THE INFLUENCE OF BASIC CONDITIONING FACTORS AND SELF-CARE AGENCY ON SELF-CARE BEHAVIORS IN THAIS WITH HYPERTENSION

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ABSTRACT

Individuals suffering from uncontrolled hypertension have a high risk for heart diseases, stroke, and renal diseases. Self-care behavior is an important process for hypertension control. This study aimed to explore the patterns of relationship among basic conditioning factors, self-care agencies, and self-care behaviors regarding hypertension control. The Self-Care Deficit Nursing Theory (SCDNT) was used as a conceptual framework in this study. The sample consisted of a total of 402 persons with hypertension from three regional hospitals in the central part of Thailand. The Demographic and Health Information questionnaire, the Chronic Illness Resources Survey questionnaire, the Revised Illness Perceptions questionnaire, the Knowledge of Self-Care Demands questionnaire, and the Self-Care Behavior questionnaire were used for data collection. The data were analyzed using Structural Equation Modeling.

The results showed that the modified hypothesized model of self-care behaviors for hypertension controls were suitable to be used with the empirical data. The model was able to explain the 49% variance in the self-care behaviors regarding hypertension control. Patient-provider communication was the strongest positive direct effect on self-care behaviors for hypertension control. Patient provider communication was the positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perception about hypertension.

This finding supported the SCDNT regarding the influence of basic conditioning factors on self-care agency and provided evidence for the development a nursing intervention program to promote patient-provider communication for helping individuals with hypertension to increase self-care behaviors regarding hypertension control.

KEY WORDS: KNOWLEDGE / PERCEPTION / PATIENT-PROVIDER COMMUNICATION / SELF-CARE BEHAVIORS / HYPERTENSION

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อิทธิพลของปัจจัยพื้นฐานและความสามารถในการดูแลตนเองต่อพฤติกรรมการดูแลตนเองในคนไทยที่เป็นความดันโลหิตสูง

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บทคัดย่อ

ผู้ที่เป็นความดันโลหิตสูงและไม่สามารถควบคุมโรคได้มีความเสี่ยงต่อการเกิดโรคหัวใจ โรคหลอดเลือดสมอง และโรคไต พฤติกรรมการดูแลตนเองมีความสำคัญในการควบคุมความดันโลหิตสูง การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาแบบแผนความสัมพันธ์ของปัจจัยพื้นฐานและความสามารถในการดูแลตนเองต่อพฤติกรรมการดูแลตนเองเพื่อควบคุมความดันโลหิตสูง โดยใช้ทฤษฎีความพร่องในการดูแลตนเองของโอเร็ม เป็นกรอบแนวคิดในการศึกษา กลุ่มตัวอย่างเป็นผู้ที่ได้รับการวินิจฉัยว่าเป็นความดันโลหิตสูงจำนวน 402 ราย จากโรงพยาบาลศูนย์ 3 แห่ง ในภาคกลางของประเทศไทย การเก็บรวบรวมข้อมูลโดยใช้แบบสอบถามข้อมูลส่วนบุคคล แบบสำรวจแหล่งสนับสนุนของผู้ป่วย แบบสอบถามการรับรู้เกี่ยวกับการเจ็บป่วย แบบสอบถามความรู้เกี่ยวกับความต้องการการดูแลตนเอง และแบบสอบถามพฤติกรรมการดูแลตนเอง วิเคราะห์แบบแผนความสัมพันธ์โดยใช้แบบจำลองสมการเชิงโครงสร้าง

ผลการวิจัยพบว่าโมเดลพฤติกรรมการดูแลตนเองเพื่อควบคุมความดันโลหิตสูงที่ได้รับการปรับปรุงมีความสอดคล้องกับข้อมูลเชิงประจักษ์ โมเดลสามารถทำนายความแปรปรวนของพฤติกรรมการดูแลตนเองได้ ร้อยละ 49 การติดต่อสื่อสารระหว่างผู้ใช้บริการและทีมสุขภาพเป็นปัจจัยที่มีอิทธิพลทางตรงด้านบวกต่อพฤติกรรมการดูแลตนเอง การติดต่อสื่อสารระหว่างผู้ใช้บริการและทีมสุขภาพมีอิทธิพลทางอ้อมต่อพฤติกรรมการดูแลตนเองโดยผ่านความรู้เกี่ยวกับโรคความดันโลหิตสูง ความรู้เกี่ยวกับความต้องการการดูแลตนเอง และการรับรู้เกี่ยวกับโรคความดันโลหิตสูง

ผลการศึกษาครั้งนี้สนับสนุนทฤษฎีความพร่องในการดูแลตนเองของโอเร็มเกี่ยวกับปัจจัยพื้นฐานมีอิทธิพลต่อความสามารถในการดูแลตนเอง และเป็นหลักฐานเชิงประจักษ์ในการพัฒนาโปรแกรมการส่งเสริมการสื่อสารระหว่างบุคลากรทีมสุขภาพกับผู้ป่วยเพื่อช่วยให้ผู้ที่เป็นความดันโลหิตสูงมีพฤติกรรมการดูแลตนเองเพื่อควบคุมความดันโลหิตดีขึ้น

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CHAPTER I
INTRODUCTION

1.1 Background and Significant of the Study

Hypertension is an important health problem in many countries around the world. As defined by the National Committee on Hypertension, hypertension is a blood pressure level higher than 140/90 mmHg (Chobanian et al., 2003). More than ninety percent of people diagnosed with hypertension are suffering from essential hypertension. Essential hypertension, defined as not having any identifiable causes for the blood pressure increase, but where several factors were responsible for its development and progression. Approximately 17 million persons died from cardiovascular diseases (WHO, 2013) and 9.4 million of these deaths was a consequence of hypertension complications (Lim et al., 2012). The overall prevalence of hypertension in the world's countries was 40% (WHO, 2013), with 28.9% of the people in the United States (Cutler et al., 2008) and 22% in Thailand (MOPH, 2011) suffering from this deadly condition. Hypertension is a potential risk factor in several chronic diseases, particularly heart disease, cerebrovascular disease, and renal disease (Lloyd-Jones, & Levy, 2007). The cost of healthcare for hypertensive persons who suffer from cardiovascular complications is seven times higher than those without cardiovascular complications (Elliott, 2003). Moreover, effective control of hypertension decreases the incidence of stroke, heart failure, and myocardial infarction for between a quarter to a half of those affected with the condition, as well as reducing the total deaths by one-fifth (Neal, MacMahon, & Chapman, 2000). Although the goal is to maintain a blood pressure below 140/90 mmHg, only one-third of hypertensive persons in the western countries (Wolf-Maier et al., 2004), and only one-seventh of Thai males, and one-fourth of Thai-females (MOPH, 2011) were able to keep their blood pressure at or below that level.

Studies done on hypertensive people identified two of the major causes of uncontrolled hypertension were inconsistency in taking antihypertension medications

and practicing unhealthy lifestyle behaviors. Even though several interventions were effective in the increase of self-care behaviors for hypertension control, uncontrolled hypertension remained a significant problem for hypertensive people. On further reflection, it was noted that some self-care behaviors were affected by complex relationships not addressed in the interventions. Knowledge about how potential factors work to influence self-care behaviors is essential in the design of an effective intervention to promote self-care behaviors for hypertension control.

Medication adherence and lifestyle modifications are two ways to treat hypertension (Chobanian et al., 2003). To control hypertension, hypertensive people must practice self-care. Self-care behaviors are essential for hypertension control because 1) people must take responsibility for their own health, 2) hypertension is a chronic condition which requires a long course of outpatient treatment, and 3) hypertension related to a person's behavior can be managed by performing self-care behaviors to control the modifiable risk factors.

Orem, who provides a concept of self-care, defines self-care as "the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being" Orem (1991, p.117). Self-care is one among six major concepts of Orem's self-care deficit nursing theory (SCDNT). Orem stated that to practice self-care, people must be aware of self-care demands and have a self-care agency assist them in meeting their self-care demands. Persons who are not able to practice self-care in order to meet those demands are characterized as having a self-care deficit, therefore, require nursing care. Orem stated that basic conditioning factors could support or hinder self-care agency and that self-care agencies were affected by basic conditioning factors, which consisted of age, gender, developmental state, health state, sociocultural orientation, health care system factors, family system factors, patterns of living, environmental factors, and resource availability and adequacy (Orem, 2001).

The Orem's SCDNT is classified as a grand theory which enables and appropriates for guiding nursing research, education and practice in general. A grand theory, which is abstract, makes it difficult to test empirically the whole theory. A middle range theory, derived from a grand theory, is less abstract and thus more appropriate for guiding nursing practice such as intervention development. The middle

range theory, derived from the SCDNT and tested in some specific groups suffering from a disease, is valuable for nursing practice. The SCDNT, which was derived and tested in several studies, for example the effect of basic conditioning factor, self-care agency, self-care, and well-being of elderly women (Wang, & Laffrey) 2001), the relationships of basic conditioning factor, self-care agency, self-care, and well-being in homeless adults (Anderson, 2001), the effect of self-care agency, self-care, health, and well-being in women (Weber, 2000) and the effect of basic conditioning factors, self-care agency, and self-care in adult women (Gallegos, 1997), the relationship between self-care agency and self-care in persons with diabetes mellitus (Sousa et al., 2005), and the relationships between basic conditioning factor and self-care in persons with chronic obstructive pulmonary disease (COPD) (Xiaolian, et al., 2002). The SCDNT was recently deduced to develop the middle range theory of weight management (Pickett, Peters, & Jarosz, 2014). However, all studies were conducted in western countries and the middle range theory, derived from the SCDNT, was rarely tested in hypertensive patients, particularly in Thailand. Therefore, this study was interesting to explore the pattern of relationships of basic conditioning factors (health state, a health system, a family system) and self-care agency (operational capability of self-care agencies) at the level of knowledge (estimative operation) and the level of practice of self-care (productive operation) in persons with hypertension.

This study provided knowledge about the validity of the SCDNT in explaining self-care behaviors of persons with hypertension and knowledge about factors influencing self-care behaviors for hypertension control. An intervention program developed based on the findings can be used for improving self-care behaviors of persons with hypertension.

1.2 Objective of the study

The aim of this study was to explore the pattern of relationships among the basic conditioning factors (patient-provider communication, duration of hypertension duration, and family support), self-care agency (knowledge about hypertension, knowledge about self-care demands, and perception about hypertension), and self-care behaviors for hypertension control.

1.3 Research questions

1. What are the relationships between duration of hypertension, family support, patient-provider communication, knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behaviors in persons with hypertension?

2. Does the hypothesized model of factors contribute to self-care behaviors of persons with hypertension fit with the data?

1.4 Theoretical framework of the present study

The Orem's Self-Care Deficit Nursing Theory:

The SCDNT consists of six major concepts, including self-care, self-care agency, self-care demands, self-care deficit, nursing agency, and the nursing system as well as one peripheral concept, basic conditioning factors. Persons who had a self-care agency were able to meet therapeutic self-care demands and achieve and maintain good self-care. On the contrary, when a person did not have a self-care agency to meet self-care demands, deficits in their care appeared. Nurses use their nursing agency to help persons in meeting self-care demands and to promote self-care agency by using methods such as assistance, education, and guidance. Basic conditioning factors, both internal and external, affected self-care agency and self-care demands (Orem, 2001).

Self-care, stated by Orem (2001) as a behavioral process, is practicing an activity which persons initiate and perform by themselves in order to maintain life, health, and well-being. Self-care is a series of complex deliberate actions with the intention of achieving a specific goal and seeking results which are determined before performing the actions. The actions, connected to the meaning of a present condition, allow the person to consider the outcomes from each action, make a judgment for an appropriate action, and make a decision on what course of action to take. Persons are able to do self-care when they are mature and having intact consciousness.

Self-care demands are actions which are required in order to meet a self-care goal. Self-care demands of persons with hypertension are medication adherence and lifestyle modification (i.e., weight control, consumption of healthy, low-salt diets,

increased physical activity, moderate alcohol consumption, smoking cessation, risk avoidance, self-monitoring, and regular follow-up).

A self-care agency is the ability of a person to know and to perform self-care actions to meet self-care demands. Self-care agency consists of foundational capabilities and dispositions, ten power components and operational capabilities. Foundational capabilities and dispositions are the ability to engage in all types of actions such as the ability to know and to do, willingness to engage in self-care operations, and concern about one's health. Ten power components are specific abilities to engage in self-care practices such as motivation and the ability to make a decision about self-care. Operational capabilities of a self-care agency are the practice of self-care, which consist of estimative, transitional, and productive operations. An estimative operation seeks knowledge and understanding about a situation and what should be done to control that situation. A transitional operation is making a decision about self-care. A transitional operation uses knowledge about self-care demands and how to meet those demands, values of practices, self-concepts, and willingness. A productive operation is an action for meeting self-care demands, monitoring for self-care practice (i.e., actions, results, effects), and decisions for subsequence actions (Orem, 2001). Operational capabilities of a self-care agency focus on the present study because they are important components of a self-care agency. Knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension are conceptualized as estimative operations. Self-care behavior for hypertension control is conceptualized as productive operation of self-care.

A nursing agency is the ability of nurses to know about self-care demands and assist patients in meeting those demands of a patient. If there are self-care deficits present, nurses use their self-care agency to provide nursing care. A nursing agency can be developed by education and experience. A nursing agency is not included in the present study.

The basic conditioning factors are a personal condition and circumstances and the basic conditioning factors can affect self-care demands and the self-care agency. The basic conditioning factors are age, gender, developmental stage, health state, healthcare system factors, patterns of living, environmental factors, and family system factor (Orem, 1991). In the present study, the basic conditioning factors

considered were the duration of the hypertension, family support, and patient-provider communication, conceptualized as health state, factors related to a family system, and factors related to a healthcare system, respectively.

Factors which contributed to the self-care behavior of Thai adults with essential hypertension were conceptualized from the Orem's SCDNT by using theoretical substruction and empirical findings. The theoretical substruction is the linkage between the conceptual framework, theoretical, and operation system and the theoretical substruction of the variables used in this study shown in the figure 1.1.

There are six major concepts within the SCDNT, including self-care, self-care agency, self-care demands, self-care deficit, nursing agency, and nursing system and one peripheral concept, basic conditioning factors (Orem, 2001). The proposition of the SCDNT stated by Orem (1995, p.106) "individuals' abilities to engage in self-care are conditioned by age, developmental state, life experience, sociocultural orientation, health, and available resources" (Orem 2001, p.147) was tested in this study.

The basic conditioning factors were conceptualized to influence self-care agency. The basic conditioning factors included in this study were health state, a family system factor, and a healthcare system factor and the variables derived from these basic conditioning factors were duration of hypertension, family support, and patient-provider communication, respectively. Self-care agency included in this study was the estimative (ability to know about self-care) and a productive operational capability (ability to perform self-care actions). The concepts derived from the estimative operational capability are knowledge about hypertension, knowledge about self-care demands and perception about hypertension and the concept derived from the productive operational capability was self-care behaviors for hypertension control.

According to the hypothesized model of the study, the basic conditioning factors directly and indirectly affected self-care behaviors for hypertension control through self-care agency. The duration of hypertension increased self-care behaviors by the improvement of skills to perform self-care behaviors and skills to integrate self-care behaviors through daily living (Kirdphon, 2003; Panpakdee, Hanucharurnkul, Sritanyarat, Kompayak, & Tanomsup, 2003). Family support assisted persons with hypertension to overcome barriers and to incorporate self-care behaviors through daily

living (Flynn et al., 2013; Kirdphon, 2003; Li, Stotts, & Froelicher, 2007; Panpakdee et al., 2003). Patient-provider communication increased awareness of persons with hypertension to control hypertension, understanding of their conditions and how to control hypertension (Bokhour et al., 2012; Flynn et al., 2013; Tian et al., 2011). Patient-provider communication helped persons with hypertension to solve problems and to address health concerns (Flynn et al., 2013). Moreover, participation in making a decision about treatment and therapeutic relationships during a communication process increased self-care behaviors for hypertension control (Harmon, Lefante, & Krousel-Wood, 2006; J. H. Robinson, Callister, Berry, & Dearing, 2008).

Knowledge about hypertension, knowledge about self-care demands and perception about hypertension mediated the relationship between basic conditioning factors (health state, duration of hypertension, family support) and self-care behaviors for hypertension control. Patient-provider communication increased knowledge about hypertension and knowledge about self-care demands of persons with hypertension and this knowledge also increased following duration of hypertension by the accumulation of knowledge in a self-learning process such as reading, trials and errors to control blood pressure. Knowledge about hypertension and knowledge about self-care demands were used for developing perceptions about hypertension by integrating knowledge with other information. This process required a cognitive function. Therefore, knowledge or facts integrated through scientific inquiries were able to change perceptions about hypertension in the right way.

The appropriate perception about hypertension, consistent with scientific knowledge, was used to make a decision to begin and to maintain self-care behaviors for controlling hypertension. Again, the appropriate perception was used for the purpose of evaluating the results of self-care, judging the continuity in performing self-care, and being aware or knowing the value of performing self-care behaviors. Therefore, patient-provider communication, duration of hypertension, family support, knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behaviors for hypertension control worked together to influence self-care behaviors for hypertension control. The hypothesized model was shown in the figure 1.2.

1.5 The studies supported the relationships within the hypothesized model

Persons were able to perform self-care when they knew about self-care demands and had self-care agency (acquired ability to begin and to maintain self-care actions to meet self-care demands) (Orem, 2001). The basic conditioning factors such as age, gender, developmental stage, family system factor, healthcare system factor, and health state affected self-care demands and self-care agency (Orem, 1991). The variables included in this study were patient-provider communication, duration of hypertension, family support, knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behaviors for hypertension control.

Duration of hypertension: Hypertension is asymptomatic disease which leads to the perception of being healthy. Long duration of hypertension could affect several factors, including self-care behaviors for hypertension control. Even though the duration of hypertension is an unchangeable factor, knowing the influence of duration of hypertension could be used for intervention development. Several studies found that a long duration of hypertension was positively associated with self-care behaviors for hypertension control (Hu, Li, & Arao, 2013; Lee et al., 2013; Lee et al., 2010; Robinson, 2012) and duration of hypertension was the predictor of self-care behaviors for hypertension control (Hyre, Krousel-Wood, Muntner, Kawasaki, & DeSalvo, 2007). The results from the qualitative study showed that persons with hypertension took some time to integrate self-care behaviors in relevancy with daily living (Panpakdee et al., 2003) and persons with hypertension could perform self-care behaviors with mild difficulty when duration of hypertension increased (Kirdphon, 2003). However, some studies found that long duration of hypertension was associated with non-adherence to antihypertensive medication (Li, Kuo, Hwang, & Hsu, 2012; Tilburt, Dy, Weeks, Klag, & Young, 2008). The relationships between duration of hypertension and self-care behaviors for hypertension control were inconsistent in the results. Duration of hypertension was hypothesized to have direct and indirect effects on self-care behaviors for hypertension control.

Family support: Family support is important for persons with hypertension because persons with hypertension share activities with their family members such as eating, doing household chores, and caring for the health of family members. Family support is important to the success in performing self-care behaviors for hypertension control. Family support is associated with antihypertensive medication adherence (Leelacharas, 2005) and self-care behaviors for hypertension control (Mitrakaseem, 2005). Persons with hypertension who perceived mild support receiving from their family members did not adhere to antihypertensive medication when compared to those who received high support (Li, Wallhagen, & Froelicher, 2008). The results from the systematic review showed that social support had a strong relationship with self-care behaviors for hypertension control (Klainin & Ounnapiruk, 2010). For the results of the qualitative study, support from a family member such as husband, wife, son, or daughter helped with hypertension to succeed in performing self-care behaviors for hypertension control (Kirdphon, 2003; Li et al., 2007; Panpakdee et al., 2003; Rosland, Heisler, & Piette, 2012). Therefore, family supported was hypothesized to have direct and indirect effects on self-care behaviors for hypertension control.

Patient-provider communication: Learning about hypertension and ways to control it is extremely important for persons who suffer from the disease. Persons with hypertension should acquire information from various sources with patient-provider communication being a good way to get that information. Indeed, patient-provider communication is an excellent way for getting information and creating therapeutic relationships between patients and healthcare providers. Patients have to communicate information about their health problems to their healthcare providers and the healthcare providers in turn have to communicate knowledge about the disease to the patients and how to use that knowledge to care for them. Quality of patient-provider communication, satisfaction with provider communication and styles of interpersonal relationships were the predictors of medication adherence (deLeon, 2004). Persons with hypertension who perceived the quality of provider communication at the low level had a lower adherence to antihypertensive medication (deLeon, 2004; Edwards, 2011; Schoenthaler et al., 2009; Schoenthaler, 2007) than persons with hypertension who understood about hypertension when they

communicated with the healthcare provider (Tian et al., 2011). The results from the qualitative study showed that suggestions from the healthcare providers had a benefit for hypertension control. Persons with hypertension who did not receive the explanation about hypertension and how to control hypertension rarely performed self-care behaviors for hypertension control (Kirdphon, 2003; Panpakdee et al., 2003). Patient-provider communication was hypothesized to have direct and indirect effects on self-care behaviors for hypertension control.

Knowledge about hypertension: Patient knowledge about the disease is important for the control of it. Persons with hypertension who had a high knowledge about hypertension was associated with medication adherence (Ambaw, Alemie, W/Yohannes, & Mengesha, 2012; Morgado, Rolo, Macedo, Pereira, & Castelo-Branco, 2010; Naewbood, 2005; Ruppar, Conn, & Russell, 2008), and lifestyle modifications (Lee et al., 2010; Mitrakaseem, 2005). On the contrary, persons with hypertension who had low knowledge about their hypertension were associated with non-adherence to antihypertensive medication (Kim et al., 2007; Turner, Hollenbeak, Weiner, Ten Have, & Roberts, 2009) and lacked in the area of practicing healthy lifestyle behaviors (Heymann, Gross, Tabenkin, Porter, & Porath, 2011). Knowledge about medication adherence was the mediating factor between patient-provider communication and medication adherence (Ambaw et al., 2012). Providing knowledge about hypertension had the effect of increasing self-care behaviors for hypertension control (Hacihasanoglu & Gozum, 2011; Huang et al., 2011; Kauric-Klein, 2011; Park, Chang, Kim, & Kwak, 2013).

Knowledge about self-care demands: Patient knowledge about self-care demands is important for the planning and execution of necessary activities for hypertension control**.** Peters and Templin (2008) found that being knowledgeable about self-care demands had a positive direct effect on self-care behaviors for hypertension control. Persons with hypertension who participated in a program to increase their knowledge about self-care demands had a higher self-care ability than those who did not participate in such a program (Rujiwatthanakorn, Panpakdee, Malathum, & Tanomsup, 2010). Providing knowledge about self-care demands in the aspect of taking medication had the effect of increasing medication adherence, but the effectiveness of the intervention was not maintained over a long period (Harper,

1984). The results reflected that, even having knowledge about hypertension and self-care demands did not translate into long-term self-care maintenance behaviors for hypertension control, which indicated that there may be other factors that may affect these relationships.

Perception about hypertension: A person's perception of hypertension was an inner factor which drove them to value, make decisions and judgments, to select, and have willingness to perform self-care behaviors for hypertension control. Persons with hypertension, having the correct perception about hypertension, attempted to perform self-care behaviors for hypertension control over a long period although they encountered barriers or received low support. Perception about hypertension was developed from knowledge about hypertension and information from various sources which accumulated throughout a lifetime. A person often selectively used knowledge and information when forming their perceptions about hypertension which they in turn used for making decisions about self-care. Therefore, the improvement of knowledge might not adequately increase self-care behaviors for hypertension control without addressing perception about hypertension. The relationship between perception about hypertension and self-care behaviors for hypertension control was found in some studies (Chen, Tsai, & Chou, 2011; Samoh, 2008).

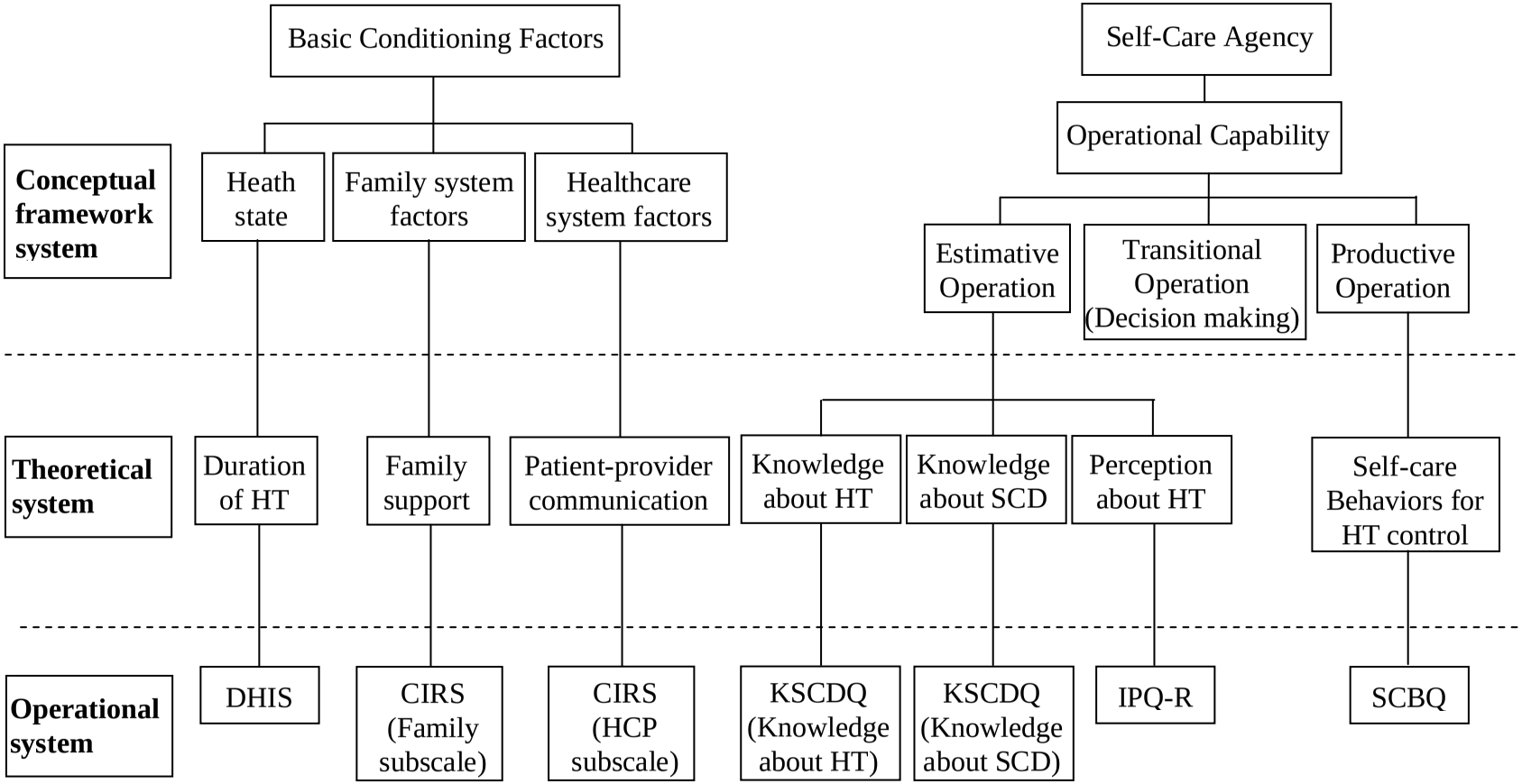


Figure 1.1 Theoretical substruction of the SCDNT related to self-care behaviors of persons with hypertension

Note: HT = Hypertension, DHIS = Demographic and Health Information Sheet, SCD = Self-care Demands, CIRS = Chronic Illness Resource Survey, KSCDQ = Knowledge about Self-Care Demands, IPQ-R = Illness Perception Questionnaire, SCBQ = Self-Care Behavior Questionnaire

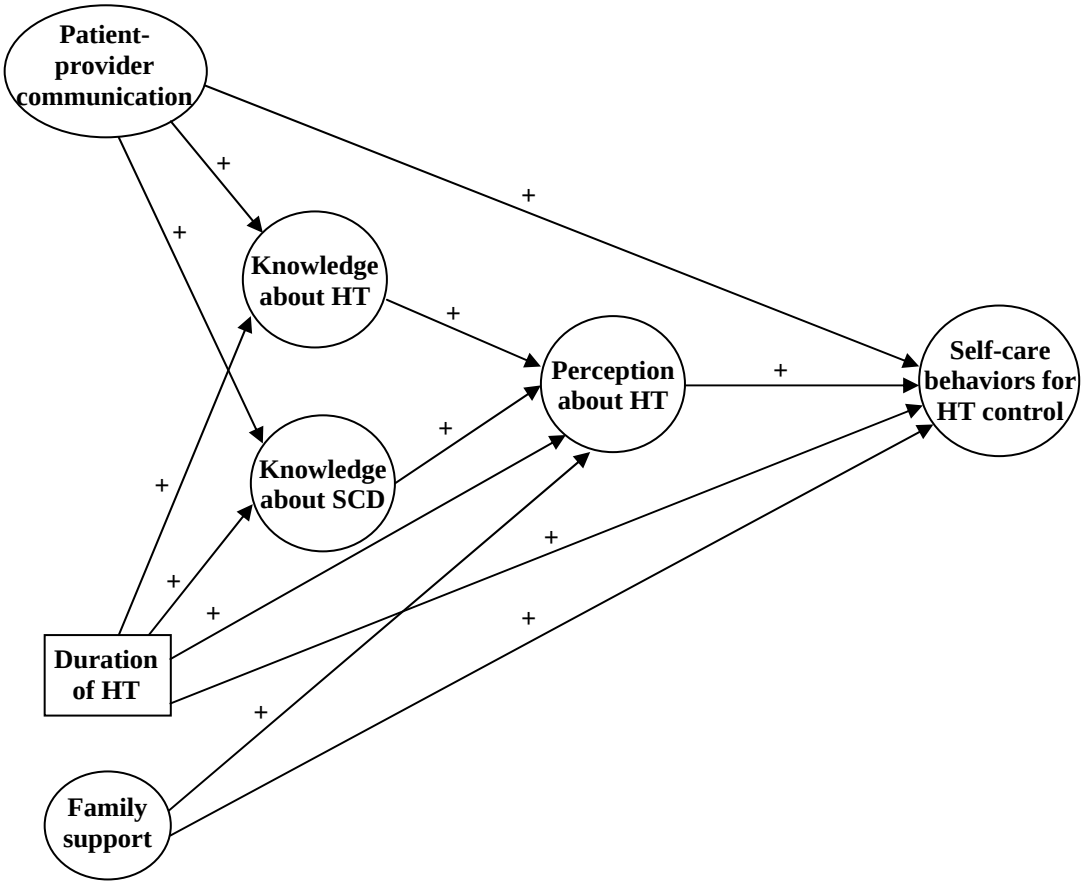


Figure 1.2 The hypothesized model of factors influencing self-care behaviors for

1.6 Hypotheses

1. Patient provider communication has a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perception about hypertension**.**

2. Duration of hypertension has a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perception about hypertension**.**

3. Family support has a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through perception about hypertension**.**

1.7 Operational definitions

Self-care behavior for hypertension control was defined as behaviors in consistently performing self-care activities related to sodium reduction, physical activity, medication management, self-monitoring, and avoiding of risk factors. Self-care behavior for hypertension control was measured by the Self-Care Behavior Questionnaire (SCBQ) which was adapted from the Perceived Self-Care Efficacy Measurement (PSEM) (Panpakdee, Kotcharin, Nopplub, & Varitsakul, 2001). A high score indicated consistency in practicing self-care activities for hypertension control.

Duration of hypertension was defined as the number of years since a person had been diagnosed with hypertension.

Family support was defined as the perception of assistance which a person with hypertension received from a family member. It was supporting for practicing self-care activities for hypertension control. Family support was measured by the family support subscale of the Chronic Illness Resources Survey (Glasgow, Strycker, Toobert, & Eakin, 2000). A high score indicated perception in receiving high support from a family member.

Patient-provider communication was defined as the perception of the quality of interactive communication between a patient and healthcare provider. The information was transmitted between a patient and healthcare provider during the process of interactive communication. Patient-provider communication was measured by the healthcare team subscale of the Chronic Illness Resources Survey (Glasgow et al., 2000). A high score indicated perception in high quality of provider communication.

Perception about hypertension was defined as cognitive viewing of hypertension. The perception about hypertension was developed using cognitive function to integrate general knowledge (scientific knowledge) and individual knowledge (information and experience). That integration process used reflection,

judgment, and interpretation of information. Perception about hypertension was measured by the Revised Perception Questionnaire (IPQ-R) (Moss-Morris et al., 2002). A high score indicated the perception of hypertension as a threat. A person perceived a threat from hypertension as a chronic condition, cyclical condition, having negative illness outcome, and controllability.

Knowledge about hypertension was defined as an understanding of hypertension in the aspects of the definition, causes, risk factors, signs, symptoms, diagnosis, complications, treatments, and goals of treatment. Knowledge about hypertension was measured by the knowledge about hypertension subscale of the Knowledge about Self-Care Demands Questionnaire (KSCDQ) (Rujiwatthanakorn et al., 2010). A high score indicated high understanding about hypertension.

Knowledge about self-care demands was defined as an understanding of self-care activities required for hypertension control. Those self-care activities were medication adherence, dietary and weight control, physical activity, reduction of stress, avoidance of risk factors, and self-monitoring. Knowledge about self-care demands was measured by the Knowledge about Self-Care Demands Questionnaire (KSCDQ) (Rujiwatthanakorn et al., 2010). A high score indicated high understanding about self-care demands for hypertension control.

Summary

The present study aimed to develop and to test the pattern of relationships among basic conditioning factors, self-care agency, and self-care behaviors for hypertension control. The middle range theory explaining self-care among persons with hypertension derived from SCDNT (Orem, 2001) was tested. The model was simultaneously tested with the empirical data collected from persons with essential hypertension. This knowledge may increase the understanding about factors influencing self-care behaviors for hypertension control and has the benefit of the development of appropriate nursing interventions. Moreover, the SCDNT is validated for advanced nursing knowledge.

CHAPTER II
REVIEW OF LITERATURE

This chapter reviews the literature related to self-care behaviors for hypertension control. The literature review includes the overview about hypertension, self-care demands for hypertension control, self-care behaviors for hypertension control, and factors associated with self-care behaviors for hypertension control.

2.1 Overview about hypertension

Hypertension is defined as a level of blood pressure higher than 140/90 mmHg (Chobanian et al., 2003). According to the 7th report of the JNC, blood pressure is classified in four categories as follows: 1) normal blood pressure (SBP $\leq$ 120 and/or DBP $\leq$ 80 mmHg); 2) prehypertension (SBP > 120 to 139 and/or DBP > 80 to 90 mmHg); 3) stage I hypertension (SBP > 140 to 159 and/or DBP > 90 to 109 mmHg); and 4) stage II hypertension (SBP $\geq$ 160 mmHg and/or DBP $\geq$110 mmHg). It is recommended that people with hypertension keep their blood pressure lower than 140/90 mmHg and 130/80 mmHg for those who have any of the following co-morbidities: diabetes, kidney disease, or other target organ damage.

According to the physiological process, the progression of hypertension develops sequentially as follows: 1) prehypertension; 2) hypertension; 3) target organ damage (LVH, hypertensive retinopathy, proteinuria, nephrosclerosis, other vascular damage); 4) adverse clinical events (myocardial infarction, angina pectoris, cerebrovascular disease, aortic aneurysm, aortic dissection, renal failure, heart failure, and other vascular events); and 5) death (Black & Elliott, 2007). Effective control of blood pressure prevents target organ damage and complications. Some important aims of hypertension control are preventing or delaying target organ damage, reducing cardiovascular mortality and morbidity, decreasing severity of hypertension, and increasing quality of life (Chobanian et al., 2003).

According to the 7th report of the JNC, persons who are first diagnosed with hypertension are treated with non-pharmacological management or lifestyle modification for some time before beginning pharmacological management. If the blood pressure is not controlled, a thiazide diuretic or other classes of anti-hypertensive drugs (e.g., angiotensin converting enzyme, beta-blocker, adrenergic receptor blocker, calcium channel blocker) are recommended for stage I hypertension and a combination of two drugs (a thiazide diuretic in combination with an anti-hypertensive drug) is recommended for stage II hypertension. For persons with hypertension who have other conditions such as diabetes or risks for diseases related to hypertension (e.g., recurrent stroke, coronary artery disease, and heart failure) it is recommended that they are treated according to the guidelines depending on the patient's condition (Chobanian et al., 2003). In order to effectively control hypertension, persons with the disease must be educated about self-care demands in order to successfully perform self-care behaviors for hypertension control.

2.2 Self-care demands for hypertension control

Self-care demands for persons with hypertension are anti-hypertensive medication adherence and lifestyle modification. Lifestyle modifications for hypertension control are reduction in and subsequent control of body weight, consumption of a healthy diet including low-salt foods, increased physical activity, moderate alcohol consumption, smoking cessation, risk factor avoidance, self-monitoring, and follow-up treatments.

2.2.1 Medication adherence

Adherence is defined as persons with illness following medical recommendations. Medication non-adherence is a serious problem for persons with chronic illnesses, including hypertension (Burke et al., 2007). Approximately one third to a half of all persons with hypertension demonstrate poor adherence to anti-hypertensive medication (Haynes, Ackloo, Sahota, McDonald, & Yao, 2008; Hyre et al., 2007), half of all persons with hypertension stop taking their medication during the first year of treatment, and one third to a half do not take medications as

prescribed by their physician (AlGhurair, Hughes, Simpson, & Guirguis, 2012). Anti-hypertensive medication non-adherence is associated with uncontrolled blood pressure (Matsumura et al., 2013), worsening clinical outcomes and a high cost of care stemming from managing related complications (Hill et al., 2011). Medication non-adherence consists of intentional (e.g. purposeful omission of medication taking) and unintentional non-adherence (e.g. forgetting to take medication) (Phillips, Leventhal, & Leventhal, 2013). A large survey of 376,162 persons with hypertension found that half of them did not take anti-hypertensive medication as prescribed by their physician (Burnier, Wuerzner, Struijker-Boudier, & Urquhart, 2013).

According to the multi-dimensional adherence model (WHO, 2008), factors related to medication non-adherence are factors related to persons, physicians, persons with illnesses (e.g., beliefs about illness and medications, self-efficacy, knowledge about illness, knowledge about medicine), factors related to a patient's condition (e.g., symptom severity, disease progression, depression), therapy barriers (e.g., side effect, complexity, convenience), socio-economic barriers (e.g., social support, financial problems), and health care/healthcare team barriers (e.g., a lack of information, provider support, provider communication, relationships with healthcare providers) (AlGhurair et al., 2012).

Effective interventions for increasing medication adherence are simplifying dose of medications, motivational strategies (e.g., reminders by healthcare providers, social support, family member support), and combining several techniques (e.g., workplace interventions, a combination of using leaflets, reminders by phone, newsletters and mail), whereas educational programs showed minimal success in the increase of medication adherence (Schroeder, Fahey, & Ebrahim, 2004). Most effective interventions are focused on support from other persons (e.g., healthcare provider and family). Support from other persons, however is difficult to maintain for a long duration. Self-support by the patient should be the goal for behaviors of medication adherence and lifestyle modification for the long term period. Even though persons have barriers or support from others, they attempted to perform those behaviors.

2.2.2 Lifestyle modifications

Effective hypertension control requires both pharmacological and non-pharmacological management. It is difficult controlling hypertension in the long-term with only pharmacological management because hypertension is related to several factors and most persons with hypertension display behavioral risks for hypertension progression, particularly being overweight, unhealthy eating behaviors, and sedentary lifestyles. The national committee on hypertension (JNC VII) used the results from systematic reviews to conclude non-pharmacological management for hypertension or self-care activities for hypertension control. Those self-care activities for hypertension control are weight reduction or weight maintenance, eating low-salt diet, consuming healthy foods (e.g., low-fat diets, high portions of fruits and vegetables), increased physical activity, moderate alcohol consumption, and smoking cessation. These self-care activities should be performed for long periods after hypertension diagnosis. The range of blood pressure reduction for each type of lifestyle modifications is as follows: 1) weight reduction (a range of SBP reduction 5-20 mmHg/10 kg); 2) eating a healthy diet aimed at stopping hypertension or Dietary Approaches to stop Hypertension (DASH) (a range of SBP reduction 8-14 mmHg); 3) sodium reduction (range of SBP reduction 2-8 mmHg); 4) physical activity (a range of SBP reduction 4-9 mmHg); and 5) moderate alcohol consumption (a range of SBP reduction 2-4 mmHg) (Chobanian et al., 2003).

At present, most people have unhealthy lifestyles. Two-thirds of Americans are inactive or display sedentary behaviors, half are overweight, one-fourth is smokers, and one-tenth consumes alcohol. Approximately one and a half tenth have three and two risk factors, respectively (Berra, 2010). The treatment with medication is less effective over a long-term period, particularly in persons with hypertension who have unhealthy lifestyles.

Performing multiple types of lifestyle modifications in an adequate time period is effective for hypertension control. However, performing multiple types of lifestyle is difficult to achieve for several reasons, including unhealthy practices or habits of a person are habits which have existed for a long-term period, a lack of resources and support from family and community, daily hassles, and time limitation to practicing healthy lifestyles (e.g., exercise, cooking at home). Helping persons with

hypertension to achieve success in performing those activities is important for the effective control of hypertension. Each type of lifestyle modification is explained in the following sections.

2.2.2.1 Body weight control, an increase in body weight is associated with raised blood pressure (Dorresteijn, Visseren, & Spiering, 2012). The possible mechanisms of obesity in association with hypertension are as follows: 1) central nervous system: the increase of sympathetic nervous system activity; 2) heart: low compliance of large conduit arteries increases cardiac output; 3) kidney: an increase in sodium retention and an increase in angiotensin II; 4) vessel: remodeling of a vessel, vascular resistance, and dysfunction of a vascular muscle; and 5) abdominal: abdominal fat leading to conduit artery stiffness, sympathetic nervous system activity, and angiotensin II (Sacks & Campos, 2010). Body mass index and waist circumference are methods for assessing obesity. Body mass index is the number of body weight in kilograms divided by the square of height in meters. Body mass index classified a normal body weight as (BMI 18.5 to 24.99 kg/m^2), overweight (BMI 25 to 29.99 kg/m^2), and obese (BMI $\geq$ 30 kg/m^2). Measurement of waist circumstance is useful in assessing central obesity. Waist circumstance $\geq$ 90 cms of men and $\geq$ 80 cms of women indicated central obesity (WHO, 2008).

More than half of persons with hypertension are overweight or obese (Howteerakul, Suwannapong, Sittilerd, & Rawdaree, 2006; Minor, Wofford, & Wyatt, 2008). It is usually recommended that obese persons with hypertension reduce body weight before being treated with other strategies. Methods for weight reduction are eating low calorie diets (energy reduction), reducing amount and frequency of food eaten, increasing physical activity, and decreasing sedentary behaviors (Chobanian et al., 2003). Obese persons who have hyperlipidemia have an increased risk for cardiovascular diseases (Braun, 2006). Persons who are overweight and obese have 40% and 62% decrease in blood pressure control when compared to those with normal weight (Czernichow et al., 2012). Overweight and obese are causal factors of blood pressure increase and progression. Helping persons with hypertension to maintain body weight in a normal range is important for achieving hypertension control.

2.2.2.2 Consumption of healthy diets, Dietary Approaches to Stop Hypertension (DASH) are eating low a fat diet and eating foods with high proportion of fruits and vegetables. Consuming DASH diets is effective in the reduction of blood pressure (Epstein et al., 2012; Salehi-Abargouei, Maghsoudi, Shirani, & Azadbakht, 2013). Diets for healthy hearts and vessels are whole grains, fresh fruits, vegetables, low fat milk, fish, nuts, and poultry. Diets for unhealthy hearts and vessels are red meat, high fat diets, and sweet beverages (Chobanian et al., 2003). Persons with hypertension should consume two to seven portions of fruits and vegetables in each day because fruits and vegetables contain high potassium which demonstrates a benefit for blood pressure reduction. Approximately three-fourths of the female and four-fifths of the male population in western countries consume less than five portions of fruits and vegetables per week (Minor et al., 2008).

The high cost of healthy foods can be a barrier to healthy eating for poor persons. Food selection is also affected by the perception of preparation time required to select, buy and cook healthy meals, cultural norms, and food availability. High calorie, unhealthy foods containing unhealthy fat (e.g., saturated fats) are usually lower in price, taste good and are easily accessed (Haskell, 2003) so are often selected by low-income people.

2.2.2.3 Eating low-salt diets, high sodium consumption is a cause of an increase in blood pressure (Mahan & Escott-Stump, 2008). High sodium consumption is associated with blood pressure increase, endothelial dysfunction, cardiovascular structure and function, renal disease progression, and cardiovascular mortality and morbidity especially in persons who are advanced in age, overweight, or obese. Reducing sodium and increasing potassium consumption are effective in hypertension prevention and hypertension control as well as for decreasing cardiovascular mortality and morbidity (Aaron & Sanders, 2013). Sodium reduction is effective in the reduction of blood pressure in dose-response and salt reduction is a cost-effective intervention for the reduction of cardiovascular disease.

Sodium chloride has a higher association with an increase in blood pressure than other sodium compounds. Sodium chloride contains forty percent sodium and sixty percent chloride (Mahan & Escott-Stump, 2008). Sodium and

potassium fluctuate in opposite directions and come from different types of foods. Primary sources of sodium are salt, processed foods and meat whereas primary sources of potassium are legumes, whole grains, bananas, orange juice, dried fruits, and potatoes.

World Health Organization and the 7th report of JNC recommend a person with hypertension should consume less than 100 mmol of sodium each day. Sodium 100 mmol equals sodium 2.4 gm or sodium chloride 6 gm (Chobanian et al., 2003). The review of studies related to sodium consumption show that high consumption of dietary sodium is associated with cardiovascular mortality and morbidity in three patterns of association including: the direct, J-shaped, and inverse association. Most studies supported the J-shaped association which indicated that very low and high consumption of sodium is associated with cardiovascular mortality and morbidity (Alderman & Cohen, 2012).

Most persons with hypertension consume sodium higher than the recommended level, for example 3,341±37 mg/day for those in western countries (Ayala, Tong, Valderrama, Ivy, & Keenan, 2010), 4,800 mg/day for those in Asian countries (Brown, Tzoulaki, Candeias, & Elliott, 2009), 7,760 gm/day for those in Thailand (Rujiwatthanakorn, 2004), and 4,700 mg/day for those in South Korea (H. S. Lee, Duffey, & Popkin, 2013). Sodium reduction is effective in the reducing blood pressure in persons with hypertension (Appel et al., 2006; Graudal, Hubeck-Graudal, & Jurgens, 2011; He, Li, & Macgregor, 2013; R. S. Taylor, Ashton, Moxham, Hooper, & Ebrahim, 2011; WHO, 2007). Results from the meta-analysis show that the reduction of sodium to 2,400 mg is associated with systolic blood pressure reduction by 3-5 mmHg and diastolic blood pressure by 2-3 mmHg (Aburto et al., 2013; He et al., 2013).

Sodium is usually added during the manufacturing process in developed countries (Brown et al., 2009; He et al., 2013) and usually added during the cooking or eating process in the developing countries. Major sources of sodium in Europe and North America come from the food industry and restaurants, in the United Kingdom from cereals, bread and meat, and in Japan and China from cooking with and eating things like soy sauce (Brown et al., 2009). Foods containing high sodium are milk, fish sauce, bread, preserved foods (Aburto et al., 2013), soup, soy sauce, bacon,

cheese, snacks, and pickled foods, Thai ready-to-eat foods (e.g., noodle, “Khaw-Pad-Ka-Praow”, “Nam-Pra-Prik-Ma-Now”, “Kriang-Prung-Ros”) (Rujiwatthanakorn, 2004). Examples in milligrams of sodium in foods are 900 mg in one cup of soup, 350 mg in one tablespoon of salad dressing (Mahan & Escott-Stump, 2008), 855 mg in 3 ounces of canned beef, 1,275 mg in 3 ounces of ham, 1,137 mg in one piece of sausage or smoked pork, 1,029 mg in one tablespoon of soy sauce, 1,403 mg in 8 ounces of steamed rice and vegetables, 1,106 mg in 1 cup of chicken noodle, 578-1,047 mg in 1 cup of soup, 1,589 mg in 1 large cheeseburger, 1,335 mg in 1 hot dog (Brown et al., 2009), and 1,500 mg in 1 tablespoon of fish sauce. Therefore, persons with hypertension must recognize and select low sodium foods. Having knowledge about the role of sodium in the increase of blood pressure, the amount of sodium recommended for consumption each day, types of foods which contain high sodium, and how to identify sodium content on a food labels may be helpful in achieving sodium reduction (Ayala et al., 2010; Warren-Findlow, Basalik, Dulin, Tapp, & Kuhn, 2013).

2.2.2.4 Increased physical activity, physical activity causes skeletal muscle contraction and energy expenditure above that of the resting state. Physical activity is a personal activity related to a sport or exercise, household chores, transportation, occupation, play, and family activities (WHO, 2011). Physical activities also include walking to the workplace, gardening, housework, floor washing, and car washing (Visuthipanich et al., 2009). Exercise is one type of physical activity, but it must be planned, structured, and repeated (Visuthipanich et al., 2009; WHO, 2011).

Physical activity should include type, duration, frequency, and intensity. A high level of physical activity is associated with health benefits as a dose response relationship. Physical activity is classified on three levels, including light, moderate, and high intensity. Moderate physical activity is an activity requiring energy expenditure of 150 calories each day or 1,000 calories each week. Examples of moderate physical activity are walking, riding a bicycle, swimming, fast dancing, washing floors, and gardening (Oja & Titze, 2011). World Health Organization recommended people have aerobic physical activity $\geq$ 150 min of moderate intensity

or ≥ 75 min of high intensity in each week. Performing physical activities for a long duration has good health benefits. Physical activities should be performed as an aerobic activity which is done continuously for at least 10 minutes. The accumulation of time in performing an aerobic activity reached each day can be used to evaluate the adequacy of daily physical activity (WHO, 2011).

It is recommended that adults and older adults have adequate physical activity at the same level for health benefits, but older adults with hypertension should perform physical activities with caution and get medical advice before pushing their efforts to the recommended level (WHO, 2011). Persons with hypertension tend to have less capacity for exercise and less strength due to a decrease in cardiovascular, neural and renal system functions (Chandrasekaran et al., 2010) Some anti-hypertensive drugs can also cause fatigue and weakness.

Exercises such as walking, aerobics, biking, yoga, and swimming are appropriate for persons with hypertension, whereas isometric exercise such as weight lifting should be avoided because it causes a strong increase in blood pressure. The results from the systematic review show that walking at a moderate or high intensity for between one half and one hour at least three days a week over a long period is effective in the reduction of blood pressure (Lee, Watson, Mulvaney, Tsai, & Lo, 2010). Moderate intensity exercise is more effective in blood pressure reduction than high intensity of exercise (Kokkinos, Giannelou, Manolis, & Pittaras, 2009). The results from a meta-analysis show that moderate and high recreational physical activity is associated with blood pressure reduction as a dose-response relationship (Huai et al., 2013). A highly sedentary lifestyle as assessed by sitting time is associated with an increased cardiovascular risk (Chomistek et al., 2013).

Though physical activity is important for all people, most people have an inadequate amount. Moreover, the heavy use of highly technological equipment promotes a sedentary lifestyle. Physical activity is a cost-effective intervention method to prevent and manage several chronic diseases. Encouraging persons with hypertension to have adequate physical activity is important for health and hypertension control.

2.2.2.5 Avoidance of risk factors

Risk factors for the development and progression of hypertension are smoking, alcohol drinking, stress, negative emotions, and sleep disorders.

Moderate alcohol consumption, alcohol consumption is a causal factor of hypertension development and progression. Persons with hypertension who drink should imbibe less than two alcoholic drinks per week for men and one drink for women (Chobanian et al., 2003). One standard drink is equal to 14 gms of alcohol or ethanol which is equal to 12 ounces of beer, 5 ounces of wine, or 5 ounces of 80-proof distilled spirits (Izzo & Black, 2008). The amount of alcohol varies in each type of beverage. For the estimation of alcohol in Thai beverages by Khuwatsamrit (2006), one standard drink is equal to 70 cc of rice whisky or herbal liquor, 3 “Kong” of “Lao Khaow” or “Ya Dong Lao”, 1 can or 450 cc of beer, or 200 cc of wine and two drinks are equal to 120 cc of rice whisky or herbal liquor, 4 “Kong” of “Lao Khaow” or “Ya dong Lao”, two cans or 750 cc of beer, or 300 cc of wine.

Alcohol effects the heart and smooth muscles of a vessel, sympathetic nervous system activation, stimulated renin-angiotensin, and increases a level of cortisol in plasma (Sesso, Cook, Buring, Manson, & Gaziano, 2008). Alcohol increases vasodilation in the first stage and sympathetic nervous system activation and constriction of a vessel in the next stage. The amount of alcohol drunk is associated with blood pressure increase as a dose response (Brown et al., 2009; Miller, Anton, Egan, Basile, & Nguyen, 2005; B. Taylor et al., 2009) in men and the J-curve relationship in women. Consumption of a small to moderate amount of alcohol can have a protective effect for hypertension risk, whereas high alcohol consumption increases hypertension risk. Even though drinking red wine at a moderate level has a protective effect in the reduction of cardiovascular events (da Luz & Coimbra, 2004), the explicit mechanism of the protective effect of light to moderate alcohol consumption on cardiovascular risk reduction is not clearly known (Arranz et al., 2012). Persons who drink heavily are associated with therapy resistance and poor medication adherence (Izzo & Black, 2003).

In summary, moderate alcohol consumption has been shown to be effective in the reduction of the cardiovascular disease in some studies, but the

explicit mechanism of this affect is not known (Arranz et al., 2012). Moreover, alcohol consumption is associated with some undesirable consequences such as hepatic disease, unnecessary loss of money and accidents. Alcoholic drinkers for whom it is difficult to control the amount and frequency of alcohol consumption, tend to increase the amount and frequency of consumption to a higher level than is recommended. Total abstinence from drinking alcohol should be the course of action for those who have been diagnosed with hypertension rather than reducing their drinking to a moderate level.

Smoking cessation, smoking poses a strong risk for the development and progression of cardiovascular disease (Braun, 2006; Najem et al., 2006; Rhee, Na, Kim, Lee, & Kim, 2007; Sobieraj, White, & Baker, 2013), arteriosclerosis (Baldassarre et al., 2009), blood pressure increase and blood vessel stiffness (Najem et al., 2006; Rhee et al., 2007). Smoking is a predictor of uncontrolled diastolic blood pressure (Dave et al., 2013). Those who smoke lightly (3-4 cigarettes/day), and those who smoke only socially (e.g., smoking at social meetings) may nonetheless suffer from the effects of smoking (Schane, Ling, & Glantz, 2010). Therefore, the recommendation for persons with hypertension is to stop smoking entirely and to avoid inhaling secondary smoke, which is important for decreasing cardiovascular risk and hypertension progression (Baldassarre et al., 2009).

Nicotine, which activates the sympathetic nervous system by a function of catecholamine (norepinephrine and epinephrine), is a major ingredient in tobacco Catecholamine increases blood pressure, heart rate, and cardiac muscle contractions. Sympathetic over-activity decreases the ventricular fibrillation threshold and increases myocardial work, ventricular node conduction, and vasoconstriction of a coronary artery (Najem et al., 2006). Over-activation of the sympathetic nervous system leads to cardiovascular diseases. Smoking 10-20 cigarettes per day increases the risk for coronary heart disease by 2 times and increases the risk for sudden cardiac mortality by 5 times (Haskell, 2003).

Smoking is a causal factor of arteriosclerosis and cardiovascular disease, particularly coronary artery disease. Smokers and secondhand smokers could receive negative consequences on smokers. The promotion of persons

with hypertension to stop smoking and to avoid secondhand smoking is important for the reduction of cardiovascular complications and blood pressure control.

Stress and negative emotions, stress increases sympathetic nervous system activity. Stress increases blood pressure over the short-term and induces vascular remodeling and vessel dysfunction over the long-term (Dickinson et al., 2008). Negative emotions such as anger, mourning, and hostility increase the level of catecholamine and cortisol in plasma, which leads to a blood pressure increase (Igna, Julkunen, & Vanhanen, 2009). Acute stress, chronic stress (e.g., socioeconomic problems, job-related stress, social isolation, loneliness, working more than 55 hours/week), and psychological factors (e.g., anger, anxiety, depression) are associated with cardiovascular or coronary disease risks (Rainforth et al., 2007; Steptoe & Kivimaki, 2013). Mild depression and anxiety increased by 2.48 and 1.59 times non-adherence to anti-hypertensive medication (Bautista, Vera-Cala, Colombo, & Smith, 2012).

Chida and Steptoe (2010), conducted a meta-analysis review for the study of the relationships between cardiovascular response, stress, and cardiovascular risk. The results are as follows: 1) stress at acute and recovery stage is associated with a cardiovascular risk over the long-term; 2) the predictors of cardiovascular response are systolic blood pressure, diastolic blood pressure and heart rate; 3) the increase of systolic blood pressure and diastolic blood pressure is associated with poor cardiovascular outcomes; 4) poor heart rate and systolic blood pressure at the recovery phase of stress are associated with persistent cardiovascular risk; 5) mental stress as measured by a cognitive task (e.g., mental arithmetic, mirror tracing, and color-word interference) is associated with impaired stress recovery; and 6) poor stress recovery is associated with the thickness of the inner wall of a carotid artery.

Stress and negative emotions are commonly found in daily living. Because it is difficult to avoid stress and negative emotions, the management of stress and negative emotions is important for reducing the effects of stress and negative emotions on physical and psychological health. Relaxation (e.g., mental imagery and breathing exercises), meditation and biofeedback decrease blood pressure by reducing arousal and maintaining autonomic balance (Rainforth et al., 2007).

Methods to reduce stress include relaxation (e.g., breathing, positive attitude), behavioral therapy and cognitive therapy (e.g., anger control, stress management, coping strategies, meditation, yoga, and communication skills), guided imagery, biofeedback (e.g., biofeedback of heart rate and blood pressure), progressive muscle relaxation, and breathing exercises (Dickinson et al., 2008). The results from a meta-analysis show that relaxation techniques are less effective in the decrease of blood pressure. Relaxation techniques decreased systolic blood pressure by 2.8-5.5 mmHg and diastolic blood pressure by 1.6-3.5 mmHg (Dickinson et al., 2008).

In summary, stress is related to blood pressure increases. Most persons with hypertension link stress as a cause of hypertension. It reflects that most persons with hypertension have a problem with stress. Stress is also a cause of ineffective hypertension control. Persons with hypertension should focus on stress reduction. Several methods are effective for reducing stress and negative emotions. Persons with hypertension should find an appropriate method for reducing stress and negative emotion appropriate for them. These methods should be used at times of stress or negative emotion in order to reduce the duration of stress and negative emotions and to reduce the effects of stress and negative emotions on health.

Sleep, sleep is one of basic human need. Sleep is necessary for health, quality of life, and performing well (WHO, 2004) for both healthy persons and persons with illness. No exact duration of sleep requires for each person which depends on a habit of sleep and a quality of sleep. However, a person should have duration of sleep lasting for 6 to 8 hours. Sleep is classified to non-rapid eye movement (NREM) which consists of stage 1 to stage 4 and rapid-eye movement (REM) which is stage 5. Factors associated with sleep are need, environment, noise, light, temperature, relationships, shift work, nutrition and metabolism, elimination patterns, exercise, vigilance, lifestyle and habits, illness, medication and chemicals, and mood state (Craven & Hirnle, 2007). Sleep-promoting factors are darkness, dim light, consistent schedule, secretion of melatonin, familiar sleep environment, optimal warmth and ventilation, performance of sleep rituals, sedative, hypnotic drugs, depression, relaxation, satiation, excessive alcohol consumption, quiet, effortless breathing. Non-rapid eye movement is deep, restful, and dreamless sleep and NREM lasts 50-90 minutes. Stage 1 takes a few minutes and has light sleep, easily aroused.

Stage 2 takes 10-20 minutes and has deeper relaxation and can be awakened with effort. Stage 3 takes 15-30 minutes and is early phase of deep sleep, relaxed muscle tone, little physical movement, and difficult to arouse. Stage 4 takes 15-30 minutes and has deep sleep, sleep walking, sleep talking, and bedwetting. Rapid-eye movement takes 20 minutes and has eye movement, very difficult to awaken, loss of muscle tones, jaw relaxes, irregular respirations, absence of snoring, and muscle twisting (Timby, 2013).

The indicators of sleep disorder are sleep latency, nocturnal awakening (time, duration), changing of the stage of sleep and autonomic function during sleep, and the number of sleep disruption. Sleep disorder such as insomnia, sleep apnea, and restless leg syndrome lead to medical and emotional problems. Approximately one-third of people suffer from sleep disorder. Sleep apnea leads to daytime sleepiness, hypertension, coronary heart disease, stroke, and cognitive impairment (WHO, 2004). The consequences of insufficient sleep on health are sleepiness, fatigue, hypertension, frustration, reduction of positive behaviors (e.g., good performance, attention, motivation, concentration, and intellectual capacity), and risky on accidents on working and driving (WHO, 2004). Duration of sleep is an important aspect to have adequate duration of deep sleep and relaxation. People should have time to sleep six to eight hours per day and a problem of sleep should be solved to help a person to achieve in adequate time and quality of sleep.

Obstructive sleep apnea (OSA) and insomnia are sleep problems of persons with hypertension. Obstructive sleep apnea is upper airway obstruction during sleep due to the functional impairment of upper-airway muscles. Among several risk factors for hypertension, OSA is a cause of hypertension, ischemic heart disease, myocardial infarction, and stroke. Obstructive sleep apnea is a predictor of hypertension, cardiovascular diseases (Giles et al., 2006), and cardiovascular mortality and morbidity (Golbidi, Badran, Ayas, & Laher, 2012). Sleep apnea is periodic stopping of breathing and hypopnea is the significant reduction in the amplitude of breathing during sleep (Golbidi et al., 2012). Apnea (complete obstruction) and hypopnea (partial obstruction) lead to an accumulation of carbon dioxide, a decrease in plasma oxygen, and sleep discontinuity. The decrease of plasma oxygen stimulates sympathetic nervous system activity which turns to increased blood

pressure (Marcus, Pothineni, Marcus, & Bisognano, 2014). Obstructive sleep apnea can be assessed using the apnea/hypopnea index (AHI). Apnea/hypopnea index is the total number of apnea and hypopnea in one hour. Obstructive sleep apnea is classified as normal (AHI < 5), mild (AHI $\geq$ 5 to < 15), moderate (AHI $\geq$ 15 to < 30), and severe (AHI $\geq$ 30) OSA. Persons at risk for sleep apnea are those who are obese, male, smoke, are of advanced age, or menopausal (Golbidi et al., 2012). Obstructive sleep apnea should be managed by a physician employing strategies such as lower extremity compression stocking and continuous positive airway pressure (CPAP) (Giles et al., 2006).

Another type of sleep problem is insomnia which is frequently found among persons with hypertension. People with insomnia find it difficult to initiate and maintain sleep, wake early in the morning and are unable to return sleep (Montgomery & Dennis, 2003). The interventions which have the effect of reducing insomnia, include taking sleeping pills, education about sleep hygiene (e.g., environmental setting and avoidance of caffeine, alcohol, a big meal, and exercise within 6 hours before bedtime), stimulus control (e.g., going to bed only when sleepy), muscle relaxation therapy, and sleep restriction therapy (Montgomery & Dennis, 2003).

In summary, obstructive sleep apnea and insomnia are problems experienced by hypertensive persons. Both insomnia and particularly obstructive sleep apnea are associated with the progression of hypertension. Persons diagnosed with hypertension should arrange their daily schedules to ensure adequate sleep time of at least six to eight hours. Moreover, persons with hypertension should identify and avoid factors related to sleep difficulty, promote factors related to the increase of sleep quality and observe their OSA. Additionally, they should consult a physician for a sleeping pill prescription upon unsuccessfully increasing sleep quality through self-care practices.

2.2.2.6 Self-monitoring, self-monitoring is an important practice for all persons with chronic diseases (Chobanian et al., 2003). What should be monitored depends on the disease. It is recommended that persons with hypertension should monitor their blood pressure level, body weight and body mass

index and target organ damage. Knowledge about the disease and performing self-monitoring (e.g., what should be monitored, how to monitor, how to record the results of monitoring, how to interpret the results, and how to communicate the results to healthcare providers) are important for being able to perform effective self-monitoring (Orem, 2001).

The targets of blood pressure, weight, and self-care behaviors are important for self-monitoring of persons with hypertension (Wilde & Garvin, 2007). Those targets should be set through a mutual understanding between the physician and the person with hypertension. Self-monitoring of blood pressure (by persons with hypertension or healthcare providers), weight, target organ damage, complications, and adverse effects of treatment regimens are important for hypertension control. Providing knowledge and training for self-monitoring skills and using the results from monitoring for the adjustment of treatment are necessary for achieving successful self-monitoring. The continuous follow-up to receive treatment is an important way to achieve success in self-monitoring.

2.2.2.7 Regular follow-up, persons with hypertension have to follow-up with a physician for medication adjustment according to his/her condition (e.g., blood pressure, target organ damage, adverse effects of a drug, complication), detection of complications, and the refill of medications. At the time of follow-up visits, problems with taking medication should be addressed in order to increase the quality of life of the patient. Strategies for reduction in waiting time for visits might motivate a patient to re-visit. For those persons with hypertension who lost contacts, follow-up by telephone, post, or home visit may be helpful for ensuring continuous treatment. These are all examples of self-care demands that persons with hypertension have to follow in order for them to maintain good health through hypertension control.

2.3 Self-care behaviors for hypertension control

According to the premise developed by Orem, self-care is a conduct which reflects self-care behaviors (Orem, 1991). Orem defined self-care as “the practice activities that individuals initiate and perform on their own behalf in maintaining life,

health, and well-being" (Orem, 1991, p.117). In order to effectively control hypertension, self-care actions based on scientific knowledge should be continuously and adequately performed along the course of the disease or as self-care behaviors. Self-care behaviors for hypertension control in the present study are conceptualized as specific actions to meet the actions required for hypertension control which persons with hypertension perform by themselves after being diagnosed with hypertension in order to control blood pressure at a normal level, to delay the progression of hypertension, and to prevent complications of hypertension.

Levin defines self-care as processes of personal action on one's own for the promotion of health, prevention of disease, detection of disease, and primary treatment (Levin, et al., 1979, cited in Shoor & Lorig, 2002). Self-care includes caring for healthy or ill persons at all stages. Self-care is caring performed by oneself or others persons (Department of Health, 2005, as cited in Jones, MacGillivray, Kroll, Zohoor, & Connaghan, 2011). Self-care includes personal care (eating and bathing), and therapeutic care (adherence to medication and treatment regimens) (Godfrey, 2010) as well as doing nothing, personal control, empowerment, emotional management, goal attainment, and behavioral changes (Jones et al., 2011). The purposes of self-care are maintaining life, health, well-being (Orem, 2001), health promotion, health prevention, health recovery, illness detection, disease management and self-management (Godfrey, 2010).

World Health Organization classified self-care into three levels including individual, family, and community. At the individual level, self-care is performed in order to maintain physical and mental health such as healthy eating, hygiene care and healthy behaviors. Self-care involves following prescribed medication regimens and prevention of disability. Self-care is influenced by perception of capability to perform self-care behaviors, self-efficacy to perform self-care behaviors, perception about illness threat to health, importance of health, ability to control health, the meaning of health, perception of causes of illness, and benefits and barriers to performing self-care behaviors (Godfrey, 2010).

Results of self-care behaviors are achievement of desirable sensation (satisfaction, responsibility, control, independence, and autonomy), functional balance, and integrity, recovery from an illness, adjustment to an illness, increased well-being,

and improvement in quality of life. Self-care behaviors decrease the burden of an illness, a complication, health service use, readmission rate, and healthcare costs (Godfrey, 2010).

Self-care behaviors of hypertensive persons require multiple assessments because they involve behaviors for the control of several risk factors for the progression of hypertension. Recently, Han, Song, Nguyen, and Kim (2014), conducted a systematic review of the instruments for measuring self-care behaviors related to hypertension control from twenty-nine articles which consisted of nineteen instruments. Medication taking is an important domain of self-care behaviors for hypertension control and is focused on in several studies. A few studies measured multiple dimensions of self-care behaviors but did not include all domains of self-care behaviors or had inadequate psychometric properties. Examples of instruments for measuring medication adherence are the Brief Medication Questionnaire (BMQ), the Medication Compliance (MC) Scale, the Self-Care Behavior Rating (SCBR) Scale, the Adherence to Medicines Questionnaire (QAM-Q), and the Medication Taking Questionnaire (MTQ). The instruments for measuring multiple dimensions of self-care behaviors for hypertension control are the Hill-Bone Adherence Scale, the Blood Pressure Self-Care Scale, the Compliance of Hypertensive Patients (CHP) scale, the Maastricht-Utrecht Adherence in Hypertension (MUAH), the Adherence Assessment Form (AAF), and the Treatment Adherence Questionnaire for Patients with Hypertension (TAQPH). Based on this review, they are lacking in the appropriate instrument for measuring all dimensions of self-care behaviors and relevant in Thai context. Based on Orem’s Self-Care Deficit Nursing Theory, self-care behaviors are difficult to assess because self-care behaviors covered both quality and quantity of self-care activities. Therefore, the instrument for measuring self-care behaviors for hypertension control in the present study has been modified from the existing instruments.

2.4 Factors associated with self-care behaviors in persons with hypertension

According to the literature review in the present study, factors related to self-care behaviors for hypertension control are patient-provider communication, duration of hypertension, family support, knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension.

2.4.1 Patient-provider communication

Communication is sharing of information, thinking and feeling between two or more persons and involves relations and interaction. Communication is information transmitted from one person to another person/other persons and this information is intended to communicate (Weiner, Barnet, Cheng, & Daaleman, 2005). Communication might be in the form of verbal or nonverbal communication, visual, written or electronic. Some examples of non-verbal communication are facial expressions, smiles, eye contact, hand gestures, loudness and rate of speech, and pauses (Jolles, Clark, & Braam, 2012). Verbal communication is good in rapidly transference of information, whereas written communication is good for its ability to be recalled (Jolles et al., 2012). Effective provider communication should be comprehensive, important, autonomous, and based on patient preferences or choices (Vahabi, 2007). Patient-provider communication demonstrated attitude without judgment, acceptance, warmth, empathy, positive relationships, encouragement to discuss the aspect of patient's concerns and topics of discussion focusing on patient choices. Communication based on these aspects brings about trust and positive relationships which is necessary for long-term treatment (Kim, Boren, & Solem, 2001).

The domains of communication are clarity, focusing on a patient's problem (i.e., concern, and expectation), explanation about the disease (i.e., condition, progression, and prognosis), explanation about self-care, and empowerment. Information from healthcare providers is important for an increase in health knowledge and positive behaviors. Persons with hypertension who receive information about the disease and self-care have greater knowledge and self-care behaviors than those who do not receive it (Tian et al., 2011). Persons with hypertension mentioned

that communication with healthcare providers is important for hypertension control (Bokhour et al., 2012; Flynn et al., 2013).

According to the systematic review of Stevenson, Cox, Britten, and Dundar (2004), most patients perceive that talking about medicines with a physician is important and useful. Ways to take medications and the experience of taking medication are frequent topics of discussion. However, the topic of discussion is most often initiated by the physician rather than by the patient. Advice given by healthcare providers ranking from the highest to the lowest are weight reduction, smoking cessation, exercise, alcohol abstinence, healthy diet, salt reduction, blood pressure self-measurement, and stress reduction, respectively (Elhani, Cleophas, & Atiqi, 2009). The results from the meta-analysis showed that ninety-eight percent of studies show a positive association between effective patient-provider communication and medication adherence. Effective patient-provider communication, perceived controllability of hypertension, satisfaction with provider communication and interpersonal styles of the patient-provider relationship are some of the predictors of medication adherence which accounts for 14.5% of the variance (deLeon, 2004). Poor patient-provider communication is associated with non-adherence to anti-hypertensive medications (Edwards, 2011; Holt et al., 2013; Schoenthaler et al., 2009; Schoenthaler, 2007).

Patient-provider communication, one health care system factor, is an important factor related to self-care behaviors for hypertension control (Hill et al., 2011). Persons with hypertension who receive advice about lifestyle modification increases 1.2 times of eating habits, 1.56 times of salt reduction, 1.48 times of exercise, and 1.78 times of alcohol reduction when compared to those who do not receive advice (Viera, Kshirsagar, & Hinderliter, 2008). Comfort in asking questions of physicians during communication is a predictor of anti-hypertensive medication adherence (Hyre et al., 2007). Quality of therapeutic relationships of providers with patients may improve adherence (Harmon et al., 2006; Robinson et al., 2008). Persons with hypertension acquire information about their disease from several sources such as family members, other people with hypertension, health care providers and the media (Jolles et al., 2012). Media is a source of information for well-educated Thai persons with hypertension (Kirdphon, 2003).

High quality patient-provider communication is an important factor for adherence to a therapeutic regimen, but several studies report inadequacy in the quality of provider communication (Fawole et al., 2013; Stevenson et al., 2004). More than half of physicians report that time limitation is a barrier to adequate quality in communication with a patient (Jolles et al., 2012). Most persons with hypertension receive advice at a low level, for example only one-fourth of persons with hypertension received advice (Fang, Keenan, & Ayala, 2010). The results from a qualitative study show that problems of provider communication are a lack of time to address the patient's concerns as well as the problem of adverse effects of drugs (Edwards, 2011). One barrier to anti-hypertensive medication adherence is a lack physician communication which is associated with a 68% decrease in medication adherence (Turner et al., 2009). Barriers to patient-provider communication from a patient's perspective are gender (woman), low socio-economic status, language, health literacy, numeracy, culture, age and psychological factors (e.g., stress, depression) (Jolles et al., 2012).

In summary, information provided by healthcare providers through patient-provider communication is important for persons with hypertension to garner correct understanding about hypertension and the actions required for its control. Effective patient-provider communication is important for the increase of patient's knowledge.

2.4.2 Duration of hypertension

The progression of hypertension and self-care behaviors increases with the duration of hypertension. Duration of hypertension increases the skills to perform self-care behaviors and to integrate self-care behaviors through daily life. Duration of hypertension increases the knowledge about hypertension and knowledge about self-care demands by the accumulation of information from various sources such as media, reading, family and friends.

Duration of hypertension is associated with self-care behaviors for hypertension control (Lee et al., 2010). Long duration of hypertension is associated with self-care behaviors for hypertension control (Hu et al., 2013; Hyre et al., 2007; Lee et al., 2013; Robinson, 2012; Roumie et al., 2011; Tilburt et al., 2008). For the

qualitative study, long duration of hypertension led to acceptance of disease and practicing self-care behaviors for hypertension control with less difficulty (Kirdphon, 2003) and the ability to integrate self-care behaviors for hypertension control through daily life (Panpakdee et al., 2003).

In contrary, duration of hypertension $\geq$ 5 years have 4.4 times increased treatment no adherence (Karaeren et al., 2009). A large survey from 2,455,193 persons with hypertension in South Korea showed that duration of treatment with anti-hypertensive medication for more than six months have a 51% reduction of medication adherence when compared to those with a duration of medication less than six months (J. H. Park, Shin, Lee, & Lee, 2008). Duration of hypertension is not associated with anti-hypertensive medication adherence in some studies (Morgado et al., 2010).

In summary, duration of hypertension is conceptualized as health state in the present study. Duration of hypertension is hypothesized to have the direct effect on self-care behaviors. According to the literature review, it is inconsistency in the relationship between duration of hypertension and self-care behaviors for hypertension control. The inconsistency of the results might be from the effects of other factors. It might have some factors related to that relationship such as, support from a family member in helping persons with hypertension to achieve in performing self-care behaviors for hypertension.

2.4.3 Family support

Family is an important part of social and support from family members is important for all people. The level of stress to health could be attenuated by social support (Cohen & Wills, 1985). House (1981) classified social support as tangible, informational, emotional, and appraisal support. Tangible support is actual or touchable assistance such as reminding for taking a medicine, helping for doing a household chore and preparing for a recommended meal. Informational support is giving necessary information to use for making a decision and solving a problem. Emotional support is giving for closeness, attachment, reassurance, caring, empathy, trust, and dependency. Emotional support brought about the feeling of being loved, cared about, being a member of the group, and being a familiar person. Appraisal support is providing of information about how well a person doing. Appraisal support

helped a person to be harmonious with the social group (Schaefer, Coyne, & Lazarus, 1981). Scheurer, Choudhry, Swanton, Matlin, and Shrank (2012) classified social support to three types as follows: 1) structural support (e.g., marrital status, living arrangements and social network size); 2); functional, practical or instrumental support (e.g., paying for medications, reading a medication lebel, medication refill, transportation, and physical assistance); and 3) emotional support (e.g., encouragement, listening, attachment, nourishment, verbal reassurance, modeling, spiritual, and informational support).

Different types of support provide different kinds of benefits. Types and sources of support required for persons with hypertension are different from those of other people. Most persons with hypertension are able to care for themselves but carrying out several types of self-care activities is difficult to achieve, particularly over a long duration if a person lacks support. Tangible and emotional supports are usually provided by family members. Tangible and emotional supports are important for persons with hypertension. Housework and caring for a child and elder is common in Thai culture. Sharing those responsibilities by family members could help those with hypertension to have time for doing some activities such as exercise, food preparation, or relaxation activities. Family members can help persons with hypertension to visit a physician, to remind a patient to take medication (Li et al., 2007), to integrate activities to manage their disease in a daily routine, to participate in making decisions, to change dietary patterns and physical activities, to carry out prescribed regimens, to reduce the emotional effects in response to an illness (Rosland et al, 2012), to help with food selection and meal preparation, to monitor and to prepare medication for taking, and to assist a patient to have positive relationships with physicians (Flynn et al., 2013). The results from the qualitative study showed that family members, such as wife, husband, children, or significant others support those with hypertension for illness management. Husbands helped their wives in doing housework, monitoring of hypertension, reminders for taking medicines, increased intention to maintain good health, and increased the demand for health services, whereas wives helped their husbands by cooking foods with low sodium and fat, limiting the amount of food intake, reminding to exercise and taking medicines (Flynn et al., 2013).

Social support is different for each person and each type of illness but a type and source of social support is common for each illness. AlGhurair et al. (2012) conducted a systematic review of the impact of social support on medication adherence and the results show that practical (tangible or instrumental support) and information support are important for starting a medication, whereas emotional support is important for medication adherence. Providing for appropriate types and sources of support is important. Social support consists of several dimensions. Kahn (1979) defined social support as the perception of interpersonal relationships between at least two persons and classified the dimensions of social support as being expressed by positive affection, affirming personal behaviors, and receiving material from another (Kahn, 1979). The dimensions of social support as described by Norbeck are quantity and network characteristics as well as types of functional supports (affect, affirmation, and aid). Social support also involves an evaluation of the interaction, pattern of interactions, or helpful relationship (Schaefer et al., 1981).

Family support is important for persons with a chronic illness. Hanucharurnkul (1988) suggests that social support should consider both sources and types of social support. Persons with chronic illness require support from health care providers, family, friends, community, and the workplace (Glasgow et al., 2000). Persons spend time mostly with their family and it is the responsibility of family members to support each other. Chronic illnesses require behavioral changes to prevent illness progression and complication. Persons with a chronic illness may have difficulties in maintaining self-care behaviors when they lack family support, for example a lack of support from a family member to buy, to select and to prepare a meal as recommended by healthcare providers (Fongwa, Evangelista, & Doering, 2006).

Antecedents of social support are a boundary of personal interaction to give and to receive help and protection, personal relationships in social network, and environment of interaction (Langford, Bowsher, Maloney, & Lillis, 1997). Consequences of social support are increased competence, engagement in healthy behaviors, perception about controllability, perceptions about security, sense of stability, (Langford et al., 1997), tangible assistance (Kane, 1988), and perception of receiving care and love, and having a communication network (Cobb, 1976). Family

support specific to a disease have an influence on patient's outcomes rather than general support (Rosland et al., 2012).

Family support and support from friends and health care providers are associated with medication taking behaviors (Leelacharas, 2005). Family support is associated with self-care behaviors with regards to medication taking and lifestyle modifications (Mitrakaseem, 2005). A high level of family support for reminding of medication taking, following-up regularly, avoiding alternative medicine, are all associated with anti-hypertensive medication adherence (Osamor & Owumi, 2011). Persons with hypertension who have a low level of support from family and friends have a 2.29 times higher incidence non-adherence to anti-hypertensive medication when compared to those who have a high level of support (Li et al., 2008). Qureshi, Hatcher, Chaturvedi, and Jafar (2007) found that family support is a predictor of anti-hypertensive medication adherence.

The results from the systematic review show that social support and support from family members have some effectiveness in the increase of medication adherence (Schroeder et al., 2004). The meta-analysis of the studies related to self-care behaviors of Thai elders with hypertension show that self-care behavior has the greatest association with social support and family relationships with the effect sizes 1.11 and 0.59, respectively (Klainin & Ounnapiruk, 2010). Social support is a predictor of positive health practices with the effect size 0.40 (Yarcheski, Mahon, Yarcheski, & Cannella, 2004). On the contrary, Feng (2009) found that family support is not associated with adherence to therapeutic regimens for the control of hypertension. Family support is not associated with self-care behaviors to consume healthy diets (Eakin et al., 2007). Ford, Kim, and Dancy (2009) conducted a qualitative study among persons with hypertension. Some persons with hypertension received support from their families and friends for eating healthy foods, whereas some did not. In summary, the support specific to a family focused in the study related to self-care behaviors for hypertension control. Therefore, the influence of social support on self-care behaviors for hypertension control is included in the present study.

2.4.4 Knowledge about hypertension

Orem (2001) states that self-care requires education and the use of knowledge and scientific health knowledge is an important factor for assisting a person to meet self-care demands for disease control. Self-care should be based on scientific knowledge (Orem, 2001). Knowledge is essential and accurate information which is acquired from several sources and has a benefit for guiding personal actions (Kaplan, 1964 as cited in Burns & Grove, 2011). Knowledge is the integration and application of scientific knowledge and that knowledge is important for knowing (Carper 1978 as cited in Bonis, 2009). Knowledge is necessary for the differentiation of what is good, bad, desirable, and undesirable (Orem, 2001). The continuous search for knowledge is an external orientation of self-care action. Nurses can help persons with hypertension through that external orientation by the use of assistance methods (Orem, 1995) such as teaching persons with hypertension about the disease and activities required for hypertension control. Information required for persons with illness are knowledge about the disease and ways to control it (Cooper, 2009). New information or new knowledge is integrated with existing perceptions of an illness. New information is developed by obs*e*rvation of symptoms or behavioral changes resulting from a disease and received from other sources (e.g., healthcare provider, media) (Leventhal, Brissette, & Leventhal, 2003).

Knowledge is important for self-care agency and can be used for evaluation of self-care agency (Orem, 1995). In order to employ therapeutic self-care, persons should have adequate knowledge about their illness for understanding the situation and knowledge about self-care demands for planning of self-care actions. Self-care agency of a person can develop and exercise. Self-care actions might not be performed if a person is satisfied in other actions (Orem, 1991). However, having adequate knowledge about hypertension should help persons to hold the value of self-care and to consistently perform self-care actions.

Based on Orem (2001), self-care agency consists of the estimative, transitional, and productive operations. Estimative operations of persons with hypertension requires two types of knowledge including: 1) previous knowledge about hypertension and self-care demands for hypertension control. This knowledge is acquired from both valid and invalid sources such as health care providers, family

members, friends, and other persons; and 2) knowledge about the current situation of persons with hypertension. An individual uses both types of knowledge for knowing and understanding about situation, making observations, interpreting the meaning and correlating the meaning of events and conditions in the process of estimative operations. The production of estimative operations issues for making a decision in the transitional operation and the transitional operation requires knowledge about self-care situations, experiences, values, and willingness of a person to perform self-care. Productive operations follow transitional operations. Productive operation is the sequence of actions which are performed to meet self-care demands. Productive operation includes the processes of designing and planning for operations and evaluating the results and the subsequent actions. The success and quality of the transitional and productive operation processes should be based on the success and quality of estimative operations. Providing knowledge to a patient increases knowledge about disease risks and adjusted beliefs about disease and increases treatment adherence (Gellad, Grenard, & Marcum, 2011).

The acquisition of information depends on the availability of information sources and the ability to obtain information from these existing sources. Generally, it contains both valid and invalid information. Knowledge of lay people is different from expert knowledge. Knowledge of lay people comes from the connection between wisdom, experience, symptoms, and environment, whereas expert knowledge is derived from facts and science (Prior, 2003). Sources of information for persons with chronic illnesses are generally their nurses, pharmacists, therapists, practitioners, friends, family member, internet, support groups, newspapers or magazines, television programs, and websites (Turner et al., 2009). According to the systematic review, interventions of health education and care provided by nurses have shown to be effective in blood pressure control (Glynn, Murphy, Smith, Schroeder, & Fahey, 2010), however that support does not extend to the effectiveness in the increase of medication adherence. Persons who provide knowledge specific to chronic illness are also important. Healthcare providers are important as valid sources of knowledge about health and illnesses. Heath education taught by healthcare providers is ineffective in the increase of patient's knowledge in several studies (Hacihasanoglu & Gozum, 2011; Haynes et al., 2008).

Information also comes from a self-learning process through trial and error such as trying to stop anti-hypertensive drugs. If complications presented during the period of medication discontinuance, persons with hypertension began to adhere to anti-hypertensive medication. Some persons try to use herbs with or without the use of a western medicine. The disadvantage of this self-learning process is that it takes a long time, thus putting the person at risk for getting incorrect information and harm of personal health. Trying to self-adjust anti-hypertensive medicines in response to symptoms is found among persons with hypertension (Marshall, Wolfe, & McKevitt, 2012).

There is some evidence that supports the relationships between knowledge about hypertension and self-care behaviors for hypertension control. High knowledge about hypertension is positively associated with medication adherence (Naewbood, 2005), and self-care behaviors (Lee et al., 2010; Mitrakaseem, 2005). Persons with hypertension who got a score above the mean on knowledge questions have six times greater adherence to therapeutic regimens when compared to those who got scores below the mean (Ambaw et al., 2012). Knowledge of medication adherence was the mediator between patient-provider communication and medication adherence. Knowledge of medication regimen had a direct effect on medication adherence (Ambaw et al., 2012). High knowledge about hypertension was 12% decreasing in intentional no adherence to anti-hypertensive medication and 8% decreasing in unintentional no adherence (Kim et al., 2007).

Persons who were able to control their blood pressure have a mean score of hypertension knowledge higher than persons who are unable to not control their blood pressure (Almas, Godil, Lalani, Samani, & Khan, 2012). Providing hypertension knowledge to persons with hypertension has the effect of increasing medication adherence (Ruppar et al., 2008). A lack of knowledge about hypertension is associated with intentional non-adherence (Kim et al., 2007) and low frequency of performing healthy lifestyle behaviors (Heymann et al., 2011). A lack of knowledge about complications from hypertension is associated with anti-hypertensive medication non-adherence (Karakurt & Kasikci, 2012). Knowledge of blood pressure goals, reasons for medication usage and the consequences of hypertension are predictors of medication adherence (Morgado et al., 2010). The content of knowledge about

duration of drug use, reasons for medication use, causes of hypertension, blood pressure targets, and side effects of medicine have 6.8, 2.8, 3.4, 12.9, and 6.0 times increase in anti-hypertensive medication adherence (Karaeren et al., 2009).

The results from the quasi-experimental study also show that providing knowledge about hypertension and self-care for hypertension control have the effect of increasing self-care behaviors about diet, exercise, stress reduction, except for medication taking (Pengpud, 2004). Knowledge about hypertension have the effect of increasing medication adherence (Kauric-Klein, 2011) and lifestyle modification (Huang et al., 2011; Park et al., 2013). The valid information received from healthcare providers is a strong predictor of a high number of self-care behaviors which accounted for 13.1% of the variance. Persons with hypertension who have low knowledge about hypertension show a 62% decrease in anti-hypertensive medication adherence (Turner et al., 2009). A high level of information sources and the information received from trusted sources, particularly healthcare providers is associated with high numbers of patient self-care behaviors. Sources from which persons with hypertension received information about their disease ranked from highest to lowest are general practitioners, family, friends, and websites (MacKichan, Paterson, Henley, & Britten, 2011).

The results from the systematic review also show that most educational interventions have the effect of increasing the participant's knowledge, medication adherence (Schroeder et al., 2004) and the reduction of blood pressure (Fahey, Schroeder, & Ebrahim, 2005). The review of the intervention aimed at increasing medication adherence in people with chronic diseases by Haynes et al. (2008) show the following results: 1) interventions by telephone have the effect of increasing anti-hypertensive medication adherence and diastolic blood pressure reduction; 2) a nurse-led intervention using a phone call and providing knowledge about hypertension, medication adherence, and side effects of drugs has the effect of increasing medication adherence; 3) nurse-led telephone and mail communication to reinforce medication adherence has the effect of increasing medication adherence; 4) interventions related to self-blood pressure monitoring have the effect of increasing medication adherence; and 5) nurse-led interventions about health support groups by talking about concerns and problems of medication as well as reinforcement is not effective in the increase of

medication adherence. On the contrary, the results of the meta-analysis show that education alone is not largely successful in the reduction of blood pressure (Glynn et al., 2010).

In summary, several studies support the relationship between knowledge about hypertension and self-care behaviors for hypertension control. The results were inconsistent in intervention about health education. Moreover, most studies focus on studying the influence of hypertension knowledge on medication adherence. The effectiveness of intervention on lifestyle modification was focused on minimally in previous studies. In the present study, the researcher hypothesized that knowledge about hypertension has both direct and indirect effects on self-care behaviors.

2.4.5 Knowledge about self-care demands

Orem (2001) states that knowledge should be used throughout a course of self-care performance. Knowledge about self-care demands and how to meet those demands is a necessary issue for guiding self-care tasks. There are several types of knowledge. For meeting the goal of self-care of persons with illness, knowledge about self-care demands should have a benefit in helping persons to achieve the goal of meeting self-care demands for illness control. Persons have to know about self-care demands in order to use them as guidance for planning their self-care actions and making decisions about self-care to meet these demands. Self-care demands are a specific type and number of actions which are necessary for meeting existing self-care requisites at specific time periods (Orem, 2001). Therapeutic self-care demands are constructed by humans with valid information related to human structure, function, and development (Orem, 2001). Self-care requires learning, use of knowledge, motivation, and specific skills. Methods, equipments, and specific actions are integrated for use in meeting self-care demands (Orem, 1991).

In general, several diseases have self-care demands in common and self-care demands of each of those diseases are integrated from scientific knowledge. Knowledge about therapeutic self-care demands have a benefit of making nursing care plans or providing nursing interventions which are specific to each disease. Nurses can assess the adequacy of self-care agency by evaluating against the specific therapeutic self-care demands (NDCG, 1979 as cited in Orem, 1991).

Studies related to knowledge about self-care demands are rarely found in literature. Only three existing studies are available. Harper (1984) found that providing for knowledge about self-care demands in the aspect of anti-hypertensive medications for women with hypertension have the effect of increasing self-care behaviors for taking anti-hypertensive medications in comparison with those who receive only knowledge about hypertension. However, the effectiveness of the intervention was reduced when the duration increases. Peters and Templin (2008), found that knowledge about self-care demands of hypertension have a positive direct effect on self-care behaviors for hypertension control. Rujiwatthanakorn et al. (2010) tested the effectiveness of a self-care management program on Thai persons with hypertension. Persons with hypertension in the intervention group had greater knowledge about self-care demands and self-care ability than those in the control group.

In summary, the studies which focus on knowledge about self-care demands is rarely found in literature. However, knowledge about self-care demands and self-care behaviors for hypertension control are associated with self-care behaviors for hypertension control but the effect is not strong and the effectiveness could not be maintained for a long duration. It is possible that some factors might influence its relationship. Knowledge related to self-care demands is hypothesized as having an effect on self-care behaviors and indirect effects on self-care behaviors through perception about hypertension.

2.4.6 Perception about hypertension

A person's perception is an important predictor of health behaviors (Diefenbach & Leventhal, 1996). Perception is formed based on experience and information and developed by interaction with that information. This information is processed by using cognition. Information processing involves evaluation of ability, and is concerned with tasks and actions (Oliveira, Pagliuca, Sousa, & Andrade, 2012). Perception, which uses sense and cognition, is an understandable phenomenon using the interpretation of sensory information based on experience, information processing, and the formation of mental models. Attributes of perception are sensation, cognition, and comprehension. The antecedent of perception is the ability to interact with one's environment through the senses. A consequence of perception is the decision to either

perform an action or not (McDonald, 2012). A person receives information from various sources and this information is issued for evaluation and decision making about one's health and illness (Diefenbach & Leventhal, 1996). Perceptions about hypertension are based on a collection of knowledge from three sources including authoritative sources (e.g., health care providers), socio-cultural circumstances (e.g., family, friends, media), and from illness experience (e.g., symptoms related to illness) (Pickett, Allen, Franklin, & Peters, 2014).

Perception about hypertension in the correct ways affects decision making for initiating and maintaining self-care behaviors for hypertension control (Panpakdee et al., 2003). Helping patients to have correct perceptions about hypertension should reduce the time required to reach this stage of integration of self-care behaviors into their daily lives rather than allowing them to develop through self-learning processes. Perceptions about hypertension are consistent and inconsistent with knowledge of health care providers (Panpakdee et al., 2003). The consistency of perception about hypertension with knowledge of healthcare providers depends on the prior acquired information and interpretation using the cognition of each person. (Marshall et al., 2012) conducted a systematic review in order to combine the results of the qualitative studies related to the perception of lay people about hypertension. The results from the systematic review show that the majority of persons with hypertension link stress as a major cause of hypertension, stroke as the major complication of hypertension, headache and dizziness as symptoms of hypertension, and the presence of symptoms as an indicator of hypertension. Persons with hypertension perceived it as both a symptomatic and asymptomatic disease. Some participants used symptoms as the indicator for taking medication.

Theories related to perceptions about illness threats are Health Belief Model and the Common Sense Model of Illness Representation. Health Belief Model focuses on the perception of illness threats in the aspect of susceptibility to a health threat and its severity, as well as the perception of benefits and barriers to control this health threat (Brown et al., 2009). The Common Sense Model of Illness Representation is based on the Health Belief Model and the Fear Drive Model. The Commonsense Model of Illness Representation conceptualized an individual as an active problem solver. An individual has perceptions about a health threat and

emotional reaction to this threat. The Commonsense Model of Illness Representation is concerned with giving an explanation of an illness threat and coping strategies for the control or the management of this threat (Leventhal, Leventhal, & Contrada, 1998). Threat is the expectation that harm and loss will happen (Lazarus & Folkman, 1984). Under the same condition, there is a variation in reaction to a condition of each person because a cognitive process involves an interaction between the condition encountering and the reaction (Lazarus & Folkman, 1984). In case of hypertension, in the condition of diagnosis with hypertension, a person will have a different reaction to hypertension because the variation in a cognitive process. The product of that cognitive process is a personal view or perception. That perception interprets what happens or gives a meaning about the condition (Lazarus & Folkman, 1984). The similarity in the pattern of a cognitive viewing should have a similarity in reaction, for example, persons with hypertension viewing stress as a cause of hypertension focused on stress management rather than changing lifestyles (Pickett et al., 2014). Therefore, changing a cognitive view in the correct way should help a person to have the correct reaction.

Common Sense Model of Illness Representation emphasizes the perception about an illness threat in the following aspects as: 1) labeling an illness (e.g., hypertension, diabetes, asthma) and perceived symptoms of an illness (e.g., cough, fatigue, pain); 2) causes (e.g., stress, behavior); 3) the expected course of illness (e.g., acute, chronic, cyclic); 4) the ability to control by treatment and/or person; and 5) consequences (e.g., death, loss of time to work, economic) (Diefenbach & Leventhal, 1996; Leventhal et al., 1998). A cognitive view of the threat of an illness could be an abstract (conceptualization or linguistic) or concrete (perception or experience) (DiMatteo, Haskard, & Williams, 2007). A health threat stimulates cognitive and emotional representation and procedures for managing the threat (control of danger) and emotion (control of fear and distress) (Leventhal et al., 2003). Concrete representations linked to a symptom of an illness because a symptom is a dominant characteristic of an illness (Brownlee, Leventhal, & Leventhal, 2000). Perceptions of an illness influenced personal behaviors in responding to a health threat such as following with a treatment regimen (Phillips et al., 2013). Petrie and Weinman (2006) stated that persons form illness perception and have emotional responses to an

illness treat after being diagnosed with an illness. Perceptions about an illness are based on previous medical knowledge or experience from a family member who has had the same illness and ways to act to reduce emotional response of that threat which is perceived from an illness. A patient links between a symptom and an illness. When persons are diagnosed with an illness, they find a symptom and have an image of their illness because of that symptom. A person views an illness issued for guiding of disease management. A cognitive view of an illness of a lay person is usually inaccurate. An inaccurate view of an illness could lead to selecting incorrect illness management. Persons integrate medical information as a perception of health which can lead to behavioral changes (Lukoschek, 2003). Perceptions about hypertension are important for performing self-care behaviors for hypertension control. In Thailand, most studies related to perception about hypertension and self-care behaviors of persons with hypertension are based on the Health Belief Model. There is only one study using the Commonsense Model of Illness Representation to guide the study of medication taking behaviors of Thai women with hypertension (Leelacharas, 2005).

2.4.6.1 Perceptions about hypertension based on the Health Belief Model, perceptions about hypertension, susceptibility to hypertension, severity of hypertension, perceived benefits and barriers to controlling hypertension are positively associated with self-care behaviors for hypertension control (Samoh, 2008). Perceived benefits and barriers to control hypertension are associated with self-care behaviors for control of the disease (Mitrakaseem, 2005). Having incorrect beliefs about hypertension management is associated with low healthy lifestyle behaviors (Heymann et al., 2011). Manchan (2004) found that persons with hypertension who have correct perceptions about hypertension in the aspect of susceptibility and severity of hypertension, as well as benefits and barriers to control hypertension have better self-care behaviors for hypertension control than those who have incorrect perceptions. Hypertensive preventative behaviors are associated with perceptions about susceptibility to hypertension, the threat of hypertension, receiving instructions from health care providers, and the possibility of hypertension prevention behaviors. Twenty-eight percent of the variance of hypertension prevention behaviors can be explained by receiving instruction from health care providers, perceptions about the

hypertension threat, and a possibility of hypertension prevention behaviors (Somjaree, 2006).

Li et al. (2012) found that persons with hypertension who have a low perception of their susceptibility to hypertension have 1.15 times increase in non-adherence to anti-hypertensive medication than those with a high perception of their susceptibility. DiMatteo et al. (2007) conducted a meta-analysis on the relationship between perception about diseases and medication adherence. Among 27 studies, perception of the severity of disease has a strong relationship to medication adherence, whereas the perception of health and the severity of a disease measured objectively is not associated with medication adherence. Persons with hypertension who have poor health status measured objectively are more adherent to anti-hypertensive medications than those who have good health status. On the contrary, persons with a severe disease who have poor health status measured objectively have low medication adherence.

2.4.6.2 Perceptions about hypertension based on the Common Sense Model of Illness Representation,

Most persons with hypertension have a perception of the disease as having a chronic duration and stable conditions, and they believed in the effectiveness of medical treatments (Hsiao, Chang, & Chen, 2012). Chen et al. (2011) found that the perception of personal control is associated with non-intentional medication adherence, eating an unhealthy diet, and exercise. Exercise is associated with symptom experience before and after hypertension diagnosis, perceptions about the consequences of hypertension, treatment control, hypertension, and non-intentional medication adherence. Perceptions of the causes of hypertension as external factors are inversely associated with eating a low-fat diet or a low-salt diet. The perception of doing risky behaviors as a cause of hypertension is associated with smoking and alcohol drinking. Persons with hypertension who have the perception of causes of hypertension as stress or external factors have low self-care behaviors in the aspects of follow-up visits, eating low-salt diets and low-fat diets. The Perception of causes of hypertension as factors related to biomedical is not associated with adherence to self-care behaviors. The perception about stress as a cause of hypertension is negatively

associated with follow-up visits. Illness coherence is a predictor of self-care behaviors for hypertension control which accounts for 7% of the explained variance (Pickett et al., 2014). The perception about hypertension as threatening is associated with anti-hypertensive medication adherence (Rajpura & Nayak, 2014). Hsiao et al. (2012) divided the participants into three groups by using a cluster analysis. Nearly half of the participants are grouped in the first cluster which has a low perception of the negative outcome of hypertension and low negative emotional response to hypertension. The second cluster has higher negative emotional responses to hypertension and higher perceptions of negative emotional responses. The third cluster has a score between cluster one and two. The first cluster has higher medication adherence, whereas those in cluster two have lower medication adherence.

Perceptions about causes of hypertension

Perceptions about causes of an illness affected the type of treatment and performing activities or behaviors to control an illness (Petrie & Weinman, 2006). Hekler et al. (2008) found that persons with hypertension who believe the cause and control of hypertension in consistency with medical knowledge is significantly associated with perceptions about hypertension symptoms, lifestyle modification, and systolic blood pressure reduction whereas persons with hypertension who believed about cause and control of hypertension related to stress is significantly associated with perception about negative outcomes of hypertension, perceptions about hypertension symptoms, and stress management. Self-care behaviors related to lifestyle modification is associated with a stress reduction and systolic blood pressure reduction. Strong perception about cause of hypertension is associated with non-adherences (Kucukarslan, 2012).

Pickett et al. (2014) found that those persons with different gender and educational levels perceived causes of hypertension differently. Approximately 34.7% of persons with hypertension perceived causes of hypertension as stress. Persons with hypertension experiencing a duration of hypertension more than five years perceived hypertension as a chronic duration. Persons with hypertension perceived causes of hypertension ranging from the highest to the lowest as stress, uncontrollable factors, biomedical factors, unhealthy behaviors, and heredity, respectively. The causes of stress, including negative emotions, attitude, and family

problems are perceived as the primary cause of hypertension which accounted for over half of the variance. Perceptions of balance and culture as causes of hypertension is a predictor of self-care behaviors for hypertension control (Chen, Tsai, & Lee, 2009). According to a systematic review, perceptions about causes of hypertension of persons with hypertension ranging from the highest to the lowest are stress, dietary, obesity, family, sedentary, alcohol drinking, heat, smoking, diabetes, and chemical exposure (Marshall et al., 2012).

Most participants believe that stress is a cause of hypertension (Rajpura & Nayak, 2014) and that management of stress is important for persons with hypertension (Lukoschek, 2003). Persons with hypertension perceived causes of hypertension as stress, eating some foods such as pork which increases pressure in blood vessels (Wilson et al., 2002). Stress is perceived to be a greater cause of hypertension than lifestyle behaviors (Kronish, Leventhal, & Horowitz, 2012).

Perceptions about consequences of hypertension

Perceptions of the consequences of hypertension misperception of negative effects of an illness on work, family, finance, and lifestyle and perceptions about the consequences reflected the perception of the severity of the condition (Petrie & Weinman, 2006). The results from the meta-analysis show that perceptions about the consequences of illness are negatively associated with psychological well being, role functioning, social functioning and liveliness (Hagger & Orbell, 2003). Perception of theconsequences of hypertensions are associated with medication adherence (Leelacharas, 2005) and the perception of the necessity of medicine (Figueiras et al., 2010). Most persons with hypertension have the perception about hypertension as being a serious illness (Kronish et al., 2012), a causal factor of death and cardiovascular diseases (Lukoschek, 2003; Wilson et al., 2002), serious consequences (e.g., stroke and kidney disease, heart attack, and death) (Aroian, Peters, Rudner, & Waser, 2012; Lukoschek, 2003).

Perceptions about duration of hypertension

Perceptions about the duration of an illness were the duration of an illness in aspects of acute, cyclical, and chronic. Perceptions about the duration of hypertension are associated with the duration of medication taking. Persons with hypertension viewing their hypertension as cyclical duration or a variation of

hypertension, depended on a level of stress of having hypertension (Petrie & Weinman, 2006). Perception about the duration of illness is negatively associated with psychological well being, role functioning, social functioning and liveliness (Hagger & Orbell, 2003). Perception about the duration of hypertension is associated with medication adherence (Leelacharas, 2005) and the perception of the necessity of medicine (Figueiras et al., 2010). Perceptions about the duration of hypertension as a chronic condition is important for performing self-care behaviors for hypertension control (Kirdphon, 2003).

Perceptions about symptoms related to hypertension

Perception of symptoms is the meaning of symptoms based on cognition and emotion, the interpretation of symptoms based on knowledge and experience, and the action based on that meaning and interpretation (Posey, 2006). Perceptions of symptoms are usually different from medical knowledge (Petrie & Weinman, 2006). Approximately ninety percent of persons with hypertension believe that they can monitor blood pressure by using symptoms as an indicator and that by observing those symptoms, they will know when their blood pressure increases. Perceptions of symptoms as an indicator of blood pressure increase and in the effectiveness of anti-hypertensive medications in attenuation of their symptoms of hypertension are associated with anti-hypertensive medication adherence (Meyer, Leventhal, & Gutmann, 1985 as cited in Diefenbach, & Leventhal, 1996). Perceptions of hypertension symptoms are associated with medication adherence (Leelacharas, 2005) and the necessity of medicine for controlling the disease (Figueiras et al., 2010). Perceptions of symptoms of hypertension are associated with perception in personal control (Chen et al., 2011). Perceptions of symptoms of illness, chronic duration of illness, and consequences of illness are associated with avoidance and emotional coping strategies (Hagger & Orbell, 2003). Perceptions of symptoms of hypertension have a direct effect on beliefs about cause and medication adherence**.** Perceptions of hypertension symptoms have an indirect effect on treatment and perception of personal control. Perceptions about symptoms of hypertension have an indirect effect on medication adherence and lifestyle modification through treatment control and personal control. Perceptions about hypertension symptoms have an indirect effect on lifestyle modification through perceptions of treatment control and personal control.

Perceptions about hypertension symptoms have an indirect effect on lifestyle modification through perceptions of treatment control and personal control (Chen et al., 2011). Symptoms after hypertension diagnosis are the predictor of self-care behaviors for hypertension control (Chen et al., 2009).

Headaches and dizziness are used as an indicator of blood pressure increase of persons with hypertension and they focus on the control of symptoms rather than the control of blood pressure. The participants used the recovery from symptoms to confirm the effectiveness of medications and they had a perception about hypertension as an acute illness. Participants who were asymptomatic had difficulty in understanding their condition (Kronish et al., 2012) or did not believe the diagnosis of hypertension (Lukoschek, 2003). The asymptomatic nature of hypertension led to a perception of hypertension as less serious, which led to non-adherence to medication (Bennett, 2011). Some persons with hypertension tried to stop medication when they were symptom free or healthy. The absence of consequences after stopping the medications led to the belief in the ability to live without medications (Edwards, 2011).

Headache and dizziness are mentioned as common symptoms of hypertension (Lukoschek, 2003). The participants described that they knew when they had high blood pressure through a variety of symptoms (dela Cruz & Galang, 2008). Persons with hypertension did not believe in the necessity of anti-hypertensive medications when they did not have signs or symptoms (Fongwa et al., 2008). The patients gave the meaning of their hypertension by observing and comparing their symptoms to other familiar illnesses. Most persons with hypertension did not have symptoms leading to living as usual lifestyle behaviors without any concern about health (Samranbua, 2011). The participants perceived hypertension as an acute condition and stopped a treatment when they did not have any symptoms. They returned to get a treatment again when symptoms recurred (Kirdphon, 2003). According to a systematic review, persons with hypertension perceive symptoms related to hypertension ranging from the highest to the lowest as headaches, dizziness, palpitations, tiredness, sweating, nausea, visual changes, and chest pain (Marshall et al., 2012).

Perception about controllability of hypertension

There are many misperceptions about the controllability of hypertension by a person or treatment (Petrie & Weinman, 2006). Perceptions about the ability to control the illness are associated with cognitive reappraisal, problem-focused coping strategies and emotional expressions. Perceptions about the ability to cure and control the illness are associated with psychological well-being, social functioning and liveliness (Hagger & Orbell, 2003). Perceptions of treatment control and personal control have direct effects on medication adherence and lifestyle modification (Chen et al., 2011). Perceptions about the ability to control hypertension are associated with anti-hypertensive medication adherence (Leelacharas, 2005). Perceptions about personal control are associated with the perception of the necessity of medicine and treatment control which is associated with perceptions about necessity of medicine (Figueiras et al., 2010). Perceptions about personal control are a predictor of self-care behaviors for hypertension control (Chen et al., 2009).

Most persons with hypertension have a perception of the effectiveness of medications, particularly in the reduction of symptoms of hypertension and have several barriers in changing their lifestyles such as physical conditions, health knowledge, and responsibility to their families. Therefore, they focused on the use of anti-hypertensive medications (Samranbua, 2011). The participants had the perception that hypertension is preventable and controllable (Aroian et al., 2012). Perceptions in curability of hypertension led persons with hypertension to modify their regimens and to try other treatments such as the use of some substances or herbs (Panpakdee et al., 2003).

Emotional perception about hypertension

Emotional perceptions of hypertension are positively associated with intake of fruits and vegetables and physical activity, as well as negatively associated with s about duration of hypertension (Stallings). Persons with hypertension who have a higher emotional perception about hypertension and their ability to control their own disease are 35% and 41% decreasing in medication adherence (Ross, Walker, & MacLeod, 2004). According to the meta-analysis from 45 studies, persons with chronic illness who had a higher emotional perception of their illness are associated with avoidance coping strategies and emotional expression

(Hagger & Orbell, 2003). Higher emotional representation is negatively associated with medication adherence (Kucukarslan, 2012).

Summary

Hypertension is a chronic illness. To control hypertension, persons with the disease should have self-care behaviors related to anti-hypertensive medication adherence and lifestyle modification. Persons with hypertension have to modify their lifestyles related to weight reduction or weight maintenance, eating low-salt diet, consuming healthy foods, increasing physical activities, and avoiding risk factors such as moderate alcohol consumption, smoking, negative emotions and stress, and lack of sufficient sleep. Anti-hypertensive medication adherence and lifestyle modification are self-care demands for hypertension control. To have self-care behaviors for hypertension control, persons with hypertension have to know about those self-care demands for practicing them. Therefore, encouraging individuals with hypertension to increase self-care behaviors for the control of the disease is an important responsibility of nurses. However, there are several factors related to self-care behaviors for hypertension control, which include duration of hypertension, family support, patient-provider communication, knowledge about hypertension, knowledge about self-care demands, and perception about hypertension.

CHAPTER III
METHODOLOGY

This chapter presents the methodology including research design, research setting, population and sample, instruments, protection of human rights, data collection, and data analysis, respectively.

3.1 Research Design

The cross-sectional model testing design was selected for use in the present study. It aims to explore the patterns of relationships between the basic conditioning factors (patient-provider communications, duration of hypertension, and family support), self-care agency (knowledge about hypertension, knowledge about self-care demands, and perceptions of hypertension), and self-care behaviors for hypertension control.

3.2 Research Setting

A regional hospital was the research setting in the present study. According to the report of the Bureau of Policy and Strategy in 2010 (MOPH, 2011), the central part of Thailand ranks first in persons with diseases related to the circulatory system. The regional hospital has at least 500 in-patient beds and physicians who specialize in several areas such as cardiology and the vascular system, neurology, urology, or hematology. Among 25 regional hospitals in Thailand, the central part of Thailand consists of 7 regional hospitals covering 27 provinces (except for Bangkok). Three regional hospitals in the central part of Thailand were selected as the research settings for the present study because patients who are treated at these hospitals have a high prevalence of hypertension and are conveniently located for data collection. These three regional hospitals can provide health services to between 634

and 855 in-patients and provide daily out-patient treatment for approximately 500 patients.

Persons with hypertension in the regional hospitals receive treatment from physicians who specialize in internal medicine. Persons with hypertension who have complicated cardiovascular problems will be referred by those physicians to receive treatment from cardiovascular disease specialists. The routine follow-up activities of persons with hypertension are: 1) receiving a laboratory test in the morning of a follow-up day or a few days before visiting; 2) getting blood pressure checked; 3) direct checking of blood pressure by nurses for those with blood pressure > 140/90 mmHg after resting for 5-10 minutes; 4) meeting a physician and receiving a drug prescription; 5) setting an appointment card for the next follow-up appointment; and 6) getting medications at an out-patient pharmacological department. Persons with hypertension receive informal health education related to hypertension from physicians and nurses according to their problems. Persons with a new diagnosis of hypertension or who require counseling about health received health counseling from nurses or health educators.

3.3 Population and Sample

Population: Population was persons with hypertension receiving treatments at outpatient clinics of the regional hospitals in the central part of Thailand.

Sample: Samples were persons with essential hypertension who received treatments from physicians at outpatient clinics at the three regional hospitals in the central part of Thailand.

Sampling: The subjects were selected using a purposive sampling method. The potential subjects who met the inclusion criteria were recruited for the study.

Inclusion criteria

1) Being aged > 18 years
2) Being diagnosed as having essential hypertension for at least one year and receiving at least one type of anti-hypertensive drug
3) Being able to communicate in Thai
4) Being willing to participate in the study

5) Having a normal cognitive function as measured by The Short Portable Mental Status Questionnaire (SPMSQ) who received the score at least eight in adults aged > 60 years or diagnosis with a disease of the brain such as a stroke or transient ischemic attack (TIA)

Exclusion criteria

1) Having secondary hypertension as documented in the patient's medical records (e.g., renovascular hypertension, pheochromocytoma)

2) Having diabetes

3) Being pregnant

Sample size: The number of persons with hypertension without diabetes mellitus who received treatment at each regional hospital in the study area was approximately 15,000 - 20,000, therefore the total population of the seven regional hospitals was approximately 105,000 - 140,000 persons being treated at these hospitals. Because the population of more than 100,000 was equal to the sample number, the number of 100,000 was used for calculating the sample size.

For the Yamane formula (Yamane, 1973, p. 1088),

$$n = \frac{N}{1 + Ne^2}$$

when n = the sample size

N = the number of population

e = the desired level of precision

If the number of population is 100,000 and the desired level of precision is 0.05, the sample size required for the present study would be

$$n = \frac{100{,}000}{1 + 100{,}000\ (0.05)^2}$$

$$n = 398$$

3.4 Instruments

The instruments of this study consisted of 1) the cognitive screening instrument and 2) the data collecting instruments. The cognitive screening instrument was the Short Portable Mental Status Questionnaire (SPMSQ) and the data collecting instruments were the Demographic and Health Information Sheet (DHIS), the Revised Illness Perceptions Questionnaire (IPQ-R), the Chronic Illness Resources Survey (CIRS), the Knowledge about Self-Care Demands Questionnaire (KSCDQ), and the Self-Care Behavior Questionnaire (SCBQ).

3.4.1 Cognitive screening instruments

The Short Portable Mental Status Questionnaire (SPMSQ)

The Short Portable Mental Status Questionnaire (SPMSQ) was used for screening a cognitive function. The Short Portable Mental Status Questionnaire was developed by Eric Pfeiffer (1975) (Mc Dowell, 2006). The items of the SPMSQ covered short and long term memory, orientation (about person, time and place), and basic mathematic calculation. The score “0” and “1” were given for an incorrect and correct answer, respectively. The total score ranged from 0 to 10. The high score indicated high intact cognitive function. In the present study, the SPMSQ was used for screening cognitive function of elder subjects aged > 60 years or had a disease of the brain such as a stroke or TIA. The elderly subjects who got a score > 8 could participate in answering the questionnaires. The SPMSQ was translated into Thai by Yamwong (1995) for measuring the cognitive function among 56 hospitalized elders. The Thai version of the SPMSQ was tested for its internal consistency and reliability by three nursing instructors. The Chonbach’s alpha of the Thai version SPMSQ was 0.94 (Yamwong, 1995). An example of the questionnaire statement was “What are the date, month, and year?”

3.4.2 The data collecting instruments

The Demographic and Health Information Sheet (DHIS)

The Demographic and Health Information Sheet (DHIS) was used for collecting demographic and health information. The DHIS was developed by the

researcher based on literature review. The DHIS consisted of two parts: 1) demographic information; and 2) health and physical examination information.

Part I, the demographic information, consisted of the items for collecting gender, age, education, occupation, marital status, income, family history of hypertension, and side effects of a drug. The demographic information was collected by asking the subjects or self-reporting by the subjects.

Part II, health and physical examination information, consisted of duration of hypertension, height, weight, blood pressure, hypertensive complications, and current anti-hypertensive drug use. The data in part II were collected from the patient's medical records. Duration of hypertension was time since a person was diagnosed with hypertension and was calculated by subtracting the present year by the year of hypertension diagnosis. Weight and height were used for calculating the body mass index (BMI). The body mass index was calculated by dividing the weight in kilograms by the square of height in meters. The levels of blood pressure in the past six months were collected and were used for calculating a mean of systolic and diastolic blood pressure. The mean of blood pressure was classified by the researcher to be the controlled level (BP < 140/90 mmHg) and uncontrolled level (BP > 140/90 mmHg).

The Revised Illness Perception Questionnaire (IPQ-R)

The Revised Illness Perception Questionnaire (IPQ-R) was the instrument for measuring perception of an illness. The IPQ was the original version of the IPQ-R and the IPQ was developed by Weinman, Petrie, Moss-morris and Horne (1996). Moss-Morris et al. (2002) revised the IPQ to the IPQ-R for improving the comprehension and psychometric properties of the IPQ. The IPQ-R consisted of three parts including: 1) identity or nature of a symptom; 2) illness representation consisting of seven subscales including timeline, consequences, personal control, treatment control, cyclical timeline, coherence, and emotional representation; and 3) perception about causes of illness (Moss-Morris et al., 2002). Only part II was used in this study for measuring perception about hypertension.

Part II, which was used for measuring perception about hypertension, consisted of 38 items. The Thai version IPQ-R translated by Sriprasong et al. (2009) consisted of 37 items because item 17 (my actions will not affect the outcome) was

deleted due to the problem of semantic equivalence. The 37-item Thai version IPQ-R was used in the present study. The Thai-version IPQ-R consisted of 7 subscales including timeline (acute/chronic) (six items), consequences (six items), cyclical timeline (four items), controllability by person (six items), controllability by treatment (five items), coherence of an illness (four items), and emotional representation (six items). The subjects responded on the five-level Likert scale, including "strongly disagree," "disagree," "neither agree nor disagree," "agree," and "strongly agree" and the score giving for these choices were 1, 2, 3, 4, and 5, respectively. The items 1, 4, 8, 15, 17, 18, 22, 23, 24, 25, 26, and 35 were negative statements and the scores were reversed before summation to the total scores. The total score ranged from 37 to 185. The high score indicated that persons had a cognitive view of hypertension as a threat to them. It was the cognitive view in the aspects of chronic duration, cyclical timeline, consequences, ability to control hypertension by person and treatment, understanding of hypertension, and negative emotions in response to hypertension. The interpretation of the total score of the IPQ-R was based on the three-level class interval, including the lower-end of the interval = mild, the middle of the interval = moderate, and the high end of the interval = high. Therefore, the interpretation of the score of the IPQ-R was persons with hypertension who viewed hypertension as threatening to them at a "37-86.3 = mild," "86.4-135.6 = moderate," "135.7-185 = high" level. The example of the questionnaire statement in the timeline subscale of the IPQ-R was "My illness will last for a long time?"

The IPQ-R was translated into Thai by Sriprasong et al. (2009) for purpose of measuring perception about illness in persons with post-myocardial infarction. The electronic mail asking permission for using the questionnaires was sent to Dr. Rona Moss-Morris, the professor of psychology as applied to medicine at King's college, before using. Weinman et al. (1996) recommended substitution of the word "illness" for the word which was specific to chronic illness such as diabetes mellitus, asthma, and hypertension. Therefore, the word "hypertension" was substituted for "post-MI" for the purpose of measuring perceptions about hypertension in this study.

Knowledge about Self-Care Demands Questionnaire (KSCDQ)

Knowledge about the Self-Care Demands Questionnaire (KSCDQ) was the instrument for measuring understanding about hypertension and self-care demands for hypertension control. The KSCDQ was developed by Rujiwatthanakorn (2010) based on the review of literature according to the Orem's Self-Care Deficit Theory of Nursing. The KSCDQ consists of two parts with a total of 36 items. The KSCDQ was used for measuring knowledge about hypertension and knowledge about self-care demands.

Part I was used for measuring knowledge about hypertension in the aspects of definition, causes, risk factors, sign, symptoms, diagnosis, complications, treatment, and goals of treatment. It consisted of 13 items and the total score ranged from 0 to 13. The high score indicated that persons with hypertension had a high understanding about hypertension. The subjects were asked to respond "yes" or "no". The incorrect and correct answer on each item was given a score 0 and 1, respectively. The subjects responding "yes" on the items 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, and 13 and the "no" answer on the items 8 and 12 gave the score 1 for each item. The interpretation of the total score of the knowledge about the hypertension subscale based on a three-level class interval was persons with hypertension having "0-4.3 = mild," "4.4-8.6 = moderate," "8.7-13 = high" understanding about hypertension. An example of the questionnaire statement was "Do persons with top blood pressure reading > 140 mmHg have hypertension?"

Part II was used for measuring knowledge about self-care demands. Part II included 23 items in 6 subscales, including medication taking (three items), dietary and body weight control (six items), aerobic exercise (two items), stress management (two items), risk behavior avoidance (five items), and self-monitoring (five items). The total score ranged from 0 to 23. The high score indicated a high understanding of self-care activities required for hypertension control. The subjects were asked to respond "yes" or "no". The incorrect and correct answers on each item were given a score 0 and 1, respectively. The subjects responded "yes" on the items 2, 9, 10, 11, 13, 15, 17, 18, 21, 22, and 23 and "no" on the items 1, 3, 4, 5, 6, 7, 8, 12, 14, 16, 19 and 20 were given a score 1 for each item. The interpretation of the total score of the knowledge about self-care demands based on a three-level class interval was persons

with hypertension having a “0-7.7 = mild,” “7.8-15.4 = moderate,” “15.5-23 = “high” level of knowledge about self-care demands. The example of the statement in the questionnaire in the medication taking subscale was “Persons with hypertension have to exercise by having a continuous movement of arms and legs for 30 minutes at least 3 days/week?”

The Chronic Illness Resources Survey (CIRS)

The Chronic Illness Resources Survey (CIRS) was the instrument for measuring multiple sources of support and resources. The CIRS was designed to be applied to chronic diseases. The CIRS was developed by Glasgow et al. (2000) and based on the Social-Ecologic Model. The items included general support such as emotional support and resources for eating, exercise, and medication taking (Glasgow et al., 2000). The CIRS consisted of eight subscales for measuring specific sources of support and resources including: 1) physician and health care team; 2) a family and friends; 3) actions of a person; 4) neighborhood; 5) community; 6) media and policy; 7) community; and 8) workplace. In the present study, two subscales of the CIRS including 1) family/friends subscale and 2) physician/health care team subscale were used for measuring family support and patient-provider communication, respectively.

The Chronic Illness Resources Survey: *Family and friend support subscale* was used for measuring *family support.* In the present study, the words “friends” was removed from all items for measuring family support. The family subscale consisted of 8 items which included the first 7 items for measuring family support and the last item for measuring the importance of family support for managing illness. The subjects responded on a five-level Likert scale from one to five. The level of scores indicated the level of support which persons received from their family members in the past three months. The five-level Likert scale consisted of “not at all,” “a little,” “a moderate amount,” “quite a bit,” and “a great deal” and the scores given for those choices were 1, 2, 3, 4, and 5, respectively. All items were positive statements. The total score ranged from 7 to 35 due to the last item used to measure the importance of family support was not include in calculating the total score. The high score indicated a perceived high level of support from a family member. The interpretation of the total score of the family and friend support subscale of the CIRS

based on a three-level class interval was persons with hypertension who had the perception about support receiving from a family member at a "7-16.3 = mild," "16.4-25.6 = moderate," "25.7-35 = high" level. The example of the statement in the questionnaire was "Have family exercised with you?"

The Chronic Illness Resources Survey: *physician/health care team subscale* was used for measuring *patient-provider communication*. This subscale consisted of 7 items. The first 6 items were used for measuring information support which a person received from a physician and health care team in the past three months and the last item for measuring the importance of a physician and health care team for managing illness. Even though the physician/health care team subscale of the Chronic Illness Resources Survey (CIRS) was not directly developed for measuring patient-provider communication, it consisted of items for measuring information support which a person received from healthcare providers. Information support was usually received from healthcare providers and this information was transferred to a person through a communication process. High information received from health care providers indicated high quality of patient-provider communication.

Glasgow et al. (2000) tested the psychometric properties of the CIRS in multiple groups of persons with chronic illnesses, including heart disease, arthritis, diabetes, and COPD. The results indicated good psychometric properties. Xu, Toobert, Savage, Pan and Whitmer (2008) modified the physician support subscale of the CIRS to the Chinese version for measuring provider communication in persons with diabetes mellitus. The Chinese version of the physician support subscale of the CIRS loaded on three factors, including clarity, explanation, and responsiveness which explained 79% of the variance. Therefore, the present study used the CIRS in the subscale of physician and healthcare team support for measuring patient-provider communication.

The subjects responded on a five-level Likert scale from one to five which indicated the quality of provider communication in the past three months. The five-level Likert scale consisted of "not at all," "a little," "a moderate," "quite a bit," and "a great deal" and the scores given for these choices were 1, 2, 3, 4, and 5, respectively. All items were positive statements. The total score ranged from 6 to 30 due to the last item for measuring the importance of family support was not include in calculating the total score. The high score indicated high quality of patient-provider communication.

The interpretation of the total score of the physician/health care team subscale of the CIRS based on a three-level class interval was persons with hypertension having perception that healthcare providers communicated with them with “6-14 = mild,” “14.1-22 = moderate,” “22.1-30 = high” quality. An example of the statement in the questionnaire was “Have your doctor or other health advisor (nurse, dietician) clearly explained what you need to do to manage your illness?” (If you have not had any doctor visits in the past 3 months, think back to the last visit you had).

The Self-Care Behavior Questionnaire (SCBQ)

The Self-Care Behavior Questionnaire (SCBQ) was used for measuring self-care behaviors for hypertension control. The SCBQ was modified from the Perceived Self-Care Efficacy Measurement (PSEM).

The Perceived Self-Care Efficacy Measurement (PSEM) was developed according to the Orem’s theory of self-care (1995) by Panpakdee, Kotcharin, Nopplub, and Varitsakul, (2001). The PSEM was developed for measuring personal confidence to practice activities for hypertension control. The PSEM consisted of six subscales including dietary and body weight control (six items), exercise (two items), medication management (five items), stress management (three items), risk factor avoidance (four items) and self-monitoring (three items). The PSEM was the twenty-three items, eleven-point Graphic Rating Scale ranging from zero to ten. The total score ranged from 0 to 230. The high score indicated high confidence to practice self-care activities for hypertension control.

In the present study, the SCBQ was modified by changing the statement “confident to practice self-care activities for hypertension control” to the statement “practice self-care activities to control hypertension.” The number of subscales and items were similar the PSEM. The response changed from an eleven-point Graphic Rating Scale ranging from zero to ten to an eight-point Graphic Rating Scale ranging from zero to seven which indicated the number of days of practicing self-care activities for hypertension control. After sending the SCBQ to evaluate the content validity by five experts, the SCBQ was revised as a recommendation by all five experts as follows:

1) The answer was modified from the eight-point Graphing scale to four-point Likert scale, including “rarely to never done,” “sometimes,” “frequently,” and “always,” and the scores giving for these choices were 0, 1, 2, and 3. To increase the objectivity of the patient’s answer, the response was changed to be the same as the response from the Self-Care Ability Questionnaire (SAQ) (Hanucharurnkul, Panpakdee, Intarasombat, Nantachaian, Partiprajak, Namjantra, et al., 2011), including: “rarely or never done” = 0 day/week; “sometimes” = 1-3 days/week; “frequently” = 4-5 days/week; and “always” = 6-7 days/week.

2) The answers for the items number 30 (smoking cessation) and 31 (alcohol drinking) were revised to “yes” or “no” with a blank for answering the type of alcohol and cigarettes, the amount of alcohol drunk and the number of cigarette smoked each day, and the number of days of alcohol drinking/cigarette smoking each week. The answers for items 30 and 31 were classified on a four-level Likert scale before combining to the total score.

Based on the JNC VII, alcohol drinking for males was classified as “no drinking or drinking < 2 drinks/day,” “2 to < 3 drinks/day,” “3 to < 4 drinks/day,” and “$\geq$ 4 drinks/day” and the scores given for these choices were 0, 1, 2, and 3, respectively. Alcohol drinking for females was classified as “no drinking or drinking < 1 drink/day,” “1 to < 2 drinks/day,” “2 to < 3 drinks/day,” and “$\geq$ 3 drinks/day” and the scores giving for these choices were 0, 1, 2, and 3, respectively.

For smoking, the response of the items was classified as “never or stopped smoking,” “1 to 10 rolls/day,” “11 to 20 rolls/day,” and “>20 rolls/day” and the scores giving for these choices were 0, 1, 2, and 3 respectively.

3) The subscale for sodium reduction was added as an item related to reading a label of sodium content;

4) The subscale for physical activity was added as two items for sedentary lifestyle and an occupational characteristic in order to cover the concept of physical activity;

5) The subscale for healthy diets and weight control was reduced from nine to seven items;

6) The subscale for medication management was added as one item for collecting intentional omission of anti-hypertensive drugs and one item for forgetting to take antihypertensive drugs.

7) The clearness and parsimony of several items were improved as recommended by the experts.

The content validity of the SCBQ was tested after revision and the CVI was 0.83. Finally, the SCBQ consisted of 31 items in 6 subscales, including eating a low sodium diet (3 items), diet and weight control (7 items), performing physical activity (4 items), medication management (5 items), self-monitoring (5 items), and risk factor avoidance (7 items). The recall period in practicing self-care activities was 1 month. The recall period in items 10, 19, 20, 21, 22, 23, 24 were 6 months because they were rare events such as follow-up visits with physician, and blood pressure recording. Items 1, 2, 4, 7, 9, 13, 17, 18, 28, 30, and 31 were negative statements and the scores on those items were reversed before summation into the total score. The total score ranged from 0 to 93. A high score indicated frequency of practicing self-care behaviors for hypertension control. The interpretation of the total score of the SCBQ based on a three-level class interval was persons with hypertension “0-31 = rarely,” “31.1-62 = moderately,” “62.1-93 = frequently” practicing self-care behaviors for hypertension control. The example of the statement in the questionnaire was “How often do you add salty condiments to your foods (already cooked foods) in the past one month?”

Asking the permission to use the instruments

All questionnaires, both original English and Thai version questionnaires, followed the process of asking permission from the owners before use. For Thai version questionnaires, all questionnaires were developed or translated by the doctoral or master degree students of Mahidol University. The process of asking permission for using the questionnaires from the Faculty of Nursing, Mahidol University was performed before using the Thai version of the Revised Illness Perceptions Questionnaire (Sriprasong et al., 2009), and the Knowledge about Self-Care Demands Questionnaire (KSCDQ) (Rujiwatthanakorn et al., 2010). The process of asking permission for modifying the questionnaires from the Graduate studies Mahidol

University was performed before using the Perceived Self-Care Efficacy Measurement (PSEM) (Panpakdee, Kotcharin, Nopplub, & Varitsakul, 2001)

Translation of the instruments

The back translation process was used with the Chronic Illness Resources Survey in order to ensure the construct equivalence. The electronic mail asking for permission for using, translating, and slightly modifying the questionnaires was sent to Dr. Russell E. Glasgow, the deputy director of implementation science at the National Cancer. Nurse instructors and the English teacher participated in the translation process of the instruments. Those specialists were proficient in writing and reading English, experienced in studying in the United States for one to five years, and experienced in translation of a questionnaires. The back translation was processed as follows: 1) the Chronic Illness Resources Survey was translated into Thai by the advisors; 2) the translated Thai version was back translated from Thai into English by two nurse instructors who did not reach a source of the questionnaires; and 3) the comparison between the back-translated version and the original version for the discrepancy in translation at the dissertation's major advisor and three nurse instructors.

Psychometric property testing of the instruments

Psychometric property testing of the instruments in this study focused on considering the original psychometric properties of the instruments and testing the psychometric properties in this study. Psychometric property testing used in this study was validity (content and factorial validity) and reliability.

Content validity of the original instruments

For the content validity of the original instruments, all original instruments had an acceptable content validity index as reported by the developers and the results were as follows:

1) The KSCDQ: the content validity of the KSCDQ was reviewed by one physician who is a specialist in cardiovascular disease and four nurse instructors who

are specialists in hypertension or chronic care. The content validity index of the KSCDQ was 0.97 (Rujiwatthanakorn et al., 2010).

2) The PSEM: the content validity of the PSEM was tested by three nurse instructors who were specialists in the chronic illness area and the results showed that the PSEM had acceptable content validity (Panpakdee, Kotcharin, Nopplub, & Varitsakul, 2001).

3) The IPQ-R: the Content Validity Index of the Revised Illness Perceptions Questionnaire was 0.87 (Sriprasong et al., 2009).

Content validity of the instruments in this study

The content validity of the Chronic Illness Resources Survey and the Self-Care Behavior Questionnaire was reviewed by five nurse educators who are experts in the chronic illness area. The specialists were asked to evaluate each item for relevancy of the items by responding on the four-point scale which included “extremely disagree,” “disagree,” “agree,” and “extremely agree”. The content validity index was calculated from the number of agreement (“agree” and “strongly agree”) divided by the number of agreement and disagreement (“agree, “strongly agree” “disagree” and “strongly disagree”). The content validity index of at least 0.80 was the cutoff point for indicating good content validity (Polit & Beck, 2004). The content validity index of the physician/health care team of the CIRS in the physician and healthcare team subscale, the CIRS in the family support subscale, and the Self-Care Behavior Questionnaire were acceptable and the CVI were 0.94, 0.88, and 0.83, respectively.

Factorial validity of the original instruments

The instruments consisting of more than one subscale were the Knowledge about Self-Care Demands Questionnaire, the Revised Illness Perception Questionnaire, and Self-Care behavior Questionnaires. The factorial validity of the Revised Illness Perception Questionnaire was supported by several studies (Abubakari et al., 2012; Brink, Alsen, & Cliffordson, 2011; Brzoska, Yilmaz-Aslan, Sultanoglu, Sultanoglu, & Razum, 2012; Chilcot, Norton, Wellsted, & Farrington, 2012; Sriprasong et al., 2009).

Factorial validity of the questionnaire in this study

Factorial validity of the Knowledge about Self-Care Demands Questionnaire, Revised Illness Perception Questionnaire, and Self-Care behavior Questionnaires were tested using the confirmatory factor analysis and the results were as follows:

1) The Knowledge about Self-care Demands Questionnaire:

The measurement model of the Knowledge about Self-care Demands Questionnaire fitted with the empirical data. The fit indices were the chi-square = 14.583, *df* = 9, p = 0.1030, CFI = 0.988, RNI = 0.988, RMSEA = 0.039, and SRMR = 0.025. Factor loadings in all subscales were significant at $p < 0.001$. Factor loadings ranging from the highest to the lowest were knowledge about diet and weight control, risk factor avoiding, self-monitoring, stress management, medication taking, and aerobic exercise, respectively and the standardized factor loadings were 0.736, 0.672, 0.633, 0.633, 476, and 0.147, respectively. The commonalities were in the range of 0.022 to 0.541 (appendix G). Diets and weight control had the highest factor loading and communality. Therefore, the diet and weight control subscale was the subscale explaining the highest variance of the KSCDQ. Factor loadings and commonalities of the aerobic exercise subscale were at the low level.

2) The Revised Illness Perception Questionnaire:

The measurement model of the Revised Illness Perception Questionnaire did not fit with the empirical data. The fit indices were the chi-square = 5.956, *df* = 9, p = 0.3929, CFI = 0.814, RNI = 0.814, RMSEA = 0.102, and SRMR = 0.064. The results showed that factor loading on the personal control and coherence subscales was not significant. The exploratory factor analysis was performed to explore the structure of the IPQ-R and the results showed that some items loaded more than one factor. With respect to the content validity supported by the developers and ability in comparison with other studies, three pairs of error correlation were performed in the subscales having cross-loadings (timeline, consequence, personal control, coherence, and emotion). Non-significant factor loadings were retained in order to maintain the content validity.

The fit indices of the modified Revised Illness Perception Questionnaire were the chi-square = 10.559, *df* = 10, p = 0.3929, CFI = 0.998, RNI = 0.998, RMSEA = 0.012, and SRMR = 0.023. All subscales had significant factor loadings at $p < 0.001$, except for personal control and coherence subscales. Factor loadings ranging from the highest to the lowest were emotion, consequences, cyclical timeline, treatment control, timeline, personal control, and coherence and the standardized factor loadings were 0.752, -0.726, 0.480, 0.322, 0.216, -0.060, and -0.026, respectively. The communalities were in the range of 0.001 to 0.566 (appendix G). Emotion subscale had the highest factor loading and communality. Therefore, emotion subscale was the subscale explaining the highest variance of the IPQ-R. Factor loadings and communalities of the timeline, personal control, and coherence subscales were at the low level.

3) The Self-Care Behavior Questionnaire:

The measurement model of the Self-Care Behavior Questionnaire fitted with the empirical data. The fit indices were the chi-square = 5.956, *df* = 9, p = 0.7443, CFI = 1.00, RNI = 1.00, RMSEA = 0.000, and SRMR = 0.019. All subscales had significant factor loadings at $p < 0.001$. Factor loadings ranging from the highest to the lowest were diet and weight control, self-monitoring, medication management, consuming low sodium diets, risk factor avoidance, and performing physical activity, respectively and the standardized factor loadings were 0.559, 0.494, 0.382, 0.377, 325, and 0.287, respectively. The communalities were in the range of 0.083 to 0.312 (appendix G). Diet and weight control had the highest factor loading and communality. Therefore, diet and weight control was the subscale explaining the highest variance of the SCBQ. Factor loadings and communalities of performing physical activity subscale was at the low level.

Reliability of the original instruments

For the original version questionnaires, the reliability of the original version questionnaires was as follows:

1) The CIRS: the internal consistency reliability of the family/friends subscale and the physician/health care team support subscale of CIRS were 0.75 and

0.91. The test-retest reliability at one week of the family/friends subscale and the physician/health care team support subscales were 0.78 and 0.77, respectively (Glasgow et al., 2000). The Chinese version of the physician support subscale of the CIRS was tested among persons with diabetes mellitus and the Cronbach's alpha was 0.74 (Xu, Toobert, Savage, Pan, & Whitmer, 2008).

2) The PSEM: the PSEM was evaluated for the test-retest reliability among persons with hypertension and the levels of the Cronbach's alpha were 0.81 (Nopplub, 2001; Varitsakul, 2001), and 0.85 (Kotcharin, 2001).

3) The IPQ-R: The levels of alpha coefficient of the IPQ-R were as follows: 1) identity (0.84); 2) timeline (0.79-0.92); 3) cyclical timeline (0.61-0.84); 4) consequence (0.77-0.82); 5) controllability by person (0.77-0.82); 6) controllability by treatment (0.60-0.81); 7) understanding about illness (0.80-0.91); and 8) emotional representation (0.77-0.94) (Brink et al., 2011; Brzoska et al., 2012; Chen, Tsai, & Lee, 2008; Chen et al., 2009). The reliability coefficients in each subscale of the IPQ-R (Thai version) ranged from 0.66 to 0.86 (Sriprasong et al., 2009).

4) The KSCDQ: the reliability coefficient of KSCDQ among 30 persons with hypertension was 0.84 and 96 persons with hypertension was 0.76 (Rujiwatthanakorn et al., 2010).

Reliability of the instruments in this study

The Cronbach's alpha was used to assess the internal consistency reliability of the Chronic Illness Resources Survey, the Revised Illness Perceptions Questionnaire, and the Self-Care Behavior Questionnaire. The Cronbach's alpha of the Knowledge about Self-Care Demands Questionnaire was calculated using Kuder-Richardson (KR-20) formula. The Cronbach's alpha level > 0.70 was used as the cut-off point of an acceptable reliability of all instruments.

The reliability testing among 30 persons with hypertension: the reliability of the Self-Care Behaviors Questionnaire, Chronic Illness Resource Surveys (family subscale), Chronic Illness Resource Surveys (healthcare provider subscale), the Revised Illness Perception Questionnaire, knowledge about hypertension, and Knowledge about Self-Care Demands Questionnaire were tested on 30 persons with

hypertension in the regional hospital. Those questionnaires were used for collecting the data and the subjects were asked their opinion about the clarity and the appropriateness of the items as well as the instructions and format of all instruments. The data collected from these persons were used for validation of the instruments and these persons were not included as samples of the present study. The reliability testing was conducted after getting the approval from the Institutional Review Board (IRB) of the Faculty of Medicine, Ramathibodi Hospital and the study hospital. The reliability coefficients of the questionnaires used in this study were shown in the table 3.1

Table 3.1 The reliability coefficients of the questionnaires used in this study

Instruments	Content validity		Reliability		
	Original	This study	Original	This study	
				N= 30	N= 402
SCBQ	-	0.83	-	0.81	0.57
CIRS (family)	-	0.88	0.75	0.84	0.84
CIRS (healthcare provider)	-	0.94	0.91	0.79	0.55
IPQ-R	0.87	-	0.66-0.86	0.79	0.71
KSCDQ	0.97	-	0.84	0.66	0.76

Note: SCBQ = Self-Care Behavior Questionnaire, CIRS = Chronic Illness Resource Survey, HC provider subscale = healthcare provider subscale, IPQ-R = Revised Illness Perception Questionnaire, and KSCDQ = Knowledge about Self-Care Demands Questionnaire

3.5 Protection of Human Rights

The study process was approved by the Institutional Review Board (IRB) of the Faculty of Medicine, Ramathibodi Hospital and three regional hospitals which were selected as research settings. The subjects were individually contacted and asked permission for answering the questionnaires and using the information in the patient's medical records. The subjects had free will to determine their willingness for answering the questionnaires. The researcher informed the subjects before they made a decision to participate in this study. Information explained to the subjects was purposes, benefits, risks, methods, potentiality to discontinue answering the

questionnaires at any time without penalty, and confidentiality of their answers by the use of coding numbers and presenting the results as a whole after analysis of the total samples. After the subjects understood the information and expressed their willingness to answer the questionnaires, the researcher or the research assistants asked them to sign a consent form. The possible risk for participation in the present study was inconvenience.

3.6 Data Collection

The data were collected by the researcher and the research assistants. Two research assistants were nurses who have worked in the chronic illness area for fifteen years and studied the course work for the master degree of Medical and Health Social Science and the master's degree in nursing. After informing the research assistants of the purposes and research process, the research assistants were trained for the data collection process, questionnaire interview techniques and data collection instruments.

The data collection process was as follows: 1) after getting approval from the Institutional Review Board (IRB) of the Faculty of Medicine, Ramathibodi Hospital and three regional hospitals, the research processes were sent to the IRB responsible persons for each hospital by sending the official documents to the director of each hospital and the process of data collection in each hospital began only after getting approval from the IRB of each hospital; 2) the researcher contacted the hospital's director, nurse's director, and staff nurses of the Outpatient Medical Clinic and informed the about the purposes and data collection processes; 3) the subjects were approached, informed of their rights, and determining their willingness for answering the questionnaires and asked permission to use the information in their patient's medical records; 4) the subjects meeting the criteria and willing to participate in the present study signed the consent form; 5) the subjects completed the questionnaires by themselves if they were able to read and write, if not the researcher read the questionnaires for them; 6) the questionnaires were sent or read to the subjects in sequential order, starting from the Self-Care Behaviors Questionnaire, the Chronic Illness Resource Surveys, the Revised Illness Perception Questionnaire, the Knowledge about Hypertension Questionnaire, the Knowledge about Self-Care

Demands Questionnaire, and the Demographic Data and Health Information Sheet, respectively; 7) the researcher checked for the completion of the questionnaires and asked the subjects to answer the incomplete items; and 8) the researcher or research assistants said thanks and gave a small gift to the subjects. The flow of data collection was shown in the figure 3.1

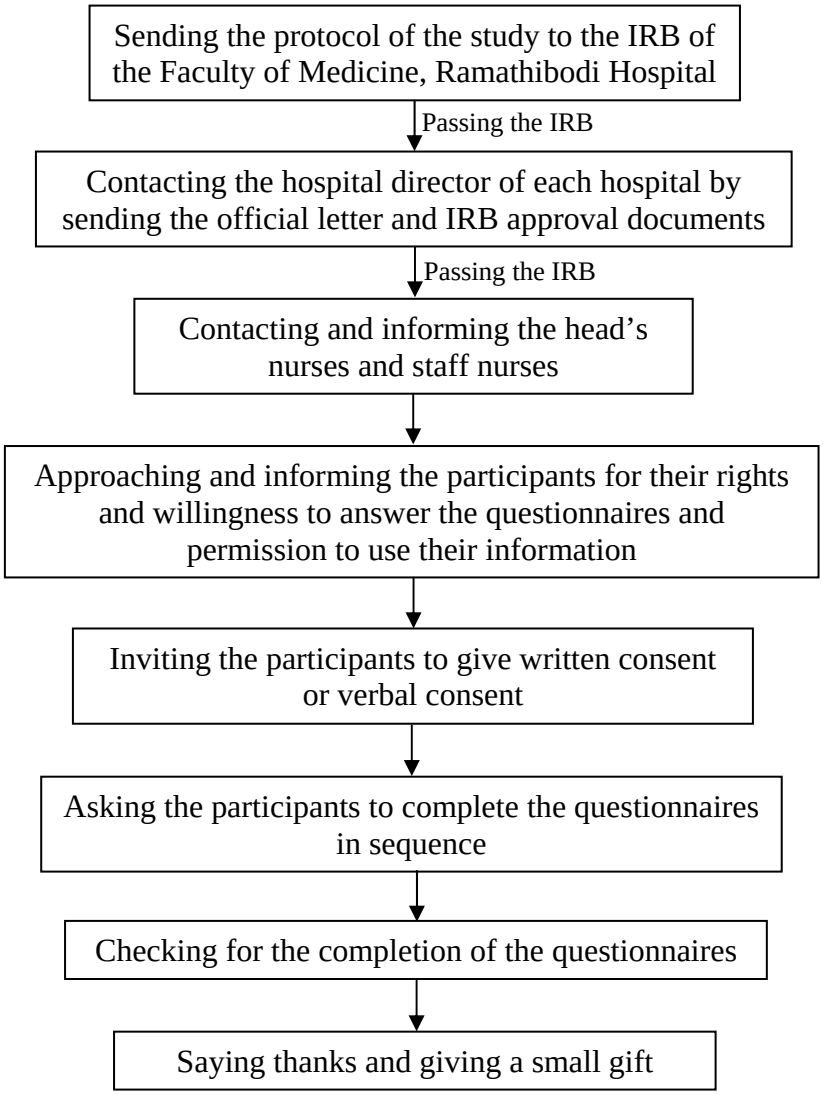


Figure 3.1 Flow diagram of the data collection processes

3.7 Data Analysis

The data analysis used the Statistical Package for Social Science (SPSS) for descriptive data analysis and the Mplus program for multivariate data analysis. The level of significance was set at 0.05. The process of data analyses consisted of model specification, model identification, data screening, and assumption checking and testing for the relationships among the concepts in the hypothesized model.

3.7.1 Model Specification

The hypothesized model consisted of three exogenous variables (duration about hypertension, family support, and patient-provider communication) and four endogenous variables (knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behaviors for hypertension control). The specification of parameters was shown in the figure 3.2

3.7.2 Model Identification

The identification of SEM required an over-identified model and avoidance of a single indicator factor for prevention of identification problems (Hair, Black, Babin, & Anderson, 2010). Over-identified model was the number of variance-covariance of observed variables exceeding the number of estimated parameters. If N equaled to the number of observed variables, the number of variance-covariance of the observed variables equaled N(N+1)/2 (Kline, 2012). In the present study, the hypothesized model consisted of 23 observed variables. Therefore, the number of variance-covariance of the observed variables equaled to (23)(23+1)/2 = 276. The hypothesized model consisted of 55 parameters to be estimated. Therefore, the degree of freedom would be 276-55 = 221 which indicated the over-identified model.

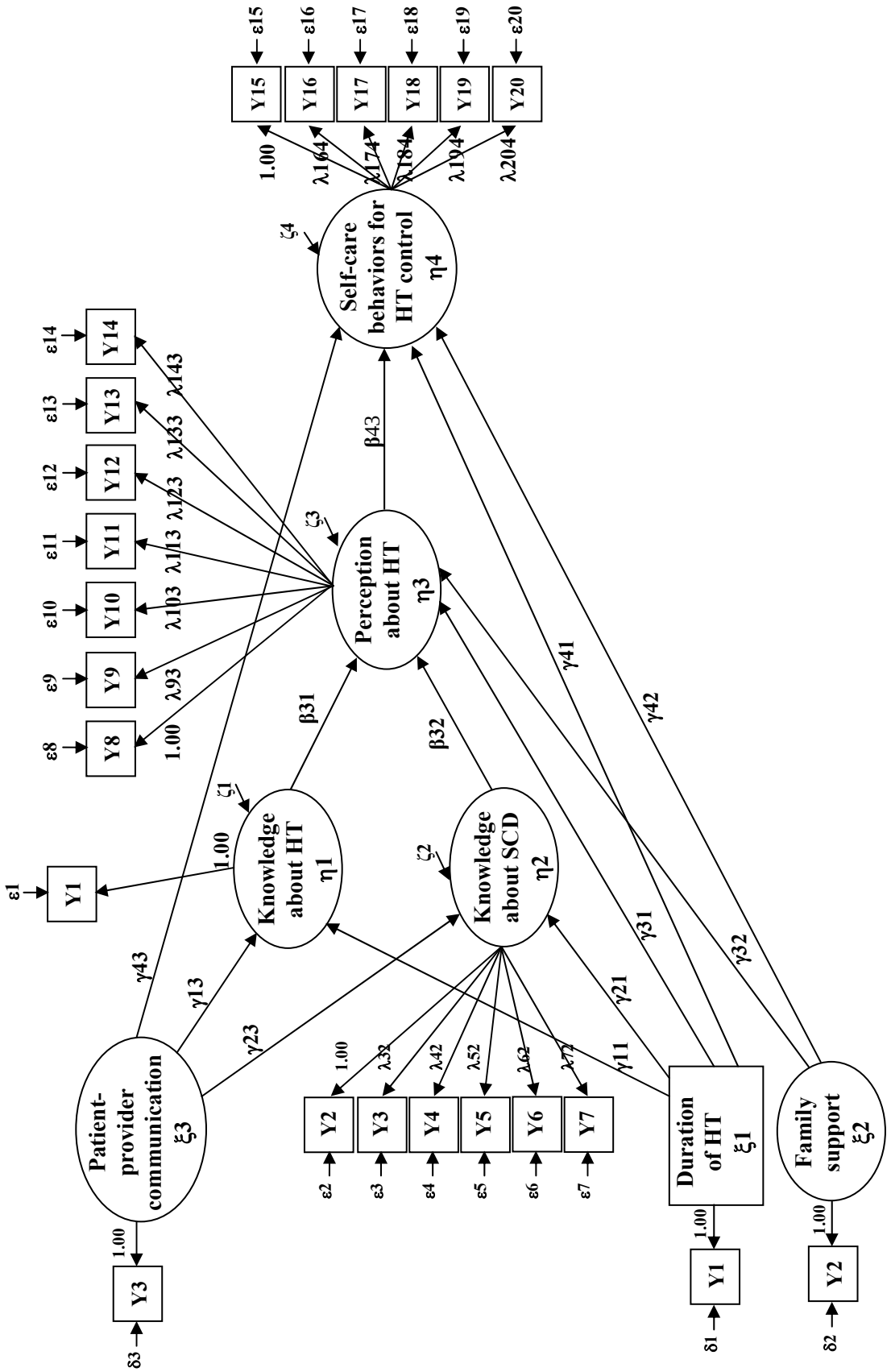


Figure 3.2 The specification of the hypothesized model

3.7.3 Data Screening

Data screening was the process of preparing for data analysis. For this study, data screening consisted of checking for the correction of data entry, missing data, and outliers.

3.7.3.1 Checking for the correction of data entry was performed by checking typing errors for at least three times and checking the value of each variable. A source of error in data entry was explored if the data was not in the possible range.

3.7.3.2 Evaluation of missing data

3.7.3.3 Evaluation of outliers used the Mahalanobis D^2 measure. The significant Mahalanobis D^2 measure was considered an outlier. The potential outliers detected by the significant Mahalanobis D^2 were reexamined using univariate methods (the truly distinctive observations after convert the data values to the standard scores) and bivariate methods (the observations fall outside other pairs of variables on the scatter plot) (Hair et al., 2010).

3.7.4 Assumption checking

The assumptions required for the analysis using the Structural Equation Modeling were tested for the assumption requiring for model development and model analysis.

3.7.4.1 The assumption required for model development was as follows: 1) a cause being come before an effect; 2) the control of confounding factors; 3) matching of the distribution of variables with estimation; and 4) the specification of each relationship must be correct.

3.7.4.1.1 A cause being come before an effect: the hypothesized model was developed based on the SCDNT, empirical data, and logical reason. The hypothesized model was complex. Therefore, the relationship between duration of hypertension and self-care behaviors for hypertension control was used as the example. The determination the effect of patient-provider communication on self-care behaviors for hypertension control was based on the SCDNT (Orem stated that the basic conditioning factor affected self-care), empirical data (the predicting studies supported this relationship), and logical reason (self-care behaviors could increase

when duration increased, but duration could not increase when self-care behaviors increased).

3.7.4.1.2 Control of confounding factors: the confounding factors of the present study were cognitive function, healthcare service receiving, dependency, and comorbidities. The confounding factor were controlled by screening for the cognitive function of the subjects, including only the regional hospitals, including only persons with hypertension who were independent, and excluding some diseases such as diabetes mellitus and secondary hypertension.

3.7.4.1.3 Matching the distribution of variables with estimation: all endogenous variables were tested for normal distribution before selecting an estimation method.

3.7.4.1.4 The correct specification of each relationship: the relationship of each pair of variables was based on the theory and the findings from the qualitative and quantitative studies.

3.7.4.2 The assumption requiring for model analysis consisted of 1) endogenous variables having the normal distribution; 2) measuring exogenous variables without errors; and 3) measuring exogenous variables at different time points.

3.7.4.2.1 Endogenous variables having the normal distribution: the endogenous variables of the present study including knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behavior for hypertension control were checked for their normal distribution using the following steps: 1) *Normality testing*, normality was the shape of data distribution of the metric variables. Normality was evaluated by the statistic value (z) for skewness and kurtosis. The skewness values being outside $\pm$1.96 indicated a meaningful skewness and kurtosis (Hair et al., 2010); 2) *Linearity testing*, linearity was the linear relationship between the independent and dependent variables. Linearity was evaluated using the scatterplot. The straight line of the relationship between each pair of independent and dependent variable indicated linearity; and 3) *Homocedasticity testing*, homocedasticity was the distribution of dependent variable scores with equal variance in every value of an independent variable. The homocedasticity was examined by the Box's M test. Non significance of the Box's M statistic indicated

homocedasticity, whereas a significance of the Box's M statistic indicated heterocedasticity. The variables having non normal distribution were transformed or analyzed by using the appropriate parameter estimation.

3.7.4.2.2 Measuring exogenous variables without errors: duration about hypertension, patient-provider communication, and family support were exogenous variables in this study. From the fact that we cannot avoid the measurement error because the measurement error occurred every time of measuring a variable (observed score = true score + measurement error). The reliability of the exogenous variables was checked and the measurement error was determined. The calculation of the measurement error was based on the reliability and variance of each variable using the formula [(1-reliability) x variance] (Kline, 2012). The variances of the exogenous variables, including duration of hypertension, patient-provider communication, and family support were determined at 2.54, 4.48, and 8.55, respectively. Including of the real measurement error in analysis helped the researcher got the accuracy of parameter estimation.

3.7.4.2.3 Measuring exogenous variables at different time point: it was the limitation of a cross sectional study. The pattern of relationship was used instead of causal relationships because the limitation of measuring an exogenous variable in a different time point.

3.7.5 Testing the relationships among the concepts in the hypothesized model

The hypothesized model consisted of the measurement model and the theoretical model. The hypothesized model was analyzed using the Structural Equation Modeling and the statistical program used Mplus. The measurement model was assessed at the first step following with the theoretical model assessment.

3.7.5.1 The measurement model assessment

The measurement model was assessed in the instruments which contained at least two indicators or subscales. In the present study, the IPQ-R, KSCDQ, and SCBQ which contained more than two factor indicators were firstly assessed for the measurement model. The process of measurement model assessment

was as follows: 1) the testing the adequacy of the measurement model by using the selected fit indices; 2) the estimation for factor loadings of each item of the questionnaires in each subscale; and 3) the estimation for the communalities (h^2) of each construct.

3.7.5.2 The theoretical model assessment

The theoretical model assessment was testing for the fit between the empirical data which were collected from persons with hypertension and the hypothesized model as well as the strength of the effect among the concepts in the hypothesized model. Knowledge about hypertension was measured by the single indicator. The error variance of knowledge about hypertension were determined at 1.16 [calculation using the formula [(1-reliability) x variance]] (Kline, 2012). The process of theoretical model assessment was as follows: 1) the testing for an adequacy fit of the theoretical model with the empirical data using the selected fit indices; and 2) the modification of the model when the hypothesized model did not fit with the data. The theoretical model was modified for improving of the model fit and the modification process was guided by the SCDNT theory and modification indices.

The selected fit indices for assessing the fit of the hypothesized model with the empirical data were the chi-square, comparative fit index (CFI), Tuckler Lewis Index (TNI), relative non-centrality index (RNI), standardized root mean residual (SRMR) and root mean square error of approximation (RMSEA). The desired values of the fit indices were significant p-value of a chi-square, CFI > 0.92, RNI > 0.92, SRMR < 0.08 and RMSEA < 0.07 (Hair et al., 2010).

Summary

This study used a cross-sectional, model testing design in order to explore the pattern of relationships between the basic conditioning factors (patient-provider communication, duration about hypertension, and family support), self-care agency (knowledge about hypertension, knowledge about self-care demands, and perception about hypertension), and self-care behaviors for hypertension control. The hypothesized model of factors influencing self-care behaviors of people with essential hypertension was tested using the Structural Equation Modeling.

CHAPTER IV
RESULTS

This chapter presents the results, including the demographic characteristics of the sample, characteristics of the study variables, data screening, assumption checking, hypothesized model testing, and hypothesis testing.

4.1 Demographic characteristics of the sample

The subjects of the present study consisted of four hundred and two persons with hypertension. The subjects were selected from three regional hospitals and approximately one-third of the total subjects. Age of the subjects ranged from 32 to 88 years (mean = 59.87 years, SD = 9.56). The majority of the subjects were female (64.4%), housekeepers (22.1%), married (66.9%), with an income less than 5,000 baht (38.6%), finished primary school (70.4%), living with a family (89.8%), and with a family history of hypertension (56.2%).

The numbers of overweight and obese subjects were 39.8% and 19.9%, respectively. Half of subjects (56.5%) could control blood pressure to less than 140/90 mmHg. The number of subjects currently smoking cigarettes and drinking alcohol was 4.5%, and 11.9%, respectively. The co-morbidities of hypertension were heart disease (6.2%), stroke (3.7%), renal disease (1.6%), transient ischemic attack (0.9%), and dyslipidemia (67.1%). The current anti-hypertensive drug used was calcium channel blockers (21.4%), β-blocker (13.7%), angiotensin converting enzyme inhibitors (12.9%), and anti-lipidemic agents (23.6%). The demographic characteristics of the sample are shown in the table 4.1.

Table 4.1 The demographic characteristics of the sample (N = 402)

Demographic characteristic	Number	Percentage
Age		
Mean = 59.87 years, SD = 9.56,		
Range = 32 - 88, Mode = 60		
Young adults (18-35 years)	4	1.0
Middle-aged adults (36-55 years)	124	30.8
Older adults (>55 years)	274	68.2
Gender		
Female	259	64.4
Male	143	35.6
Duration of hypertension (Mode = 5)		
< 5 years	136	33.8
5 to 10 years	140	34.8
> 10 years	126	31.4
Education		
None	15	3.7
Primary school	283	70.4
Secondary school	59	14.7
Bachelor degree	36	9.0
Higher degree	9	2.2
Occupation		
None	74	18.4
Housekeeper	89	22.2
Employee	75	18.7
Agriculture	64	15.9
Government officer	52	12.9
Seller	38	9.5
State enterprise employee	3	0.7
Others	7	1.7
Marital status		
Married	269	66.9
Separated/widowed/divorced	89	22.1
Single	44	11.0

Table 4.1 The demographic characteristics of the sample (N = 402) (cont.)

Demographic characteristic	Number	Percentage
Income (Baths)		
No income	50	15.7
< 5,000	123	38.6
5,000 - <10,000	62	19.4
10,001 - <30,000	62	19.4
30,001 - 50,000	16	5.0
> 50,000	6	1.9
Sufficient of income		
Sufficient	269	67.4
Not sufficient	86	21.6
Sufficient and save	44	11.0
Living arrangement		
With family	361	89.8
Living alone	25	6.2
With others	16	4.0
BMI (kg/m^2)		
Underweight (< 18)	3	0.7
Normal (18-24.9)	159	39.6
Overweight (25-29.9)	160	39.8
Obesity($\geq$ 30)	80	19.9
BP in the past 6 months		
Controlled	227	56.5
Uncontrolled	175	43.5
Family history of HT		
Yes	226	56.2
No	176	43.8
Smoking		
No smoking	366	91.0
Current smoking	18	4.5
Stop smoking	18	4.5
Alcohol drinking		
No drinking	331	82.3
Current drinking	48	11.9
Stop drinking	23	5.7

Table 4.1 The demographic characteristics of the sample (N = 402) (cont.)

Demographic characteristic	Number	Percentage
Numbers of comorbidities		
None	137	34.2
One	212	52.7
Two	48	11.9
Three	5	1.3
Types of comorbidities (N = 322)		
Heart diseases	20	6.2
Musculoskeletal diseases	20	6.2
Stroke	12	3.7
TIA	3	0.9
Renal diseases	5	1.6
Dyslipidemia	216	67.1
Others	46	14.3
Current drug use (N = 948)		
CCBs	203	21.4
β-blocker	130	13.7
ACEIs	122	12.9
Angiotensin II antagonist	104	11.0
Diuretics	79	8.3
Alpha blockers	11	1.2
Anti-lipidemic agents	224	23.6
Others	75	7.9

Abbreviations: TIA, Transient ischemic attack; β-blocker, Beta blocker; ACEI, Angiotensin-converting enzyme inhibitors; CCB, Calcium-channel blockers.

4.2 The descriptive characteristics of the variables

Duration of hypertension ranged from 1 to 46 years (mean = 7.3, SD = 5.4). Knowledge about hypertension (mean = 9.8, SD = 2.2) and knowledge about self-care demands (mean = 21.9, SD = 1.9) were at the high level. Perception about quality of provider communication (mean = 20.1, SD = 3.2) and support from their family members (mean = 21.2, SD = 7.1) were at the moderate level.

The majority of the subjects had high knowledge about medication taking (mean = 2.9, SD = 0.4), knowledge about diet and weight control (mean = 5.7,

SD = 0.9), knowledge about exercise (mean = 1.8, SD = 0.5), knowledge about stress management (mean = 2.0, SD = 0.2), knowledge about risk avoidance (mean = 4.7, SD = 0.6), knowledge about self-monitoring (mean = 4.9, SD = 0.4).

The majority of the subjects perceived hypertension as a moderate threat to them (mean = 123.4, SD = 11.4). For specific types of perception about hypertension, persons with hypertension perceived hypertension as having a chronic timeline (mean = 24.1, SD = 4.8), moderate cyclical timeline (mean = 13.3, SD = 2.2), mild consequences (mean = 13.8, SD = 5.0), highly control by person (mean = 20.0, SD = 5.5), highly control by treatment (mean = 17.9, SD = 2.8), high understanding (mean = 18.6, SD = 4.6), and mildly negative emotional response to hypertension (mean = 12.3, SD = 5.5).

The majority of subjects practiced self-care behaviors for hypertension control at a moderate level (mean = 58.6, SD = 6.8). Most subjects practiced self-care behaviors at a high level in the aspects of medication management (mean = 11.4, SD = 1.7) and risk factor avoidance (mean = 17.9, SD = 2.8). They practiced self-care behaviors at a moderate level in the aspects of eating a low-salt diet (mean = 4.7, SD = 1.2), diet and weight control (mean = 11.8, SD = 2.0), increased physical activity (mean = 5.2, SD = 2.3, and self-monitoring (mean = 7.7, SD = 2.3). The characteristics of the variables were shown in table 4.2 and appendix G.

Table 4.2 Descriptive statistics of the study variables (N = 402)

Variables	Possible range	Actual range	Mean	SD	Interpretation
Duration of HT	> 1	1 - 46	7.3	5.4	Long duration
Knowledge about HT	0 - 13	2 - 13	9.8	2.1	High understanding
Knowledge about SCD	0 - 23	8 - 23	21.9	1.9	High understanding
Patient-provider communication	6 - 30	12-29	20.1	3.2	Moderate quality
Family support	7 - 35	7 - 34	21.2	7.1	Moderate support
Perception about HT	37 - 185	80 - 158	123.4	11.4	Moderate threat
Self-care behaviors	0 - 93	41-83	58.6	6.8	Moderate practicing

4.3 Data Screening

Data screening consisted of checking for correction of data entry, missing data, and outliers. The results of data screening were as follows:

4.3.1 The demographic characteristics of the sample and the characteristics of the variables in the descriptive statistic (i.e., frequency, actual range) were in the possible range. The descriptive statistic of the sample and variables were shown in table 4.1 and 4.2.

4.3.2 No missing data was detected because the answers on all the questionnaires were checked for completeness after self-administering the questionnaires. The respondents were asked for their willingness to answer the incomplete items.

4.3.3 Seventeen cases had significant outliers as detected by the Mahalanobis D^2 distance and its p-value. The values of Mahalanobis distance ranged from 4.44 to 299.97 and the Mahalanobis distance ranging from 50.63 to 299.97 were significant outliers at $p < 0.001$. The univariate outliers were examined to explore the source of the problems. Long duration of hypertension and low knowledge of self-care demands were a source of multivariate outliers. Those outliers were ignored because they reflected a real situation, and did not occur through error. The bivariate correlation between duration of hypertension versus self-care behaviors and knowledge of self-care demands versus self-care behaviors in the presence and absence of those outliers did not differ in the pattern of relationships. Therefore, those outliers should be included in the analysis.

4.4 Assumption checking

Based on Kline (2012), the assumptions for SEM analysis consisted of the assumption for model development and model analysis. The assumption for model development was explained in the chapter III. This chapter explained the assumptions for model analysis. The assumptions for model analysis included endogenous variables having the normal distribution, exogenous variables measuring without errors, and exogenous variable measuring at a different time point.

Endogenous variables having normal distribution: The distribution of endogenous variables was evaluated based on normality, linearity, and homocedasticity and the results were as follows:

- ***Normality testing***, the normality testing was the shapes of data distribution of the variables. The normality testing was tested using the statistic value (z) for the skewness and kurtosis. The skewness values outside $\pm$ 1.00 and kurtosis outside $\pm$ 1.96 indicated a meaningful skewness and kurtosis, respectively (Hair et al., 2010). The levels of skewness of each variable were greater than 1.00 in all subscales of knowledge about self-care demands, duration of hypertension, knowledge about hypertension, self-care behaviors in the subscales of alcohol and smoking, and medication management. The statistic value (z) for kurtosis of duration about hypertension, family support, patient-provider communication, knowledge about hypertension, all subscales of knowledge about self-care demands, perceptions about hypertension in the subscales of a timeline and personal control, self-care behaviors in the subscales of alcohol and smoking, awareness about hypertension, and medication were outside $\pm$ 1.96. The levels of skewness and kurtosis outside the normal range indicating that several observed variables were non-normal distribution.

For the normality testing of endogenous variables, knowledge about hypertension, perception about hypertension, and self-care behaviors for hypertension control were within normal distribution. Knowledge about self-care demands was not normal distribution.

- ***Linearity testing***, the linearity testing was the scatterplot between the pairs of independent and dependent variables. Family support, patient-provider communication, and perception about hypertension was linearity but duration of hypertension, family support, patient-provider communication, knowledge about hypertension, and knowledge about self-care demands was not linear.

For the linearity testing of the endogenous variables, knowledge about hypertension and perception about hypertension were linear but knowledge about self-care demands was not linear.

- ***Homoscedasticity testing***, homosedasticity testing was the distribution of dependent variable having equal variance across the range of predictor variables. Homosedasticity testing was done using the Box's M statistic. The results showed that the Box's M statistic was significant which indicated heterocedascity.

The analysis of the overall results of the normality, linearity, and homocedasity testing showed that knowledge about self-care demands was not normally distributed. Therefore, the estimation of parameters using maximum likelihood with standard errors and a mean-adjusted chi-square or MLM was selected for increase the robust of parameter estimation in data with non-normal distribution (Byrne, 2012).

4.5 The hypothesized model testing

The hypothesized model consisted of the measurement model and theoretical model. The Mplus statistical program was used for assessing the fitting of the hypothesized model with the empirical data. The hypothesized model was analyzed using the two-step approach by beginning with the measurement model assessment following with the theoretical model assessment.

4.5.1 The measurement model assessment

The multiple subscale instruments, including the IPQ-R, the KSCDQ, and the SCBQ were assessed for the measurement model.

Knowledge about self-care demands:

Factor loadings of all factors or subscales were significant at $p < 0.001$, except for knowledge about exercise subscale ($p < 0.05$). Factor loadings ranging from the highest to the lowest were diet and weight control, self-monitoring, risk factor avoiding, stress management, medication adherence, and aerobic exercise, respectively and the standardized factor loadings were 0.838, 0.658, 0.563, 0.537, 0.483, and 0.155, respectively and the communalities were in the range of 0.024 to 0.703 (table 4.3).

Perceptions about hypertension:

Factor loadings of all factors or subscales were significant at $p < 0.001$, except for the coherence subscale ($p = 0.150$). Factor loadings ranging from the

highest to the lowest were treatment control, coherence, emotional representation, consequences, personal control, timeline, and cyclical timeline, respectively and the standardized factor loadings were 0.479, 0.471, -0.386, -0.333, 0.332, 0.258, and -0.098, respectively and the communalities were in the range of 0.010 to 0.229 (table 4.3).

Self-care behaviors for hypertension control:

Factor loadings of all factors or subscales were significant at $p < 0.001$, except for avoiding of alcohol and smoking ($p = 0.061$). Factor loadings ranging from the highest to the lowest were self-monitoring, risk factor avoidance, diet and weight control, medical management, eating low sodium diets, and increase physical activity, respectively and the standardized factor loadings ranging from the highest to the lowest were 0.614, 0.608, 0.400, 0.276, 242, and 0.192, respectively and the communalities were in the range of 0.037 to 0.377 (table 4.3).

The factor loading of the coherence subscale of perceptions about hypertension was not significant. The coherence subscale was retained in the analysis because the validity of the coherence subscale was supported by expert reviewing and the psychometric property testing in other studies. Overall results of the measurement model testing were acceptable for further theoretical model analysis for the reasons as follows: 1) overall factors were significant loadings, except for the coherence subscale of the IPQ-R; and 2) overall factors were in the expected direction, except for three factors in the perception about hypertension (i.e., consequences, coherence, and emotional representation). However, some negative factor loadings could be supported by another study (Sriprasong, et al., 2009). The negative factor loadings were the same patterns along the process of statistical analysis.

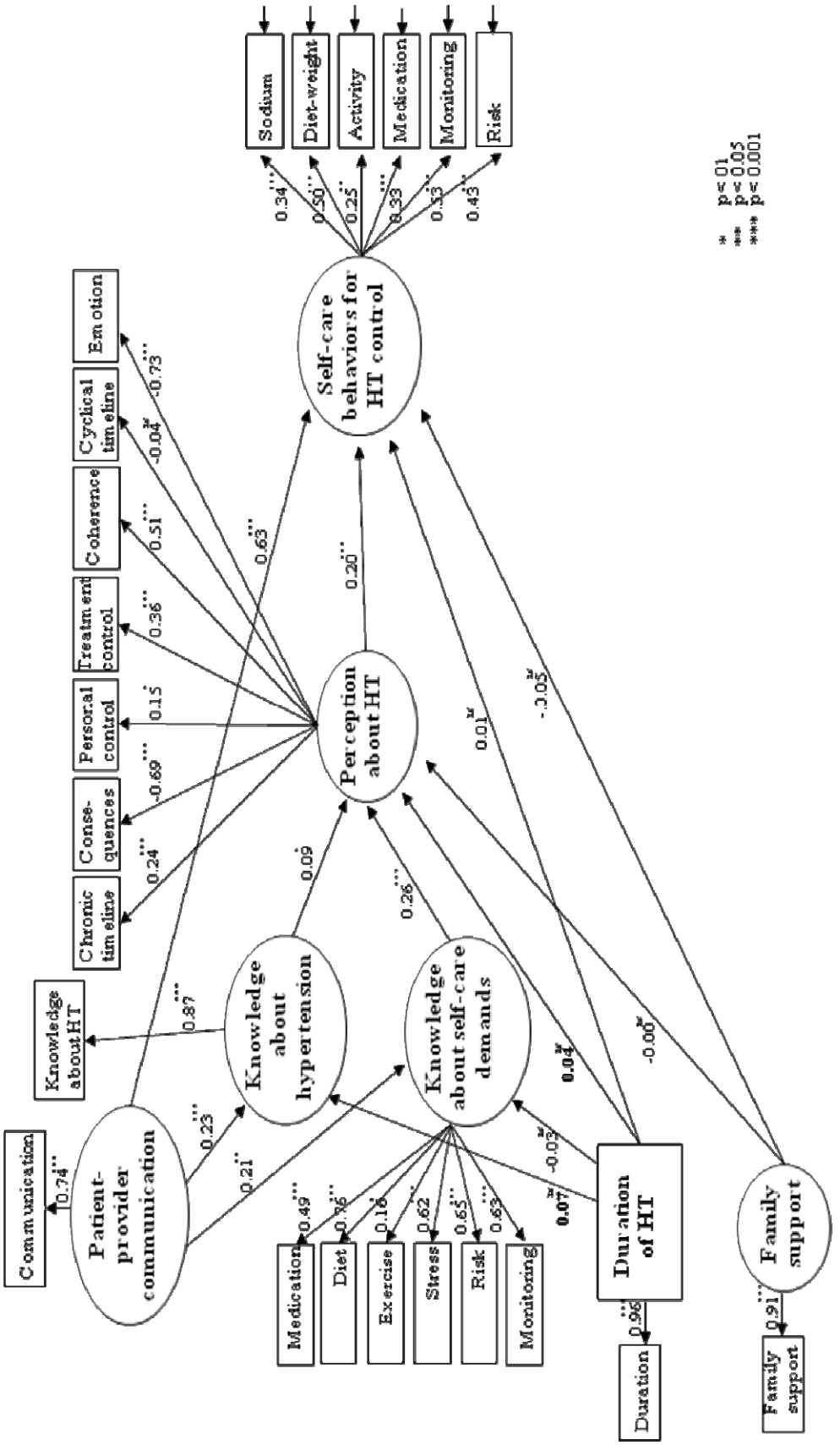
Table 4.3 The measurement model testing results of knowledge about self-care demands, perception about hypertension, and self-care behaviors for hypertension control (N = 402)

Parameter	Standardized factor loading	S.E.	t-value	h^2
Knowledge about self-care demands				
Medication taking	0.483***	0.101	4.777	0.233
Diet and weight control	0.838***	0.051	16.313	0.703
Aerobic exercise	0.155*	0.071	2.190	0.024
Stress management	0.537***	0.118	4.555	0.289
Risk factor avoidance	0.563***	0.075	7.525	0.317
Self-monitoring	0.658***	0.081	8.083	0.433
Perception about hypertension				
Timeline acute/chronic	0.258***	0.059	4.386	0.066
Consequences	-0.333***	0.062	-5.378	0.111
Personal control	0.332***	0.057	5.873	0.111
Treatment control	0.479***	0.064	7.499	0.229
Timeline cyclical	0.471***	0.055	8.584	0.222
Coherence	-0.098ns	0.068	-1.440	0.010
Emotion representation	-0.386***	0.059	-6.502	0.149
Self-care behaviors for hypertension control				
Consuming low sodium diet	0.242***	0.062	3.931	0.059
Diet and weight control	0.400***	0.055	7.323	0.160
Performing physical activity	0.192**	0.059	3.245	0.037
Medical management	0.276***	0.062	4.432	0.076
Self-monitoring	0.614***	0.076	8.047	0.377
Risk factor avoidance	0.608***	0.074	8.229	0.369

Note: * p-value < 0.05, **p-value < 0.01, ***p-value < 0.001, SE = Standard error, h^2= Communality

4.5.2 The theoretical model assessment

The theoretical model assessment consisted of the theoretical model assessment, model modification and model interpretation. The process consisted of the cycle of one-by-one adding a variable and examining a result. The results were examined for the error and warning message, values of fit indices (i.e., Chi-square and its significant value, CFI, TLI, RMSEA, and SRMR), residuals, standardized residuals, and parameter estimation (i.e., the values of parameters, significant or the estimation divided by standard error), and direction of parameter estimation. The variables were sequentially added by beginning with the path from perception about hypertension to self-care behaviors for hypertension control. The remaining variables were added one-by one in sequence including knowledge about self-care demands, knowledge about hypertension, patient-provider communication, family support, and duration about hypertension, respectively. No error or warning message presented along the process of model testing. However, the model did not fit with the empirical data with the values of Chi-square = 612.301, df = 219, $p < 0.0001$, CFI = 0.650, TLI = 0.595, RNI = 0.650, RMSEA = 0.067, SRMR = 0.082 (table 4.4 figure 4.1). Therefore, the hypothesized model had to be modified for the purpose of solving the misspecification and improving the fit of the hypothesized model with the empirical data.



Chi-square = 612.301, *df* = 219, p < 0.0001, CFI = 0.650, RNI = 0.595, RMSEA = 0.067, SRMR = 0.082

Figure 4.1 Hypothesized model of self-care behaviors of persons with hypertension (N = 402)

The model modification: the variables were added in sequence as had been done previously, except for freeing of some parameters and dropping of some non-significant parameters. The model modification was performed by re-specification of misspecified parameters. The modification of the model was guided by the theory, logical reason, and magnitude of modification provided by the statistical program. The model was mostly modified by correlation of the measurement error which was based on the following reasons: 1) the complexity of the hypothesized model; 2) the nature of several variables of this study had some association (i.e., patient-provider communication, knowledge, perceptions) which were supported with several pieces of evidence in the literature review; and 3) factor indicators of knowledge about self-care demands, perception about hypertension, self-care behaviors for hypertension control had the problem of cross loadings in several items; and 4) it was not appropriate to change the original structure of the questionnaires. The steps of the model modification were as follows:

Firstly, the path from perception about hypertension to self-care behaviors for hypertension control was included in the analysis. The model did not fit with the data but the effect was significant. Four pairs of measurement error correlation between the factor indicators (subscales) of perception about hypertension were set as freeing parameters which were similar to the modified measurement model of the Illness Perception Questionnaire in chapter III. The model nearly fit the data and perceptions about hypertension had the moderate effect on self-care behaviors for hypertension control ($\beta = 0.47$, $p < 0.001$).

Secondly, paths from all endogenous variables were tested which included self-care behaviors for hypertension control, perceptions about hypertension, knowledge about hypertension, and knowledge about self-care demands. The model did not fit with the data but all three paths were significant. Ten pairs of error correlation among factor indicators (subscales) of knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension were set as freeing parameters. The model nearly fit with the data and the effects were significant in all paths.

Thirdly, paths from all exogenous variables to endogenous variables were included in the analysis. The model did not fit with the data. Nineteen pairs of measurement error correlation among the factor indicators (subscales) of knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension as well as among each factor indicator (subscale) of self-care behaviors for hypertension control were set as freeing parameters. The results showed that the patterns of relationships did not change before and after correlation of the measurement errors. The model did not fit with the data with the values of Chi-square = 612.301, df = 219, $p < 0.0001$, CFI = 0.650, TLI = 0.595, RNI = 0.650, RMSEA = 0.067, SRMR = 0.082.

Fourthly, four paths from duration about hypertension to four endogenous variables (i.e., knowledge about hypertension, knowledge about self-care demands, perceptions about hypertension, and self-care behaviors for hypertension control) and two paths from family support to two endogenous variables (i.e., perception about hypertension and self-care behaviors) were deleted. The fit indices of the model improved to an acceptable fit with the level of Chi-square = 232.672, df = 154, $p < 0.0001$, CFI = 0.923, TLI = 0.895, RNI = 0.923, RMSEA = 0.036, SRMR = 0.053 (table 4.4, figure 4.2). The standardized residuals ranged from 0 to 0.779 which did not exceed $\pm$ 4. The fit indices for the residuals (RMSEA and SRMR) were in the acceptable values. Totally, the model was re-specified as follows: 1) freeing 31 pairs of the measurement error correlations among the subscales of knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension and among the subscale of self-care behavior; 2) freeing one pair of the residual between knowledge about hypertension and knowledge about self-care demands; and 3) two paths from family support and four paths from duration about hypertension to the endogenous variables were deleted.

The model interpretation:

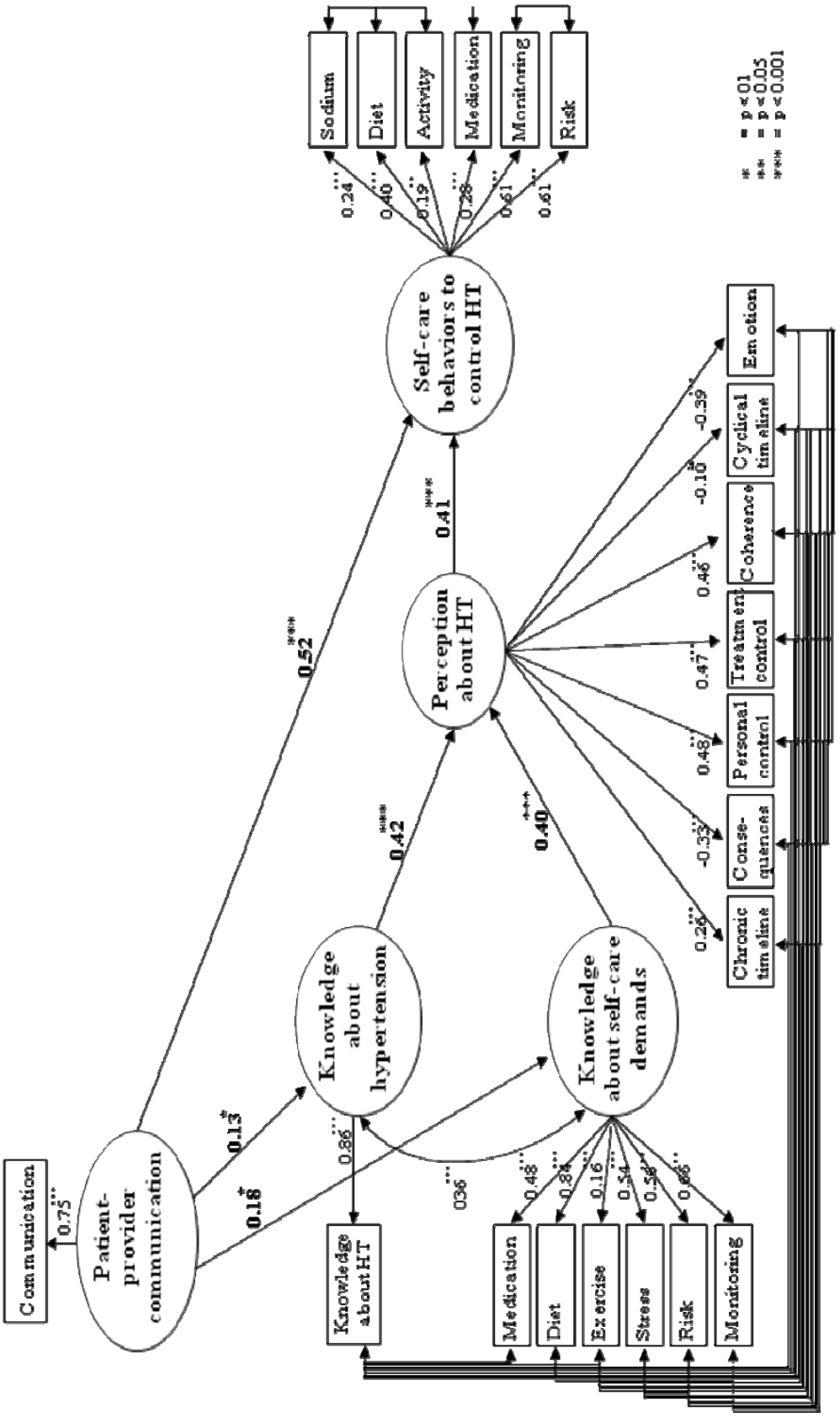
The model could explain 49% in the variance of self-care behaviors for hypertension control, 46% in the variance of perceptions about hypertension, 0.03% in the variance of knowledge about self-care demands, and 0.02% in the variances of knowledge about hypertension. The parameter estimation of all paths in the theoretical model was in the right direction which was similar to the hypothesized model. The

standardized residuals of knowledge about hypertension, knowledge about self-care demands, perceptions about hypertension, and self-care behaviors for hypertension control were 0.98, 0.97, 0.54, and 0.51, respectively. Patient provider communication had a positive direct effect on self-care behaviors for hypertension control ($\gamma = 0.52$, $p < 0.001$). Patient-provider communication had a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension ($\gamma = 0.13$, $p < 0.05$) and perception about hypertension ($\beta = 0.42$, $p < 0.001$), respectively. Patient-provider communication had a positive indirect effect on self-care behaviors for hypertension control through knowledge about self-care demands ($\gamma = 0.18$, $p < 0.05$) and perception about self-care demands ($\beta = 0.40$, $p < 0.001$), respectively. Duration of hypertension and family support did not have either a direct or indirect effect on self-care behaviors for hypertension control. The results were also shown in the figure 4.2 and table 4.4.

Table 4.4 The fit indices of the hypothesized and the modified hypothesized models

Statistic testing	Hypothesized model	Modified model
Chi-square (χ^2)	612.301 $p < 0.0001$ $df = 219$	232.672, $p < 0.0001$ $df = 154$
CFI or TLI	CFI = 0.650, TLI = 0.595	CFI = 0.923, TLI = 0.895
RNI	0.650	0.923
SRMR	0.067	0.036
RMSEA	0.082	0.053

Note: CFI = Comparative Fit Index, TLI = Tucker Lewis Index, RNI = relative noncentrality index, SRMR = standardized root mean square residual, RMSEA = Root Mean Square Error of Approximation



$\chi^2 = 232.672$, $df = 154$, $p < 0.0001$, CFI = 923, RNI = 0.923, RMSEA = 0.036, SRMR = 0.053

Figure 4.2 Modified hypothesized model of self-care behaviors of persons with hypertension (N = 402)

Table 4.5 Total effect, indirect effect, and direct effect of the causal and the affected variables in the self-care behavior for hypertension control model

Causal variables	Affected variables											
	Knowledge about HT			Knowledge about SCD			Perception about HT			Self-care behaviors		
	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE
Patient-provider communication	0.15*	0.02ns	0.13*	0.15*	0.02ns	0.13*	-	-	-	0.52***		0.52***
Knowledge about HT	-	-	-	-	-	0.42***	-	-	0.42***	-	-	-
Knowledge about SCD	-	-	-	-	-	0.40***	-	-	0.40***	-	-	-
Perception about HT	-	-	-	-	-	-	-	-	-	0.41***	-	0.41***
R^2	$R^2 = 0.02$			$R^2 = 0.03$			$R^2 = 0.46$			$R^2 = 0.49$		

Note: **p-value < 0.01, ***p-value < 0.001, TE = total effect, IE = indirect effect, DE = direct effect

4.6 The hypothesis testing

The hypothesis testing consisted of the overall and specific hypothesis testing. The specific hypothesis was used to explain the details of the overall hypothesis.

The overall hypothesis testing: The basic conditioning factors (patient-provider communication, duration about hypertension, and family support) had a positive direct effect on self-care behaviors for hypertension control and positive indirect effects on self-care behaviors for hypertension control through self-care agency (knowledge about hypertension, knowledge about self-care demands, and perception about hypertension).

The basic conditioning factors had a positive direct effect on self-care behaviors for hypertension control and positive indirect effects on self-care behaviors for hypertension control through self-care agency. However, not all relationships in

the hypothesized model were entirely supported. Therefore, the specific hypothesis testing was presented in detail of each relationship.

The specific hypothesis testing:

Specific hypothesis 1: Patient-provider communication had a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perception about hypertension.

Patient-provider communication had a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perception about hypertension. Hypothesis 1 was entirely supported.

Specific hypothesis 2: Duration of hypertension had a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension.

Duration of hypertension did not have either a positive direct or an indirect effect on self-care behaviors for hypertension control. Hypothesis 2 was not supported.

Specific hypothesis 3: Family support had a positive direct effect on self-care behaviors for hypertension control and a positive indirect effect on self-care behaviors for hypertension control through perceptions about hypertension.

Family support did not have either a positive direct or an indirect effect on self-care behaviors for hypertension control. Hypothesis 3 was not supported.

CHAPTER V
DISCUSSION

This chapter presents discussion about the demographic characteristics of persons with hypertension, characteristics of the variables, models of self-care behaviors of persons with hypertension.

5.1 Demographic characteristics of persons with hypertension

The number of subjects in the present study was four hundred and two persons with hypertension who received treatment at three regional hospitals in the central part of Thailand. Age of the subjects ranged from 32 to 88 years (mean = 59.87, mode = 60) which reflected that most persons with hypertension in this study were older adults. An adult was a mature person who was able to make a decision, including decision about self-care (Orem, 1995). Most subjects were housekeepers, average income < 5,000 bath/month, having sufficient income, living with family and having a family history of hypertension. The result was consistent with the study of Leelacharas (2005) which found that approximately 60% of the subjects had a family history of hypertension. It reflected that the development of hypertension in the subjects in this study may have been caused by a consequence of heredity (unchangeable factors) and a pattern of health behaviors of each family (changeable factors).

More than half of persons with hypertension were overweight or obese (overweight = 39.8% and obese = 19.9%). Most persons with hypertension were female and housekeepers which might be a cause of overweight or obese. This finding was consistent with several studies (deLeon, 2004; Han, Lee, Commodore-Mensah, & Kim, 2014; Hekler et al., 2008; Howteerakul et al., 2006; Lee et al., 2013; Minor et al., 2008; Warren-Findlow & Seymour, 2011). Being overweight and obesity are important metabolic problems of persons with hypertension. More than half of the

subjects had a problem of dyslipidemia and one-fourth of the subjects were treated with anti-lipidemic drugs. Approximately 56.5% of persons with hypertension could control their blood pressure to a level less than 140/90 mmHg which was higher than other studies which reported the number of controlled hypertension at 43% (Leelacharas, 2005) and 42.3% (Howteerakul et al., 2006). The rate of controlled hypertension was also higher than in overall Thailand. Only one-seventh of males and one-fourth of females can control blood pressure to a level less than 140/90 mmHg (MOPH, 2011). In other countries, the percentage of controlled hypertension is approximately one-third (Heckler et al., 2008). It was also higher than the large survey from 20 countries which found the control rate of persons with hypertension to be 32% (Ikeda et al., 2014). The high rate of controlled hypertension of the subjects in the present study may be caused by excluding persons with hypertension who have diabetes mellitus and severely uncontrolled hypertension as well as the fact that the average age of the participants was at the beginning of older adults. Even though normal blood pressure was an important goal of hypertension treatment for preventing hypertension consequences (e.g., disease progression, complications, costs of curing of complications, and decreased quality of life), only half of persons with hypertension in the present study could not control their blood pressure. It is a serious problem which requires an effective solution.

5.2 Characteristics of the variables

Duration of hypertension of the subjects ranged from 1 to 46 years (mean = 7.29, SD = 5.38, mode = 5). Approximately two-thirds of the subjects had time duration of hypertension $\geq$ 5 years which indicated living with hypertension long-term. The subjects perceived that they received support or help from their family members at a moderate level. The results were consistent with qualitative studies which demonstrated most persons with hypertension receive help from a family member (Flynn et al., 2013; Li et al., 2007; Panpakdee et al., 2003; Rosland et al., 2012). The subjects perceived that communication from healthcare providers ranked a moderate quality. The quality of patient-provider communication was higher than other studies (Fang et al., 2010; Fawole et al., 2013; Jolles et al., 2012; Stevenson et al., 2004). The

questionnaires for measuring patient-provider communication consisted of the details as follows: healthcare providers answered a question of a patient, addressed concern of a patient, carefully listened to what patients' saying about their illnesses, explained the results of testing, and explained about self-care demands for hypertension control. Provider communication in those aspects indicated communication with patients by focusing on patient's problems or concerns which were important aspects of communication for increasing self-care behaviors for hypertension control. The subjects showed a high level of understanding about hypertension and self-care demands for hypertension control. The findings were consistent with the study of Rujiwatthanakorn et al. (2010) who found that persons with hypertension had a high level of knowledge about hypertension and self-care demands. Approximately 83.3% of persons with hypertension believe in the presence of headache and dizziness when blood pressure increases. Low knowledge about hypertension in this aspect of persons with asymptomatic hypertension might lead to low awareness about hypertension control.

The subjects perceived that hypertension was a moderate threat to them. Perception about hypertension as a threat to a person was consistent with scientific knowledge. For specific types of perception, the subjects perceived hypertension as a disease with a chronic timeline whereas the perception of long duration of hypertension was consistent with other studies (Almas et al., 2012; Huai et al., 2013). The results were also consistent with the study of Pickett et al. (2014). They found that persons with hypertension for more than five years perceived hypertension as a chronic disease more so than those having had of hypertension less than five years. The results from the qualitative studies also showed that perception about hypertension as having a long duration was important for consistency in performing self-care behaviors for hypertension control (Kirdphon, 2003; Panpakdee et al., 2003). The subjects perceived that hypertension had a moderate cyclical timeline. Persons with an illness viewed their hypertension as having a cyclical timeline depending on the level of stress in living with an illness (Petrie & Weinman, 2006). The subjects' perception about hypertension as having mild consequences could be supported by the fact that most persons with hypertension in this study were healthy, had less complications, no co-morbidity of diabetes mellitus, and were independent. Those

patient characteristics led to a perception of hypertension as having a mild consequence. Perception about the consequences of an illness related to perception about severity of an illness (Petrie & Weinman, 2006). Based on scientific knowledge, hypertension is an illness with serious consequences. Perceptions about hypertension as having mild consequences may lead to low practicing self-care behaviors for hypertension control. Hypertensive persons with diabetes were not included in this study and this characteristic might cause perceptions about hypertension as having mild consequences. Hypertensive persons with diabetes mellitus performed self-care behaviors differently from those without diabetes mellitus. Another study found that persons with hypertension perceived hypertension as a chronic illness and mild importance, but hypertensive persons with diabetes viewed hypertension as a chronic disease and high importance (Anthony, Valinsky, Inbar, Gabriel, & Varda, 2012).

The subjects perceived hypertension as either highly personally controllable or controllable with the help of treatment. That perception was consistent with healthcare knowledge. Persons with hypertension have the perception that the ability to control personally hypertension focuses on lifestyle modifications, but those who had the perception of the ability to control hypertension only through treatment focused on taking medication.

The subjects practiced self-care behaviors for hypertension control at a moderate level. For the specific types of self-care behaviors, the subjects practiced those behaviors in the aspect of eating a low sodium diet at a moderate level. The results of this study show that most subjects frequently practice self-care behaviors in the aspect of consuming a low salt diet but approximately 78.9% of the subjects in the present study never read a label for sodium content before purchasing packaged foods. Thais with hypertension practiced reading a label for sodium content less than Americans with hypertension. Approximately 53% of Americans (Ayala et al., 2010) and 78% of African American (Satia, Galanko, & Neuhouser, 2005) read food labels before purchasing the product. Even though reading a label requires reading and interpretation skills, only one-third of persons with a high education (64% of the respondents had a tertiary qualification) frequently read a label for sodium content and the remainder read them sometimes or never at all (Grimes, Riddell, & Nowson, 2009). The present study found that most participants frequently consumed a low salt

diet but rarely read the label for sodium content before purchasing packaged foods. A lack of knowledge about sodium contents in each type of foods and knowledge about reading and calculating sodium content of a food label were a cause of overeating of salt in each day. It could be supported by the study of Rujiwattanakorn (2004) which found that Thais with hypertension consumed sodium at a rate three times higher than the recommended level. However, the practice of taking sodium in this study was not objectively measured for the exact amount of sodium consumed each day.

The subjects practiced self-care behaviors in the aspect of eating healthy diets and weight control and increased physical activity at a moderate level. Some studies found that most persons with hypertension consumed less than five portions of fruits and vegetables per day in each week (Minor et al., 2008). High cost of healthy foods such as lean pork, fish, pesticide free vegetables, and soy oil are also a barrier to eating healthy foods. Poor persons may select foods for just sustenance rather than for health and may also have a limited food selection. These factors may be a cause of overweight and obese of the subjects in this study.

The subjects practiced self-care behaviors in the aspect of medical management at the high level. The belief in the efficacy of antihypertensive medication might be a cause of medication adherence of the subjects in this study. Self-care behavior in the aspect of medication adherence was consistent with other studies (Marshall et al., 2012; Pickett et al., 2014). Several studies found that approximately half of persons with hypertension took their medication as recommended by their physician (Hu et al., 2013; Warren-Findlow & Seymour, 2011). Some persons with hypertension focused on taking anti-hypertensive medication while ignoring lifestyle modifications because they believed in the efficacy of medication (Samranbua, 2011).

5.3 The model of self-care behaviors of persons with hypertension

The model of self-care behaviors of persons with hypertension explains how basic conditioning factors influence self-care agency. The results indicate that the SCDNT is valid in explaining a phenomenon related to self-care behaviors of persons

with hypertension. The findings could support the SCDNT that the basic conditioning factors affected self-care agency. The influence of the basic conditioning factors on self-care agency is supported with the study related to weight management (Pickett et al., 2014). The influence of the estimative operation on productive operation in the estimative operation process of self-care agency among persons with hypertension is supported by other studies (Peter & Templin, 2008, Harper, 1984). The theoretical testing in this study also expanded knowledge related to factors influencing self-care behaviors for hypertension control and these factors were patient-provider communication, knowledge about hypertension and self-care demands for hypertension control, and perception about hypertension.

The results indicate that patient-provider communication in the aspects of encouragement for continuous follow-up, participation in decision making about plans and goals for treatment, intentionally listening to what a patient's saying, answering and addressing a patient's concerns, explaining about the results of testing, and clearly explaining about self-care demands for hypertension control is important aspects of communication to promote self-care behaviors for hypertension control. The results indicate four important findings, including 1) patient-provider communication has a positive direct effect on self-care behaviors for hypertension control; 2) patient-provider communication has a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension; 3) duration of hypertension does not have either a direct or indirect effect on self-care behaviors for hypertension control; and 4) family support does not have either direct or indirect effects on self-care behaviors for hypertension control.

1) Patient-provider communication has a positive direct effect on self-care behaviors for hypertension control.

The results indicated that patient-provider communication in the aspects of support for continuous follow-up encourages persons with hypertension to participate in decision making about plans and goals of treatment, intentionally listening to what a patient's saying, answering and addressing their concerns, explaining about the results of testing, and clearly explaining about self-care demands for hypertension control.

The influence of patient-provider communication on self-care behaviors for hypertension control can be supported by the following reasons: 1) support for continuous follow-up can help persons with hypertension to receive long-term treatment; 2) encouraging persons with hypertension to participate in the decision making about plans and goals of treatment increases the achievement in performing self-care behaviors for hypertension control (Harmon et al., 2006; Robinson et al., 2008); 3) intently listening to what a patient's saying could increase perceptions of being important and cared about; 4) answering and addressing a patient's concerns helps persons with hypertension to solve problems, to reduce difficulties in performing self-care behaviors for hypertension control, and to reduce patient's concerns (Flynn et al., 2013); 5) explaining the results of testing can increase patients' understanding about their condition and increase awareness in performing self-care behaviors for hypertension control; and 6) clearly explaining about self-care demands for hypertension control increases patients' understanding about necessary activities required for practicing to control hypertension.

Orem (2001) also stated that self-care is learned activities through interpersonal relations and communication. Interpersonal relationships require continuous communication. Interpersonal relationships are important for self-care and communication is important for interpersonal relationship (Orem, 2001). Tian et al. (2011) also found that patient-provider communication is effective in the increase of self-care behaviors of persons with a chronic illness. Patient-provider communication, particularly in active listening and addressing concerns, are important for anti-hypertensive medication adherence (deLeon, 2004; Hill et al., 2011). Most persons with hypertension perceive that communication with healthcare providers is important and useful for hypertension control (Bokhour et al., 2012; Flynn et al., 2013).

2) Patient-provider communication has a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension.

The findings could explain that patient-provider communication increases knowledge about hypertension and knowledge about self-care demands for

hypertension control. That knowledge increases perceptions about hypertension in appropriate ways. Appropriate perceptions about hypertension are used for making decisions about when to begin and how to maintain self-care behaviors for hypertension control. Appropriate perceptions are used for evaluating the results of self-care, judging the continuity of performing self-care, and being aware or knowing the value of performing self-care behaviors.

Based on the SCDNT (Orem, 2001), self-care is deliberate actions which include estimative, transitional, and productive operational process. Antecedent knowledge both scientific and common sense knowledge is used along with the process of deliberate actions (Orem, 2001). Antecedent knowledge is used for investigation of self-care in an estimative process, making a decision in a transitional process, and planning and evaluating self-care actions in the productive operational process. In the estimative operation, perception about hypertension is used for knowing about unchangeable conditions (the condition of having hypertension) and what self-care activities are required for the control of a changeable factor (e.g., eating, exercising, and medication taking). Perceptions about hypertension are used for making decisions based on when to begin and how to continue self-care actions. If persons have clear and appropriate perceptions about hypertension, they could make correct decisions about self-care in the transitional operation process. Finally, persons with hypertension produce a course of actions and evaluation for performances, results, and subsequence actions in a productive operation process. A person uses perceptions for making decisions about doing or not doing, as well as using perceptions along with the process of self-care. The psychologist theorists state that perceptions of illness influence personal behaviors in response to a health threat such as following treatment regimens (Phillips et al., 2013).

The effect of patient-provider communication on knowledge about hypertension and self-care demands reflects that high quality patient-provider communication conveys valid knowledge about hypertension and self-care demands for hypertension control to persons with hypertension. Orem (2001) also states that knowledge is necessary for planning specific actions and understanding the relationship between an action and a goal. The effects of patient-provider communication in the aspect of providing information about hypertension and self-

care demands for hypertension control is found in Thais with hypertension (Rujiwattanakorn et al., 2010). Harper (1984) found that providing knowledge about hypertension does not help patients maintain self-care behaviors for a long duration. On the other hand, helping persons with hypertension to have appropriate perceptions about hypertension may help them to maintain self-care behaviors over a long period.

Self-care behaviors of a person are determined by perception and perception is used for making the decision to perform an action (Diefenbach & Leventhal, 1996). Perception about hypertension in relevancy with knowledge of healthcare providers might help a patient maintain self-care behaviors in the long-term. Most persons with hypertension are healthy which leads to perceptions about hypertension as being less serious. Perceptions about hypertension should be consistent with scientific knowledge of healthcare providers, for example diseases with long duration, seriousness of consequences, ability to control by a person or treatment.

Perceptions consist of several aspects. Several studies support the idea that perceptions about hypertension are associated with self-care behaviors for hypertension control, including perceptions about hypertension in the aspects of timeline, consequence, and controllability (Chen et al., 2011; Leelacharas, 2005; Pickett et al., 2014; Rajpura & Nayak, 2014). Persons with hypertension perform self-care behaviors for hypertension control if they have appropriate perceptions about hypertension. Perceptions about hypertension are an inner factor which may be important for persons with a chronic disease.

3) Duration of hypertension does not affect self-care agency and self-care behaviors for hypertension control.

Duration may relate to skill of practice. However, self-care activities for hypertension control are not complex because most types of self-care for hypertension control are the commonly recommended practices for being healthy. Persons with hypertension may require less complicated skills to perform these behaviors, but they have to apply effort rather than skill. Practicing self-care takes a lot of effort therefore, it is difficult to maintain self-care practice for a long duration. Research findings are inconsistent with regards to the relationship between duration of hypertension and

self-care behaviors for hypertension control. Long duration of hypertension has a positive association with self-care behaviors for hypertension control (Hu et al., 2013; Hyre et al., 2007; Karakurt & Kasikci, 2012; Lee et al., 2013; Lee et al., 2010; Robinson, 2012; Roumie et al., 2011), negative association with self-care behaviors for hypertension control (Karaeren et al., 2009; Li et al., 2012; Tilburt et al., 2008), and no association with self-care behaviors for hypertension control (Hekler et al., 2008; Morgado et al., 2010).

4) Family support does not affect self-care agency and self-care behaviors for hypertension control.

Family support does not affect self-care agency. That result could be supported by the fact that persons with hypertension are able to care for themselves. Persons with hypertension perceive that they are healthy or non-sick persons. Social support is a factor for reducing stress in affect on health. For situations without stress, social support may not be necessary. Most subjects in the present study received a moderate level of support from a family member. The majority of subjects are early older adults and healthy. Receiving help from other persons might lead to the perception of lacking ability. At the time of data collection, several subjects stated that they had the ability to care for themselves as well as having an intact memory. Therefore, support from a family member such as reminders to take medicine and eat healthy foods was not necessary.

In summary, among factors influencing the basic conditioning factors, a healthcare system factor (patient-provider communication) was important for persons with hypertension rather than a family system (family support) factor and a health state (duration of hypertension). Patient-provider communication is a powerful factor that directly and indirectly increases self-care behaviors for hypertension control. Patient-provider communication directly increases self-care behaviors for hypertension control by helping a person to address problems or concerns. Patient-provider communication indirectly increases self-care behaviors for hypertension control by increasing knowledge about hypertension and self-care demands and perceptions about hypertension. Persons with hypertension will have self-care behaviors for hypertension control when 1) having an intact cognitive function; 2)

having self-care agency (the ability to know, to make a decision, and to perform actions); and 3) having knowledge (scientific and common sense knowledge) or perceptions about a situation and a way to control a condition. Supporting factors, particularly high quality of patient-provider communication, could help a person to achieve performance of self-care behaviors for hypertension control.

CHAPTER VI
CONCLUSION

This chapter presents the conclusion of the study which includes summary of the study, implications of the study, limitations of the study, and recommendations for a further study.

6.1 Summary of the study

This study was a cross-sectional, model testing design. The aim of this study was to explore the patterns of relationships among the basic conditioning factors (patient-provider communication, duration of hypertension, and family support), self-care agency (knowledge about hypertension, knowledge about self-care demands, and perceptions about hypertension), and self-care behaviors for hypertension control. The study was hypothesized that the self-care agency was influenced by basic conditioning factors. The research settings were three regional hospitals in the central part of Thailand. The data was collected by the researcher and two research assistants between February and June, 2014**.** The subjects were age > 18 years, having been diagnosed with hypertension for at least one year, receiving at least one type of anti-hypertensive drug, having intact cognitive function as screened by the SPMSQ, and without co-morbidity of diabetes. The total subjects were 402 persons with hypertension.

The instruments used in this study included the Demographic and Health Information Sheet (DHIS), the Chronic Illness Resources Survey (CIRS), the Revised Illness Perceptions Questionnaire (IPQ-R), the Knowledge about Self-Care Demands Questionnaire (KSCDQ), and the Self-Care Behavior Questionnaire (SCBQ). The Chronic Illness Resources Survey (CIRS) was developed in western countries and was translated using the Back translation process. The Self-Care Behavior Questionnaire (SCBQ) was modified from the Perceived Self-Care Efficacy Measurement (PSEM).

The content validity of the Chronic Illness Resources Survey and the Self-Care Behavior Questionnaire were reviewed by five experts who are nurse instructors and specialists in the chronic illness. The content validity index of the physician/health care team of the CIRS, the family/friends subscales of the CIRS and the Self-Care Behavior Questionnaire were acceptable and the CVI were 0.94, 0.88, and 0.83, respectively. The reliability of the testing among 30 persons with hypertension of the Self-Care Behaviors Questionnaire, the family subscale of the Chronic Illness Resource Surveys, the healthcare team subscale of the Chronic Illness Resource Surveys, the Revised Illness Perception Questionnaire, and the Knowledge of Self-Care Demands Questionnaire were 0.81, 0.84, 0.79, 0.79, and 0.66 respectively.

The data analysis used the Statistical Package for Social Science (SPSS) for descriptive data analysis and the Mplus program for multivariate data analysis. The data screening and assumption underlying SEM analysis were checked before data analysis. The results showed that the age of the subjects ranged from 32 to 88 years, the majority of the subjects were female, housekeepers, married status, having finished primary school, living with family, and having a family history of hypertension. More than half of the subjects were overweight or obese. Half of the subjects had uncontrolled hypertension. The majority of them had a problem of dyslipidemia.

The majority of the subjects had hypertension for 5 years with a range of duration from 1 to 46 years. Most subjects perceived hypertension as a moderate threat to them. Most subjects perceived hypertension as having a chronic timeline, or a moderate cyclical timeline, mild consequences, high personal control and treatment, high understanding about hypertension, and mild negative emotional response to hypertension. The majority of subjects had moderate practicing self-care behaviors for hypertension control. Most subjects had high practicing self-care about medication management and risk factor avoidance. They had moderate practicing self-care in the aspects of eating low-salt diets, diet and weight control, increased physical activity, and self-monitoring.

The modified hypothesized model fitted with the data with the values of Chi-square = 232.672, df = 154, $p < 0.0001$, CFI = 0.923, TLI = 0.895, RNI = 0.923, RMSEA = 0.036, SRMR = 0.053. The model could explain 49% in the variance of self-care behaviors for hypertension control. Patient provider communication had a

positive direct effect on self-care behaviors for hypertension control ($\gamma = 0.52$, $p < 0.001$). Patient-provider communication had a positive indirect effect on self-care behaviors for hypertension control through knowledge about hypertension ($\gamma = 0.13$, $p < 0.05$) and perceptions about hypertension ($\beta = 0.42$, $p < 0.001$), respectively. Patient-provider communication had a positive indirect effect on self-care behaviors for hypertension control through knowledge about self-care demands ($\gamma = 0.18$, $p < 0.05$) and perceptions about self-care demands ($\beta = 0.40$, $p < 0.001$), respectively. Duration of hypertension and family support did not have either a direct or indirect effect on self-care behaviors for hypertension control. The hypotheses of this study were partially supported.

6.2 Implications of the study

Implication to nursing science:

The SCDNT can be effectively used for guiding a study of persons with hypertension. The results support the SCDNT in the aspect of the effect of the basic conditioning factors on self-care agency. Among ten types of basic conditioning factors, a health system factor conceptualized as patient-provider communication in this study is important for persons with hypertension to increase self-care behaviors for hypertension control. To increase self-care behavior, healthcare providers should increase self-care agency of persons with hypertension by effectively communicating with persons with hypertension.

Implication to nursing practice:

The model of factors which influences self-care behaviors for hypertension control explains how persons with hypertension consistently perform self-care behaviors for hypertension control. The results of the present study can be used for developing nursing intervention for improving self-care behaviors for hypertension control. Nurses can help persons with hypertension to increase self-care behaviors for hypertension control by using the following strategies: 1) increase the quality of patient-provider communication by supporting continuous follow-up, encouraging persons with hypertension to participate in making decisions about plans and goals of treatment, carefully listening to what persons with hypertension say, clearly explaining

hypertension and self-care demands, addressing concerns, and explaining tests results such as blood pressure and laboratory tests; 2) increasing knowledge about hypertension and self-care demands through communication about self-care demands for hypertension and providing a source of scientific knowledge such as reading materials, posters, and media, particularly in the waiting time for services; and 3) helping persons with hypertension to have appropriate perceptions about hypertension which is consistent with scientific knowledge, particularly perceptions about hypertension in the aspects of chronic timeline, seriousness of consequences, controllability by person and treatment, coherence about hypertension, and negative emotions in response to hypertension. However, the effectiveness of an intervention, including these aspects, should be developed and tested before being used in a real nursing practice.

6.3 Limitations of the study

1) The use of purposive and convenience samples and selected only the regional hospital. Therefore, the results could generalize to persons with hypertension who have the same characteristics as the subjects of this study.

2) The cross-sectional study limited ability to measure changing overtime of the variables and did not meet the assumption of SEM in the aspect of temporality (the requirement in measuring the variables in the model in a different time point) (Kline, 2012). Therefore, measuring the variables more than one time was suggested to increase the understanding in long duration and meeting the assumption of SEM.

6.4 Recommendations for a further study

1) The development a nursing intervention program to promote patient-provider communication for helping individuals with hypertension to increase self-care behaviors regarding hypertension control.

2) Patient-provider communication could account for a small variance of knowledge about hypertension and knowledge about self-care demands and it might

be explained by other factors. Finding factor affecting knowledge about hypertension, knowledge about self-care demands, perception about hypertension, and self-care behaviors for hypertension control was required for a further study.

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APPENDICES

APPENDIX A

IRB APPROVAL DOCUMENTS

คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
๒๗๐ ถนนพระราม ๖ แขวงทุ่งพญาไท เขตราชเทวี กทม. ๑๐๔๐๐
โทร. ๐-๒๓๕๔-๗๒๗๕, ๐-๒๒๐๑-๑๒๕๖ โทรสาร ๐-๒๓๕๔-๗๒๓๓
Faculty of Medicine Ramathibodi Hospital, Mahidol University
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Tel. (+66) 2354-7275, (+66) 2201-1296 Fax (+66) 2354-7233

Documentary Proof of Ethical Clearance
Committee on Human Rights Related to Research Involving Human Subjects
Faculty of Medicine Ramathibodi Hospital, Mahidol University

MURA2013/708

Title of Project	The Influence of Basic Conditioning Factors and Self-Care Agency on Self-Care Behaviors in Thais with Hypertension
Protocol Number	ID 12-56-35
Principal Investigator	Miss. Ladda Saleema
Official Address	Faculty of Nursing Mahidol University

The aforementioned project has been reviewed and approved by the Committee on Human Rights Related to Research Involving Human Subjects, based on the Declaration of Helsinki.

Signature of Secretary Committee on Human Rights Related to Research Involving Human Subjects	..... Prof. Duangrurdee Wattanasirichaigoon, M.D.
Signature of Chairman Committee on Human Rights Related to Research Involving Human Subjects	..... Prof. Pratak O-Prasertsawat, M.D.
Date of Approval	January 17, 2014
Duration of Study	6 Months

คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
๒๗๐ ถนนพระราม ๖ แขวงทุ่งพญาไท เขตราชเทวี กทม. ๑๐๔๐๐
โทร. ๐-๒๓๕๔-๗๒๗๕, ๐-๒๒๐๑-๑๒๕๖ โทรสาร ๐-๒๓๕๔-๗๒๓๓
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เอกสารรับรองโดยคณะกรรมการจริยธรรมการวิจัยในคน
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี
มหาวิทยาลัยมหิดล

เลขที่ ๒๕๕๖/๗๐๘

ชื่อโครงการ	อิทธิพลของปัจจัยพื้นฐานและความสามารถในการดูแลตนเองต่อพฤติกรรมการดูแลตนเองในคนไทยที่เป็นความดันโลหิตสูง
เลขที่โครงการ/รหัส	ID ๑๒-๕๖-๓๕ ย
ชื่อหัวหน้าโครงการ	นางสาวลัดดา สะลีมา
สถานศึกษา	คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

ขอรับรองว่าโครงการดังกล่าวข้างต้นได้ผ่านการพิจารณาเห็นชอบโดยสอดคล้องกับแนวปฏิญญา เฮลซิงกิ จากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

ลงนาม	
กรรมการและเลขานุการจริยธรรมการวิจัยในคน	(ศาสตราจารย์ แพทย์หญิงดวงฤดี วัฒนศิริชัยกุล)
ลงนาม	
ประธานกรรมการจริยธรรมการวิจัยในคน	(ศาสตราจารย์ นายแพทย์ประทักษ์ โอประเสริฐสวัสดิ์)
วันที่รับรอง	๑๗ มกราคม ๒๕๕๗
ระยะเวลาในการศึกษา	๖ เดือน

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย

(Patient/Participant Information Sheet)

ชื่อโครงการ อิทธิพลของปัจจัยพื้นฐานและความสามารถในการดูแลตนเองต่อพฤติกรรมการดูแลตนเองในคนไทยที่เป็นความดันโลหิตสูง

"THE INFLUENCE OF BASIC CONDITIONING FACTORS AND SELF-CARE AGENCY ON SELF-CARE BEHAVIORS IN THAIS WITH HYPERTENSION"

ชื่อผู้วิจัย นางสาวลัดดา สะลีมา

สถานที่วิจัย หน่วยตรวจโรคอายุรกรรม แผนกผู้ป่วยนอก ของโรงพยาบาลศูนย์ 3 แห่ง คือ โรงพยาบาลราชบุรี โรงพยาบาลนครปฐม และโรงพยาบาลเจ้าพระยายมราช

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

นางสาวลัดดา สะลีมา
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โทรศัพท์ 086-6678948

ผู้สนับสนุนการวิจัย ไม่มี

ความเป็นมาของโครงการ

ความดันโลหิตสูงเป็นปัญหาสาธารณสุขที่สำคัญซึ่งส่งผลกระทบต่อประชาชนจำนวนมาก องค์การอนามัยโลกประมาณการณ์ว่าในปี 2568 จะมีผู้เป็นความดันโลหิตสูงจำนวน 1.56 พันล้านคน ปัญหาสำคัญสำหรับผู้เป็นความดันโลหิตสูงคือการเกิดภาวะแทรกซ้อนจากการควบคุมความดันโลหิตไม่มีประสิทธิภาพ ผู้เป็นความดันโลหิตสูงที่ไม่สามารถควบคุมความดันโลหิตให้อยู่ในเกณฑ์ปกติมีความเสี่ยงต่อการเกิดโรคหัวใจ โรคหลอดเลือดสมอง และโรคไต กระทรวงสาธารณสุขไทยรายงานว่าผู้เป็นความดันโลหิตสูงมีจำนวนมากขึ้นในแต่ละปี และผู้ป่วยที่นอนรักษาตัวในโรงพยาบาลจำนวนมากที่สุดคือผู้ป่วยที่มีสาเหตุที่เกี่ยวข้องกับความดันโลหิตสูง ผู้ชายไทยที่เป็นความดันโลหิตสูงจำนวน 7 คน สามารถควบคุมความดันโลหิตได้เพียง 1 คน และในผู้หญิงไทยที่เป็นความดันโลหิตสูงจำนวน 4 คน สามารถควบคุมความดันโลหิตได้เพียง 1 คน ซึ่งพบว่าอัตราการควบคุมความดันโลหิตให้อยู่ในเกณฑ์ปกติของคนไทยที่เป็นความดันโลหิตสูงยังอยู่ในระดับต่ำ

การควบคุมความดันโลหิตสูงอย่างมีประสิทธิภาพนั้นผู้เป็นความดันโลหิตสูงจำเป็นต้องรับประทานยาควบคุมความดันโลหิตให้ครบถ้วนอย่างต่อเนื่องตามแผนการรักษาของแพทย์ ร่วมกับการปรับพฤติกรรมเพื่อลดปัจจัยเสี่ยงต่างๆ เช่น การรับประทานอาหารที่มีเกลือและไขมันต่ำ การออกกำลังกายอย่างสม่ำเสมอ การงดดื่มสุราและสูบบุหรี่ การควบคุมน้ำหนักให้อยู่ในเกณฑ์ปกติ และการลดความเครียด ซึ่งการทำกิจกรรมการดูแลตนเองดังกล่าว ผู้ที่มีความดันโลหิตสูงอาจจะไม่สามารถปฏิบัติได้อย่างสม่ำเสมอซึ่งอาจจะมีสาเหตุจากด้านตัวผู้ป่วยเอง เช่น ความรู้ความเข้าใจเกี่ยวกับโรคและสิ่งที่ต้องปฏิบัติเพื่อควบคุมความดันโลหิตสูง หรือจากการสนับสนุนของครอบครัว หรือจากด้านบุคลากรเจ้าหน้าที่ทีมสุขภาพที่ติดต่อสื่อสาร ให้คำแนะนำผู้ป่วย ดังนั้นในการศึกษาครั้งนี้จึงศึกษาถึงปัจจัยที่ส่งผลต่อพฤติกรรมการดูแลตนเองเพื่อควบคุมความดันโลหิต ซึ่งผลการศึกษาครั้งนี้จะทำให้บุคลากรทางด้านสาธารณสุขเข้าใจถึงสาเหตุที่อาจจะเกี่ยวข้องกับพฤติกรรมการดูแลตนเองของผู้ป่วยที่เป็นโรคความดันโลหิตสูง

วัตถุประสงค์

เพื่อศึกษาความสัมพันธ์เชิงสาเหตุได้แก่ ระยะเวลาการเป็นโรคความดันโลหิตสูง การติดต่อสื่อสารระหว่างผู้ป่วยและบุคคลากรในทีมสุขภาพ การรับรู้พฤติกรรมสนับสนุนจากบุคคลในครอบครัว ความรู้เกี่ยวกับโรคความดันโลหิตสูงและความต้องการการดูแลตนเองเมื่อเป็นโรคความดันโลหิตสูง และความเชื่อเกี่ยวกับโรคความดันโลหิตสูง ว่าจะมีผลต่อพฤติกรรมการดูแลตนเองของผู้ที่เป็นโรคความดันโลหิตสูงอย่างไร

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย

ผู้วิจัยขอเชิญท่านเข้าร่วมในการศึกษาครั้งนี้เนื่องจากท่านเป็นโรคความดันโลหิตสูงที่ปฏิบัติตนเพื่อควบคุมโรคความดันโลหิตสูง หากท่านยินดีเข้าร่วมในการวิจัยครั้งนี้ ผู้วิจัยจะขออนุญาตให้ท่านตอบแบบสอบถามเกี่ยวกับความรู้เรื่องความดันโลหิตสูงและความต้องการการดูแลตนเองเพื่อควบคุมความดันโลหิตสูง ความเชื่อเกี่ยวกับโรคความดันโลหิตสูง การรับรู้การได้รับการสนับสนุนจากครอบครัว การติดต่อสื่อสารระหว่างผู้ป่วยและผู้ให้บริการสุขภาพ และพฤติกรรมการดูแลตนเองเพื่อควบคุมความดันโลหิตสูง รวมทั้งข้อมูลส่วนบุคคล โดยที่ท่านจะเสียเวลาในการตอบแบบสอบถามประมาณ 30 - 45 นาทีโดยผู้วิจัยจะขออนุญาตให้ท่านตอบแบบสอบถามขณะนั่งรอตรวจหรือขณะนั่งรอรับยา โดยจะเชิญท่านนั่งตอบแบบสอบถามตรงบริเวณที่ห่างจากบุคคลอื่นเพื่อให้มีความเป็นส่วนตัวกับท่าน

หากท่านมีข้อสงสัยเกี่ยวกับการวิจัยครั้งนี้ ผู้วิจัยยินดีจะตอบให้ท่านเข้าใจ ท่านมีสิทธิจะตอบรับหรือปฏิเสธในการเข้าร่วมการวิจัยครั้งนี้ แม้ว่าท่านยินยอมเข้าร่วมวิจัยครั้งนี้แล้วท่านมีสิทธิจะยกเลิกหรือถอนตัวจากการศึกษาครั้งนี้ ได้ทุกเวลาที่ท่านต้องการ การตัดสินใจเข้าร่วมหรือไม่เข้าร่วมในการศึกษาครั้งนี้จะไม่มีผลต่อการตรวจรับการรักษาในโรงพยาบาล

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมการวิจัย

การศึกษาครั้งนี้จะเป็นประโยชน์ทางอ้อมต่อตัวท่านเนื่องจากผลการศึกษาครั้งนี้จะเป็นข้อมูลให้ทีมสุขภาพทราบถึงสาเหตุที่มีผลต่อการปฏิบัติตัวของผู้ที่เป็นโรคความดันโลหิตสูง ในการควบคุมความดันโลหิตและอาจจะนำความรู้ที่ได้จากการศึกษาครั้งนี้ไปจัดกิจกรรมการส่งเสริมให้ผู้ที่เป็นโรคความดันโลหิตสูงมีพฤติกรรมในการดูแลตนเองเพื่อควบคุมความดันโลหิตสูงให้มีประสิทธิภาพต่อไป

การศึกษาครั้งนี้ไม่ส่งผลกระทบในด้านเสียหายใดๆ แก่ท่านนอกจากอาจทำให้ท่านเสียเวลาไปบ้าง อีกทั้งข้อคำถามบางข้ออาจกระทบความรู้สึกของท่านได้ ดังนั้นผู้ป่วยมีสิทธิที่จะปฏิเสธการตอบแบบคำถาม ให้สัมภาษณ์หรือถอนตัวออกจากการศึกษาครั้งนี้ได้ทุกเวลาที่ผู้ป่วยต้องการ การตัดสินใจเข้าร่วมหรือไม่เข้าร่วมการศึกษาในครั้งนี้ จะไม่มีผลต่อความสัมพันธ์ระหว่างท่านกับหน่วยงานใดๆ เช่นโรงพยาบาลที่ให้การรักษาท่าน

การเก็บข้อมูลเป็นความลับ

ข้อมูลส่วนตัวของผู้ป่วยจะได้รับการเก็บรักษาไว้ ไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวม ชื่อของท่านจะไม่ปรากฏในแบบฟอร์มใดๆ ของแบบสอบถาม และตัวเลขจะใช้แทนชื่อของผู้เข้าร่วมวิจัยแต่ละท่าน การเปิดเผยข้อมูลเกี่ยวกับผู้ป่วยต่อหน่วยงานที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น และข้อมูลในแบบสอบถามของผู้ป่วยจะเก็บไว้เป็นความลับ ผู้วิจัยจะทำการทำลายแบบสอบถามเหล่านั้นด้วยตนเองภายหลังเสร็จสิ้นการวิจัย

ถ้าท่านมีปัญหาข้องใจหรือรู้สึกกังวลใจกับการเข้าร่วมในโครงการวิจัยนี้ ท่านสามารถติดต่อกับประธานกรรมการจริยธรรมการวิจัยในคน สำนักงานวิจัยคณะฯ อาคารวิจัยและสวัสดิการ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี เบอร์โทรศัพท์ 02-201-1544

หนังสือยินยอมโดยได้รับการบอกกล่าวและเต็มใจ

(Informed Consent Form)

ชื่อโครงการ อิทธิพลของปัจจัยพื้นฐานและความสามารถในการดูแลตนเองต่อพฤติกรรมการดูแลตนเอง ในคนไทยที่เป็นความดันโลหิตสูง

ชื่อผู้วิจัย นางสาวลัดดา สะลีมา

*ชื่อผู้เข้าร่วมการวิจัย ……

อายุ …… เลขที่เวชระเบียน ……

คำยินยอมของผู้เข้าร่วมการวิจัย

ข้าพเจ้า นาย/นาง/นางสาว ได้ทราบรายละเอียดของโครงการวิจัยตลอดจนประโยชน์ และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้วอย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้นและยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้น และข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้นข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่เข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ลงชื่อ……(ผู้เข้าร่วมการวิจัย)

……..(พยาน)

……..(พยาน)

วันที่ ……

คำอธิบายของแพทย์หรือผู้วิจัย

ข้าพเจ้าได้อธิบายรายละเอียดของโครงการ ตลอดจนประโยชน์ของการวิจัย รวมทั้งข้อเสี่ยงที่อาจจะเกิดขึ้นแก่ผู้เข้าร่วมการวิจัยทราบแล้วอย่างชัดเจนโดยไม่มีสิ่งใดปิดบังซ่อนเร้น

ลงชื่อ……(แพทย์หรือผู้วิจัย)

วันที่……

หมายเหตุ : กรณีผู้เข้าร่วมการวิจัยไม่สามารถอ่านหนังสือได้ ให้ผู้วิจัยอ่านข้อความในหนังสือยินยอมฯ นี้ให้แก่ผู้เข้าร่วมการวิจัยฟังจนเข้าใจดีแล้ว และให้ผู้เข้าร่วมการวิจัยลงนามหรือพิมพ์ลายนิ้วหัวแม่มือรับทราบในการให้ความยินยอมดังกล่าวข้างต้นไว้ด้วย

* ผู้เข้าร่วมการวิจัย หมายถึง ผู้ยินยอมตนให้ทำวิจัย

APPENDIX B

PERMISSION LETTERS FOR USING THE QUESTIONNAIRES

Permission letter for using the IPQ-R

จาก: **ลัดดา สะลีมา** (saleema_ladda@hotmail.com)

ส่งเมื่อ: 7 มีนาคม 2556 10:52:29

ถึง: r.moss-morris@auckland.ac.nz (r.moss-morris@auckland.ac.nz); rona.moss-morris@kcl.ac.uk (rona.moss-morris@kcl.ac.uk)

Dear Professor Rona Moss-Morris,

My name is Ladda Saleema, a doctoral nursing student of Doctor of Philosophy Programme in Nursing (International and Collaboration with Foreign University Programme), Mahidol University, Thailand. My major advisor is Assoc. Prof. Dr. Orasa Panpakdee who is a faculty member of Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand. I am currently in the process of developing my dissertation proposal. The topic of my research is factors contributing to self-care behaviors of Thai adults with essential hypertension.

I read your questionnaire “The Revised Illness Perception Questionnaire (IPQ-R) hypertension” which was posed in the website “http://www.uib.no/ipq/”. I am interesting in the Revised Illness Perception Questionnaire (IPQ-R) for using as the instruments to measure perceptions about hypertension of hypertensive patients. Therefore, I would like to ask you for permission to translate and use The Revised Illness Perception Questionnaire (IPQ-R) for collecting data in my study.

Thank you for your kind attention and I am looking forward to your reply.

Sincerely Yours,
Ladda Saleema
Doctor of Philosophy Programme in
Nursing, (International and Collaboration
with Foreign University Programme),
Mahidol University, Thailand.

จาก: Moss-Morris, Rona (rona.moss-morris@kcl.ac.uk)

ส่งเมื่อ: 7 มีนาคม 2556 16:19:15

ถึง: ลัดดา สะลีมา (saleema_ladda@hotmail.com)

Dear Ladda
That's fine.
Best wishes
Rona
Sent from my iPhon

Permission letter for using the CIRS

From: ลัดดา สะลีมา <saleema_ladda@hotmail.com<mailto:saleema_ladda@hotmail.com>>
Date: Tuesday, July 30, 2013 12:18 AM
To: NCI Computer Services <russ.glasgow@nih.gov<mailto:russ.glasgow@nih.gov>>
Subject: Requestion for using the CIRS
Dear Dr. Russell E. Glasgow

My name is Ladda Saleema, a doctoral nursing student of Doctor of Philosophy Programme in Nursing (International and Collaboration with Foreign University Programme), Mahidol University, Thailand. My major advisor is Assoc. Prof. Dr. Orasa Panpakdee who is a faculty member of Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand. I am currently in the process of developing my dissertation proposal. The topic of my research is factors contributing to self-care behaviors of persons with essential hypertension.

I read your article “A Social–Ecologic Approach to Assessing Support for Disease Self-Management: The Chronic Illness Resources Survey” which was published in the Journal of Behavioral MedicineJournal, 2000, volume 23, number 6, pages 559-583. I am interesting in the family/friends and physician/health care team subscales of the Chronic Illness Resources Survey (CIRS) to measure social support in my study. Therefore, I would like to ask you for permission to translate, to modify in a little bit of the items to relevancy with my culture and to use both subscales of the CIRS for collecting data in my study.

Thank you for your kind attention and I am looking forward to your reply.

Sincerely Yours,
Ladda Saleema
Doctor of Philosophy Programme in
Nursing, (International and Collaboration
with Foreign University Programme),
Mahidol University, Thailand.

Dear Ladda-
Thank you for your interest in our 'CIRS' scale.
You have my permission to translate and adapt the scale as requested.
Sincerely,
Russell E. Glasgow, Ph.D.

APPENDIX C

LIST OF EXPERTS FOR CONTENT VALIDITY APPROVAL

List of experts for content validity approval

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APPENDIX D
THE INSTRUMENTS

แบบสอบถามข้อมูลส่วนบุคคล

คำชี้แจง โปรดเขียนคำตอบในช่องว่างหรือ ทำเครื่องหมาย √ หน้าข้อความ ที่ตรงกับความจริงของตัวท่านมากที่สุด

ส่วนที่ 1 แบบบันทึกข้อมูลทั่วไป

1.เพศ ( ) ชาย ( ) หญิง

2.อายุ ..... ปี ..... เดือน วัน เดือน ปี เกิด .....

3.ระยะเวลาที่เป็นความดันโลหิตสูง.....ปี (เริ่มเป็นเมื่อปี พ.ศ. .....)

4.ระดับการศึกษา

( ) ไม่ได้เรียนหนังสือ ( ) ประถมศึกษา ( ) มัธยมศึกษา

( ) อนุปริญญา ( ) ปริญญาตรี ( ) สูงกว่าปริญญาตรี

( ) อื่นๆ ระบุ.....

5.อาชีพ

( ) ไม่ได้ทำงาน ( ) แม่บ้าน/พ่อบ้าน ( ) เกษตรกร ( ) รับจ้าง

( ) ค้าขาย ( ) ข้าราชการ/รัฐวิสาหกิจ ( ) ข้าราชการบำนาญ

( ) อื่นๆ ระบุ.....

6.สถานภาพสมรส

( ) โสด ( ) คู่ ( ) หม้าย ( ) หย่าร้าง

7.รายได้ของครอบครัว (รายได้ของทุกคนรวมกัน) .....บาท/ต่อเดือน

8.จำนวนสมาชิกในครอบครัว …….. คน

9.ท่านมีญาติสายตรงเป็นโรคความดันโลหิตสูงหรือไม่

พ่อเป็นความดันโลหิตสูง ( ) ใช่ ( ) ไม่ใช่

แม่เป็นความดันโลหิตสูง ( ) ใช่ ( ) ไม่ใช่

พี่น้องท้องเดียวกันกับพ่อเป็นความดันโลหิตสูง ..... คน

พี่น้องท้องเดียวกันกับแม่เป็นความดันโลหิตสูง ..... คน

10.อาการข้างเคียงจากการรับประทานยารักษาความดันโลหิตสูง

( ) ไม่มี

( ) มี ระบุ ……

ส่วนที่ 2 แบบบันทึกข้อมูลจากเวชระเบียนผู้ป่วย

1.ได้รับการวินิจฉัยว่าเป็นโรคความดันโลหิตสูงเมื่อ ..... (ระบุ วัน เดือน ปี)

2.ระยะเวลาที่เป็นโรคความดันโลหิตสูง.....ปี

3.ส่วนสูง ..... เซนติเมตร น้ำหนัก ..... กิโลกรัม BMI .....

4.BP ในช่วง 6 เดือนที่ผ่านมา

1) ..... 2) ..... 3) .....

4) ..... 5) ..... 6) .....

5.ภาวะแทรกซ้อนจากโรคความดันโลหิตสูง

( ) heart failure ( ) LVH ( ) MI ( ) angina

( ) proteinurea ( ) nephrosclerosis ( ) renal failure ( ) PAD

( ) retinopathy ( ) อื่นๆ.....

6.ยารักษาความดันโลหิตสูงที่ได้รับและขนาดที่รับประทาน

1) ชื่อยา ..... ขนาด ….....

2) ชื่อยา ..... ขนาด ….....

3) ชื่อยา ..... ขนาด ….....

4) ชื่อยา ..... ขนาด ….....

5) ชื่อยา ..... ขนาด ….....

6) ชื่อยา ..... ขนาด ….....

7) ชื่อยา ..... ขนาด ….....

8) ชื่อยา ..... ขนาด ….....

9) ชื่อยา ..... ขนาด ….....

Self-Care Behavior Questionnaire

Instruction: Please make a circle around an answer that you think most relevance with your behaviors

1. In the pass 1 month, how often you added condiments such as fish sauce, soy source, and another source in already cooked foods?

A. Rarely or never done

B. Sometimes

C. Frequently

D. Always

2. In the pass 1 month, how often you eat fatty foods such as leg pork, streaky pork, coconut milk, chicken leather, egg, oyster, squid or other fatty foods?

A. Rarely or never done (0 day/week)

E. Sometimes (1-3 days/week)

F. Frequently (4-5 day/week)

G. Always (6-7 day/week)

3. In the pass 1 month, how often you read a food label of sodium content before eating or buying package foods?

A. Rarely or never done

B. Sometimes

C. Frequently

D. Always

4.……

……

30. In the pass 1 month, do you drink alcohol beverage such as spirits, rice whisky, beers, herbal liquor, wine?

☐ No

☐ Drink

Type .....

Amount ..... /week

Frequently ..... days/week

แบบสอบถามพฤติกรรมการดูแลตนเองของผู้ป่วยโรคความดันโลหิตสูง

คำชี้แจง กรุณาทำเครื่องหมายวงกลมล้อมรอบคำตอบที่ตรงกับพฤติกรรมการดูแลตนเองของท่าน

1. ในช่วง 1 เดือนที่ผ่านมา ท่านเติมเครื่องปรุงรสเค็มเช่น น้ำปลา ซีอิ้ว ซอส เพิ่มในอาหารที่ปรุงรสมาแล้วบ่อยเพียงใด?

ก. ไม่เติมเลยเติมทุกครั้งที่กิน

ข. เติมนานๆ ครั้งที่กิน

ค. เติมเกือบทุกครั้งที่กิน

ง. เติมทุกครั้งที่กิน

2. ในช่วง 1 เดือนที่ผ่านมา ท่านกินอาหารจำพวก ปลาเค็ม หมูเค็ม ไข่เค็ม อาหารกระป๋อง กุนเชียง หมูหยอง ไส้กรอก อาหารหมักดอง หรืออาหารที่มีเกลือหรือโซเดียมสูงชนิดอื่นๆ บ่อยเพียงใด?

ก. ไม่ได้กินเลย

ข. กินบ้าง (ประมาณ 1-3 วันต่อสัปดาห์)

ค. กินค่อนข้างบ่อย (ประมาณ 4-5 วันต่อสัปดาห์)

ง. กินเป็นประจำ (ประมาณ 6-7 วันต่อสัปดาห์)

3. ในช่วง 1 เดือนที่ผ่านมา ท่านอ่านฉลากอาหารเพื่อดูปริมาณเกลือก่อนเลือกซื้อหรือเลือกกินอาหารสำเร็จรูป บ่อยเพียงใด

ก. ไม่ได้อ่านเลย

ข. อ่านบ้างเป็นบางครั้ง

ค. อ่านเกือบทุกครั้ง

ง. อ่านทุกครั้ง

4. ……..……...

……..……...

……..……...

31. ในช่วง 1 เดือนที่ผ่านมา ท่านดื่มเครื่องดื่มที่มีแอลกอฮอล์เช่น สุรา เหล้า เหล้าขาว ยาดองเหล้า เบียร์ ไวน์ หรือไม่?

☐ ไม่ดื่ม

☐ ดื่ม

ชนิด .....

ปริมาณ ..... ต่อวัน

จำนวน ..... วันต่อสัปดาห์

Chronic Illness Resource Survey (family subscale)

Family					
	Not at all		**A moderate amount**		**A great deal**
Over the **past 3 months**, to what extent…	**1**	**2**	**3**	**4**	**5**
1. Have family or friends exercise with you?	☐1	☐2	☐3	☐4	☐5
2. Have family or friends listened carefully to what you had to say about your illness?	☐1	☐2	☐3	☐4	☐5
3. Have family or friends encouraged you to do the things you need to do for your family?	☐1	☐2	☐3	☐4	☐5
5. …… …… ……	☐1	☐2	☐3	☐4	☐5
6. …… …… ……	☐1	☐2	☐3	☐4	☐5
7. …… …… ……	☐1	☐2	☐3	☐4	☐5
8. …… …… ……	☐1	☐2	☐3	☐4	☐5

แบบสอบถามการช่วยเหลือสนับสนุนจากบุคคลในครอบครัว

คำชี้แจง กรุณาทำเครื่องหมาย **X** ลงในช่องว่างตามความคิดเห็นของท่านต่อข้อความดังต่อไปนี้

การช่วยเหลือสนับสนุนจากบุคคลในครอบครัว (ในช่วง 3 เดือนที่ผ่านมา)	**การได้รับการช่วยเหลือ**				
	ไม่เคยเลย	**น้อยครั้ง**	**บางครั้ง**	**ค่อนข้างบ่อย**	**ทุกครั้ง/บ่อยมาก**
1.คนในครอบครัวร่วมออกกำลังกายกับท่าน มากน้อยเพียงใด?					
2.คนในครอบครัวสนใจฟังในสิ่งที่ท่านบอกกล่าวเกี่ยวกับความเจ็บป่วย มากน้อยเพียงใด?					
3.คนในครอบครัวคอยกระตุ้นให้ท่านทำสิ่งที่จำเป็นต่อความเจ็บป่วย (เช่น การกินยาให้ตรงเวลา) มากน้อยเพียงใด?					
4.…… …… ……					
5.…… …… ……					
6.…… …… ……					
7.…… …… ……					
8.…… …… ……					

Chronic Illness Resource Survey (Healthcare team subscale)

Doctor and Health Care Team					
	Not at all		**A moderate amount**		**A great deal**
Over the **past 3 months**, to what extent…	**1**	**2**	**3**	**4**	**5**
1. Has your doctor or other health advisor (nurse, dietician) clearly explained what you needed to do to manage your illness? (*If you have not had any doctor visits in the past 3 months, think back to the last visit you had*.)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2. Has your doctor or other health advisor provided support between visits such as phone calls, reminder letters, or newsletters?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3. Has your doctor involved you as an equal manner in making decisions about illness management strategies and goals?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4. …… …… ……	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5. …… …… ……	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6. …… …… ……	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7. …… …… ……	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

แบบสอบถามการติดต่อสื่อสารระหว่างผู้ป่วยและบุคลากรทีมสุขภาพ

คำชี้แจง กรุณาทำเครื่องหมาย **X** ลงในช่องว่างตามความคิดเห็นของท่านต่อข้อความดังต่อไปนี้

การช่วยเหลือสนับสนุนจากบุคลากรทีมสุขภาพ (ในช่วง 3 เดือนที่ผ่านมา)	**การได้รับการช่วยเหลือ**				
	ไม่เคยเลย	**น้อยครั้ง**	**บางครั้ง**	**ค่อนข้างบ่อย**	**ทุกครั้ง/บ่อยมาก**
1.ท่านได้รับคำอธิบายจากแพทย์ พยาบาล นักกำหนดอาหาร และเจ้าหน้าที่สุขภาพอื่นๆ เกี่ยวกับการจัดการกับความเจ็บป่วย มากน้อยเพียงใด?					
2.แพทย์หรือเจ้าหน้าที่สุขภาพได้ให้การสนับสนุนช่วยเหลือท่านโดยการให้ข้อมูลทางโทรศัพท์, ทางจดหมายเตือน, หรือทางจุลสาร มากน้อยเพียงใด?					
3.แพทย์ได้ให้ท่านมีส่วนร่วมในการตัดสินใจเกี่ยวกับแผนการรักษาและการตั้งเป้าหมายในการรักษา ของท่าน มากน้อยเพียงใด?					
4.…….. …….. ……..					
5.…….. …….. ……..					
6.…….. …….. ……..					
7.…….. …….. ……..					

Knowledge about Hypertension Questionnaire

Please do the sign √ in the box you think that it was correct

	Questions	Answers
1.	People with systolic blood pressure > 140 mmHg is persons with hypertension	☐ Yes ☐ No
2.	People with diastolic blood pressure > 90 mmHg is persons with hypertension	☐ Yes ☐ No
3.	People having a family history of hypertension have a high risk for hypertension more than other persons?	☐ Yes ☐ No
4.	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
13.	....	☐ Yes ☐ No

แบบสอบถามความรู้เรื่องโรคความดันโลหิตสูง

คำชี้แจง กรุณาทำเครื่องหมาย √ ลงในช่องที่ตรงกับคำตอบที่ท่านคิดว่าถูกต้อง

ข้อ	คำถาม	คำตอบ
1.	คนที่มีความดันโลหิตสูงตัวบนตั้งแต่ 140 มิลลิเมตรปรอทขึ้นไปแสดงว่าเป็นความดันโลหิตสูง	☐ ใช่ ☐ ไม่ใช่
2.	คนที่มีความดันโลหิตสูงตัวล่างตั้งแต่ 90 มิลลิเมตรปรอทขึ้นไปแสดงว่าเป็นความดันโลหิตสูง	☐ ใช่ ☐ ไม่ใช่
3.	คนที่มีพ่อ แม่ พี่ น้อง เป็นความดันโลหิตสูงจะมีโอกาสเสี่ยงในการเกิดความดันโลหิตสูงมากกว่าคนที่ไม่มีพ่อ แม่ พี่ น้องเป็นความดันโลหิตสูง	☐ ใช่ ☐ ไม่ใช่
4.	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
13.	…… ……	☐ ใช่ ☐ ไม่ใช่

Knowledge about Self-Care Demands Questionnaire

Please do the sign √ in the box you think that it was correct

	Questions	Answers
1.	Persons with hypertension can stop taking antihypertensive medication when feeling well or workable?	☐ Yes ☐ No
2.	If having a problem after taking antihypertensive medication, persons with hypertension should consult a physician for adjusting a type or dosage of a drug?	☐ Yes ☐ No
3.	Persons with hypertension can stop taking antihypertensive medication when blood pressure being normal?	☐ Yes ☐ No
4.	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
	....	☐ Yes ☐ No
23.	....	☐ Yes ☐ No

แบบสอบถามความรู้เรื่องความต้องการการดูแลตนเอง

คำชี้แจง กรุณาทำเครื่องหมาย √ ลงในช่องที่ตรงกับคำตอบที่ท่านคิดว่าถูกต้อง

ข้อ	คำถาม	คำตอบ
1.	ผู้เป็นความดันโลหิตสูงสามารถหยุดกินยาได้เอง เมื่อรู้สึกสบายดีและทำงานได้ตามปกติ	☐ ใช่ ☐ ไม่ใช่
2.	ถ้ามีอาการผิดปกติเกิดขึ้นหลังกินยา ผู้เป็นความดันโลหิตสูงควรปรึกษาแพทย์ เพื่อปรับเปลี่ยนชนิดยาหรือขนาดยาใหม่	☐ ใช่ ☐ ไม่ใช่
3.	ผู้เป็นความดันโลหิตสูงสามารถหยุดกินยาได้เอง เมื่อความดันโลหิตลดลงสู่ระดับปกติ	☐ ใช่ ☐ ไม่ใช่
4.	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
	…… ……	☐ ใช่ ☐ ไม่ใช่
23.	…… ……	☐ ใช่ ☐ ไม่ใช่

Illness Perception Questionnaire (IPQ-R)

We are interested in your own personal views of how you now see your current illness. Please indicate how much you agree or disagree with the following statements about your illness by ticking the appropriate box.

	Views about your illness	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
IP1	My illness will last a short time					
IP2	My illness is likely to be permanent rather than temporary					
IP3	My illness will last for a long time					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
	…… ……					
IP37	…… ……					

แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วย

คำชี้แจง แบบสอบถามนี้เกี่ยวกับความคิดเห็นของท่านที่มีต่อการเป็นโรคความดันโลหิตสูง กรุณาทำเครื่องหมาย √ ลงในช่องว่างตามความคิดเห็นของท่านต่อข้อความดังต่อไปนี้

ข้อ	ความคิดเห็นเกี่ยวกับโรคความดันโลหิตสูง	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วย	ไม่แน่ใจ	เห็นด้วย	เห็นด้วยอย่างยิ่ง
1.	โรคความดันโลหิตสูงของฉันจะเป็นแค่ในช่วงเวลาอันสั้น					
2	โรคความดันโลหิตสูงของฉันอาจจะเป็นตลอดไปมากกว่าเป็นชั่วคราว					
3	โรคความดันโลหิตสูงของฉันใช้เวลานานกว่าจะหาย					
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37	....					

APPENDIX E

COVARIANCE AND CORRELATION MATRIX

Covariance Matrix of the study variables

	DUR	FAM	COM	KHT	KMED	KDIET	KEXE	KSTR	KRIS	KMON	TIME	CONS	PCON	TCON	COH	CYC	EMOT	SOD	DIET	ACT	MED	MON	RISK
DUR	28.928																						
FAM	-6.867	50.303																					
COM	-0.461	6.069	10.089																				
KHT	0.532	1.086	0.384	4.690																			
KMED	-0.077	0.211	0.128	-0.013	0.169																		
KDIET	-0.037	0.300	0.323	0.500	0.148	0.841																	
KEXE	0.166	-0.075	0.110	0.267	0.016	0.048	0.213																
KSTR	-0.035	-0.036	0.030	0.046	0.018	0.061	0.004	0.022															
KRIS	0.013	0.243	-0.066	0.230	0.060	0.247	0.015	0.040	0.313														
KMON	-0.133	0.181	0.065	0.182	0.051	0.174	0.029	0.023	0.098	0.163													
TIME	3.822	-1.589	0.565	1.147	0.224	0.600	0.567	0.046	0.003	0.182	23.274												
CONS	-1.163	0.894	-1.452	0.323	-0.317	-0.788	-0.110	-0.039	0.002	-0.143	-2.806	25.056											
PCON	0.202	2.436	1.558	2.739	0.023	0.487	0.235	0.020	0.137	0.198	1.220	-0.092	12.269										
TCON	-1.930	0.505	0.997	0.401	0.198	0.521	0.287	0.045	0.187	0.152	1.487	-2.239	1.087	4.667									
COH	1.435	0.682	3.192	2.170	0.274	0.814	0.333	0.024	0.014	0.118	3.963	-7.589	3.939	2.567	21.239								
CYC	1.127	-1.229	0.741	-0.729	0.026	-0.951	0.190	0.015	-0.087	-0.088	2.106	0.112	-0.328	0.108	-0.596	4.970							
EMOT	-0.545	-0.498	-0.978	-0.765	-0.267	-0.808	-0.234	-0.040	-0.155	-0.152	-4.157	15.562	0.618	-2.552	-8.584	0.523	30.309						
SOD	0.567	-0.182	0.283	0.032	0.010	0.103	0.027	-0.001	-0.002	0.029	0.322	-0.782	0.086	0.096	0.685	-0.122	-0.929	1.435					
DIET	0.819	0.448	0.896	1.141	0.066	0.278	0.070	-0.002	0.059	0.063	0.031	-0.413	1.335	0.390	1.600	-0.416	-1.001	0.581	4.098				
ACT	-0.760	1.907	0.944	0.260	-0.008	-0.130	0.016	-0.052	-0.139	0.013	-0.526	1.189	0.729	0.256	-0.604	-0.156	1.211	0.242	0.746	5.295			
MED	0.643	0.295	0.333	0.056	0.057	0.194	0.045	-0.012	0.051	0.104	-0.023	-0.282	0.331	0.248	0.486	-0.227	0.244	0.310	0.615	0.473	3.008		
MON	0.289	2.739	2.252	1.061	0.093	0.226	0.089	0.004	0.021	0.125	-0.393	0.504	1.278	0.197	1.339	-0.266	0.007	0.381	1.276	0.805	0.954	5.214	
RISK	0.016	1.376	2.224	1.057	0.234	0.579	0.213	0.055	0.073	0.147	2.488	-2.475	1.951	1.391	3.096	0.094	-3.933	0.504	1.083	0.560	0.483	0.906	7.627
MEANS	7.29	21.23	19.84	9.78	2.90	5.65	1.80	1.98	4.69	4.86	24.09	13.78	20.02	21.29	18.64	13.27	12.31	4.67	11.77	5.16	11.43	7.65	17.87
SD	21.23	7.092	3.176	2.166	.411	.917	.461	.149	.559	.404	4.824	5.006	3.503	2.160	4.609	2.229	5.505	1.198	2.024	2.301	1.735	2.283	2.762

Correlation Matrix of the study variables

	DUR	FAM	COM	KHT	KMED	KDIET	KEXE	KSTR	KRIS	KMON	TIME	CONS	PCON	TCON	COH	CYC	EMOT	SOD	DIET	ACT	MED	MON	RISK
DUR	1																						
FAM	**-.180****	1																					
COM	**-.027**	**.269****	1																				
KHT	**.046**	**.071**	**.056**	1																			
KMED	**-.035**	**.073**	**.098***	**-.015**	1																		
KDIET	**-.008**	**.046**	**.111***	**.252****	**.393****	1																	
KEXE	**.067**	**-.023**	**.075**	**.267****	**.085**	**.115***	1																
KSTR	**-.044**	**-.034**	**.063**	**.143****	**.297****	**.449****	**.057**	1															
KRIS	**.004**	**.061**	**-.037**	**.190****	**.262****	**.482****	**.057**	**.475****	1														
KMON	**-.061**	**.063**	**.051**	**.208****	**.304****	**.470****	**.158****	**.375****	**.432****	1													
TIME	**.147****	**-.046**	**.037**	**.110***	**.113***	**.136****	**.255****	**.065**	**.001**	**.093**	1												
CONS	**-.043**	**.025**	**-.091**	**.030**	**-.154****	**-.172****	**-.048**	**-.052**	**.001**	**-.070**	**-.116***	1											
PCON	**.011**	**.098***	**.140****	**.361****	**.016**	**.152****	**.145****	**.039**	**.070**	**.140****	**.072**	**-.005**	1										
TCON	**-.166****	**.033**	**.145****	**.086**	**.223****	**.263****	**.288****	**.140****	**.155****	**.175****	**.143****	**-.207****	**.144****	1									
COH	**.058**	**.021**	**.218****	**.217****	**.145****	**.193****	**.157****	**.034**	**.005**	**.063**	**.178****	**-.329****	**.244****	**.258****	1								
CYC	**.094**	**-.078**	**.105***	**-.151****	**.028**	**-.025**	**.184****	**.044**	**-.070**	**-.098**	**.196****	**.010**	**-.042**	**.022**	**-.058**	1							
EMOT	**-.018**	**-.013**	**-.056**	**-.064**	**-.118***	**-.160****	**-.092**	**-.048**	**-.050**	**-.068**	**-.157****	**.565****	**.032**	**-.215****	**-.338****	**.043**	1						
SOD	**.088**	**-.021**	**.075**	**.012**	**.020**	**.094**	**.048**	**-.005**	**-.004**	**.060**	**.056**	**-.130****	**.020**	**.037**	**.124***	**-.046**	**-.141****	1					
DIET	**.075**	**.031**	**.139****	**.260****	**.079**	**.150****	**.075**	**-.005**	**.052**	**.077**	**.003**	**-.041**	**.188****	**.089**	**.171****	**-.092**	**-.090**	**.240****	1				
ACT	**-.061**	**.117***	**.129****	**.052**	**-.008**	**-.061**	**.015**	**-.152****	**-.108***	**.013**	**-.047**	**.103***	**.090**	**.051**	**-.057**	**-.030**	**.096**	**.088**	**.160****	1			
MED	**.069**	**.024**	**.060**	**.015**	**.080**	**.122***	**.056**	**-.048**	**.053**	**.148****	**-.003**	**-.032**	**.054**	**.066**	**.061**	**-.059**	**.026**	**.149****	**.175****	**.119***	1		
MON	**.024**	**.169****	**.310****	**.215****	**.100***	**.108***	**.084**	**.012**	**.017**	**.135****	**-.036**	**.044**	**.160****	**.040**	**.127***	**-.052**	**.001**	**.139****	**.276****	**.153****	**.241****	1	
RISK	**.001**	**.070**	**.254****	**.177****	**.206****	**.229****	**.168****	**.134****	**.047**	**.132****	**.187****	**-.179****	**.202****	**.233****	**.243****	**.015**	**-.259****	**.152****	**.194****	**.088**	**.101***	**.144****	1
MEANS	**7.29**	**21.23**	**19.84**	**9.78**	**2.90**	**5.65**	**1.80**	**1.98**	**4.69**	**4.86**	**24.09**	**13.78**	**20.02**	**21.29**	**18.64**	**13.27**	**12.31**	**4.67**	**11.77**	**5.16**	**11.43**	**7.65**	**17.87**
SD	**5.378**	**7.092**	**3.176**	**2.166**	**.411**	**.917**	**.461**	**.149**	**.559**	**.404**	**4.824**	**5.006**	**3.503**	**2.160**	**4.609**	**2.229**	**5.505**	**1.198**	**2.024**	**2.301**	**1.735**	**2.283**	**2.762**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

APPENDIX F

THE MEASUREMENT MODEL TESTING

Table F1 The measurement model testing results of the Knowledge about Self-Care Demands Questionnaire

Parameter	Standardized factor loading	S.E.	t-value	h^2
Knowledge about SCD				
Medication taking	0.476***	0.046	10.351	0.226
Diets/ weight control	0.736***	0.034	21.568	0.541
Aerobic exercise	0.147**	0.055	2.649	0.022
Stress management	0.633***	0.039	16.331	0.400
Risk avoidance	0.672***	0.037	18.192	0.451
Self-monitoring	0.633***	0.038	16.467	0.401
χ^2= 14.583, p = 0.1030, CFI = 0.988, RNI = 0.988, RMSEA = 0.039, SRMR = 0.025				

Note: * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001, S.E. = Standard error, h^2 = Communality, χ^2 = Chi-square, *df* = degree of freedom, CFI = comparative fit index, RNI = relative noncentrality index, RMSEA = root mean square error of approximation, SRMR = standardized root mean residual

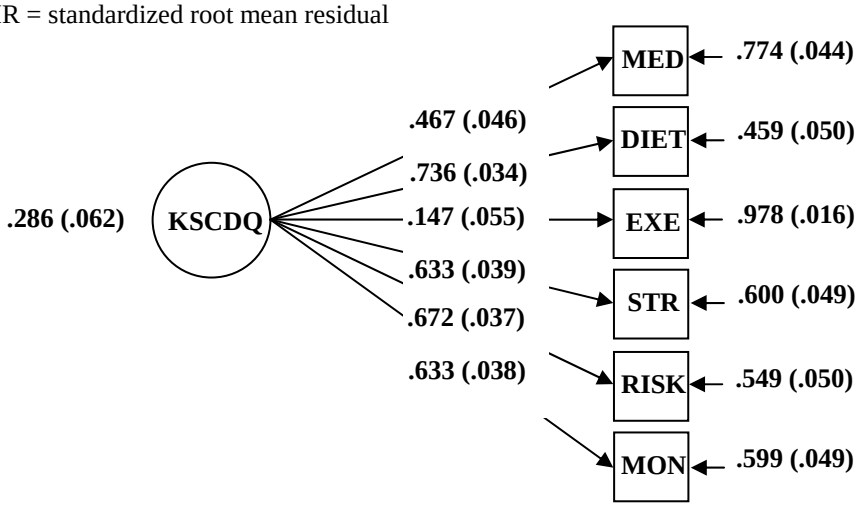
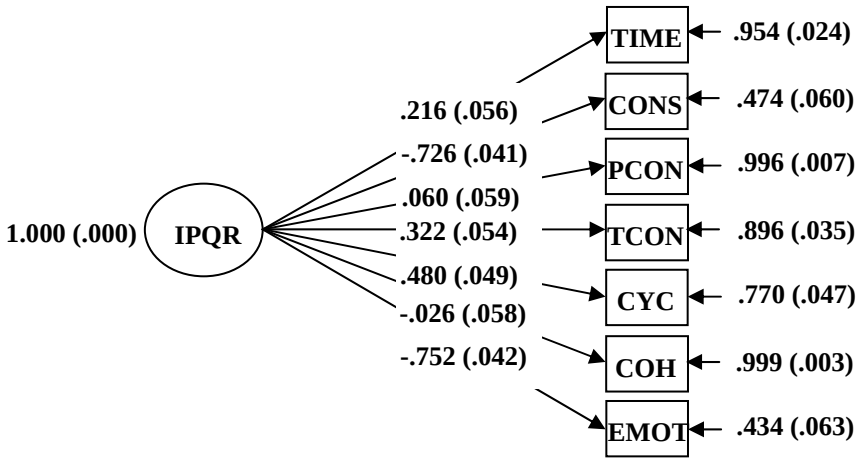


Figure F1 The CFA of Knowledge about Self-care Demands Questionnaire

Table F2 The measurement model testing results of the Revised Illness Perception Questionnaire

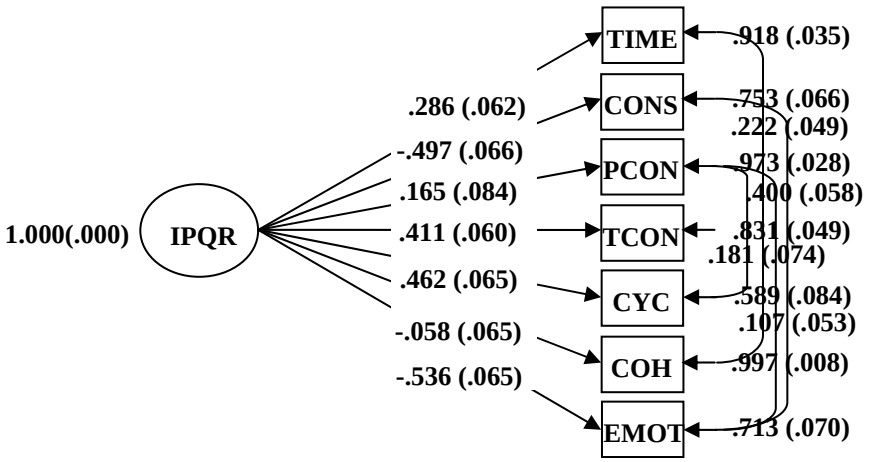
Parameter	Standardized factor loading	S.E.	t-value	h^2
Perception about HT (original)				
Timeline acute/chronic	0.216***	0.056	3.829	0.044
Consequences	-0.726***	0.041	-17.663	0.526
Personal control	0.060ns	0.059	1.017	0.004
Treatment control	0.322***	0.054	5.950	0.104
Timeline cyclical	0.480***	0.048	9.721	0.230
Coherence	-0.026ns	0.058	-0.451	0.001
Emotion representation	-0.752***	0.042	-18.006	0.566
Perception about HT(modified)				
Timeline acute/chronic	0.286***	0.062	4.620	0.082
Consequences	-0.497***	0.066	-7.516	0.247
Personal control	0.165ns	0.084	1.940	0.027
Treatment control	0.411***	0.060	6.836	0.169
Timeline cyclical	0.642***	0.065	9.798	0.412
Coherence	-0.058ns	0.065	-0.895	0.003
Emotion representation	-0.536***	0.065	-8.229	0.287
Original				
χ^2= 72.030, p = 0.3929, CFI = 0.814, RNI = 0.721, RMSEA = 0.102, SRMR = 0.064				
Modified				
χ^2= 10.559, p = 0.3929, CFI = 0.998, RNI = 0.998, RMSEA = 0.013, SRMR = 0.023				

Note: * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001, S.E. = Standard error, h^2 = Communality, χ^2 = Chi-square, *df* = degree of freedom, CFI = comparative fit index, RNI = relative noncentrality index, RMSEA = root mean square error of approximation, SRMR = standardized root mean residual



χ^2 = 72.03, *df* = 14, p < 0.001, CFI = 0.814, RNI = 0.721,
RMSEA = 0.102, SRMR = 0.064

Figure F2 The CFA of the Revised Illness Perception Questionnaire (original)



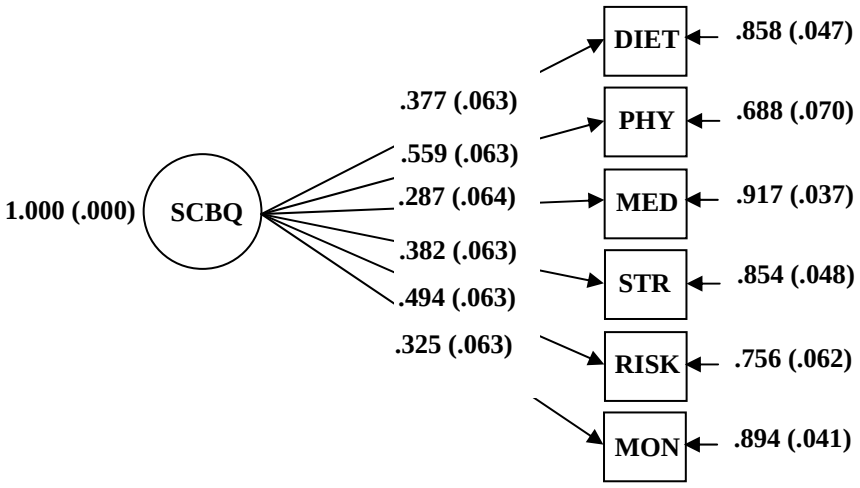
χ^2 = 10.559, *df* = 10, p < 0.3929, CFI = 0.998, RNI = 0.996,
RMSEA = 0.012, SRMR = 0.023

Figure F3 The CFA of the Revised Illness Perception Questionnaire (modified)

Table F3 The measurement model testing results of Self-Care behaviors Questionnaire

Parameter	Standardized factor loading	S.E.	t-value	h^2
Self-care behaviors				
Consuming low sodium diets	0.377***	0.063	6.004	0.142
Diet and weight control	0.559***	0.063	8.878	0.312
Performing physical activity	0.287***	0.064	4.518	0.083
Medication management	0.382***	0.063	6.017	0.146
Self-monitoring	0.494***	0.063	7.907	0.244
Risk factor avoidance	0.325***	0.063	5.146	0.106
χ^2= 5.956, p = 0.7443, CFI = 1.00, RNI = 1.00, RMSEA = 0.000, SRMR = 0.019				

Note: * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001, S.E. = Standard error, h^2 = Communality, χ^2 = Chi-square, *df* = degree of freedom, CFI = comparative fit index, RNI = relative noncentrality index, RMSEA = root mean square error of approximation, SRMR = standardized root mean residual



χ^2 = 5.956, *df* = 9, p = 0.7443, CFI = 1.00, RNI = 1.00,
RMSEA = 0.000, SRMR = 0.019

Figure F4 The CFA of Self-Care Behaviors Questionnaire

APPENDIX G

THE CHARACTERISTICS OF THE STUDY VARIABLES

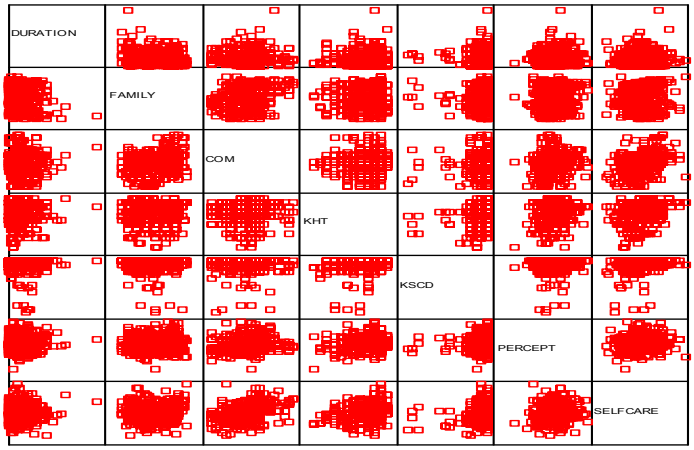
Table 4.2 The characteristics of the study variables

Variables	Possible range	Actual range	Mean	SD
Duration of HT (mode = 5)	>1	1 - 46	7.3	5.4
Knowledge about HT	0 - 13	2 - 13	9.8	2.2
Knowledge about SCD				
Medication taking	0 - 3	0 - 3	2.9	0.4
Diet & weight	0 - 6	0 - 6	5.7	0.9
Exercise	0 - 2	0 - 2	1.8	0.5
Stress management	0 - 2	0 - 2	2.0	0.2
Risk avoidance	0 - 5	1 - 5	4.7	0.6
Self-monitoring	0 - 5	2 - 5	4.9	0.4
Total	0 - 23	8 - 23	21.9	1.9
Patient-provider communication	6 - 30	12-29	20.1	3.2
Family support	7 - 35	7 - 34	21.2	7.1
Perception about HT				
Timeline acute/chronic)	6 - 30	7 - 30	24.1	4.8
Timeline (cyclical)	4 - 20	5 - 19	13.3	2.2
Consequences	6 - 30	6 -28	13.8	5.0
Personal control	5 - 25	7 -25	20.0	3.5
Treatment control	5 - 25	13-25	21.3	2.2
Coherence	5 - 25	5-25	18.6	4.6
Emotion	6 - 30	6 - 30	12.3	5.5
Total	37 - 185	80 - 158	123.4	11.4
Self-care behaviors				
Low sodium diet	0 - 18	2 - 9	4.7	1.2
Diet & weight control	0 - 9	6- 20	11.8	2.0
Physical activity	0 - 36	0 - 11	5.2	2.3
Medical management	0 - 12	0 - 15	11.4	1.7
Self-monitoring	0 - 15	1 - 15	7.7	2.3
Risk factor avoidance	0 - 90	6 - 21	17.9	2.8
Total	0 - 93	41-83	58.6	6.8

APPENDIX H

TESTING OF NORMAL DISTRIBUTION

Scatter plot of the variables



Box's M test of homocedassticity

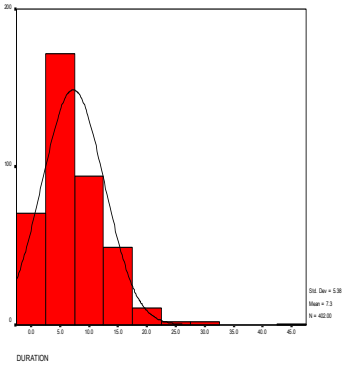
Box's M		963.593
F	Approx.	1.883
	df1	420
	df2	24302.877
	Sig.	.000

The log of its determinant is 16.899.

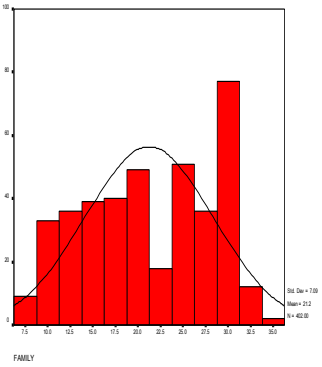
Variables	Skewness	Kurtosis
Exogenous variables		
Duration of HT	1.816	7.149
Family support	-.195	-1.162
Provider communication	-.159	.492
Endogenous variables		
Knowledge about HT	-1.093	1.035
Knowledge about SCD	-4.179	22.713
Perception about HT	.204	.428
Self-care behaviors for HT control	.109	.378

Exogenous variables

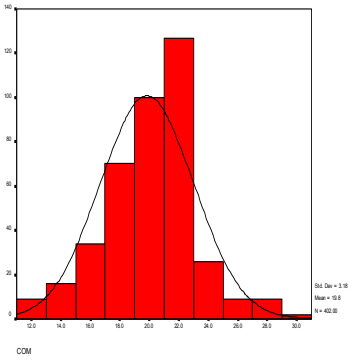
Duration of HT



Family support

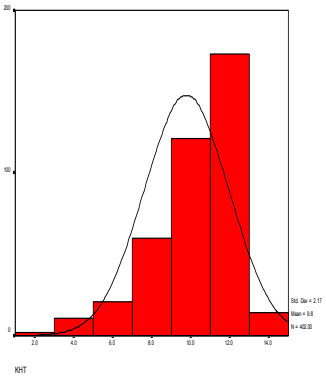


Patient-provider communication

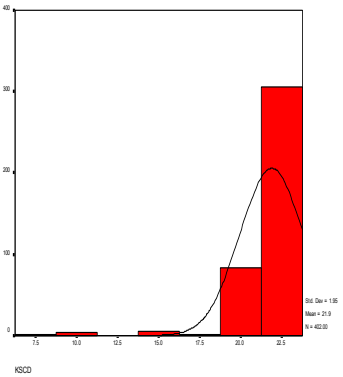


Endogenous variables

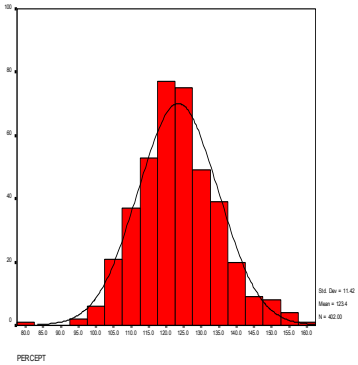
Knowledge about HT



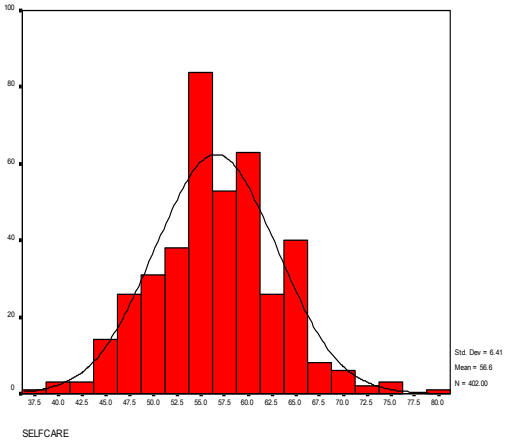
Knowledge about SCD



Perception about HT



Self-care behavior for HT control



BIOGRAPHY

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