



Relationships between illness perception, functional status, social support, and self-care behavior among Thai people at high risk of stroke: A cross-sectional study

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Abstract

Background: People at high risk of stroke reported having difficulty performing self-care behavior. Although the literature has identified various factors related to self-care behavior in this population; however, there is a lack of studies to conclude the associated antecedents of self-care behavior, particularly in Thailand.

Objective: This study aimed to examine the relationships between illness perception, functional status, social support, and self-care behavior among people at high risk of stroke.

Methods: A correlational cross-sectional study design was used. One hundred and seventy people at high risk of stroke were selected from ten health-promoting hospitals in the Northeast region of Thailand using multi-stage sampling. Data were gathered using self-report questionnaires, including the brief illness perception questionnaire, functional status scale, multidimensional scale of perceived social support, and self-care behavior questionnaire, from November 2021 to February 2022. Data were analyzed using mean, standard deviation, and Pearson's product-moment correlation.

Results: One hundred percent of the participants completed the questionnaires. The participants had a moderate level of self-care behavior ($M = 64.54$, $SD = 7.46$). Social support and functional status had medium positive significant correlations with self-care behavior among people at high risk of stroke ($r = 0.460$ and $r = 0.304$, $p < 0.01$), respectively. In contrast, illness perception had a small negative significant correlation with self-care behavior among people at high risk of stroke ($r = -0.179$, $p < 0.05$).

Conclusion: Social support, functional status, and illness perception are essential factors of self-care behavior among people at high risk of stroke. The findings shed light that nurses and other healthcare professionals should promote self-care behavior in these people by enhancing them to maintain proper functioning, positive illness-related perception, and family members' involvement. However, further study is needed to determine a causal relationship between these factors with self-care behavior.

Keywords

functional status; illness perception; people at high risk of stroke; social support; self-care behavior; Thailand

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Background

Globally, stroke is one of the serious chronic diseases that cause significant health burdens (Bhagavathy et al., 2022), and it is currently the second cause of death (Feigin et al., 2021). In 2021, the stroke incidence was 12.20 million cases (Feigin et al., 2021), while in Asian countries, the prevalence of stroke is also high; Thailand reported the highest stroke prevalence that occurred in up to 75 percent of adults and older adults (Chantkran et al., 2021). However, stroke consequently impacts many aspects of the health system, including individuals with stroke, family members, and health services (Yang et al., 2021).

People at high risk of stroke are an individual who suffers from many risk factors. In addition, various modifiable risk factors force individuals to be at a high risk of stroke. For example, people diagnosed with chronic diseases such as hypertension, dyslipidemia, heart disease, or diabetes mellitus have an increased risk for stroke (Feigin et al., 2021; Setyopranoto et al., 2019). Furthermore, lifestyle factors, including unhealthy diet consumption, physical inactivity, being overweight, and smoking cessation, can increase the prevalence rate of stroke (Harshfield et al., 2021). Thus, to prevent this disease, enhancing self-care behavior among these people at risk of stroke is recommended (Riegel et al., 2017). However, information regarding self-care behavior and its related factors is limited.

Self-care behavior, for people at high risk of stroke, is defined as performance that individuals start and perform on their own to maintain well-being, such as consuming healthy food, taking prescribed medication, doing exercise, reducing stress, and reducing tobacco and alcohol consumption. These behaviors might help an individual to be physically and mentally free from illness and live happily in society (Riegel et al., 2017). Unfortunately, existing literature found that people at risk of stroke had difficulty maintaining self-care behavior (Riandini et al., 2018). For example, hypertensive patients consumed a high-salt diet and performed less exercise (Wiriyatanakorn et al., 2021). In addition, patients with diabetes mellitus had a low level of taking medication based on the prescription by the physician (Jannoo & Khan, 2019). Consequently, inadequate self-care behavior significantly reduces the quality of life and increases the cost of treatment (Bairami et al., 2017).

Regarding the theory of self-care, Orem (2001) believed that individual initiates to perform health activities to maintain their well-being. There are several factors influencing individuals' self-care behavior. Some studies have reported the potential facilitating and impediment factors correlated with self-care behavior in patients living with chronic disease. For the facilitating factors, Park and Kim (2019) noted that social support was associated with self-care behavior among patients with hypertension. In addition, functional status was correlated with self-care behavior among patients with diabetes (Riandini et al., 2018). For the impediment factors, a previous study found that a high level of negative illness perception was correlated to poor self-care behavior to control glycemic levels (Ngetich et al., 2022). These postulate that people at high risk of stroke with better self-care behavior might be supported by good social support, functional status, and a positive perception of their illness.

However, to our knowledge, studies examining these factors in people at high risk of stroke are limited, especially in Thailand. Furthermore, no study examined these variables using the theory of self-care as the theoretical framework. These barriers might impede nurses and other healthcare providers from understanding and developing specific nursing interventions that support self-care behavior among this population.

Therefore, the objective of this study was to examine the relationships between illness perception, functional status, social support, and self-care behavior among Thai people at high risk of stroke. The findings from this study can be utilized as empirical evidence for healthcare providers, including nurses, to support the guideline of enhancing self-care behavior among people at high risk of stroke. Furthermore, understanding the relationships among these variables will enhance the knowledge for developing an effective nursing intervention to maintain and improve self-care behavior for people at high risk of stroke.

Methods

Study Design

A correlational cross-sectional design was employed in this study.

Samples/Participants

The inclusion criteria of the samples/participants were those: (a) having been diagnosed with diabetes mellitus, hypertension, hyperlipidemia, or heart diseases, (b) being a high risk of stroke screening by the Thai Cardio-Vascular (CV) Risk score (Division of Non-Communicable Disease, 2015) which scored $\geq 20\%$, (c) aged 30 and older, (d) understanding the Thai language, and (e) were able and willing to provide informed consent. In addition, participants with a history of stroke were excluded from this study.

To calculate the sample size of this study, the power analysis technique recommended by Cohen (1988) was utilized through the G*Power version 3.19.2 (Faul et al., 2007). In addition, data from a previous study were used to calculate the sample size, including the statistically significant level as 0.05, the power of the test as 0.25, and the effect size as 0.25 (Saleema et al., 2016). Therefore, the minimum sample size required for correlational analysis was 164. In addition, to consider a 10% attrition rate, 170 participants were needed for the study.

Generally, people at risk of stroke living in a community across Thailand were screened using the Thai CV Risk score (Division of Non-Communicable Disease, 2015). Therefore, selecting one province would provide samples from a broad geographical region of Thailand. In this study, multi-stage sampling was used, which can be described as follow:

- 1) One region was randomly selected from the six-regions system. As a result, the Northeast region of Thailand was chosen.
- 2) Of the 20 provinces in the Northeast region, one province was randomly selected, which was Nakhon Ratchasima.
- 3) Thirty-two subdistricts remain in Nakhon Ratchasima province. Ten subdistricts were randomly selected.
- 4) One health-promoting hospital was randomly selected from each selected subdistrict. Thus, ten health-promoting hospitals were chosen to collect the data.

Due to each health-promoting hospital having a different number of samples, the probability proportional to the size sampling method was employed (Lemeshow et al., 1990). This method helped the researchers to recruit participants in each setting. Each participant was selected in accordance with the inclusion criteria.

Instruments

Six instruments were used in this study:

- 1) Demographic data form

The demographic information form was developed by researchers. This form comprised two parts: the first part was a self-administered questionnaire concerned with personal information, including gender, age, monthly income, marital status, education level, and occupation. The second part of this form was investigated by the researchers to assess diagnosis, duration of illness, and body mass index.

- 2) The Thai Cardiovascular (CV) Risk score

This instrument was developed by the Division of Non-Communicable Disease (2015) and used for stroke risk screening. It consists of eight items: age, gender, waistline, height, smoking status, diabetes mellitus, systolic blood pressure, and cholesterol. The levels of risk of stroke were identified as low (score $< 10\%$), moderate (score $10\% - < 20\%$), high (score $20\% - < 30\%$), very high (score $30\% - < 40\%$), and

dangerous (score $\geq 40\%$). Its validation was found in a study by Jinatongthai et al. (2021). In our study, the reliability of this instrument was tested, and it found that Cronbach's alpha coefficient was 1.00.

3) Brief illness perception questionnaire

This instrument was developed by Broadbent et al. (2006). The Thai language version of Thepphawan et al. (2011) was used in this study. Each item represents one component of this instrument, including 1) timeline, 2) personal control, 3) treatment control, 4) consequences, 5) concerns, 6) identity, 7) illness comprehension, and 8) emotions. A Likert scale (0 to 10) was used, and the total score was calculated by summing all eight items. Possible scores ranged from 0 to 100. The higher the illness perception score, the more likely the individual viewed their illness as a threatening event and impacted their health. The instrument's reliability has been tested in a previous study (Maninet et al., 2021), with a Cronbach's alpha value of 0.93. In the current study, Cronbach's alpha coefficient was also examined, with a value of 0.84.

4) Functional status scale

The researchers developed this instrument to investigate the ability of each person to perform usual activities regarding physical activities, working and role activities, and psychological activities. This scale consists of 20 items using a Likert scale ranging from 1 (none of the time) to 4 (all of the time). The possible total scores on the scale ranged from 0-80. The functional status levels were divided into three categories, including low (score = 0-26), moderate (score = 27-54), and high (score = 55-80). For the validity testing, Exploratory Factor Analysis (EFA) was conducted with a Promax rotation using Statistical Package for the Social Science (SPSS) for Windows version 22. One hundred respondents with similar characteristics to the current study's samples were invited to answer the questionnaire. As a result, this 20-item structure was found to explain 62.56 percent of the variance in the pattern of relationships among the items. For the reliability testing, Cronbach's alpha coefficient of this instrument was 0.76.

5) Multidimensional scale of perceived social support

This instrument was developed by Zimet et al. (1990) and is available in the Thai version translated by Wongpakaran et al. (2011). This instrument has three components, including family members (3 items), friends (3 items), and significant others (3 items). These 12 items were rated on a 7-point scale ranging from 1 (totally disagree) to 7 (totally agree). The possible total scores on the scale ranged from 12-84. For the interpretation of the total score, the higher scores on social support indicated a greater perception that individuals have received support from others. A previous study reported good reliability of this instrument (Maninet et al., 2021). In the current study, Cronbach's alpha coefficient was 0.90.

6) Self-care behavior scale

This instrument was developed by the researchers to assess individual activities regarding stroke prevention. It consists of 25 items which separate into five dimensions, including performing exercise, consuming alcohol and tobacco, consuming healthy food, declining stress, and taking medications based on prescription. A Likert scale was used from 1 to 4. The possible scores ranged from 25-100. The levels of self-care behavior are divided into three categories:

low (score = 25-50), moderate (score = 51-75), and high (score = 76-100). EFA was conducted to measure construct validity with a Promax rotation using SPSS version 22 for Windows. One hundred respondents who had similar characteristics to the samples in this study were included. The results showed that this 25-item structure was found to explain 68.72 percent of the variance in the pattern of relationships among the items. In addition, Cronbach's alpha coefficient was used to measure reliability, with a value of 0.84.

Data Collection

Two research assistants (nurses in the study setting) who had an experience in research data collection were invited. They were trained in the data collection techniques and explained about the study design, objective of the study, and research questionnaire. It was ensured they all understood before gathering data. Prior to the main data collection, field testing was conducted to examine the psychometric properties of the instruments. After the instruments were considered valid and reliable, the data collection for the main study was done from November 2021 to February 2022. A letter asking permission to collect data was then sent to the directors of each selected setting. The researchers asked for cooperation from the directors of each health-promoting hospital to choose the participants who met the inclusion criteria. The questionnaires were read to each participant, and the researchers gave appropriate explanations. The participants answered the questionnaires in approximately 30 minutes. Next, the researchers examined the questionnaire to ensure the completeness of the data.

Data Analysis

The data were analyzed using the SPSS for Windows version 22. The distribution plots for each variable were investigated prior to the data analysis. Examination of the obtained normal probability plots indicated that the distribution met the normality assumption for all studied variables. To describe the characteristics of the participants, percentages, means, and standard deviations were used. Frequencies and percentages were utilized to analyze the categorical data. Pearson's product-moment correlations were employed to investigate relationships between the independent and dependent variables of the study. A *p*-value was set at <0.05 , considered statistically significant. The strength of the correlation coefficient was divided into small ($r = 0.10 - 0.29$), medium ($r = 0.30 - 0.49$), and large ($r = 0.50 - 1.00$) (Cohen, 1988).

Ethical Considerations

This study was approved by the committee of human research from the Nakhon Ratchasima public health provincial office (NRPH 036) on 31 May 2021. This study is a part of the research project "Factors related to self-care behavior among people at risk of stroke in Nakhon Ratchasima province." The first phase was done from July to October 2021 among participants at low and moderate risk of stroke, and it has been published in a local journal in the Thai language (Desaravinid, 2022). This current study used another dataset of participants at high risk of stroke with different independent variables collected from November 2021 to February 2022. The reason for collecting data in two separate phases was that it took more time to assess people at high risk of stroke, and it was

according to the appointment with the medical doctors. Therefore, it is ensured no overlapping of data and no study duplication.

In this study, the researchers approached the selected participant individually once the potential participants were identified. The participants were invited to interview in a prepared and quiet room at the health-promoting hospital. Then researchers introduced themselves, established rapport, explained the objectives, what contributions the subject would make, and how the confidentiality or anonymity of information was given to the participants. After the participants had agreed to participate in the study, they were asked to sign a consent form. One hundred percent of the participants gave formal consent to be a part of this study.

Results

Characteristics of the Participants

The findings revealed that over half of the participants were female (55.30%). The mean age of the participants was 58.56 years old (SD = 9.24), ranging from 35 - 86 years old. The average duration of illness was 8.16 (SD = 5.80) years, ranging from 1 to 25 years. The average systolic blood pressure was 123.35 mmHg (SD = 17.60), while the average diastolic blood pressure was 73.21 mmHg (SD = 9.92). The average body mass index was 18.74 kg/m² (SD = 2.66) and ranged from 13.75 to 27.27 kg/m². **Table 1** illustrates the information on the demographic characteristics of the participants.

Table 1 Characteristics of the participants (N = 170)

Variables	n	%
Marital status		
Married	135	79.40
Single	20	11.80
Divorced	15	8.80
Educational level		
Primary school	130	76.50
High school	26	15.20
Uneducated	12	7.10
Bachelor's degree or above	2	1.20
Career		
Agriculturist	71	41.80
Company employee	45	26.40
Owned business	25	14.70
Unemployed	25	14.70
Government officer	4	2.40
Family member with a history of stroke		
No	162	95.30
Yes	8	4.70
History of tobacco use		
No	142	83.50
Yes	28	16.50
Diagnosis		
Diabetes mellitus	119	70.00
Hypertension + Diabetes mellitus	29	17.10
Hypertension	15	8.80
Heart diseases	4	2.40
Hyperlipidemia	3	1.70

Descriptive Statistics of the Studied Variables

The findings revealed that the average score of illness perception was 54.31 (SD = 9.78), which indicated that the

participants had a high level of threatening view regarding their illness. For functional status, the mean score was 54.87 (SD = 10.46), which presented that the participants had a moderate level of functional status. In addition, the participants in this study perceived that they had a moderate level of social support from others (M = 74.12, SD = 8.28). Finally, the average score for self-care behavior was 64.54 (SD = 7.46), representing that the participants had a moderate level of self-care behavior. **Table 2** presents the summary findings of the major studied variables.

Table 2 Descriptive statistics for the studied variables (N = 170)

Variables	Min	Max	M	SD	Sk	Ku
Illness perception	24	76	54.31	9.78	-0.35	0.18
Functional status	23	79	54.87	10.46	-0.15	0.06
Social support	36	84	74.12	8.28	-0.26	0.73
Self-care behavior	36	86	64.54	7.46	-0.82	0.37

Min = Minimum | Max = Maximum | M = Mean | SD = Standard deviation | Sk = Skewness | Ku = Kurtosis

Relationships between Studied Variables and Self-care Behavior

The relationships between the studied variables are shown in **Table 3**. This study found that social support and functional status had medium positive significant correlations with self-care behavior among people at high risk of stroke ($r = 0.460$ and $r = 0.304$, $p < 0.01$), respectively. In contrast, illness perception had a small negative significant correlation to self-care behavior among people at high risk of stroke ($r = -0.179$, $p < 0.05$).

Table 3 Relationships between studied variables and self-care behavior (N = 170)

Variables	Illness perception	Functional status	Social support	Self-care behavior
Illness perception	1			
Functional status	-0.218**	1		
Social support	-0.146	0.032	1	
Self-care behavior	-0.179*	0.304**	0.460**	1

*Significant $p < 0.05$ | **Significant $p < 0.01$

Discussion

According to our knowledge, this is the first study to examine the factors related to self-care behavior among Thai people at high risk of stroke, which can be considered the strength of the study.

This study found that social support was positively associated with self-care behavior. This indicates that the participants who received support from social around would perform good self-care to prevent stroke. This might be because the participants in this study perceived that family members, healthcare providers, and other significant people could support them in maintaining proper self-care behavior. In addition, most of the participants were married (79.40%). This might be relevant to Thai cultural beliefs and values that

family members, particularly couples, are the key to looking after any person suffering from a health problem. Thus, people may feel responsible for performing self-care. This is, however, similar to the finding of one study conducted in Thailand by [Ruangchaitaweesuk et al. \(2021\)](#), indicating that the more people at risk of stroke receive support from society, the better their prevention behavior.

Furthermore, like other studies conducted overseas, social support was associated with self-care behavior among patients with chronic illnesses such as diabetes, hypertension, heart disease, and hyperlipidemia ([Jo et al., 2020](#); [Karimy et al., 2018](#)). Besides, regarding the theory of self-care ([Orem, 2001](#)), this study also supports that the perception of having support from society facilitates a person to look after themselves and consequently have better self-care behavior to prevent stroke. Therefore, enhancing social support might help a person at high risk of stroke in terms of performing better self-care behavior.

Functional status was another factor that found a positive correlation with self-care behavior among people at high risk of stroke. It indicates that the participants who could perform the usual activities independently might have a better intention to maintain self-care. Interestingly, the highest age of the participants in this study was 86 years old. This old age might also impact the level of self-care behavior of the participants as well as the individual's functional status ([Zhou et al., 2022](#)). Therefore, this age group should be specially recognized when promoting self-care behavior. The result of this study is, however, relevant to a previous study indicating that patients with chronic disease who have moderate to high functional status reported increasing their interest in self-care, such as exercising and preparing healthy food ([Riandini et al., 2018](#)). In addition, the finding in this study supports the theory of self-care that individuals who can perform the physical, role, and emotional functioning would be able to continue the requirements for self-care ([Orem, 2001](#)).

Our findings also show that illness perception is an impediment factor related to self-care behavior. This finding suggests that a higher negative perception of being at increased risk of stroke is associated with poorer self-care behavior. It can be explained by the fact that the participants in this study have been living with their chronic disease for many years, with an average of 8.16 years. This long duration of illness might force them to face a high level of perceived illness threat and perceive it as an additional burden. Similarly, a previous study conducted by [Oconnell et al. \(2020\)](#) reported that patients with chronic disease believe that their illness is the major cause of stroke. In addition, [Ngetich et al. \(2022\)](#) also found that patients with diabetes with a high score of illness perception reported poor self-care behavior to control glycemic levels. Also, patients with type 2 diabetes believed that being diagnosed with this disease affected their life and increased their level of stress ([Ngetich et al., 2022](#)). Thus, enhancing proper perception regarding illness and health problems would increase the individual's self-care behavior.

On the other hand, one study conducted in Indonesia also used the brief-illness perception questionnaire to assess illness perception among patients with uncontrolled hypertension ([Pahria et al., 2022](#)). They noted that illness perception was positively correlated with self-care behavior. This reflects that various cultural and socioenvironmental

aspects may affect the patients' illness perception, including different diagnosis types and complications. Therefore, a positive perception of the disease might inspire people at high risk of stroke to make the right decisions to perform proper self-care behavior.

Limitations of the Study

This study has several limitations. First, these findings represent the results from one province in Thailand. Therefore, our results were limited and could not be generalized to the entire population among people at high risk of stroke in Thailand. Second, the selected factors were based on the facilitator and impediment factors which could not explain the entire conceptual framework of the self-care theory. Finally, most of the participants were diagnosed with diabetes mellitus. Thus, other health conditions included in this study, such as hypertension, heart disease, and hyperlipidemia, might not be well represented.

Implications for Nursing Practice and Recommendations for Future Research

For nursing practice, social support has a positive relationship with self-care behavior among people at high risk of stroke. This implies that nurses should question individuals at each appointment regarding the availability of spouses, family members, friends, and significant others. Importantly, families should be allowed to involve in the interventions to support this population and thereby increase self-care behavior actively. Nurses should also assess the individual's ability to maintain functional status alone. Patients should receive the instruction and strategies to perform usual activities in daily life, working, and psychological functioning to enhance self-care properly. Additionally, individuals with a negative perception regarding their illness should be given information about their disease, treatment options, symptoms, emotional coping strategies, and strategies to look after his/herself at home.

Future research can be recommended to explore the predicting factors of self-care behavior among people at high risk of stroke, underpinning the theory of self-care. However, due to using a cross-sectional design in our study, the ability to infer causality was limited. Therefore, testing the causal relationship among these variables is recommended. In addition, interventions that enhance self-care behavior among people at high risk of stroke should be tailored. The components of the intervention should include enhancing family involvement, positive perception of disease, and the individual's ability to maintain functional status.

Conclusion

Self-care behavior is vital to maintain well-being among people at high risk of stroke. This study found that the participants had a moderate level of self-care behavior. The factors correlated to self-care behavior among this population were social support, functional status, and illness perception. This study highlights that healthcare providers, including nurses, should assess and encourage people at high risk of stroke to maintain their self-care behavior. To achieve the goal, family members should be involved, and patients should have well functional status. In addition, the perception of disease should be informed to enhance the understanding of their disease and

motivate them to maintain sustainable self-care behavior. However, a causal relationship among these factors should be conducted in future research.

Declaration of Conflicting Interest

The authors declare there is no conflict of interest.

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Authors' Contributions

The first author conceptualized the research design, reviewed the literature, performed data analysis, drafted the article, and was involved in writing the manuscript. The second author performed the data collection and was involved in writing the manuscript. All authors were accountable for each study step and approved the submitted and published versions.

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Data Availability

The datasets used for analysis are available from the corresponding author upon reasonable request.

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