manual for diet and medication use, videos for exercise and body scan, Line application group, telephone number exchange, reminder for activities, and questions and answers sessions. Lastly, for the Outcomes, the researcher monitor and evaluate the patient's practice before and after the 12-week program.

The **screening tools** were the Thai Mental-state Examination and the Modified Rankin Scale. For the Thai Mental-state Examination, with a total score of 30 points, the participants had to have at least 23 points which indicated adequate cognitive function. The Modified Rankin Scale was used to evaluate disability and dependence. With a total score of 0 to 6 points, the participants had to have mild normality with only 2 points or less (i.e., being able to walk with no need of help).

The first part of the questionnaire collected demographic and clinical characteristics of the participants including sex, age, marital status, education level, income, history of chronic illness, family history of stroke, smoking, alcohol intake, current occupation, score of National Institutes of Health Stroke Scale (NIHSS), score of Modified Rankin Scale (mRS), healthcare payment scheme, and community healthcare provider. The researcher asked the participants and filled in the questionnaire. For the caregiver, the questionnaire collected sex, age, relationship with the patient, and number of hours per day taking care of the patient. The researcher also collected this information.

The last part of the questionnaire was to evaluate the preventive behavior for recurrence of cerebrovascular incident.[37,38] The questions asked the patients to evaluate themselves on how often they performed each behavior. The 36 questions assessed diet behavior (18 questions), exercise (10 questions), and stress management (8 questions). The response was a 5-point Likert-type rating scale ranging from 1-never, to 2-the least (1 to 2 times per week), 3-moderately (3 to 4 times per week), 4-often (5 to 6 times per week), and 5-always (everyday) for positive statements. The scores of the negative statements were reversed. The possible overall total score was 36 – 180 points, where higher scores indicate a higher level of desirable behavior.[39] The possible total score of diet, exercise, and stress management behaviors were 18 – 90, 10 – 50, and 8 – 40 points, respectively.

The questionnaire of the preventive behavior was tested for content validity by 5 experts in stroke specifically one physician, one physical therapist, two nurses, and one nursing instructor. It was found to have good content validity with an index of 0.97. The internal consistency reliability tested in 20 individuals with characteristics comparable with the participants found to be high with a Cronbach's alpha coefficient of 0.98.

Participant ethical protection

The study was approved by the Ethics Committee for Human Study of Thammasat University (approval number: 021/2564). The participants were informed about the objective, process, benefits, and the voluntary and confidentiality nature of the study. Written informed consent was obtained before participation. The participants could withdraw from the study at any time with no negative consequences on the care they received. For participants in the control group, the usual care was provided. After the experiment, they were educated with the same content as provided in the test group.

The experiment conduct and data collection procedure

Participants in both groups were assessed for readiness to participate in the study. The conduct in the two groups was as follows. In the **control group**, the participants received the usual care which included care from physician, nurse, pharmacist, physical therapist, and other healthcare providers at the medical ward. They were taken care of on mobility, provision of knowledge on medication use, risk factors control, and discharge plan. After the entire experiment, the questionnaire was completed, and the participants were educated with knowledge about the disease and self-

management with the manual provided. The behavior was assessed two times, i.e., before and after the 12-week intervention. For the post-intervention evaluation, the participants were asked to visit the hospital for evaluation.

In the **test group**, the participants received the usual care as in the control group. In addition, they attended the 12-week individual and family self-management program to prevent cerebrovascular incident recurrence as follows. The first meeting was held within 24 hours after admission. The researcher provided knowledge and identified beliefs of the patient and family members. The researcher used 15-minute PowerPoint slides to provide knowledge about stroke. The researcher discussed about belief with the patient and family members that could affect the behavior risky for the disease and recurrence. The researcher discussed with the patient and family member for 15 minutes about the importance of the behavior to prevent the recurrence and reflected on their knowledge and belief. The researcher trained the patient and family member on self- management skill training) (6 skills of 1-goal setting, 2-self-monitoring and self-reflecting, 3-decision-making, 4-planning and executing, 5-self-evaluating, and 6-modifying according to the outcomes) in 60 minutes.

The 2nd meeting was held on the discharge day. The researcher met the patient and family member for 15 minutes to review what knowledge had been taught, revisited the belief, and re-trained the s elf- management skills (6 skills of 1-goal setting, 2-self-monitoring and self-reflecting, 3-decision-making, 4-planning and executing, 5-self-evaluating, and 6-modifying according to the outcomes) in 45 minutes. The researcher gave the patient a manual for self-management and a diary to record self-management behavior with verbal instruction. The researcher gave videos of exercise and body scan to view at home. Five minutes were spent for telephone number exchange for future remote encouragement and questions and answers sessions.

The 3rd set of meetings was held after the patient was discharged from the hospital. The researcher telephoned the patient to follow-up on the practice at weeks 1, 3, 5, 7 and 9 with 30 minutes for each call. The researcher discussed with the patient the problems and possible solutions and offered encouragement to better the practice.

The 4th meeting was at the office visit which was at week 12 after the discharge. The researcher met participants of both groups to assess the behavior using the questionnaire. The researcher discussed problems and difficulties of practicing the desirable behaviors with the participants in the test group and encouragement was given. The session took 40 minutes.

Data analysis

Descriptive statistics including mean with standard deviation and frequency with percentage were used to summarize demographic and clinical characteristics of the patient and family member and scores of the preventive behaviors. Differences in these characteristics were compared using chi-square test or Fisher's exact test for categorical variables as appropriate, and independent t test or Mann-Witney U test for continuous variables as appropriate.

For between-group comparisons, scores of preventive behaviors before and after the intervention between the two groups were compared using independent t test because all variables were normally distributed. For within-group comparisons, scores of preventive behaviors between and after the intervention within each group were compared using paired t test because all variables were normally distributed. Statistical significance was set at a type I error of 55a. All statistical analyses were performed using the software program SPSS version 20.

Results

Of the 64 participants (31 each in the control and test groups), their mean ages were comparable (68.2 and 64.28 years, respectively) (Table 1). The majority of them were men (59.4% for both), married (65.6% and 68.8%, respectively), with primary school education (59.4% and 40.6%, respectively), with hypertension (56.3% and 78.1%, respectively), with smoking history (53.1% for both), and alcohol intake (62.5% for both). While the patients in the control group had an NIHSS score of 1 (34.4%); those in the test group had NIHSS score of 2 points (53.1%). The majority of them had mRS score of 1 point (50.0% and 46.9%, respectively), For family member as the caregiver, they were comparable in age (42.72 and 45.16 years, respectively). The majority were women (78.1% and 65.6%, respectively), and children/niece/nephew (71.9% and 59.4%, respectively). No significant differences between the two groups were found (Table 1).

For **between-group comparisons**, before the training program, scores of preventive behaviors both the overall and individual behaviors, between the control and test groups were

not significantly different (Table 2). At the end of the program, scores of preventive behaviors both the overall and individual behaviors in the test group were significantly higher than those in the control group (P < 0.001 for all) (Table 2).

Table 1 Demographic and clinical characteristics of the patients and family caregivers (N = 64).

	N (%)			Statistics value	P-value
	Control group (n = 32)	Test group (n= 32)	Total (N = 64)		
The patient					
Sex				0.00[C]	1.00
Men	19 (59.4)	19 (59.4)	38 (59.4)		
Women	13 (40.6)	13 (40.6)	26 (40.6)		
Age (years), mean (SD)	68.72 (10.42)	64.28 (10.46)	66.50 (10.60)	-1.546[M]	0.122
30 - 39	1 (3.1)	0 (0)	1 (1.6)		
40 - 49	0 (0)	4 (12.5)	4 (6.3)		
50 - 59	2 (6.3)	6 (18.8)	8 (12.5)		
60 - 69	14 (43.8)	9 (28.1)	23 (35.9)		
70 - 79	12 (37.5)	13 (40.6)	25 (39.1)		
> 79	3 (9.4)	0 (0)	3 (4.7)		
Marital status				3.239[F]	0.518
Single	4 (12.5)	2 (6.3)	6 (9.4)		
Married	21 (65.6)	22 (68.8)	43 (67.2)		
Widowed	5 (15.6)	8 (25.0)	13 (20.3)		
Divorced	1 (3.1)	0 (0)	1 (1.6)		
Separated	1 (3.1)	0 (0)	1 (1.6)		
Education level				4.103[F]	0.576
No formal education	0 (0)	1 (3.1)	1 (1.6)		
Primary school	19 (59.4)	13 (40.6)	32 (50)		
High school	5 (15.6)	9 (28.1)	14 (21.9)		
Associate degree	2 (6.3)	2 (6.3)	4 (6.3)		
Bachelor's degree	4 (12.5)	6 (18.8)	10 (15.6)		
Higher than bachelor's degree	2 (6.3)	1 (3.1)	3 (4.7)		
Chronic illness				2.744[C]	0.184
No	8 (25.0)	3 (9.4)	11 (17.2)		
Yes	24 (75.0)	29 (90.6)	53 (82.8)		
Diabetes	9 (28.1)	16 (50.0)	25 (39.1)	3.216[C]	0.123
Hypertension	18 (56.3)	25 (78.1)	43 (67.2)	3.473[C]	0.109
Dyslipidemia	16 (50.0)	22 (68.8)	38 (59.4)	2.332[C]	0.203
Heart disease	4 (12.5)	3 (9.4)	7 (10.9)	.160[C]	1.00
Atrial fibrillation	3 (9.4)	3 (9.4)	6 (9.4)	.000[C]	1.00
Kidney disease	4 (12.5)	2 (6.3)	6 (9.4)	.736[C]	0.672
Smoking history				.000[C]	1.00
No	15 (46.9)	15 (46.9)	30 (46.9)		
With smoking history	17 (53.1)	17 (53.1)	34 (53.1)		
Past smoker	9 (28.1)	11 (34.4)	20 (31.3)	.291[C]	0.788
1 - 10 years	3 (9.4)	2 (6.3)	5 (7.8)		
11 - 20 years	4 (12.5)	8 (25.0)	12 (18.8)		
> 20 years	2 (6.3)	1 (3.1)	3 (4.7)		
Present smoker	8 (25.0)	6 (18.8)	14 (21.9)	.366[C]	0.763
Alcohol intake history				.000[C]	1.00
No	12 (37.5)	12 (37.5)	24 (37.5)		
With history	20 (62.5)	20 (62.5)	40 (62.5)		
Past drinker	9 (28.1)	8 (25.0)	17 (26.6)	.080[C]	1.00
1 - 10 years	4 (12.5)	1 (3.1)	5 (7.8)		
11 - 20 years	5 (15.6)	5 (15.6)	10 (15.6)		
> 20 years	0 (0)	2 (6.3)	2 (3.1)		
Present drinker	11 (34.4)	12 (37.5)	23 (35.9)	.068[C]	1.00
NIHSS score (point)				7.166[F]	0.114
0	2 (6.3)	2 (6.3)	4 (6.3)		
1	11 (34.4)	7 (21.9)	18 (28.1)		
2	7 (21.9)	17 (53.1)	24 (37.5)		
3	5 (15.6)	3 (9.4)	8 (12.5)		
4	7 (21.9)	3 (9.4)	10 (15.6)		
mRS score (point)				2.024[C]	0.364
0	3 (9.4)	7 (21.9)	10 (15.6)		
1	16 (50.0)	15 (46.9)	31 (48.4)		
2	13 (40.6)	10 (31.3)	23 (35.9)		
Main family caregiver					
Sex				1.237[C]	0.405
Men	7 (21.9)	11 (34.4)	18 (28.1)		
Women	25 (78.1)	21 (65.6)	46 (71.9)		
Age (years), mean (SD)	42.72 (12.27)	45.16 (11.04)	43.94 (11.64)	-0.840[M]	0.401
18 - 30	3 (9.4)	3 (9.4)	6 (9.4)		
31 - 40	18 (56.3)	10 (31.3)	28 (43.8)		
41 - 50	3 (9.4)	8 (25.0)	11 (17.2)		
> 50	8 (25.0)	11 (34.4)	19 (29.7)		
Relationship with the patient				1.376[F]	0.555
Spouse	7 (21.9)	11 (34.4)	18 (28.1)		
Children/niece/nephew	23 (71.9)	19 (59.4)	42 (65.6)		
Relatives	2 (6.3)	2 (6.3)	4 (6.3)		

* More than 1 chronic illness was applicable, [C] = Chi-square test, [F] = Fisher exact test, [M] = Mann-Whitney U test

Table 2 Between-group comparisons of cores of preventive behavior in the two groups before and after the training program (N = 64).

Preventive behavior	Mean ± SD				t	P-value
	Control group (n = 32)		Test group (n = 32)			
Overall behavior						
Before	109.21	9.65	108.62	8.40	.262	0.794
After	107.09	8.32	147.15	6.84	-21.02	< 0.001
Diet behavior						
Before	61.31	5.86	60.00	5.32	.937	0.352
After	63.28	6.21	79.31	3.75	-12.48	< 0.001
Exercise behavior						
Before	21.50	5.86	20.62	3.80	.774	0.442
After	16.59	6.21	33.65	3.83	-19.95	< 0.001
Stress management behavior	26.40	3.11	28.00	3.52	-1.91	0.060
Before	27.21	3.24	34.18	1.33	-11.25	< 0.001
After						

For **within-group comparisons**, in the **control group**, scores of preventive behaviors of the overall behavior and diet behavior and stress management behavior before and after the program were not different; however, scores of exercise behavior decreased from before to after the program with statistical significance (21.50 to 16.59 points, respectively, P-value < 0.001) (Table 3). In the **test group**, scores of the overall behavior and each of all individual behaviors before the program increased after the program with statistical significance (P-value < 0.001 for all) (Table 3).

Table 3 Within-group comparisons of cores of preventive behavior in the two groups before and after the training program (N = 64).

Preventive behavior	Mean ± SD				t	P-value
	Before		After			
Overall behavior						
Control group (n = 32)	109.21	9.65	107.09	8.32	1.41	0.167
Test group (n = 32)	108.62	8.40	147.15	6.84	-22.99	< 0.001
Diet behavior						
Control group (n = 32)	61.31	5.86	63.28	6.21	-1.65	0.109
Test group (n = 32)	60.00	5.32	79.31	3.75	-19.11	< 0.001
Exercise behavior						
Control group (n = 32)	21.50	5.86	16.59	2.94	5.50	< 0.001
Test group (n = 32)	20.62	3.80	33.65	3.83	-15.70	< 0.001
Stress management behavior						
Control group (n = 32)	26.40	3.11	27.21	3.24	-1.45	0.155
Test group (n = 32)	28.00	3.52	34.18	1.33	-11.38	< 0.001

Discussions and Conclusion

The 12-week individual and family self-management program as the intervention on preventive behavior of recurrence of cerebrovascular incident in patients with mRS score of 0 - 2 points and NIHSS score of 0 - 4 points resulted in a significant increase in behavior scores both overall behavior and individual behaviors of diet, exercise and stress management when compared with the usual care. This could be because the training program used videos to provide knowledge so the patient and family caregiver could learn and understand stroke and severity of the recurrent incident.[40]

The knowledge helped the patient and family caregiver developed self-management which allowed the family caregiver to facilitate the self-management behavior of the patient, ultimately the desirable preventive behavior. Our finding is consistent with the work of Tepsuwan and colleagues where 8-week stroke preventing program helped the patient have preventive behaviors compared with the usual care.[35]

In addition, the caregiver could have helped the patient in self-management in preventing the recurrence.[41] The caregiver could help the patient change the preventive behavior to fit their own context. Whenever the patient and the caregiver had questions, they could call the researcher for help and advice in solving the problems. The training program also had follow-up calls at week 1, 3, 5, 7, and 9 after discharge. The researcher asked how they practiced preventive behaviors on signs and symptoms encountered, and problems and obstacles. The patient had opportunities to ask and discuss all issues, receive advice, and get encouraged from the researcher. A study in Thailand on the 8-week individual and family self-management program in the elderly prepared for proctoscopy provided knowledge, trained self-management, prepared family members, promoted self-control, and monitored and followed up through telephone call.[42] They found that the patients had behavior of proper preparation for proctoscopy significantly better than those receiving the usual advice.

At the end of the 12-week program, scores of overall and individual preventive behaviors were significantly higher than those in the control group. The training program could enhance self-care that fit the context of the given patient and his/her family. This could be because knowledge and belief could be improved. The patient could realize about the severity of the recurrence and the preventive behaviors were enforced.[26] Such knowledge consisted of the stroke, cause of the disease, risk factors of recurrence, and how to monitor signs and symptoms of the disease. The patient and family caregiver were allowed to discuss about knowledge, self-care, and belief with the researcher individually. They were supported for proper behaviors on diet, exercise, and stress management specific to the context of the patient and his/her family. On the other hand, patients in the control group received only the usual care and advice which provided only information with no advice specific to each given patient's context, no planning for self-care specific to the patient, and no home telephone call follow-up.

In addition to the information provided, skill based on the concept of Ryan and Sawin were trained. The shared goals were set so that the patient and family caregiver were determined to behavioral modification. The patient and family caregiver usually set the goal on exercise, meditation, proper diet, following the appointed office visits, and self-evaluation and self-reflection with tangible diary record. This could show also the improper behaviors in each week such as lack of exercise, consumption of sweet, oily, salty food, and inadequate sleep or poor sleep hygiene. Such information could then be analyzed for causes of and possible solutions for such improper behaviors. The patient and caregiver could make a decision to modify their behavior based on what was found from monitoring, planning and execution, and self-evaluation and self-reflection. The patient and family caregiver could evaluate weekly whether they could practice as planned against the set target and plan for modification that was sill suitable to their own context. They could see their own success or failure clearly.

In terms of social facilitation, tangible aids were provided such as manual for self-care practice, videos for diet, exercise, and meditation, diary for the practice, and telephone number exchanged. The most found obstacle of the actual behavior was physical weakness (i.e., muscle weakness) which did not allow them to perform the behavior. As a result, they were afraid to exert because of fear of fall. They were also afraid of social interaction because of a poor image of disability. They had difficulty finding a more proper diet or were familiar with the old diet. The researcher advised the patient and family caregiver on exercise by having the caregiver be available for help at all time so the patient could be more relieved and confident. The patient was advised to start exercise on the bed or chair at the level they feel comfortable to do. The patient was encouraged to go exercise outside of the house.

At the early phase, the family caregiver should accompany the patient at all time to enhance the confidence. Once the patient had more exercise outside, their fear decreased, and they were more confident to go out without the caregiver. For diet behavior, the researcher advised the patient and caregiver to reduce condiments and amount of favorite food that was improper for the disease. The caregiver was told to participate in diet control. Before the program, the caregiver usually offered psychological support and encouragement; when in the program they helped prepare food suitable for the disease, offer nutritional supplement, and facilitate exercise, relaxation, and stress management. The caregiver participated with the patient in planning for self-care which could help achieve the set goal. The finding in our study is consistent with a previous study where the 8-week program of self-management with family support resulted in a lower recurrence rate among patients with stroke compared with those receiving regular care.[43] Their program evaluated the problems of preventive behavior, provided knowledge, trained skills of self-management, prepared family members to facilitate the patient, promoted self-control at home on diet, medication use, and exercise.

This study has certain limitations. Only patients with stroke with mild disease (i.e., mRS score of 0 – 2 points) were included in the study, therefore, generalization to the patients with more severe disease should be cautious.

Based on study findings and conduct, a long-term outcome of the training program should be conducted. For example, a follow-up of 6 months to 1 year is recommended with respect to the long-term changes of various recurrence risk factors such as blood pressure and lipid profile. In addition, long-term outcomes such as quality of life and sustainability of the behavior could be observed.

In conclusion, the 12-week individual and family self-management program on preventive behavior of recurrence of cerebrovascular incident compared with the usual care could improve scores of the overall, diet, exercise, and stress management behaviors. This could help reduce the rate of recurrence. The training program should be applied more widely for the care of cerebrovascular patients.

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