

ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมสุขภาพของผู้สูงอายุโรคหลอดเลือดสมองกลับเป็นซ้ำ Factors Related to Health Behaviors of the Elderly with Recurrent Stroke

นิพนธ์ต้นฉบับ

Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาระดับพฤติกรรมสุขภาพของผู้สูงอายุโรคหลอดเลือดสมองกลับเป็นซ้ำ และศึกษาปัจจัยสัมพันธ์กับพฤติกรรมสุขภาพดังกล่าว **วิธีการศึกษา:** การศึกษานี้ใช้แบบแผนความเชื่อด้านสุขภาพเป็นกรอบแนวคิด กลุ่มตัวอย่างที่ศึกษา คือ ผู้สูงอายุตั้งแต่ 60 ปีขึ้นไปที่ได้รับการวินิจฉัยจากแพทย์ว่าเป็นโรคหลอดเลือดสมองกลับเป็นซ้ำและมารับการตรวจที่คลินิกประสาทวิทยา สถาบันประสาทวิทยา กรุงเทพมหานคร จำนวน 88 ราย โดยการสุ่มอย่างง่าย เก็บข้อมูลตั้งแต่วันที่ 21 กุมภาพันธ์ พ.ศ. 2562 ถึง 15 มิถุนายน พ.ศ. 2562 โดยใช้สัมภาษณ์ได้แก่ แบบสัมภาษณ์พฤติกรรมสุขภาพของผู้สูงอายุโรคหลอดเลือดสมองกลับเป็นซ้ำ การรับรู้โอกาสเสี่ยง การรับรู้ความรุนแรงของโรค การรับรู้ประโยชน์ของการปฏิบัติพฤติกรรมสุขภาพ การรับรู้อุปสรรค การรับรู้สิ่งชักนำ และการรับรู้ความสามารถของตนเอง ทดสอบความสัมพันธ์ระหว่างพฤติกรรมสุขภาพกับปัจจัยต่าง ๆ ด้วยค่าสหสัมพันธ์ของเพียร์สัน **ผลการศึกษา:** ผู้สูงอายุโรคหลอดเลือดสมองกลับเป็นซ้ำมีพฤติกรรมสุขภาพระดับสูง ($M = 60.19 \pm 6.981$ คะแนน) และปัจจัยที่สัมพันธ์ทางบวกในระดับปานกลางกับพฤติกรรมสุขภาพได้แก่ การรับรู้ประโยชน์ของการปฏิบัติพฤติกรรมสุขภาพ และการรับรู้สิ่งชักนำให้สู่การปฏิบัติพฤติกรรมสุขภาพ ($r = 0.306, P\text{-value} = 0.002$ ทั้งสองคู่ความสัมพันธ์) ส่วนปัจจัยที่สัมพันธ์ทางบวกในระดับต่ำ ได้แก่ การรับรู้โอกาสเสี่ยงโรคหลอดเลือดสมองกลับเป็นซ้ำ ($r = 0.220, P\text{-value} = 0.020$) การรับรู้ความรุนแรงโรคหลอดเลือดสมองกลับเป็นซ้ำ ($r = 0.224, P\text{-value} = 0.018$) การรับรู้ความสามารถของตนเอง ($r = 0.204, P\text{-value} = 0.028$) และการรับรู้อุปสรรคของการปฏิบัติพฤติกรรมสุขภาพสัมพันธ์ทางลบในระดับต่ำกับพฤติกรรมสุขภาพ ($r = -0.273, P\text{-value} = 0.005$) **สรุป:** ผู้สูงอายุโรคหลอดเลือดสมองกลับเป็นซ้ำมีพฤติกรรมสุขภาพในระดับสูง และสัมพันธ์กับปัจจัยตามแบบแผนความเชื่อด้านสุขภาพ อาจพัฒนารูปแบบส่งเสริมพฤติกรรมสุขภาพโดยส่งเสริมผ่านปัจจัยตามแบบแผนความเชื่อด้านสุขภาพ

คำสำคัญ: พฤติกรรมสุขภาพ, แบบแผนความเชื่อด้านสุขภาพ, ผู้สูงอายุ, โรคหลอดเลือดสมองกลับเป็นซ้ำ

Abstract

Objective: To determine level of health behavior practice in the elderly with recurrent stroke and associating factors. **Method:** Factors based on Health Belief Model were used in this study. Sample was 88 patients aged 60 years or older with recurrent stroke and receiving care at Prasat Neurological Institute, Bangkok, Thailand, from February 21, to June 15, 2019, selected by simple random sampling. The interview was done using following questionnaires: health behavior of elderly with recurrent stroke, perceived risk, and perceived severity of recurrent stroke, and perceived benefits, perceived barriers, perceived cues to action, and perceived self-efficacy of health behavior. Correlation between the health behavior and each of the factors was tested using Pearson's product moment correlation coefficient **Results:** Patients had a high level of health behavior ($M = 60.19 \pm 6.981$ points). Health behavior was positively correlated with perceived benefits and perceived cues to action at a medium level ($r = 0.306, P\text{-value} = 0.002$ for both). The behavior was positively correlated with perceived risk ($r = 0.220, P\text{-value} = 0.020$), perceived severity ($r = 0.224, P\text{-value} = 0.018$) and perceived self-efficacy ($r = 0.204, P\text{-value} = 0.028$) at a low level. The behavior was negatively correlated with perceived barriers at a low level ($r = -0.273, P\text{-value} = 0.005$). **Conclusion:** Health behavior among the elderly with recurrent stroke was at high level and significantly associated with factors based on the Health Belief Model. Intervens to promote health behavior based on Health Belief Model could be developed.

Keywords: health behavior, Health Belief Model, elderly, recurrent stroke

Editorial note

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Introduction

Stroke is a severe neurological disorder and has been continuously increasing in annual incidence. It has been reported that stroke is the second most cause of death worldwide with 17 million stroke patients and a mortality rate of 65 millions annually.¹ More importantly, one in four stroke cases experienced the

recurrence.² In Thailand, based on our survey at the Prasat Neurological Institute, we found that stroke patients in the inpatient department were those with recurrent stroke with 137, 140 and 158 cases in 2017 to 2019, respectively (data not published). These annual incidences corresponding to

23.66%, 20.26% and 22.57% of all stroke patients registered at this institute. These findings suggested an increasing number of stroke especially in the elderly. A higher number of severe stroke cases have been found. As a result, the mortality rate has been increased by two folds and disability rate has been increased with the increased stroke recurrence.^{3,4}

Recurrent stroke is associated with various factors. Previous international studies revealed that 70% of the cases involved large vessel cerebrovascular occlusions and 30% involved small vessel occlusions.^{5,6} Poor health behaviors could also contribute to the incidence of recurrence. National and international studies suggested that some stroke patients lacked in controlling preventable risk factors and comorbidities to prevent stroke recurrence. These included diet not appropriate for stroke patients, lack of exercise, obesity, inadequate rest, stress, disrupted medication use, medication noncompliance, self-termination on medications, poor follow-up compliance, and poor control on hypertension, hyperlipidemia, diabetes mellitus, and heart diseases.⁷⁻⁹ These indicated that the elderly with stroke who had poor health behaviors could face negative consequences especially the increase in recurrence risk. The acceptance to implement appropriate health behaviors is however needed before the actual practice of such behaviors, the right attitude or belief in appropriate health behaviors is needed before the change could be realized.

Based on Health Belief Model, for a person to perform any task or behavior to avoid the illness, the person has to perceive that they are at risk or the illness is severe. In addition, to allow themselves to perform such specific health behaviors to avoid the illness, alleviate the threat, and reduce disease severity, they need to perceive no or less barriers to carry out such behaviors. The person need to perceive cue to action and their ability to perform the behaviors at the adequate level so that they can achieve the sustainable target health behaviors.¹⁰

For the prevention of stroke recurrence, appropriate behaviors include proper diets (i.e., avoiding foods with high sodium, sugar, and fat), weight control, exercise, stress management, blood pressure control, blood sugar control, lipid control, and heart disease control.¹¹ It was reported that perceived risk of stroke and co-morbidities was associated with health behaviors in stroke patients^{12,13} and perceived severity was associated with self-care behavior in preventing

stroke.^{14,15} Perceived benefits and barriers of the health behavior practice were associated with the actual practice of the behavior in patients with stroke.^{16,17} It was found that experience of stroke, health behavior promotion information, and the relationship between healthcare personnel and patient family members were associated with the actual practice of health behavior of the patients with the risk of stroke.^{17,18} Perceived self-efficacy was found to relate to self-care behavior in stroke patients.^{19,20} These previous studies showed relationships between various components of the Health Belief Model and the health behavior among adult patients with strokes or with the risk of stroke; however, such relationships among patients with recurrent stroke had not been known.

With the concern about health behaviors of the elderly patients with recurrent stroke, this present study aimed to elucidate the relationship between each of the six components of the Health Belief Model and the health behavior practice.¹⁰ These six components specific to this study included perceived risk of stroke recurrence, perceived severity of recurrent stroke, perceived benefits of performing health behaviors to prevent recurrent stroke, perceived barriers of performing health behaviors to prevent recurrent stroke, perceived cues to perform health behaviors to prevent recurrent stroke, and perceived self-efficacy of performing health behaviors to prevent recurrent stroke. Specifically, this present aimed to 1) determine levels of health behaviors among the elderly patients with recurrent stroke and 2) examine the relationships between the health behavior and each of the six components of the Health Belief Model as stated above. We hypothesized that perceived risk, perceived severity, perceived benefits, perceived cues, and perceived self-efficacy of performing health behaviors to prevent recurrent stroke was positively correlated with the health behaviors; while perceived barriers was negatively correlated with the health behaviors.

Methods

In this correlational descriptive research, the sample was the elderly diagnosed with recurrent stroke receiving care and follow-up visits at the out-patient department of Prasat Neurological Institute, Bangkok, Thailand, from February 21, 2019 to June 15, 2019. The sample size was estimated using the power analysis of Polit and Hungler²¹ with a type I error of

5% (or $\alpha = 0.05$), a power of test of 80%²¹, and a predetermined effect size of 0.30 as guided by a correlation coefficient of 0.30 between the perceived cues to perform behaviors to prevent stroke.¹⁷ As a result, a sample size of 88 participants was required.

Participants were selected using simple random sampling technique. Inclusion criteria were as follows. Participants had to be able to communicate in Thai language, had consciousness and cognitive function adequate for communication based on the six-item Cognitive Impairment scale (6CIT) (i.e., a score of 0 to 7 points)²², and no complications while interviewed. Participants with decreased consciousness, headache, or sudden weakness of the limbs were excluded from the study.

Study instruments

The questionnaire for participant interview consisted of **8 sections** as follows. The **first section** collected demographic data of the participant including gender, age, weight, height, waist circumference, body mass index, religion, education level, marital status, occupation, personal income, residence, and healthcare payment scheme. This first section also collected health status which included family history of stroke, illnesses, stroke severity based on NIH Stroke Scale/Score (NIHSS), brain impairment based on modified Rankin score (m-RS), and number of recurrent stroke.

In the **second section** of the questionnaire, questions regarding health behaviors of the elderly with recurrent stroke were created by the investigators as guided by relevant literature. Health behaviors of the elderly with recurrent stroke were referred to activities and self-care that could affect the patient's health and well-being. These activities and self-care were represented in 18 items with both positive and negative statements. The response was a 4-point Likert type scale ranging from 1-never practice, to 2-practice sometimes, 3-practice frequently and 4-always practice for positive statement. Scores of negative statements were reversed. With possible total scores of 18 – 72 points, levels of performing health behaviors could be categorized as low, medium and high for scores of 18 – 35, 36 – 53 and 54 – 72 points, respectively.

The **third section** asked the participants about their perceived risk of recurrent stroke. This section was also created by the investigators based on relevant literature.

Perceived risk of recurrent stroke meant how the elderly with recurrent stroke viewed their likelihood of facing another recurrence according to 10 various risks. The response was a 4-point Likert type scale ranging from 1-highly disagree to 2-less disagree, 3-agree and 4-highly agree. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived risk of recurrent stroke.

The **fourth section** asked the participants about their perceived severity of recurrent stroke. This section was also created by the investigators based on relevant literature. Perceived severity of recurrent stroke was referred to how the recurrent stroke impacted their physical, mental, economic and social aspects of life using 10 items. The response was a 4-point Likert type scale ranging from 1-highly disagree to 2-less disagree, 3-agree and 4-highly agree. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived severity of recurrent stroke.

In the **fifth section**, the participants were asked about their perceived benefits of performing health behaviors to prevent recurrent stroke on their health and well-being. This section was also created by the investigators based on relevant literature. The response to the 10 items was a 4-point Likert type scale ranging from 1-highly disagree to 2-less disagree, 3-agree and 4-highly agree. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived benefits of performing health behaviors.

The **sixth section** asked the participants about their perceived barriers of performing health behaviors to prevent recurrent stroke. This section was also created by the investigators based on relevant literature. Perceived barriers of performing health behaviors was referred to how each of the 10 scenarios was considered as the obstacle or hindrance to performing the health behavior. The response was a 4-point Likert type scale ranging from 1-highly disagree to 2-less disagree, 3-agree and 4-highly agree. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived severity of recurrent stroke.

In the **seventh section**, the participants were asked about their perceived cues to actions of performing health behaviors to prevent recurrent stroke. This section was also created by the investigators based on relevant literature. The cues to action was referred to how much the participants agreed that they received the cues to action both internal cues (e.g., experience in stroke and signals of stroke) and external ones (e.g., information, family and healthcare personnel). The

response to the 10 items was a 4-point Likert type scale ranging from 1-highly disagree to 2-less disagree, 3-agree and 4-highly agree. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived cues to action.

The **eighth section** asked the participants about their perceived self-efficacy in performing health behaviors to prevent recurrent stroke. This section was also created by the investigators based on relevant literature. Perceived self-efficacy was referred to how the participant was confident to perform health behaviors in each of the 10 scenarios. The response was a 4-point Likert type scale ranging from 1-not at all confident to 2-less confident, 3-confident and 4-highly confident. With possible total scores of 10 – 40 points, higher scores indicated higher level of perceived self-efficacy in performing health behaviors.

In terms of quality assurance on this instrument, the questionnaire was examined for **content validity** by five experts consisting of one physician specialized in stroke care, two nursing faculty members specialized in health behavior theories, and two practicing nurses specialized in stroke care. Comments on coverage of necessary content and language adequacy were provided by the experts and revision on the questionnaire was carried out accordingly. With the content validity index (CVI) criterion cutoff of 0.8 or over²³, scales in sections 2 to 8 of the questionnaire were found to have acceptable content validity with CVIs of 1.0, 1.0, 1.0, 1.0, .80, .98, and 1.0, respectively. In terms of instrument's **reliability**, scales in sections 2 to 8 of the questionnaire were tested in 30 patients at the Prasat Neurological Institute comparable to the prospective participants. All of these scales were found to have acceptable internal consistency reliability with Cronbach's alpha coefficients of 0.73, 0.85, 0.80, 0.81, 0.73, 0.73 and 0.75, respectively which was higher than the criterion cut-off of 0.70.²⁴

Ethics consideration and data collection procedure

This research was approved by the Ethics Committee of the Faculty of Nursing, Burapha University (approval number: 05-10-2561) and of the Ethics Committee of Prasat Neurological Institute (approval number: 62007). Once approved, the investigators started data collection by approaching randomly selected participants. These prospective participants were provided the objectives and steps of the study. Participant's right protection was provided.

Once the informed consent form was signed, the participants were asked to answer the questionnaire through the in-person interview. The information and answer was recorded on the questionnaire by the investigators. The interview took about 45 minutes to complete. Data collection was conducted from February 21, 2019 to June 15, 2019.

Data analysis

Descriptive statistics was used to present demographic information including mean with standard deviation and frequency with percentage. Levels of health behaviors in preventing recurrent stroke and each of the 7 components based on the Health Belief Model were also presented as mean with standard deviation and frequency with percentage.

The association between score of health behaviors in preventing recurrent stroke and each of the 7 components based on the Health Belief Model was tested using Pearson's product moment correlation analysis. Strength of correlation was classified as high, medium and low with Pearson's product moment correlation coefficient (r) of > 0.70 , $0.30 - 0.70$ and < 0.30 , respectively.²⁴ In This analysis, the assumptions of normal distribution (by Fisher skewness coefficient and Fisher kurtosis coefficient), homoscedasticity (by scatter plot), and linear relationship on all variables were not violated, therefore Pearson's product moment correlation analysis was appropriate.²⁵

Statistical significance was set at a type I error of 5% (or P -value < 0.05). All statistical analyses were conducted using SPSS for Windows version 26.

Results

Of the 88 participants included, the majority was in their 69 years of age (51.10%) with the range of 60 to 83 years old and an average of 70.8 ± 8.06 years (Table 1). There were more men (64.80%) than women. Almost all of them were Buddhist (98.90). The majority finished primary school (54.50%) and was married (73.90%). After stroke recurrence, the majority did not work (30.70%), followed by being employed by government and governmental enterprise (27.30%). About half of them lived with their spouse (51.10%) and depended on the civil servant medical benefit scheme (53.40%). The majority a personal monthly income of less than 10,000 Baht (33.30%), followed by those with 30,000 Baht (27.30%). It was found that 43.10% of them were men with

waist circumference of less than 90 centimeters and 10.20% were women with waist circumference of less than 80 centimeters. The majority had BMI of 18.5 – 22.99 and 23.00 – 24.99 kg/m² (26.10% for both).

Almost three quarters of the participants had no family history of stroke (73.90%) and almost all of them (97.70%) had co-morbidity with two diseases in the majority of them (52.30%). Hypertension was the most found co-morbidity (81.30%), followed by hyperlipidemia (61.60%). Severity of stroke was in mild level with NIHSS score of 1 – 4 points (71.60%). The majority had brain impairment at mild level or 2 points of m-RS (31.80%) followed by moderate level (3 points of m-RS) (29.50%). About two thirds had two recurrences (69.30%) followed by three recurrences (30.70%) (Table 1).

The health behavior score was 60.19 points by average with the majority of the participants had high level of the behavior (73.90%) (Table 2). The aspect of observing signs of abnormalities of stroke recurrence had the highest score (mean = 3.73 ± 1.16 points), followed by medication compliance (mean = 3.65 ± 1.36 points) and stress management (mean = 3.56 ± 1.68 points).

It was found that health behavior to prevent stroke recurrence was significantly, positively correlated with perceived benefits ($r = 0.306$, P -value = 0.002) and perceived cues to action ($r = 0.306$, P -value = 0.002) at a medium level (Table 3). In addition, health behavior to prevent stroke recurrence was significantly, positively correlated with perceived risk of recurrent stroke ($r = 0.220$, P -value = 0.020), perceived severity of recurrent stroke ($r = 0.224$, P -value = 0.018), and perceived self-efficacy to perform the behavior ($r = 0.204$, P -value = 0.028) at a low level. As expected, health behavior was significantly, negatively correlated with perceived barriers of performing health behavior ($r = -0.273$, P -value = 0.005) at a low level.

Discussions and Conclusion

In this present study, health behavior practice to prevent stroke recurrence among the elderly with recurrent stroke was found at a high level. This could be attributable to the early stage of elderly of the participants since the majority of them was in the age of 60 to 69 years old (51.10%). In the early elderly stage, physical strength is relatively reserved to perform daily activities, while cognition, intellect and consciousness are also intact in accordance with the 6CIT

Table 1 Characteristics of the participants (N = 88).

Characteristics	N	%
Age (years)		
60 – 69	45	51.10
70 – 79	24	27.30
80 or older	19	21.60
Mean = 70.86, SD = 8.06, Min = 60, Max = 87		
Gender		
Male	57	64.80
Female	31	35.20
Religion		
Buddhism	87	98.90
Islam	1	1.10
Education		
No formal education	3	3.40
Primary school	48	54.50
Primary high school	6	6.80
Secondary high school	5	5.70
Vocational school	4	4.50
Secondary vocational school	5	5.70
Bachelor's degree	15	17.00
Master degree	2	2.30
Marital status		
Single	4	4.50
Married	65	73.90
Divorced/widowed	19	21.60
Occupation		
Not working	27	30.70
Farmer	12	13.60
Labor	17	19.30
Government and governmental enterprise employee	24	27.30
Private company employee	3	3.40
Living arrangement		
With parents	2	2.30
With spouse	45	51.10
With offspring	39	44.30
With nephew/niece	2	2.30
Healthcare payment scheme		
Civil servant medical benefit scheme	47	53.40
Medical benefit scheme for government enterprise employee	3	3.40
Universal coverage scheme	22	25.00
Out-of-pocket	16	18.20
Personal monthly income (Baht)		
Less than 10,000	29	33.00
10,001 - 15,000	15	17.00
15,001 - 20,000	6	6.80
20,001 - 25,000	4	4.50
25,001 - 30,000	10	11.40
30,000 or higher	24	27.30
Waist circumference (cm.)		
Male, ≤ 90	38	43.10
Female, ≤ 80	9	10.20
Male, > 90	19	21.50
Female, > 80	22	25.00
Body mass in (kg/m²)		
Less than 18.50	2	2.20
18.50 - 22.99	23	26.10
23.00 - 24.99	23	26.10
25.00 - 29.99	21	23.90
30.00 or higher	19	21.60
Mean = 25.38, SD = 4.52, Min = 17, Max = 40		
Family history of stroke		
Yes	23	26.10
No	65	73.90
Co-morbidity		
Yes	86	97.70
No	2	2.30
Number of co-morbidity		
0	2	2.30
1	24	27.30
2	46	52.30
3	16	18.10
Type of comorbidity		
Hypertension	70	81.30
Hyperlipidemia	53	61.60
Diabetes mellitus	35	40.60
Ischemic heart disease	5	5.80
Atrial arrhythmia	3	3.40
Kidney failure	1	1.20
Parkinson's disease	1	1.20
NIH Stroke Scale/Score (NIHSS)		
Normal (0 points)	13	14.70
Mild (1 – 4 points)	63	71.60
Moderate (5 – 15 points)	12	13.60
Brain impairment based on modified Rankin score (m-RS)		
No impairment (0 points)	6	6.80
No severe impairment (1 point)	22	25.00
Mild impairment (2 points)	28	31.80
Moderate (3 points)	26	29.50
Severe (4 points)	6	6.80
Number of recurrent stroke		
2	61	69.30
3	27	30.70

Table 2 Level of health behavior in preventing recurrent stroke (N = 88).

Health behavior level	Possible score (points)	Actual score (points)	N	%
Moderate	36 - 53	45 - 52	23	26.10
High	54 - 72	54 - 71	65	73.90

Mean = 60.19, SD = 6.981 points

Table 3 Correlation between health behavior to prevent recurrent stroke and each of components based on the Health Belief Model (N = 88).

Components based on the Health Belief Model	Pearson's product moment correlation coefficient (r)	P-value	Level of correlation*
Perceived risk of recurrent stroke	0.220	0.020	Low
Perceived severity of recurrent stroke	0.224	0.018	Low
Perceived benefits of performing health behaviors to prevent recurrent stroke	0.306	0.002	Medium
Perceived barriers of performing health behaviors to prevent recurrent stroke	-0.273	0.005	Low
Perceived cues to actions of performing health behaviors to prevent recurrent stroke	0.306	0.002	Medium
Perceived self-efficacy in performing health behaviors to prevent recurrent stroke	0.204	0.028	Low

* Level of correlation based on Pearson's product moment correlation coefficient (r): < 0.30 = low; 0.30 - 0.70 = medium; > 0.70 = high.

score of 0 – 7 points as required for study inclusion.²² Both physical and mental integrities as well as the experience in stroke allowed patients in our study to be able to perform health behavior for the prevention of stroke recurrence.¹⁶

Experience of recurrent stroke could help the patient build up strong health behavior. Since as high as 69.30% of the participants experience second recurrent stroke, they were more likely to receive information from multidisciplinary team on the disease and guidance to appropriate self-care since the disease was stable till the hospital discharge. As a result, the patients and their family members were more well-equipped with knowledge and understanding in self-care to prevent the recurrence. In addition, since the participants had at least primary education to post-graduate level collectively (96.6%), they were ready for learning, seeking information and understanding the information about the illness and self-care for the illness. They were also used their own experience and knowledge for building up self-care behavior for their illness. In addition, since most patients were married and lived with their spouse, offspring, nephews/nieces, and parents, they were more likely to receive help and encouragement for performing behaviors needed for stroke prevention.²⁶ Since half of them were under the civil servant medical benefit scheme (53.40%), their access to health care was less likely to be disrupted, all care, information, and encouragement to

perform health behavior from healthcare team could be more fully available.

Health behavior to prevent stroke recurrence was significantly correlated with each of the six components guided by the Health Belief Model (HBM). The positive association between health behavior and perceived risk of recurrent stroke could be due to certain factors. Based on HBM, perceived risk which is the extent of the likelihood the persons think that they would face the event or the illness could be influenced by various factors. In this study, all participants experienced stroke recurrence for 2 and 3 times and most of them (97.70%) had 1 – 3 co-morbidities including hypertension, diabetes, hyperlipidemia and heart disease. These circumstances could make the patients believe that they were more likely to have more recurrence. The more risk they perceived, the more appropriate health behavior they performed. Our finding was consistent with other studies where perceived risk was positively associated with treatment compliance, preventive behavior, and stroke self-care management among stroke survivors.^{12,17-27}

Perceived severity of stroke recurrence was positively associated with health behavior. Based on HBM, the severity could be various kinds of negative impacts on life caused by the illness including disability, complications, discomfort, and pain, as well as non-health impacts such as loss of job and assets and social status. In this study, participants with mild, moderate and severe impairment/disability altogether accounted for 93.10% of the sample; while 36.30% of them had moderate and severe impairment/disability. These health status of the patients could contribute to the perception that stroke recurrence could cause more disabilities such as more weakness in limbs, less or no ability for self-care, less ability to perform daily activities (showering, dressing, and eating). They could have noticed that all of these negative impacts posed the burden on their family members. In addition, with a stroke recurrence experience of 2 to 3 times, these patients could have had a more comprehension on the severity of stroke recurrence. Once more proper health behaviors were performed, hence a positive association of perceived severity and the behavior. Our finding was consistent with previous studies where perceived severity of stroke recurrence was positively correlated with self-care behavior to prevent stroke, self-care behavior among patients with high risk of stroke, and medication use behavior of patients with hypertension.^{15,17,28}

Perceived benefit of health behavior was positively correlated with health behavior among patients with recurrent stroke. According to the HBM, the patients could have realized the positive effects of performing the health behavior and the negative effects of not performing the behavior. The positive effects included less severe disease, less detrimental effects on health, less economic burden, and more satisfaction and self-worthiness. At clinic visit and hospitalization, the patients were given information about treatment protocol, signs of stroke recurrence, access to urgent care for stroke by physicians and nurses. In addition, advice on health behaviors proper for stroke prevention was also given and this included the control on co-morbidities such as hypertension, hyperlipidemia, and diabetes, by complying with prescribed medications, having adequate rest, managing stress, and controlling weight within normal range. This provision of health promotion with the positive and negative effects the patients had experienced could have enhanced the perception of values and benefits of health behaviors, hence the resulting inclination towards positive health behaviors to prevent stroke recurrence. These patients perceived the benefits of regular follow-up visits, medication compliance, and adequate 6 to 8 hours of rest. A higher level of perceived benefits could have led to a higher level of health behavior; hence a positive association. Our finding was consistent with previous studies where perceived benefit was positively associated with health behavior in stroke patients and with health behavior to prevent stroke in patients with high risk of stroke such as hypertension.^{17,23,29}

Perceived barriers were negatively associated with health behavior in patients with recurrent stroke. Based on HBM, various factors could be perceived as barriers to perform health behavior including the expenses, embarrassment, frustration, and difficult or complicate tasks. Perceived barriers in our study was found to be at a low level which meant that the likelihood for behavior performance should be high. With a high level of performing health behavior found, the negative association between perceived barriers and the behavior thus was low. The more they practiced, the lower they perceived the barriers and the more they valued the behavior. In our study, the participants provided more detail that some behaviors were deemed as obstacles such as exercise, inability to cook, and the travel from home to the hospital; while others as not obstacles for performing health behavior including smoking, alcohol drinking, inadequate rest or sleep,

and stress (data not shown). These perceptions could be due to the information and advice they received while being hospitalized. For example, quitting smoking and alcohol drinking, and avoiding being around people who smoke could help reduce the risk of recurrent stroke. A low level of barriers and its association with the behavior could be attributable to the fact that these participants were in their early stage of elderly (60 – 69 years old) and had mild stroke severity (71.50%), with brain impairment/disability at mild (31.80%) and moderate (29.50%) level. This relatively mild frailty and/or disability could allow these participants to live almost a normal life with no impact on daily activities. In addition, experience with recurrent stroke could also facilitate living adjustment and adopting health behavior proper for stroke. As a result, these participants viewed health behaviors for preventing recurrent stroke as less obstacles or hindrances for performing the behavior. Ultimately, a low level of negative association of perceived barriers with the health behavior among patients with recurrent stroke. Our finding was consistent with previous studies where perceived barrier was negatively correlated with stroke management behavior, health behavior to prevent dementia, and health promoting behavior among patients with hypertension.^{27,30,31}

Perceived cues to action were also positively correlated with health behaviors. Based on HBM, cues that could prompt the individuals for action could be internal and external ones. Among these patients, internal cues could be experiences and warning signs of stroke recurrence. With their second and third stroke recurrence, our participants would have been knowledgeable and well experienced with warning signs and symptoms of stroke including facial palsy, hemiparesis or weakness in limbs on one side of the body, and dysarthria or speech difficulties. They also were well aware of external cues including communication and advice from various sources and helps from individuals such as family members, close friends and/or co-workers. Participants in this study received information, knowledge and advice about self-care for stroke while hospitalized and before discharged which included knowledge about stroke, advice on self-care to prevent recurrence, and all other related information from healthcare personnel. Furthermore, with the policy to decrease mortality rate of stroke of Thailand Ministry of Public Health, communication on health behavior to prevent stroke was carried out through more channels and media. Therefore the information was more readily available and accessible.

Another possible external cue was support, help and care from family members. Most participants lived with their spouse, parents, offsprings and nieces/nephews. These support, help and care could have positive impact on the patients' outlook on life which probably further encouraged and prompted them for the action of performing health behavior. Ultimately, the positive relationship between cues to action and the behavior was evident. Our finding was consistent with previous studies where cues to action were positively correlated with experience of stroke, perceived warning signs of stroke, receiving information and encouragement from healthcare personnel, nurses, family members and communities to regularly perform proper health behaviors.^{17,18,32}

Finally, perceived self-efficacy was positively correlated with health behavior among patients with recurrent stroke. The individuals need to have capability to carry out tasks when facing difficulties. Self-efficacy motivates the individual to carry out the tasks. Our participants were in their early stage of the elderly with relatively intact physical, mental and cognitive status. In addition, with their second or third recurrence of stroke, the participants could have more confidence to deal with the illness. Most of the participants had education at least of primary school level which allowed them to be able to seek and learn new information to overcome their doubt in taking care of themselves. They were also able to use their experience of stroke to improve their self-care. Their confidence to perform health behavior could be enhanced by the support, help and care from their spouse, parents, and offsprings. As a result, their perceived self-efficacy was positively associated with their health behavior. Our finding was consistent with previous studies where perceived self-efficacy was positively related with self-care ability in daily activities in stroke patients, and health promoting behavior among patients with hypertension.^{20,30}

This study had certain limitations. Since most of the participants were in their early stage of elderly (51.10% in 60 – 69 years old), generalizability to older individuals could be limited. Since this was cross-sectional study, sustainability of the adopted health behavior could not be known.

Based on our study findings, interventions to optimize perceived risk and severity of recurrent stroke, and perceived benefits, cues to action, barriers and self-efficacy of performing health behavior should be created and applied on patients with recurrent stroke to improve their health behavior to prevent the recurrence. The development described above

should be promoted by the healthcare administrators at all levels. In nursing education, relationships between health behavior and factors based on the Health Belief Model should be taught and interventions should also be created and tested.

For suture research, more studies with larger sample size to account for those with different number of stroke recurrence should be conducted to prove if any discrepancy among patients with difference in recurrence number. More patients with older age should also be studied so that the application on those older than participants in our study could be done. Prospective studies with at least six months to one year follow-up should be conducted to examine the sustainability of the adopted health behavior.

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References

1. World Stroke Organization (WSO). Campaign advocacy brochures 2017. (Accessed on July 15, 2019, at http://www.worldstrokecampaign.org/images/wsd2017/brochures2017/WSD_brochure_FINAL_sponsor_.pdf)
2. Ezenwa C, Gutierrez J. (2015). Secondary stroke prevention: challenges and solutions. *Vasc Health Risk Manag* 2015;11:437-450. (doi: 10.2147/VHRM.S63791)
3. Mendis S. Stroke disability and rehabilitation of stroke: World Health Organization perspective. *Inter J Stroke* 2013;8(1):3-4.
4. Slark J. Adherence to secondary prevention strategies after stroke: A review of the literature. *Br J Neurosci Nurs* 2010;6(6):282-286.
5. Benjamin EJ, Blaha MJ, Chiuve SE, et al. Heart disease and stroke statistics-2017 update: a report from the American Heart Association. *Circulation* 2017;135(10):e146-e603.
6. de la Camara AG, Arche JFV, Vivas PF, et al. Recurrence after a first-ever ischemic stroke development of a clinical prediction rule. *Res Neurol Inter J* 2013;2013:1-13. (doi: 0.5171/2013.264063)
7. Tiamkao S. Recurrent ischemic stroke in Srinagarind Hospital. *North-Eastern Thai J Neurosci* 2011;6(3):31-38. (in Thai)
8. Goldfinger JZ, Kronish IM, Fei K, et al. Peer education for secondary stroke prevention in inner-city minorities: Design and methods of the Prevent Recurrence of All Inner-city Strokes through Education randomized controlled trial. *Contemp Clin Trials* 2012;33(5):1065-1073.
9. Moerch-Rasmussen A, Nacu A, Waje-Andreassen U, Thomassen L, Naess H. Recurrent ischemic stroke is associated with the burden of risk factors. *Acta Neurol Scand* 2016;133(4):289-294.
10. Strecher VJ, Rosenstock IM. The health belief model. In: Glanz K, Lewis FM, Rimer BK (eds.). *Health behavior and health education: Theory, research, and practice*. San Francisco. Jossey-Bass, 1997: pp.31-43.
11. Kernan WN, Ovbiagele B, Black HR, et al. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline

- for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 2014;45(7):2160-2236.
12. O'carroll R, Whittaker J, Hamilton B, Johnston M, Sudlow C, Dennis M. Predictors of adherence to secondary preventive medication in stroke patients. *Ann Behav Med* 2010;41(3):383-390.
 13. Suanprasert N, Tantirithisak T. Impact of risk factors for recurrent ischemic stroke in Prasat Neurological Institute. *J Med Assoc Thailand* 2011;94(9):1035-1043.
 14. Hutakorn S. Self-care behaviors in the prevention of cerebrovascular disease of prisoners in medical correctional institution. *Kasetsart Educ Rev* 2006;22(3):105-113. (in Thai)
 15. Edwards MM. Beliefs about hypertension among people with uncontrolled hypertension. Master of Public Health thesis. Seattle. University of Washington, 2015.
 16. Joychoo N, Pinyopasakul W, Chareonkitkarn V. Relationships among age, perceived benefits of health behaviors, perceived barriers of health behaviors and health behaviors in patients with ischemic stroke. *Rama Nurs J* 2014;20(2):236-248. (in Thai)
 17. Tijayoung S. The factors influencing preventive behaviors amongst risk group stroke patients. Master of Nursing Science thesis. Nakhonpathom. Christian University, 2014. (in Thai)
 18. Chambers JA, O'Carroll RE, Hamilton B, et al. Adherence to medication in stroke survivors: a qualitative comparison of low and high adherers. *Br J Health Psychol* 2011;16(3):592- 609.
 19. Thaivon T. The relation between self-efficacy and activities of daily living performance of stroke clients admitted in Thammasat University Hospital. *TUH J Online* 2016;1(1):84-96. (in Thai)
 20. Thimayom P, Chuawanlee W, Jinng P. The effect of self-efficacy program on self-care behavior of hemiparesis patients. *J Behav Sci Dev* 2012;4(1):63-73. (in Thai)
 21. Polit DF, Hungler BP. Nursing research: Principles and method. 3rd ed. Philadelphia. Lippincott, 1987.
 22. Udonsart S, Pornchai Jullamate P, Piphatvanitcha N. Male caregiver burden of elderly with stroke and its related factors. RTUNC 2018, the 3rd National Conference May 25, 2018. Ubonratchathani, Thailand. Ubonratchathani University, May 25, 2018: pp.4451-461. (in Thai)
 23. Polit DF, Beck CT. Nursing research: Principles and methods. Lippincott Williams & Wilkins, 2004.
 24. Srisatidnarakul B. Research methodology in nursing science. 5th ed. Bangkok. You and I Intermedia, 2010. (in Thai)
 25. Baramee C. Statistics for health science research and data analysis with SPSS program. Chonburi. Srisilp Printing, 2012. (in Thai)
 26. Bualeang A. Factors related to quality of life among older adults recovering from stroke. Master of Science thesis (Public Health). Bangkok. Graduate School, Mahidol University, 2010. (in Thai)
 27. Chiangtong K. Relationships between the Health Belief Model, warning signs perception and management of stroke behavior in the risk group of stroke, Doi Saket District, Chiang Mai Province. Independent study. Master of Public Health. Chiang Mai. Graduate School, Chiang Mai University, 2011. (in Thai)
 28. Jangwang S, Pittayapinune T, Chutipattana N. Factors related to self-care behavior for prevention of diabetes mellitus and hypertension among population groups at risk. *Southern Coll Network J Nurs Pub Health* 2016;3(1):110-118. (in Thai)
 29. Nepal HK. Factor related to health promoting behavior among hypertensive patients in Bhutan. Master of Nursing Science thesis. Chonburi. Faculty of Nursing, Burapha University, 2015).
 30. Ubolwong K, Piphatvanitcha N. The relationship between health belief and dementia preventive behavior in older adults with hypertension. *J Boromarajonani Coll Nurs Bangkok* 2017;33(2):14-24.
 31. Robinson T. Hypertension beliefs and behaviors of African Americans in selected Cleveland public housing. 2012. Electronic Thesis or Dissertation. (Accessed on July 15, 2019, at <https://etd.ohiolink.edu/>)
 32. Jiang SS, Shen LP, Ruan HF, Li L, Gao LL, Wan LH. Family function and health behaviours of stroke survivors. *Inter J Nurs Sci* 2014;1(3): 272-276.