FACTORS INFLUENCING MEDICATION ADHERENCE IN HYPERTENSIVE PATIENTS WITHOUT COMPLICATIONS

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Thesis
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ABSTRACT

This study used a correlational predictive design to explore medication adherence and the influence of illness perceptions (control, consequence) and medication beliefs (necessity and concern) on medication adherence to antihypertensive medications among essential hypertensive patients without complications. Convenience sampling was used to recruit 85 persons with essential hypertension who were older than 18 years old and sought out treatment at the Primary Care Unit (PCU) of Siriraj Hospital from March to May of 2013. Data collection instruments consisted of four parts: 1) the demographic data questionnaire, 2) the Brief Illness Perception Questionnaire (Brief IPQ), 3) the Belief about Medicine Questionnaire (BMQ), and 4) 8-item Morisky Medication Adherence Scale (8-item MMAS). The data were analyzed by using percentage, mean, min, max, standard deviation, Pearson's correlation moment, and multiple regression analysis.

The results showed that the overall medication adherence of participants was at low level (mean = 5.92, SD = ±1.71). Multiple regression analysis revealed that the independent variables could explain the variance of medication adherence in hypertensive patients without complications by 17.2% with statistical significant (R^2 = .172, p <.01). Concern about medication was the most variable which had an influence on medication adherence (beta = -.374; p < .01).

Based on the study finding, it is suggested that healthcare providers need to focus on assessing negative beliefs that the patients have through their prescribed medications before giving education about medications in order to encourage medication adherence in hypertensive patients without complications.

KEY WORDS: ESSENTIAL HYTENSTION/ MEDICATION ADHERENCE/ MEDICATION BELIEFS/ ILLNESS PERCEPTIONS

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ปัจจัยที่มีอิทธิพลต่อความร่วมมือในการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูงที่ยังไม่มีภาวะแทรกซ้อน
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บทคัดย่อ

การศึกษานี้เป็นการวิจัยหาความสัมพันธ์เชิงทำนาย (Correlational predictive research)เพื่อศึกษาอิทธิพลของการรับรู้ความเจ็บป่วย (ด้านการรับรู้ผลกระทบจากความเจ็บป่วย และการรับรู้ความสามารถในการควบคุมหรือรักษาความเจ็บป่วย) และความเชื่อเกี่ยวกับยา (ด้านความจำเป็นเกี่ยวกับยา และความกังวลเกี่ยวกับยา) ต่อความร่วมมือในการรับประทานยาลดความดันในผู้ป่วยโรคความดันโลหิตสูงที่ยังไม่มีภาวะแทรกซ้อน กลุ่มตัวอย่าง คือผู้ป่วยโรคความดันโลหิตสูงชนิดปฐมภูมิที่มีอายุ 18 ปีขึ้นไป จำนวน 85 รายซึ่งมาตรวจตามนัดที่หน่วยบริการปฐมภูมิ โรงพยาบาลศิริราชระหว่างเดือนมีนาคม ถึงพฤษภาคม พ.ศ.2556 ซึ่งได้มาจากการเลือกกลุ่มตัวอย่างแบบสะดวก (convenient sampling) เครื่องมือในการเก็บรวบรวมข้อมูลประกอบด้วยแบบสอบถามได้แก่ 1) แบบบันทึกข้อมูลส่วนบุคคลของผู้ป่วย แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วยฉบับย่อ (Brief IPQ) 2) แบบสอบถามความเชื่อเกี่ยวกับยาลดความดันโลหิตสูง (BMQ) 3) แบบสอบถามความสม่ำเสมอในการรับประทานยาของมอริสกี้ (8-item MMAS) วิเคราะห์ข้อมูลโดยใช้ร้อยละ ค่าสูงสุด ค่าต่ำสุด ค่าเฉลี่ย ค่ามัธยฐาน ส่วนเบี่ยงเบนมาตรฐาน ค่าสหสัมพันธ์ และการวิเคราะห์ถดถอยพหุคูณ

ผลการศึกษาพบว่าความร่วมมือในการรับประทานยาโดยรวมอยู่ในเกณฑ์ค่อนข้างต่ำ (mean = 5.92 , SD = 1.71) ผลการวิเคราะห์ถดถอยพแบบพหุคูณพบว่าตัวแปรอิสระทั้งหมดสามารถอธิบายความผันแปรของความร่วมมือในการรับประทานยาของผู้ป่วยโรคความดันโลหิตสูงที่ไม่มีภาวะแทรกซ้อนได้ร้อยละ 17.2 อย่างมีนัยสำคัญทางสถิติ (R^2= .0.172, p < .01) โดยความกังวลเกี่ยวกับยาเป็นตัวแปรที่มีอิทธิพลต่อความร่วมมือในการรับประทานยามากที่สุด(beta = -.374; p <.01).

ข้อเสนอแนะ บุคคลากรทางด้านสุขภาพควรให้ความสำคัญในการประเมินความเชื่อด้านลบหรือความกังวลซึ่งผู้ป่วยที่มีต่อยาที่ได้รับ ก่อนการให้ความรู้เพื่อส่งสริมความร่วมมือในการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูงที่ยังไม่มีภาวะแทรกซ้อน

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CHAPTER I
INTRODUCTION

Background and Significance of the Study

Hypertension is a major risk factor for cerebrovascular diseases, which lead to the disability and premature death in world population. It is estimated that 1 in 4 adults or equated to 1 billion individuals, worldwide, will be affected from having high blood pressure. The number is expected to grow up to 1.5 billion or around 30% of the global population by 2025 (Perkovic, Huxley, Wu, Prabhakaran, & MacMahon, 2007). World Health Organization (WHO) reported that 7.14 million of the global population die from hypertension every year (Babatsikou & Zavitsanou, 2010). Moreover, hypertension is also a cause of increasing health care expenditures; both direct and indirect cost (Roger et al., 2012).

In Thailand, the prevalence of hypertension among Thai adults, who are older than 25 years, in 2008 was approximately 34.2% of the age-standardized comparison (Krishnan, Garg, & Kahandaliyanage, 2013) and the prevalence rate trends to increase with advancing age (Buranakitjaroen, 2011). With the impacts of hypertension, the statistic showed that 97.54% of hypertensive patients had no complications; however, it was found that the hospitalization rate of hypertensive-related complications such as ischemic heart disease, kidney disease, and stroke was increased from 544 cases in 2005 to be 981 cases per hundred thousand population in 2008, resulted in the fourth leading causes of death in Thai adults (Bureau of Health Policy and Strategy, 2009).

In Siriraj Hospital, the number of hypertension cases in the Out-patient Department (OPD) was reported at 62,152 cases in 2007 and increased to be 94,272 cases in 2011, in which, 88% of those patients were still free from hypertensive-related complications (Medical Statistic Record, Siriraj Hospital, 2012). Additionally, this trend can be found in the Primary Care Unit (PCU) at Siriraj Hospital, where hypertension is on the top of the list for chronic diseases. Most of patients have blood

pressure in staged I or stage II, and 75% had not reported complications yet. However, 63% of those had been referred to the hospital because of uncontrolled blood pressure (Medical Statistic Record, PCU, 2010).

In regard to hypertension, it is a chronic condition which is classified into two categories; essential (primary) and secondary hypertension. Most of patients (90-95%) are diagnosed as essential hypertension (Buranakitjaroen, 2011). The pathological process of hypertension gradually leads to the vascular remodeling, endothelial dysfunction (Levy, Ambrosio, Pries & Struijker-Boudier, 2001) and results in the impairment of tissue perfusion. These processes are silently developed without obviously symptoms until target organ tissues are damaged and complications have occurred (Levy et al., 2008). Therefore, most of hypertensive patients may not be immediately concerned that they have hypertension until the serious complications have developed.

Medication regimens have been reported as an efficient treatment in controlling blood pressure. Antihypertensive medications help to increase vasodilation and resulted in improvement of tissue perfusion (Levy et al., 2008). Moreover, clinical trials had supported that antihypertensive therapy is the most effective therapy to reduce the incidence of cardiovascular events (Levy, Ambrosio, Pries, & Struijker-Boudier, 2001) by 35% to 40% for stroke, 20% to 25% for myocardial infarction, and 50% for heart failure (Chobanian et al., 2003). Therefore, the encouragement of hypertensive patients to adhere to prescribed drug is very important to prevent further disabilities, morbidities, and premature death.

However, it is importance to focus on the trend of medication adherence rate. It was found that adherence rate has been decreased to 70% in average after three months of initial antihypertensive medication (Grégoire et al., 2002). Regarding long-term, the adherence rate was found to be between 14% and 73% at 1 year and gradually decreased between 9% and 59% at third year, then between 16% and 51% at fourth year, and continued to 39% at the tenth year (Elliott, 2009). As a consequence, it estimated that 75% of patients with a diagnosis of hypertension are unable to achieve optimal blood pressure control (WHO, 2003), and are at risk for developing hypertensive-related complications. Since, previous evidences indicated that the rate of medication adherence at 75% (typical rate in practice) to shorter-acting

drugs were predicted a clinical loss of mean SBP reduction of more than 2 mmHg /day, this may increase 0.5% absolute risk at 10- years for CVD development (Lowy et al., 2011). In addition, other studies have indicated that hypertensive patients were at risk of developing complications (e.g. ischemic heart disease, chronic kidney disease, stroke, and heart failure) by 30% to 50% if they were non-adherent to antihypertensive medication for 3 to 5 years (Buranakitjaroen, 2010). Based on the trend of decreasing medication adherence rate, it can be assumed that numerous of hypertensive patients will be driven into complications stage quickly, which may lead to a greater burden on our healthcare system and economy in the future. Therefore, in order to prevent these problems, poor medication adherence needs to be addressed.

In previous studies, medication adherence in hypertensive patients had been influenced by many factors such as multiple morbidities (Hughes, 2004) complexity of regimen (Choudhry et al., 2011; Ingersoll & Cohen, 2008),side effects (Elliott, 2009; George & Shalansky, 2007; Lewis & Riegel, 2010; Vawter, Tong, Gemilyan, & Yoon, 2008), cost of treatment (Kennedy & Erb, 2002), and cognitive decline (Jacobs, De Castro, Fuchs, & Ferreira, 2011; Nair et al., 2011). All of these factors were seemed to be barriers for medication adherence in the studies, which included all diagnoses of essential hypertension. There were no studies conducted for a specific group such as in hypertensive patients who did not develop complications. In this stage, hypertension is typically asymptomatic compared to the adverse effects of antihypertensive medications. This can possibly lead to the different perceptions about hypertension and its treatments in hypertensive patients without complications. For example, without the symptoms, a patient might think that they have been already cured (Kirdphon, 2003; Lukoschek, 2003), remain unawareness that hypertension is a major cardiovascular risk factors in the long term (Gregoire, Moisan, Guibert, Ciampi, & Milot, 2006), or perceiving that living with medications' adverse effects of medication use was more physically impacting than having hypertension (Lewis, Askie, Randleman, & Shelton-Dunston, 2010). Consequently, the patients may decide to discontinue their medications.

To understand the factors influencing medication adherence, Horne (1997) had proposed a conceptual framework of illness and treatment perceptions, which extended from Leventhal's self-regulatory model. The model had suggested that

health-related behaviors or coping procedures (e.g. taking medications) in the patient is strongly determined by the role of perceptions of their illness and its treatment.

Illness perceptions consist of five dimensions including identity, timeline, causal, control, and consequence. However, previous studies indicated that two dimensions of illness perceptions: consequence and control had been played a prominent role on medication adherence in hypertensive patients (Chen, Tsai & Chou, 2009; Feng, 2009; Gregoire et al., 2006; Ross et al., 2004).

Consequence is patients' perceptions about the severity of their conditions. This usually refers to the patients' view about the impacts of illness on their physical disabilities, lifestyles, families works, and finances (Petrie & Weinman, 2006). With implication to the disease, perceiving of consequence will evoke the patient to be concerned about negative effects of disease on their health. Hence, they are more likely to be compliant in adjusting lifestyle and taking medications in order to control the disease. For example, a study was found that perceptions of serious consequences were independently associated and predicted better adherence to physical exercise, weight management and taking medication in patient with coronary artery disease (Stafford, Jackson, & Berk, 2008), and chronic heart failure (MacInnes, 2011). In hypertensive patients, it was also found that the patient who recognized hypertension as a condition which results in serious negative effects (consequence) will expresses their emotional response such as fear, anxiety and sadness. This reaction will motivate them to strictly comply with the prescribed regimen with a good expectation to control blood pressure and prevent complications (Kirdphon, 2003). Thus, the perception of hypertensive consequence was positively associated with self-management (Feng, 2009) and lifestyle modification such as stress reduction behavior in the patients (Hekler et al., 2008). In contrast, the patients were more than twice as likely to be non-compliant if they did not believe in consequences or severity of the condition compared to those who believed hypertension had numerous negative effects (Gregoire et al., 2006).

Control is another dimension of illness perceptions. It refers to the patients' view about how their illness is susceptible to self-control or responsive to the treatment (Petrie & Weinman, 2006). In regards to medication adherence in hypertensive patients, perception of control will motivate the patients to adhere with

their antihypertensive prescriptions. To support this point, previous studies indicated that perceived control is strongly associated with coping behavior such as self-management (Feng, 2009) and much more directly affecting medication adherence (Chen et al., 2009). With sub-dimension of control, a study was found that personal control was a significant predictor of adherence to self-management in hypertensive patients (Chen Tsai & Lee, 2009), whereas, treatment control was a significant predictor of a good medication adherence (Chen et al., 2009; Ross, Walker & MacLeod, 2004). These findings indicated the beliefs that hypertension can be susceptible to control by whether personal's ability or medication is going to develop the senses of control, which could empower the patients to be adherent with their treatment regimen. Therefore, as a composition of illness perceptions, consequence and control may hold a key role to the adherence of antihypertensive medication treatments among hypertensive patients.

Medication beliefs are another determinant of coping behaviors under the model by Horne (1997). It has been proven that medication beliefs were influenced on a patient's decision in taking prescribed medications and were revealed as a stronger predictors of medication adherence compared to clinical or demographic factors (Horne & Weinman, 1999). Basically, medication beliefs can be grouped under two categories: beliefs about necessity and concerns about medication (Horne & Weinman, 1999).

Beliefs about necessity refer to the perceived benefits of medicine in improving or protecting health from becoming worse. This is going to make the patient adhere with their medication in the long-term (Horn, 2003). Thus, a higher belief about necessity of medication has been assumed to link with a higher adherence in the patient. As the evidence was found that beliefs about necessity of the medication was related with a higher rate of reported medication adherence (Horne & Weinman, 1999; MacInnes, 2011). The beliefs that medication is beneficial leading to preventing complications, improving quality of life, etc. were reported as an encouragement factor on medication taking behavior (Kirdphon, 2003; Lukoschek, 2003). Conversely, doubting about the necessity of medication was associated with non-adherent behaviors in the patients (Horne & Weinman, 2002). Moreover, the study found that appropriate changing of medication beliefs (necessity) could improve intentional non-

adherence in the patient ($B = -0.19$, $P < 0.01$) (Schüz et al., 2011). Therefore, understanding of how the patients perceive about the necessity of medication is one of important factors that will help to explain variation in medication adherence. Therefore, good adherence rates were usually found in the patients, who believed in the necessity of antihypertensive medications.

On the contrary, Horne (1997) mentioned that "medication can be perceived as a double-edge sword in patient's perspective". Concern about medication (e.g. side effects, long-term dangers, potential addiction or dependence) is another side of patient's view about medications, which was reported as a barrier of adherence to prescribed medications. As previous evidences, the concerns about medication or negative perceptions about medication was associated with lower self-reported on adherence (Gatti, Jacobson, Gazmararian, Schmotzer, & Kripalani, 2009; Rujisatian, 2009). For example, a study was found that diabetic patients who are worried about side-effects of their hypoglycemic drugs showed poor medication adherence (Mann, Ponieman, Leventhal, & Halm, 2009). In hypertensive patients, the evidences also reported similar results. Most of the patients believed that taking antihypertensive medication causes undesirable effects to the body (Gregoire, et al., 2006; Kirdphon, 2003; Lukoschek, 2003), and it could not prevent any further complications (Gregoire et al., 2006). Some believed that living with the medications' adverse effects have more physically bad effects than having hypertension (Lewis, Askie, Randleman, & Shelton-Dunston, 2010). These patients have possibly considered stopping taking antihypertensive medications (Hughes, 2004). Therefore, patients who are concerned about antihypertensive medications seemed to be non-adherent (Ross, Walker, & MacLeod, 2004), particularly in older adults (Ruppar, Dobbels, & De Geest, 2012).

According to the literature, it was indicated that perceived consequence and control about illness as well as beliefs about necessity and concerns about antihypertensive medications were influenced on medication adherence in hypertensive patients. However, most all of the studies are internationally published (Chen, Tsai, & Lee, 2009; Feng, 2009; Ross et al., 2004; Ruppar et al., 2012), which were included hypertension subjects without distinguishing between the patient having and not having complications or comorbidities. Therefore, the influence of illness perceptions and medication beliefs on medication adherence in the previous studies

were possibly as a result of complications or/and comorbidities as well as their medications, more than the effects from hypertension and antihypertensive medications. Thus, the findings may be unable to definitely explain that how illness perceptions and medication beliefs are exactly impacts on medication taking behaviors in hypertensive patients. In Thailand, the influence of illness perceptions and medication beliefs on medication adherence was investigated among patients with a similar chronic disease such as diabetes. They found that adherence to hypoglycemic medications was significantly related with illness perceptions (identity, consequence, and concerns about illness) and medication beliefs (Rujisatian, 2009). However, no study had been conducted in patients, particularly in susceptible groups such as hypertensive patients without complications, which are; 1) having high volume, 2) presenting unobvious symptom, and 3) receiving less amount of medicine. These characteristics are possibly led to the different perceptions about hypertension and its medication, which eventually influenced on the different levels of medication adherence.

Therefore, in this study, the researcher is interested in investigating illness perception; consequence and control, as well as medication beliefs and its influence on medication adherence in hypertensive patients without complications in order to provide a better understanding about perception of consequence and control as well as beliefs on antihypertensive medications. This will guide the direction of nursing intervention in improving medication adherence, which helps to prevent and delay severe complications in the patient as well as to reduce the further burden of health and healthcare expenditures in the level of individual, family and country**.**

Research Questions

1) How are the perceptions of consequence, control, as well as beliefs about antihypertensive medications in hypertensive patients without complications?

2) How is medication adherence in hypertensive patients without complications?

3) Do the perceptions of consequence, control, as well as beliefs about antihypertensive medications influence the medication adherence in hypertensive patients without complications?

Objectives of the Study

1) To explore the perceptions of consequence, control, as well as beliefs about antihypertensive medications in hypertensive patients without complications.

2) To explore medication adherence in hypertensive patients without complications.

3) To investigate the influence of illness perceptions in terms of consequence and control, as well as medication beliefs on medication adherence in hypertensive patients without complications.

Conceptual Framework

The study was designed to investigate the factors influencing medication adherence in hypertensive patients under the conceptual framework of Treatment beliefs and the self-regulatory model by Horne (1997). This framework had been extended from the Common-sense model of Self-Regulatory by Leventhal H., Diefenbach, and Leventhal E., (1992). This model suggests that individuals who are diagnosed with an illness (health threat/stimuli) will generally develop an organized pattern of views or perceptions about their condition; based on the parallel possessing system between cognitive and emotional representation. The cognitive representation is individual perceptions about the disease. It is composed of five distinct dimensions; identity, timeline, cause, consequence, and control, whereas emotional representation is an internal emotional response to the mental image of possible dangers imposed by the disease. It is composed of emotional responses and concerns about illness. The parallel processing between cognitive and emotional representation will influence health behaviors (e.g. taking medication) as well as motivate the patient to regulate with those behaviors in order to maintain heath status or return to state of “problem free” (Leventhal, Brissette, & Leventhal, 2003). Based on this concept, the Common-

sense model of Self-Regulatory has been frequently used as the conceptual framework in the nursing field in order to facilitate an understanding of how the patient perceives and cope with their illness (Leventhal et al., 2003).

However, there are some apparent limitations raised up after use of this model. For example, to assess only illness perception may not be enough to understand medication-taking behaviors in the patient, who was viewed as an "active problem solver". Hence, another dimension such as the perceptions of treatment such as beliefs about necessity and concerns about medication possibly need to be assessed (Horne, 1997). To extend the explanation of the Common-Sense Model of Self-Regulatory on this point, Horne (1997) had proposed the idea that health-related behaviors or coping responses in the people might be influenced not only by their illness perceptions but also depend upon the representation of treatments. According to extended model, disease and its treatment are going to be a stimulus, which generally trigger patients' views or perceptions about their illness (illness perception) and its treatments (treatment perception/ medication beliefs). These views are key determinants of coping procedures (e.g. medication adherence), and then the outcome of coping procedures will be appraised. This idea was expected to be helpful in increasing the understanding about health-related behaviors such as medication adherence in patient with different chronic diseases (Broadbent, Donkin, & Stroh, 2011; Bucks et al., 2009; MacInnes, 2011; Mann et al., 2009). However, illness perceptions – identity, control, and consequence could mostly explain medication adherence in patients with chronic disease, but identity seems to be likely associated with medication adherence in patient with chronic diseases that have obviously exacerbating symptoms rather than asymptomatic disease. Therefore, two dimensions of illness perceptions and medication beliefs were assumed to be influence on medication adherence in hypertensive patients without complications as the following:

Consequence refers to patients' perception towards the impacts of hypertension on their lifestyles (Levental et al., 2003). According to the conceptual framework, being diagnosed with hypertension will invoke a person to develop the realization of harmful severity or negative impacts on their lifestyles such as health status, works, finances which leads to the regulation of health behaviors (e.g. taking medication) in order to minimize those impacts. Therefore, a greater perception of

consequence by hypertension might predict a higher medication adherence in hypertensive patients without complications.

Control refers to patients' view towards ability to control the illness whether by personal control or treatment control (Leventhal et al., 2003). According to the conceptual framework, being diagnosis with hypertension will invoke the patient to develop an individual's perception about whether the disease can be responded to whether personal control or treatment control. This perception will empower the patient to comply with their healthy behaviors. Therefore, a higher perception that hypertension can be control might predict a higher behavioral of taking antihypertensive medications in hypertensive patients without complications.

Belief about necessity refers to the perception of personal needs of medication in maintenance patients' condition or protecting further complications (Horne, 1997). Therefore, a higher belief about necessity of medications might predict a higher medication adherence in hypertensive patients without complications.

Concern about medication refers to the perception of negative effects of medication such as worrying about long-tern effects, disruption on daily life, addiction, etc. (Horne, 1997). Therefore, a higher concern about medications might predict a lower medication adherence in hypertensive patients without complications.

In summary, the influence of control, consequence, beliefs about necessity and concerns about medication on medication adherence in hypertensive patients without complications had been examined under the conceptual framework of Treatment beliefs and the Self-Regulatory model (Horne, 1997) as the following figure:

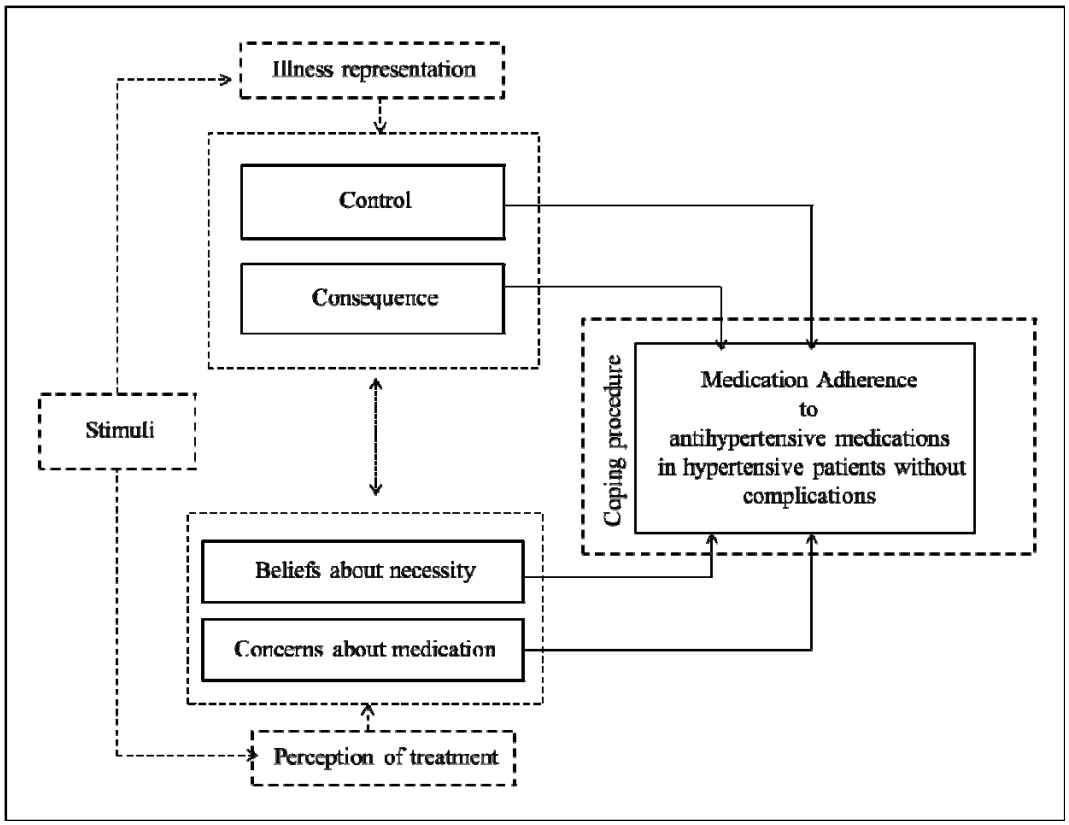

Figure1.1 The conceptual framework of the study

Scope of the Study

This present research is a descriptive study which aimed to examine the influence of illness perceptions and medication beliefs on adherence in hypertensive patients without complications, who sought out the appointment at Primary Care Unit (PCU) in Siriraj Hospital. The data collection was took place from December 2012 to May 2013.

Definition of Terms

- Consequence refers to the views that hypertensive patients without complications have about the impacts of hypertension on their lifestyles. Consequence was measured by using the Brief Illness Perception Questionnaire (Brief-IPQ) item 1. The answer was characterized as a continuous linear scale 0- to- 10.

- Control refers to the views that hypertensive patients without complications have about the ability to control hypertension by person (personal control) and medication (treatment control). Control was measured by using Brief-IPQ item 3 and 4. The answers were characterized as a continuous linear scale 0- to- 10.

- Belief about necessity refers to the perception towards the necessary to adhere to antihypertensive medications in order to maintain their health or prevent future complications. In this study, belief about necessity was measured by the first part of the BMQ, namely BMQ-Necessity, which was composed of 5 question items. The answers were characterized as a five-point Likert scale, ranging from 1= strongly disagree to 5 = strongly agree. The score in this part ranges from 5 to 25. A higher score indicated a stronger belief about necessity of antihypertensive medication.

- Concern about medication refers to the perception that hypertensive patients without complications have about the negative effects of antihypertensive medications e.g. side effects, long-tern dangers, addiction, dependence, etc. In this study, concern about medication was measured by the second parts of the BMQ, which was composed of 5 question items. The answers were characterized as a five-point Likert scale, ranging from 1= strongly disagree to 5 = strongly agree. The score ranges from 5 to 25. A higher score indicated a stronger concern about antihypertensive medication.

3. Medication adherence refers to the appropriate used of antihypertensive regimen according to the time, dosage, and frequency, which are indicated on the prescription. In this study, medication adherence was measured by the 8-item medication adherence scale (8-item MMAS) consisting of 8 questions with the total score of 0 to 8. The score less than 6 regards low adherence, score 6 to less than 8 regards medium adherence, and score = 8 regards high adherence.

Expected Outcome of the Study

1) The data obtained will be helpful in providing a true understanding of factors that affect medication adherence in hypertensive patients who are stayed free from developing hypertensive-related complications and will help practitioners to better engage and communicate with patients.

2) The data obtained will be used as basically knowledge for further nursing intervention in order to improve medication adherence in hypertensive patients without complications.

3) Greater knowledge of the beliefs that older adults hold about their medications can permit clinicians to target more effectively their monitoring and intervention efforts to those patients at highest risk.

CHAPTER II
LITERATURE REVIEW

This study aimed to investigate factors that influenced medication adherence in hypertensive patients without complications. In this chapter, the related literature and research were reviewed in the following topics:

1. Hypertensive patients without complications
    - 1.1 Epidemiology of hypertension
    - 1.2 Definition and clinical manifestation of hypertension
    - 1.3 Pathophysiology of hypertension and its consequences
    - 1.4 Treatment strategies
2. Medication adherence in hypertensive patients
3. Self-Regulatory Model
4. Factors related to medication adherence in hypertensive patients
    - 4.1 Illness perceptions
    - 4.2 Medication beliefs

2.1 Patients with hypertension without complications

2.1.1 Epidemiology of hypertension

Hypertension is one of the most important global health problems. It has been reported that in the year 2000 the 972 million people in the world population had hypertension; 639 million (65.7%) of those were distributed in economically developing countries, and another 333 million (34.2%) live in developed countries (Kearney et al., 2005). Furthermore, the number of patients with hypertension was predicted to be increasing by 80% and 24% in developing and developed countries in the year 2025, respectively (Perkovic, Huxley, Wu, Prabhakaran, & MacMahon, 2007). In United States of American, 29.9% of the population aged 18 years old and

older have been diagnosed with essential hypertension (Keenan & Rosendorf, 2011). In Thailand, it has been reported that the prevalence of hypertension among Thai adults, who are older than 25 years of age, was approximately 34.2% (Krishnani, Garg, & Kahandaliyanagei, 2013), particular in people who are between 56 and 65 years olds (Prakobchai, 2010). Females have been found to be more susceptible to prevalent of hypertension than males (35.7% vs. 26.7%) (Bureau of Health Policy and Strategy, 2008). This is because Thai female prone to have a higher rates of overweight and obesity (Aekplakorn & Mo-suwan, 2009; Natarajan & Nietert, 2004), which are a risk factors for hypertension, particularly when they are going through the post-menopausal period: the transition time that the women have deleterious changes in inflammatory markers, adipokines (Lee et al., 2009) and estrogen level, resulting in increasing in adipose tissue and visceral fat, which would link to weight gain and obesity (Pallottini, Bulzomi, Galluzzo, Martini, & Marino, 2008).

With regard to hypertensive-related complications, the screening for hypertension in 44 provinces around the country showed that 98% of the patients had not yet developed hypertensive complications (Thailand Healthy Lifestyle Strategic Plan 2007- 2016). However, the patients in this group may require special attention because a previous study had indicated that 70% of the people, who have been diagnosed with essential hypertension, are not aware that they have the disease (Aekplakorn et al., 2008). As a consequence, there are only 36.6% of the patients, who have received medications to gain blood pressure control below 140/90 mmHg (Leelacharas, 2009).That means the other 63.4% of the people with hypertension cannot control their blood pressure properly and may be at risk of early developing complications. Therefore, the massive number of hypertensive patients without complications should be taken into serious consideration so as to prevent further health burdens.

2.1.2 Definition and clinical manifestation of hypertension

2.1.2.1 Definition of hypertension

Hypertension is a condition of persistent elevation of arterial pressure due to the abnormalities in regulatory mechanisms of blood pressure. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation,

and Treatment of High Blood Pressure (2004) has defined hypertension as a condition in which a person has systolic blood pressure (SBP) above 140 mmHg and/or diastolic blood pressure (DBP) above 90 mmHg (Chobanian et al., 2003). Similarly, the guideline on treatment of hypertension proposed by Thai Hypertension Society (2012) has defined hypertension as a state in which SBP is equal to or greater than 140 mmHg or/and DBP is equal to or greater than 90 mmHg. Therefore, the accuracy of measuring blood pressure is a key concept in diagnosing hypertension. It is recommended that the patients should be seated quietly for at least five minutes in a chair, with their feet on the floor, arm supported at the heart level and encircled with an appropriated cuff size when having their blood pressure measured. Caffeine, exercise, and smoking should be avoided for at least 30 minutes prior to the measurement (Balatbat, 2008). According to these criteria, hypertension needs to be diagnosed if blood pressure readings are of ≥ 140/90 mmHg for at least twice in three different office visits and with an interval ranging from two to four weeks (Nguyen, Dominguez, Nguyen, & Gullapalli, 2010).

Patients with hypertension without complications refer to the group of patients who have been diagnosed with essential hypertension and are still free of having hypertensive-related vascular complications e.g. stroke, ischemic heart disease, peripheral artery disease, etc. Therefore, without complication, most characteristics of patients in this group are as follows: 1) having blood pressure at a mild to moderate level, 2) having unobvious symptoms, and 3) receiving a smaller number of medicines.

2.1.2.2 Clinical manifestation

Based on a review of literature, hypertension is not an absolutely asymptomatic condition. There are several clinical presentations that have been experienced or reported by the patients. For example, a previous study has addressed the presence of some physical symptoms in the patients with hypertension. It has been found that between 16 % to 30% of patients experienced physical symptoms such as tiredness (31%), hot flushes (28%), headache (24%), reduced daily life energy (23%), and palpitations (22%) (Okken et al., 2008). The symptoms which are most frequently reported are headaches (50%), dizziness/lightheadedness (40%), and visual changes (10%), respectively (Franklin, 2010).

The symptoms in hypertensive patients possibly come from psychological responses, which could be explained that perception of having hypertension may lead to emotional responses such as fear, worry, and anxiety. These feelings will be perceived by the hypothalamus, which when sends signals to stimulate the sympathetic nervous system (SNS). The stimulation of the SNS results in the release of catecholamine, a neurotransmitter which responds to an increase in heart rate and results in palpitation as well as vasoconstriction, particularly in small peripheral arteries. This might lead to the decrease in blood supply that goes to the peripheral organs such as the eyes and brain, which is a cause of visual change, headache or dizziness in hypertensive patients. Moreover, catecholamine also brings about an increase the metabolic rate of the body which could be a cause of fatigue and depletion of energy as shown the following figure:

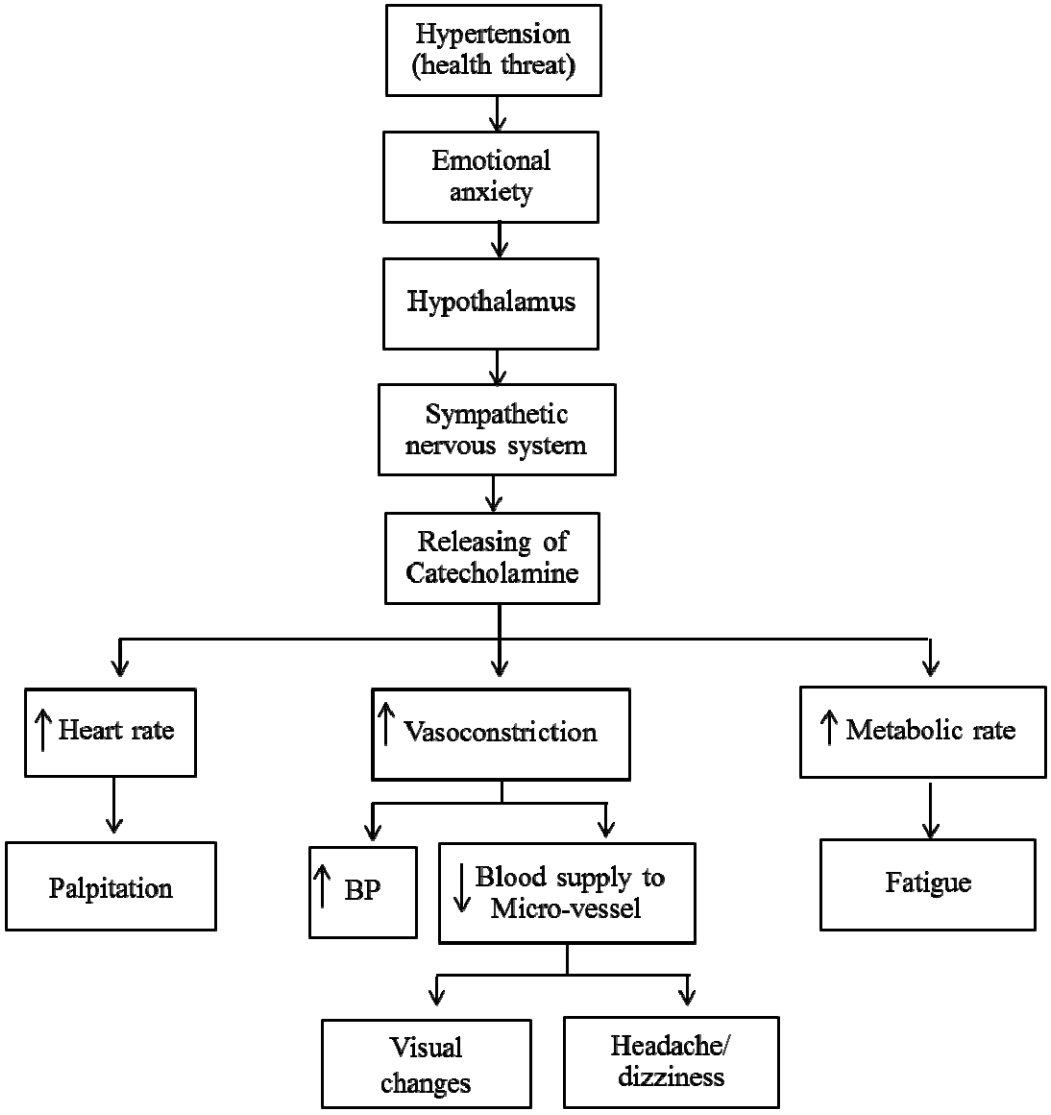

Figure 2.1 The mechanism of hypertensive symptoms based on a review of literature.

However, according to previous studies, the aforementioned symptoms seem to be rarely presented until the hypertensive-related complications or comorbidities are developed (Lukoschek, 2003; Rizzoni et al., 2003).

2.1.3 Pathogenesis of hypertension and its consequences

Hypertension is a chronic condition that can be a cause of micro-vascular abnormality in three different ways:

Firstly, hypertension has been reported to be associated with eutrophic inward remodeling of small arteries and arterioles (Levy et al., 2008), which is characterized by an increasing number of cell layers and reducing internal lumen diameter. This will make the blood vessels become narrow (increasing media wall: lumen ratio) (Heagerty, 2007), resulting in microcirculation impairment, which eventually affects tissue perfusion and is finally involved in target organ damage and hypertensive complication. This is consistent with a study carried out by Rizzoni and colleagues (2001) which found that subcutaneous arteries in hypertensive patients with cardiovascular events have smaller internal diameter and greater M/L ratio compared with those that are without the cardiovascular events (Rizzoni, et al., 2003). Another study has also found that cardiovascular events in essential hypertensive patients are related to increasing M/L ratio of small arteries during a mean follow-up period of ten years (Mathiassen et al., 2007). Moreover, one study has reported that 100% of stage I hypertensive subjects have small arteries remodeling (Schiffrin, 2012). Thus, it could be concluded that vascular remodeling is a consequence of hypertension that may lead to the development of target organ damage in hypertensive patients.

Endothelial dysfunction is a vascular functional abnormality which is affected by high blood pressure. Dysfunction of the endothelium is often associated with elevation of blood pressure (BP), and this leads to the phenomenon of cardiovascular diseases. Generally, healthy endothelial cells usually respond to a number of stimuli by releasing nitric oxide (NO), a substance that is responsible in vascular smooth muscle relaxation. However, prolonged elevation of intra-arterial pressure in hypertensive patients leads to damage or tear of the endothelial wall and results in a decrease the production of NO, possibly contributing to atherosclerosis (Schiffrin, 2012). It has been reported that 60% of the patients with stage I hypertension have endothelium dysfunction that may contribute to the progression of atherosclerosis (Schiffrin, 2012). Therefore, hypertension could be recognized as a contributing factor that could lead to the development of atherosclerosis as well as cardiovascular events (Savoia et al., 2011; Vanhoutte, 2009).

Lastly, micro-vascular rarefaction is another form of vascular change that has been constantly observed in hypertension disease. It is characterized by a reduction in the density: number, or length of very small arterioles (Levy et al., 2008).

This change could lead to the reduction of surface areas that are available for oxygen exchange between capillaries and target cells, thus resulting in reduction of tissue perfusion and impeding blood-tissue exchange, which eventually bring about target-organ damage and complications in hypertensive patients (Levy, et al., 2008).

In conclusion, hypertension is a cause of gradual change in micro-vessels with the following three characteristics: 1) increased M/L ratio, 2) induced endothelial dysfunctions, and 3) increased micro-vascular rarefaction. These pathological changes are silently developed without being noticed by the patients. Therefore, nursing intervention must be focused on how to help hypertensive patients to adhere to medications in order to prevent or delay the pathological process and complications of hypertension.

2.1.4 Treatment strategies

Due to the optimal target of nursing care for hypertensive patients is keeping blood pressure controlled, preventing or delaying progression of hypertensive-related complications is deemed vital. Essentially, the strategies that are used to control blood pressure can be divided into two groups: lifestyle modifications and drug administration.

2.1.4.1 Lifestyle modifications

Lifestyle modification is a strategy with low risk and is less expensive. Normally, it is recommended to combine with medication which possibly helps to reduce the number of medications used as well as increase the effectiveness of the treatment. A randomized control trial has reported that lifestyle change e.g. improved diet, exercise, restriction of sodium and alcohol intake, and fish oil supplement, could reduce blood pressure levels with statistical significant (Dickinson et al., 2006). However, lifestyle modifications have limitations in preventing cardiovascular events based on their efficacy in lowering blood pressure (typically averaging 2 to 5 mmHg), particularly when each of that is used individually, compared with those achieved by the drugs (Gibson, Fritz, & Kachur, 2009). Moreover, lifestyle modification may not be easily accepted and maintained by the patients with competitive lifestyles (Babatsikou & Zavitsanou, 2010; Chrysant, 2011), particularly for the conditions whose signs or symptoms they do obviously. In

addition, the competitive lifestyle in modern societies and an increase in prevalence of overweight also make blood pressure become more difficult to control with by lifestyle modifications alone. Thus, lifestyle modifications are mostly important as a complementary treatment to increase the effectiveness of antihypertensive medications.

2.1.4.2 Drugs administration

Drugs administration is an effective way to achieve blood pressure control as well as to delay cardiovascular events in hypertensive patients. However, starting intensive therapies may cause intolerance symptoms and undesirable side effects, which are varies among the types of antihypertensive medication. For example:

Diuretics e.g. hydrochlorothiazide, furosemide, spironolactone, etc. are drugs that work on different target sites in the nephrons; result in increasing renal excretion of sodium, water, and other electrolytes, which usually present as urination. Basically, diuretics are prescribed a first line agent in treatment of hypertension because they have been proven to reduce cardiovascular mortality and morbidity in systolic and diastolic forms of hypertension and do so at low cost (Sica et al., 2011). However, based on their pharmacological effects, taking diuretic could be a caused of having frequency of urination, electrolyte imbalances, and impotence (Sica et al., 2011).

Beta Blocker (BBs) e.g. atenolol, metroprolol are common used to treat hypertension. They are used to decreased heart rate and contractility, which in turn decreasing in cardiac output and blood pressure level. Beta Blockers are considered to be used as a first line drug if the patients were had coronary arteries disease, tachyarrhythmia, only. However, the patients may experience bradycardia, dizziness, cold hands and feet from decreasing of cardiac output may be occurred while taking BBs (Thai Guidelines on The Treatment of Hypertension Update, 2012).

Angiotensin-Converting Enzyme Inhibitors (ACEIs) e.g. enalapril, captopril, etc. are normally used to block the conversion of angiotensin I to be angiotensin II by inhibiting angiotensin-converting enzyme, which in turn, it brings about vasodilation effect and reducing retention of sodium and water, resulting in decreasing peripheral vascular resistant and blood pressure levels (Abrams, Lammon,

Pennington, & Goldsmith, 2009). However, there are some adverse effects should be monitored during prescription, particular coughing, which was found to be significantly associated with non-compliance in patients who were received angiotensin-converting enzyme inhibitors (Gregoire, Moisan, Guibert, Ciampi, & Milot, 2006).

Angiotensin II Receptor Blockers (ARBs) e.g. losartan, valsatan, etc. are used to bind with angiotensin II AT1 receptors, which are located in the renal, myocardial, and vascular tissues in the body, resulting in decreasing of 1) sympathetic activity, 2) vasoconstriction, and 3) sodium retention. All resulted in the decreasing of blood pressure levels (Abrams, et al., 2009). This action mechanism of ARB is similar to ACEIs. Hence, they are not recommended to accompany with ACEIs. Instead, ARBs are usually considered as a second line when the patient cannot be tolerance with side effects by ACEIs.

Calcium Channel Blockers (CCBs) e.g. amlodipine, verapamil, etc. are other types of antihypertensive medication that used to control blood pressure. There are two different types of CCB; hydropyridines and none- hydropyridines. None-hydropyridines are common prescribed in control arrhythmias, whereas dihydropyridines are well known to treat hypertension by mainly effect on the arteries by inhibiting the entrance and exist of calcium in vascular smooth muscles, resulting in vasodilation of the arterioles and then decreasing of peripheral resistant (Abrams et al., 2009), which is consequent in lowering of blood pressure. However, some patients may experience ankle edema while taking CCBs.

Direct Vasodilators such as hydralazine is also one of antihypertensive medication that directly relaxes smooth muscle in blood vessels, resulting in dilation and decreased peripheral capsular resistance. Hydralazine is common known in this type. Basically, this medication is not use alone as monotherapy because of direct vasodilation effects in lowering blood pressure. Some of the adverse effects include reflex tachycardia, dizziness, and lupus-like syndromes were reported to be association with hydralazine (Kandler, Mah, Tejani, & Stabler, 2010).

On the contrary, delay of drugs administration may expose hypertensive patients to high risk complications. Therefore, according to the treatment

guideline of hypertension, physicians have to make decisions to prescribe medications based on the following: 1) systolic and diastolic blood pressure, 2) cardiovascular risk levels (Buranakitjareon, 2010) as shown in the following table:

Table 2.1 Guideline for giving antihypertensive drugs in hypertensive patients without complications, applied from the Thai Guideline on the Treatment of Hypertension Update, 2012

CVD risk factor	**Blood Pressure (mmHg)**		
	Mild Stage (SBP 140-159 or DBP 90-99)	Moderate Stage (SBP 160-179 or DBP 100-109)	Severe Stage (SPB ≥ 180 or DBP ≥ 110)
1. No risk	Lifestyle modification for 2-3 months and starting medication if BP still ≥ 140/90	Lifestyle modification for 2-3 weeks and starting medication if BP still ≥ 140/90	Lifestyle modification and Starting medication
2. Having 1-2 risks	Lifestyle modification for 2-3 weeks and starting medication if BP still ≥140/90	Lifestyle modification for 2-3 weeks and starting medication if BP still ≥ 140/90	Lifestyle modification and starting medication
3. Having ≥ 3 risks	Lifestyle modification and starting medication	Lifestyle modification and starting medication	Lifestyle modification and starting medication

The optimal targets of drug administration in hypertensive patients without complications are 1) to achieve BP goal at 140/90 mmHg or less, and 2) to prevent cardiovascular events and renal impairments (Buranakitjareon, 2010). Basically, antihypertensive drugs are prescribed as a monotherapy or combination therapy (Buranakitjareon, 2010).

Monotherapy refers to the management of hypertension by a single agent. All classes of antihypertensive medications include diuretic, Calcium Channel Blochers (CCB), Angiotensin converting enzyme inhibitors (ACEIs), Angiotensin II receptor blockers (ARBs), and Beta blockers (BBs), which can be used as a first line therapy to control blood pressure in hypertensive patients. However, diuretics are often considered as the first-choice drug compared to other classes (Chobanian, et al., 2003, European Society of Hypertension-European Society of Cardiology, 2003). Although monotherapy is usually suggested for mild to moderate hypertension with low cardiovascular risks, most of hypertensive patients could not have adequate blood pressure control by using monotherapy. A review by Holzgreve (2003) has indicated that the true response rate of BP reduction is only 27% to 59% for patients who received the maximum dose of single antihypertensive drug. There is not only the limitation in lowering blood pressure, but there is also a problem with non-medication adherence in patients who receive monotherapy. Most of the patients reported terminating their daily dose of hypertensive drug because of their experience with undesirable side effects or wrong belief about lack of necessity of taking single medication. Poor adherence to monotherapy can lead to inadequate control of blood pressure, thus possibly making additional agents necessary.

Combination therapy refers to the use of more than one class of antihypertensive drugs. In practice, more than two-thirds of hypertensive patients cannot control blood pressure by one drug (Chobanian, et al., 2003). In contrast, hypertensive patients who have achieved blood pressure control mostly require at least two or more antihypertensive drugs (Chobanian, et al., 2003). By principle, combination therapy will be prescribed if the patients have a high profile of CVD risks (Buranakitjareon, 2010), or their blood pressure is still higher than the optimal level (>140/90 mmHg) for at least 20/10 mmHg after monotherapy has been prescribed for

two or three months (Thai Guideline on the Treatment of Hypertension Updated, 2012).

Cross combination antihypertensive drugs have proved to be successful to increase efficacy to control blood pressure and prevent cardiovascular events as well as reduce adverse effects from maximum doses of monotherapy (Law, Wald, Morris, & Jordan, 2003). There are many classes of antihypertensive drugs that can be prescribed as a combination therapy, as illustrated in the figure below.

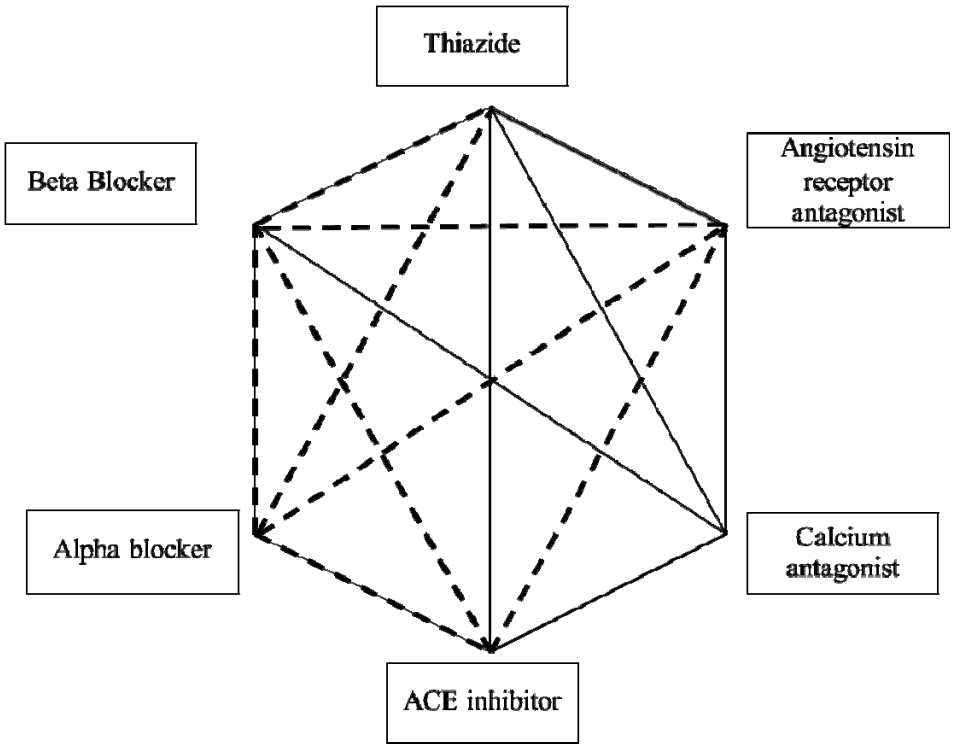

Figure 2.2 Possible combination between some classes of antihypertensive drugs, with the preferred combinations in the general hypertensive population being represented as thick lines; *Copyright by ESH/ESC (2007).*

In addition, although monotherapy and combination therapy are beneficial in keeping blood pressure under control and preventing further complications in hypertensive patients. However, the patients should be recommended to see hypertensive specialists if blood pressure is still uncontrolled after four combinations of antihypertensive drugs have been prescribed (Thai Guideline on The Treatment of Hypertension Updated, 2012).

In conclusion, drugs administration in hypertensive patients without complications is depicted as shown in the following figure:

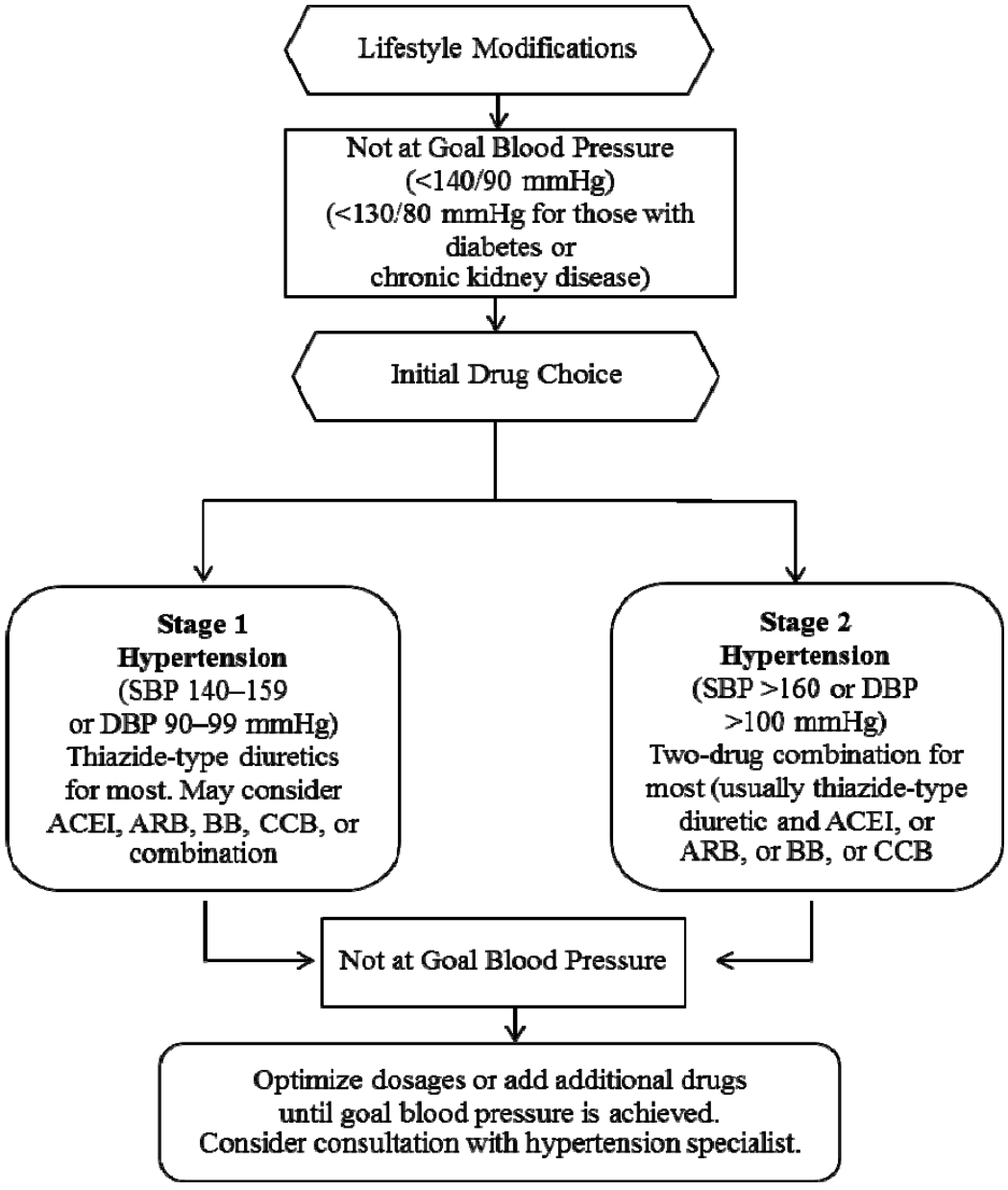

Figure 2.3 Algorithm for treatment of hypertension without complication, applied from JNC 7 (2003)

2.2 Medication adherence in hypertensive patients

2.2.1 Terminology of medication adherence

The term that is used to describe medication intake as recommended by doctors or other healthcare professional has been controversial in the literature review. In the past medication taking behaviors were explained in terms of *compliance*, which was defined as a person's behavior which was a passive response to medical or health advice (Hughes, 2004). Based on its meaning, the term compliance' does not portray of mutual discussion between patients and health professionals about the goal. As result, the patients may have a default by not following healthcare providers' advice. Therefore, the term to describe medication taking behavior has been moved away from '*compliance*' towards '*adherence*' (Hughes, 2004), which is defined as the "active, voluntary, and collaborative involvement the of the patients in a mutually acceptable course of behavior to produce a therapeutic result" (Delamater, 2006). Therefore, medication adherence is considered to be a more acceptable term compared to the term 'compliance' because it recognizes the autonomy of the patients and require their agreement to the regimen recommendations given by the healthcare professional (WHO, 2003), with respect to the type, timing, dosage, and frequency of prescriptions (Cramer et al., 2008; Elliott, 2009; Osterberg & Blaschke, 2005).

Therefore, patients' medication adherence refers to the performance in which the patients take the medication with respect to the type, time, dosage, and frequency, which are indicated on the label, through the duration of therapy (Cramer et al., 2008).

2.2.2 Pattern of adherence to antihypertensive regimens

According to the review of literature and research, changes in medication adherence rates could be considered in two aspects:

Adherence rate is various changes among classes of antihypertensive medications. For example, a retrospective longitudinal analysis investigated the discontinuation rate among 60,685 hypertensive adults who received monotherapy prescription of HCTZ (n =18,713), amlodipine (n= 11,520), lisinopril (n =21,138), or valsartan (n = 9314) and found that discontinuation rates for various classes of

antihypertensive medication were 44.2% in diuretic, 39.7% in CCB, 35.2% in ACE inhibitor, and 30.6% in ARB (Elliott, Plauschinat, Skrepnek, & Gause, 2007). Consistently, a more recent retrospective cohort study investigated a time-trend analysis of adherence to antihypertensive medications among patients who had received a new treatment for hypertension with diuretics, BBs, CCBs, ACEIs, or ARBs and reported that the risk of non-adherence was higher in those initiated on diuretics (OR = 4.28), calcium channel blockers (OR = 1.67), beta-blockers (OR = 1.56), angiotensin-converting enzyme inhibitors (OR = 1.19), and ARB (OR=1), respectively (Esposti et al., 2010). Therefore, medication adherence rates vary among classes of antihypertensive medication. Patients with diuretic prescription are the most likely to have non-adherence, followed by those with CCB, ACE inhibitor, and ARB, respectively.

Besides, medication adherence rates can be changing over time. In a short period, Gregoire, Moisan, Guibert, Ciampi, and Milot (2002) examined the discontinuation of antihypertensive medications and related-factors of discontinuation among 682 hypertensive patients with newly prescribed monotherapy. During the study, the patients were interviewed by telephone for four times during 18 months to obtain adherence information. It was found that 24% of the patients started discontinuing their initial antihypertensive medication during the first three months.

To investigate medication adherence in one year, a study was carried out by using electronic monitoring to monitor adherence to antihypertensive prescription, a once daily dose. It was found that 50% of the hypertensive patients had stopped taking antihypertensive drugs within one year (Vrijens, Vincze, Kristanto, Urquhart, & Burnier, 2008). At four years, a retrospective, longitudinal cohort study had been conducted to evaluate persistence patterns in hypertensive patients who had no compelling disease and who began treatment with a monotherapy regimen. The overall outcomes (persistence) were evaluated at 12^{th}, 24^{th}, 36^{th}, and 48^{th} months. The finding indicated that the greatest decline in persistence occurred between initiation of antihypertensive medication and at the 12^{th} month (100% to 75%). Then, the persistence consistently declined to 50% and 30 % at the 4^{th} year (Conlin, Gerth, Fox, Roehm, & Boccuzzi, 2001). It was estimated only 39% of the patients continuously

took antihypertensive medication during the ten years of follow-up (Van Wijk, Klungel, Heerdink, & de Boer, 2005).

In summary, adherence or persistence rates vary between 30% and 80% depending on time and antihypertensive drug classes. Most of the hypertensive patients in the aforementioned studies were having no complications and they began to discontinue antihypertensive drugs at three months, especially when they were prescribed with monotherapy of diuretics. Therefore, proactive concern on these points might help to protect the patients from uncontrolled BP and eventually complications.

2.2.3 The effects of non-medication adherence in hypertensive patients

Blood pressure level

Poor medication adherence is a main barrier of unsuccessful blood pressure control in hypertensive patients**.** In determining the effects of imperfect adherence (e.g. occasionally missing prescribed doses) on the rate of loss of antihypertensive effects when the dose was stopped or missed in one day (mmHg/day), a study found that patients whose adherence rate to short-acting drugs (enalapril, atenolol) was 75% were likely have a clinical loss of mean systolic blood pressure lowering effect of more than 2 mmHg/day (Lowy, 2011). In contrast, adherence to medication has been proved as an effective strategy to achieve blood pressure control. One of the previous studies used Medication Events Monitoring System (MEMS) to investigate the magnitude of relationship between the effects of medication adherence on once daily dose prescription and blood pressure control for one week. The resulted revealed that blood pressure levels in seven days of excellent adherence was decreased between 12⁄7 mmHg and 15⁄8 mmHg when compared to seven days of poor adherence (Lynch et al., 2012).

Complications

Non-adherence to antihypertensive drugs is often associated with increasing risk of cardiovascular events. It was found that 75% of medication adherence on once-daily dose prescription was related to an increasing 10-year CVD risk between 1.3% and 7.1% when compared with perfect adherence (Lowy et al., 2011). In the long run, a study has reported that non-persistent antihypertensive for

two years was associated with 15% increased risk of acute myocardial infarction (RR 1.15; 95% CI 1.00–1.33) and 28% increased risk of stroke (RR 1.28; 95% CI 1.15–1.45) (Breekveldt-Postma et al., 2008). On the contrary, good adherence is an important strategy to achieve blood pressure control, resulting in minimizing further serious complications e.g. stroke, myocardial infarction, heart failure, and chronic kidney disease.

Kettani and colleagues (2005) had assessed the impact of adherence to antihypertensive agents on the incidence of cerebrovascular disease in hypertensive patients who were aged between 45 and 85 years old. They found that adherence to antihypertensive drugs (≥80%) for at least one year was significantly associated with a 22% decreased risk of cardiovascular disease (rate ratio, 0.78; 95% CI, 0.70 to 0.87) when compared with lower adherence. Moreover, an earlier clinical trial had reported that adherence to antihypertensive therapy was found to be associated with reduction in stroke incidence averaging 35% to 40%, myocardial infarction 20% to 25%, and HF 50% (Chobanian, et al., 2003)

Hospitalization

In general, non-medication adherence is the most important factor of hypertensive crises (hazard ratio 5.88, 95% confidence interval 1.59–21.77, $P < 0.01$) (Saguner et al., 2010), and non-medication is significantly associated with increasing risks of all-cause hospitalization (Ho et al., 2006). In Thailand, non-medication adherence in hypertensive patients was associated with 400 cases of hospitalization in 2003 and the number increased to 861 cases per 100,000 in 2008 (Bureau of Health Policy and Strategy, 2008). On the other hand, good adherence is related to fewer hospitalizations (Hughes, 2004). For example, a retrospective cohort observation of hypertensive patients who were aged less than 65 years found that one-year risk of hospitalization was significantly lower for patients who had 80% to 100% adherence rate to their antihypertensive medications (Sokol, McGuigan, Verbrugge, & Epstein, 2005).

Mortality

The most extreme consequence of non-adherence may be death. One study had investigated the effects of treatment adherence and risk of death among patients after a myocardial infarction (age range of 30-69 years). The results showed that patients who did not have good adherence to treatment were two to six times more likely to die within a year of follow-up compared to the ones who had good adherence (Huge, 2004). The finding from this study is consistent with a previous report that non-adherence to cardio-protective medications was associated with a 50% to 80% relative increase in risk of mortality (Ho et al., 2006).

On the other hand, evidence has revealed that 80% adherence to antihypertensive medications for at least one year was associated with lower mortality rates (Simpson et al., 2006). In a longer period, Gudmundsson and colleagues (2005) compared hypertensive patients who were being followed up and their treatment made their condition uncontrolled (systolic blood pressure ≥160 mmHg and/or diastolic blood pressure ≥95 mmHg) and those who were being treated and their hypertension had been controlled for 30 years. They found that patients with hypertension who were treated and whose condition was controlled had a significantly lower risk of CVD mortality than that of patients who were still being treated and their condition was still uncontrolled.

Health care cost

Regarding cost utilization, adherence to antihypertensive treatment has both short-term and long-term economic implications. In the short term, prescription drugs expenditures or direct cost for adherent patients may possibly seem to be high. However, when they are compared to long-term costs, the potential healthcare costs in adherent patients tend to decrease because the patients seemed to have less burden caused by hypertensive-related complications and hospitalization rates, which resulted in a net reduction in overall healthcare costs (Sokol et al., 2005).

2.2.4 Method of measuring medication adherence

There are a variety of methods used to monitor medication adherence. These methods could be divided into two major groups according to a literature review as follows:

1) Direct methods (e.g. laboratory detection, direct observation, etc.)

- Laboratory detection is a method to measure biological markers or drug metabolized products. For example, spot urinary samples had been used to detect non-adherence to ACE-inhibitors treatment. This method is quite inexpensive, and it can be performed by non-specialist laboratories. Additionally, it does not require complex statistical models for interpretation (Azizi, et al., 2006). However, this method may have a limitation to apply in detection of low medication adherence in hypertensive patients. This is because, most of the hypertensive patients are prescribed with combination regimen, so the efficacy of therapy cannot be justified by measuring adherence to only one type of medication. Moreover, biological markers or metabolic products of the drugs might be influenced by diet, absorption, other drugs, and rate of excretion.

- Direct observation of the patient taking medication. This method is not feasible in outpatient practice of hypertensive patients because in the real world we cannot observe patients when they take their medication every day, while medication adherence needs monitoring over a span of years (Hawkshead & Krousel-Wood, 2007).

With those limitations, the direct method, laboratory detection, and biological markers may not be practical for use in clinical routines to detect non-adherence to antihypertensive drugs.

2) Indirect methods (e.g. self- report, pill count, pharmacy refill rate, electronic adherence monitoring device, etc.)

- *Self-report* is a method which is commonly known and widely applied in clinical settings. This method is simple and economical. It gives a real-time feedback regarding potential reasons for poor adherence including social, situational and behavioral factors (Hawkshead & Krousel-Wood, 2007). Therefore, this measure has been considered as an appropriate tool to identify low medication adherence in clinical settings, particularly in the outpatient department (Morisky et al., 2008).

The new eight-item self-report Morisky Medication Adherence Scale (MMAS) is one kind of self-report questionnaire, which is widely acceptedand frequently used in clinical settings. To evaluate the association and concordance between MMAS and other methods such pharmacy refill rate, Krousel-Wood et al. (2009) found that MMAS is significantly associated with antihypertensive drug pharmacy refill adherence. Additionally, MMAS been used to test the properties of predictive validity in 1,367 hypertensive patients in an outpatient setting. It was found that the MMAS was reliable (α=0.83) and significantly associated with blood pressure control ($P<0.05$) (Morisky, Ang, Krousel-Wood, & Ward, 2008). This has indicated that this measure has good reliability and predictable validity, so it could be used as an initial tool to monitor medication adherence level as well as predict the risk of uncontrolled blood pressure in hypertensive patients at an outpatient setting (Morisky, et al., 2008). However, this measure is subjective. Hence, when using MMAS, users have to be aware of its subjectivity in nature because the result could be biased from inaccurate recalls, social desirability, or overestimation by the patients (Ho, Bryson, & Rumsfeld, 2009).

- *Pill count* is the simplest method for measuring medication adherence by counting the dosage units (tablets, capsules, or other dosage units). In a clinical setting, pill count has simplicity, empiric nature, and a low cost. When it is compared with other methods, pill count has been reported to be significantly correlated with electronic medication monitors in a study of hypertensive patients (Hamilton, 2003). Therefore, pill count is also a choice of measures which could be used to monitor medication adherence in practice (Hawkshead & Krousel-Wood, 2007). Pill count can be calculated by using the following equation:

$$\% \text{ Adherence} = \left[\frac{(\text{no.doses actually taken})}{\text{no.dose that should have been taken}}\right] \times 100$$

Based on the aforementioned equation, pill count may have a limitation in providing information on other aspects of taking medications, such as dose timing, drug holidays (i.e., omission of medication on three or more sequential days), etc. In

addition, the data can be manipulated by patients (e.g. pill dumping), which can possibly distort the clinical outcomes (Osterberg & Blaschke, 2005).

- *Pharmacy refill rate* is one of the most frequently used methods that are mentioned in the literature reviewed in this study. This method reflects medication taking behaviors. More importantly, it cannot be distorted by the patients because it is not subjective. Therefore, the pharmacy refill rate could minimize the bias from overestimation of adherence. Basically, the pharmacy refill rate is used to measure medication adherence in two ways: the medication possession ratio and the proportion of days covered by the methods, which are defined by the number of doses dispensed in relation to a dispensing period (Ho, Bryson, & Rumsfeld, 2009). Typically the cut-off point for determining adherence by the pharmacy fill data are as follows: <80% = under adherence, 80-120% = adherence, >120% = over adherence (Hawkshead & Krousel-Wood, 2007). Although, the pharmacy refill rate is objective and useful for use with larger populations, it may be unable to confirm medication consumption by the patients. Moreover, this method cannot reflect any changes in medication taking behaviors in the patients.

- *Electronic adherence monitoring device*. Medication event monitoring system (MEMS) is one kind of electronic devices. It is commonly known as the most reliable method in monitoring actual medication used because it uses a computer chip to record medication data, including dose frequency, dose time, and dose interval (Hawkshead & Krousel-Wood, 2007). According to its psychometrical properties, MEMS is widely accepted as the most reliable method in monitoring medication adherence, and it has been used as a means of validation of other measurement methods used in the context of intervention (Hamilton, 2003).However, there are several limitations that can be found when using MEMS. For example, there can be potential device failure and inaccurate data record if there is interference by patients or other devices or if patients transfer the medication to another container. In addition, it is more expensive compared to other methods (Hawkshead & Krousel-Wood, 2007). Thus, the electronic monitoring device is likely to be used in actual clinical practice.

In summary, the aforementioned review has indicated that there is no golden method that can be used to monitor medication adherence. However, based on the prominent characteristics of self-reports, which are more simple, involve lower

costs, and have high sensitivity in detecting low medication adherence. Self-report is possible considered as an appropriate measure to assess medication adherence in this study.

2.3 Self-Regulatory Model

Self-Regulatory Model (SRM) is one of cognitive behavioral models that have widely been applied in nursing research. The model has provided a conceptual framework for understanding the role of symptoms and emotional responses regarding a variety of health behaviors (Leventhal et al., 1992), under the conceptualization that when individuals face a health threat such as a new symptom or diagnosis, they will actively build up or develop a commonsense idea or perception about their condition, which is going to be used to determine individuals' coping strategies in managing with their health or illness problems (Cameron & Leventhal, 2003). Therefore, it can be said that "illness perception" is the key concept of SRM. In research studies, this term has been used interchangeably with "illness representation" (Skinner et al., 2011), "illness belief" (Hekler, et al., 2008), and "illness schemata" (Figueiras et al., 2010).

Based on the Self-Regulatory Model, health behavior is one of the coping strategies, which have been guided by individuals' perception about their health threats. Basically, illness perceptions consist of the interaction between two parallel processing arms which are cognitive processing and emotional processing.

1) Cognitive processing is related to the perceiving reality of health threat. According to the concept, individuals who are exposed to the internal and/or external threat will organize, analyze, interpret information, and finally give the meaning to the threat in their own views or perceptions, which consist of five distinct dimensions of identity, timeline, cause, controllability, and consequence.

Identity is considered the label of the illness and its symptoms, which the patients perceive to be related to their illness. The causal is the patients' view about what may be the cause of their illness; this refers to a perceived cause of illness. Timeline is the patients' perception about how long their condition will last or even be seen as acute, chronic, or episodic. This element will be evaluated and changed when time passes. Consequence is the impacts that patients expect to happen and affect on

their lifestyles as the outcome of the illness, indicating patients' perception of the impacts of the illness. The last dimension of cognitive perception is cure/ control, which refers to the patients' perception that their illness could be controlled, whether by their ability (personal control) or the efficacy of the treatment (treatment control).

2) Emotional processing refers to an emotional reaction to the illness. This is another processing arm of illness perception, which consists of two dimensions: the emotional response and concern of illness. Emotional response refers to patients' perception about their affected feeling toward the illness, while concern of illness can be considered worrying about the illness.

The interaction of two processing arms-cognitive and emotional is a key component that will shape individuals' strategies to cope with the illness or threat. In the following process, the outcomes of strategies will be appraised. The successful outcomes are going to motivate individuals to continue regulating those strategies in order to continuously reduce or minimize the illness or threat. Such interaction is presented in the following figure:

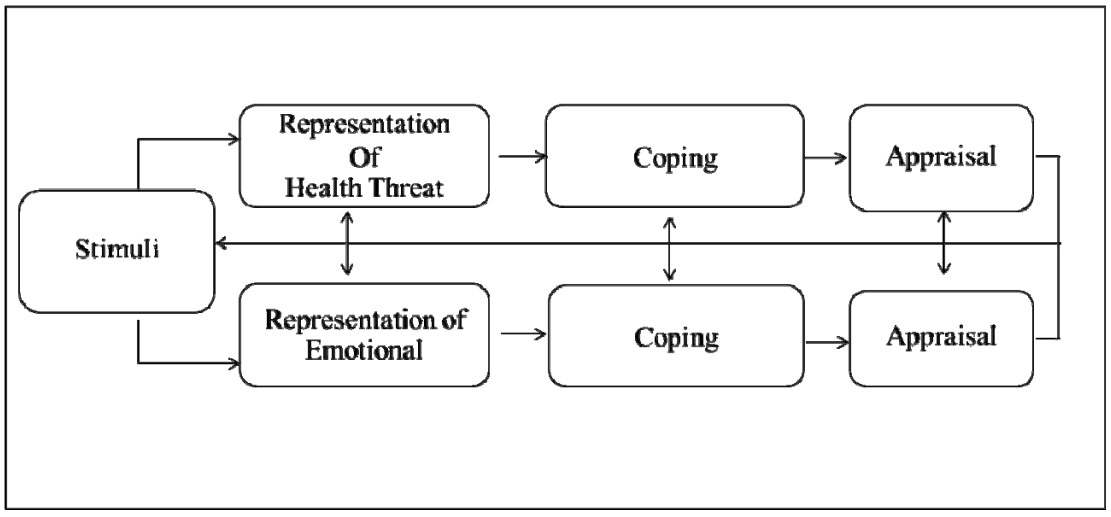

Figure 2.4 The Common-sense model of Self-regulation by Laventhal (1992)

According to the concept, illness perception is widely useful to explain the link between beliefs and health behaviors in a different populations such as patients with coronary arteries disease (Petrie, Cameron, Ellis, Buick, & Weinman, 2002), diabetes mellitus (Mann et al., 2009; Rujisatian, 2009), hypertension (Chen et al.,

2011; Chen et al., 2009; Feng, 2009; Hekler et al., 2008), asthma (Jessop & Rutter, 2003), chronic pain (Nicklas, Dunbar, & Wild, 2009), and HIV infection (Reynolds et al., 2009). For example, in patients with coronary arteries disease, a previous study has investigated the association between illness beliefs and adherence to secondary prevention behaviors of recently hospitalized patients. The results revealed that beliefs relating to the identity, timeline, consequences, control, and cause of CAD could significantly predict adherence (Stafford et al., 2008). Likewise, a study in hypertensive patients has reported that illness perception had a significant influence on both adherence to the antihypertensive regimens and self-management recommendations (Chen et al., 2011; Feng, 2009).

Although illness perceptions have been concluded as key factors in regulating health behaviors in order to reduce health problems, previous application of SRM have suggested that the model is rather specific in perceiving illness, which may not be enough to understand the complexities of health behaviors in clinical practice. To better understand health behaviors such as medication talking behavior, there is also a need to understand individuals' view about the treatments or advice they have been given (Reynold & Alonzo, 2000). Based on this belief, previous studies have investigated the relationship between beliefs about medicines and medication adherence in patients with asthma. The results showed that non-adherent behaviors were reported to be associated with doubts about the necessity of medication, but not, concerns about its potential adverse effects (Horne & Weinman, 2002). Another study also found similar results that higher perception of necessity of medication was correlated with more report of adherence ($r = 0.21$, $n = 24$, $p<0.01$), whereas higher concerns were correlated with fewer reports of adherence ($r = 0.33$, $n = 24$, $p<0.01$) (Horne & Weinman, 1999; Ross et al., 2004). Such findings have extended the view of Self-Regulatory Model that illness perception needs to be incorporated into study of medication beliefs in terms of necessity and concerns in order to better understand medication adherence behaviors in the patients (Horne & Weinman, 2002) as depicted in following picture:

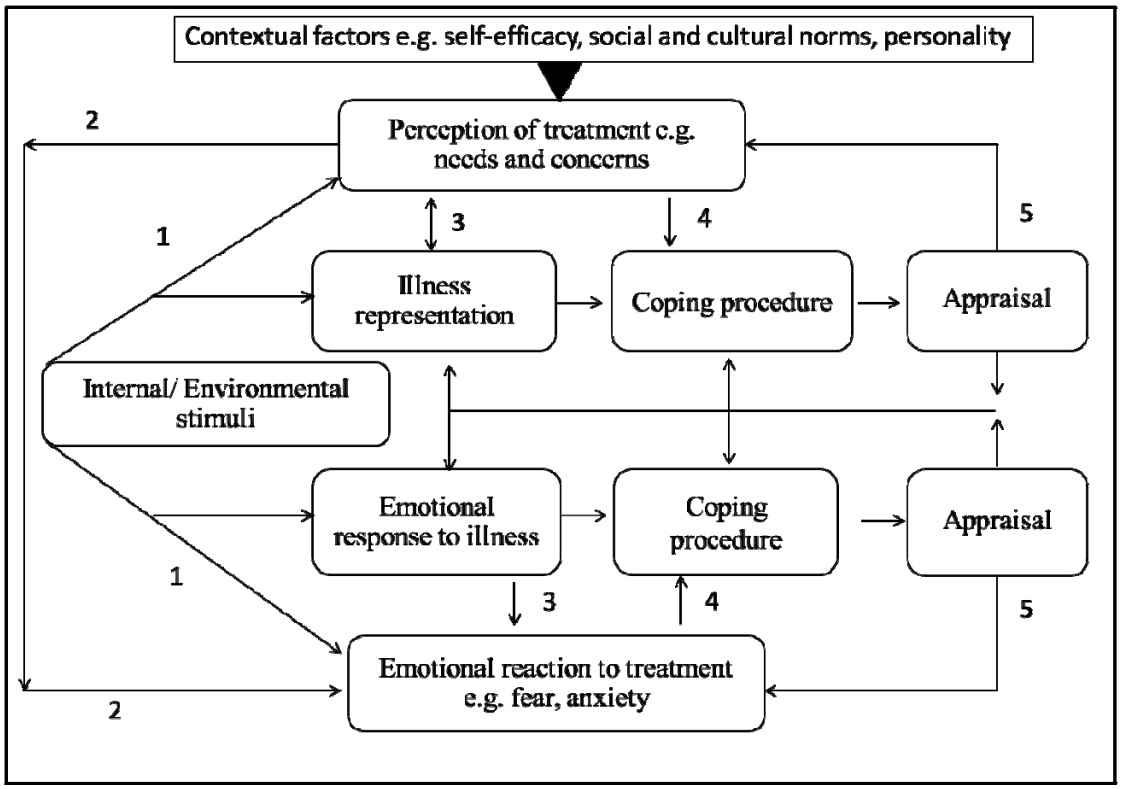

Figure 2.5 Treatment perception and the Common-Sense Model of Self-Regulatory by Horne (2003).

According to the extended Self-Regulatory Model, it is proposed that people are going to use the interplay between illness and treatment perception to shape coping strategies to minimize their illness or threats. In the next process, the outcomes of strategies will be appraised. The successful outcomes will motivate individuals to regulate those strategies in order to continuously reduce or minimize the illness or threat. Based on the extended of Self-Regulatory Model, the disease and medication are referred to the stimulus, which is going to stimulate the patient to develop their views about the illness (illness perception) and its treatment (treatment perception). Both will determine and influence the coping behaviors (e.g. medication adherence, physical exercise, control diet, etc.) in many different populations (Broadbent, Petrie, Main, & Weinman, 2006; Bucks et al., 2009; Mann, Ponieman, Leventhal, & Halm, 2009; Ross et al., 2004; Rujisatian, 2009).

Therefore, the present study has assumed that applying this model to explore medication adherence in hypertensive patients without complications may be

able to explain how the perception about hypertension and its treatments is impacted on adherence among this population.

2.4 Factors related medication adherence in hypertensive patients

Many factors have been studied and reported to be associated with non-mediation adherence. For example, WHO (2003) has identified and divided contributing factors to non-medication adherence into five categories 1) patient-related factors, 2) condition-related factors, 3) therapy-related factors, 4) socio-economic factors, and 5) health-care system/health-care team related factors. In this study, the researcher has placed the focus on the importance of patient-related factors such beliefs or perceptions about illness and its medication because these factors have been indicated as strong predictors of medication adherence in previous studies.

2.4.1 Illness perception

Illness perceptions refer to the patients' views or beliefs about their condition. This factor has been used to explain the link between patients' belief and health behaviors in the area of nursing. Based on a literature review, the terms "illness perception" (Broadbent, Donkin, & Stroh, 2011; Chen, Tsai, & Chou, 2011; Feng, 2009) "illness representation" (van-der Hofstadt, Rodríguez-Marín, Quiles, Mira, & Sitges, 2003) "illness schematic" (Figueiras et al., 2010) "illness beliefs" (Stafford, Jackson, & Berk, 2008), or "cognitive representation" (Thepphawan, 2010) were used interchangeably. However, the term "illness perception" is used in this study because it is commonly applied by previous studies.

Based on the Self- Regulatory Model, patents' illness perceptions refer to a group of perceptions about illness, which are composed of five distinct views: 1) the identity includes a disease label and the individuals' ideas about the symptomatic representation of the disease; 2) the timeline refers to an expected time frame or expected duration of the illness; 3) the causal is the individuals' conceptions about the probable cause of the illness; 4) the perceived controllability refers to the individuals' conceptions about whether the illness is responded to self and/or treatment intervention; and 5) the consequence refers to short-term and long-term impacts of the

illness on their daily life. Each perception freely guides or motivates individuals to be engaged in health behaviors in the ways that are consistent with their perceptions with expectation to reduce or control their illness (Leventhal, Brissette, & Levelthal, 2003). Therefore, illness perceptions are compared to the primary guides for coping strategies, which have been used to explore the variation of coping strategies such as medication taking behaviors in different chronic conditions under the Self-Regulatory Model.

For instance, Stafford, Jackson, and Berk (2008) had investigated the association between illness beliefs and adherence to secondary prevention behaviors; physical exercise, taking medications, weight management, alcohol use, and smoking in 193 recently hospitalized patients with coronary artery disease (CAD). Revises-Illness Perception Questionnaires (IPQ-R) was used to the measure illness beliefs. The study finding indicated that most of the participants believed CAD was chronicity with severe consequences, but it could be controlled by the person and treatment. Furthermore, smoking, alcohol, emotional state, and heredity were significantly considered as causal factors of CAD by the patients. With regard to adherence, it has been found that beliefs relating to the identity, timeline, consequences, control/cure, and cause of CAD had contributed significantly to the explanatory power of adherence, and more serious consequences are the only one illness perception that independently associated with better adherence. Similarly, a study in patients with acute coronary syndromes (ACS) has reported that among the components of illness perceptions: higher perceptions of control and consequence could predict decision time to seek treatment (Thepphawan, 2010), whereas identity and others could not. By the same token, a study in patients with chronic heart failure (CHF) also found that perceptions of serious consequences were a significant predictor of the factor of self-care (MacInnes, 2011). According to the studies in patients with life threatening diseases (CAD, ACS, and CHF), it was reported that among illness perception domains, consequence and then control are the most important domains that often influence and motivate the patients to adhere to health behaviors, including medication adherence. It is possible that those patients may have perceived concrete impacts of the conditions, which they could obviously experience in their current daily life, e.g. chest pain, dyspnea, fatigue, etc., all of which clearly affected their activities, working,

and financial status, etc. However, taking medication made them almost definitely feel improvement and control. Therefore, perceptions of consequence and control could motivate the patients to adhere to their medications more. Interestingly, as for identity, there was not significant impact of identity on medication adherence even when those conditions are definitely symptomatic diseases. It is possible that the perceptions of symptoms may have strongly happened only when the symptoms were exacerbated compared to the impact of conditions on their daily lives, which usually remained unchanged even when the symptoms were not present.

In patients with diabetes mellitus, Broadbent, Donkin, & Stroh (2011) investigated the association between illness perceptions an adherence to medications, diet, and exercise in patients with diabetes mellitus. It was found that fewer consequences and identity were negatively associated with medication and diet adherence, whereas higher personal control was positively associated with medication adherence and diet adherence. It is possible that the patients may have used consequence as an outcome when evaluating the effectiveness of their coping method (taking medication). Therefore, in the situation that patients had good adherence to medications, they may have perceived that the disease had fewer impacts on their health. Similarly, a study was carried out by Rujisatian (2009) to examine the relationship between illness perceptions and adherence to oral anti-hyperglycemic medications among 85 patients with type II diabetes mellitus using the Self-Regulatory Model as a conceptual framework. Brief Illness Perception Questionnaires (Brief IPQ) was used to measure illness perception. Pearson's correlation showed that low identity and consequence were negatively associated with medication adherence. It is possible that the participants in this study reported a high level of medication adherence. As a result of evaluation of the effectiveness of medication, the patients might have experienced fewer undesirable symptoms as well as perceived less adverse consequences of the disease on their lives. However, it is worth noting that control was not shown to have an association with medication adherence.

In contrast, Mann (2010) studied the predictors of medication adherence among diabetic patients who had a long standing with diabetes and reported high levels of co-morbid conditions commonly associated with diabetes. It was found that, more than half of these patients needed to control blood sugar levels by using insulin.

The results also showed that the consequences of diabetes were minimal, diabetes had few symptoms, and perceiving themselves as having little control over diabetes was associated with poor medication adherence to anti-hyperglycemic medication. This could be explained that perceiving fewer consequences and symptoms of diabetes may have made the participants acknowledge that the disease had already improved or turned to normal. This is because basically signs and symptoms were interpreted as a necessary principle of disease (Lukoschek, 2003). Without noticing any symptoms or abnormal feelings, patients may have been made perceive that the disease had less impact or they may have even defined themselves as normal or cured (Kirdphon, 2003). Therefore, the patients might have perceived that medications were no longer necessary for them, so they stopped taking medication.

As for hypertensive population, Feng (2009) explored the illness perceptions as well as examined the relationship between this factor and self-management behaviors in hypertensive patients. The IPQ-R was used to measure illness perceptions about hypertension. The results showed that 78% of patients perceived that hypertension was a chronic condition which was caused by stress, worry or eating habits. Furthermore, 15.4% believed that hypertension was a serious condition but it could be controlled by themselves (46.6%) as well as treatment (70%). With regard to symptoms, patients believed that some specific symptom such as dizziness, feeling of loss of strength, and eye ache were related to hypertension. Pearson's correlation coefficient showed that the components of illness perceptions of emotional representation, timeline, treatment control, consequence, and identity were positively correlated with to self-management among hypertensive patients. Likewise, Gregoire, Moisan, Guibert, Ciampi and Milot (2006) conducted a prospective cohort study which aimed to explore predictors of non-medication compliance in 173 hypertensive patients. The results showed that the patients with lower perception of risk or impacts of hypertension were two times more likely to be noncompliant (95% CI 1.21 to 3.33) than those who believed it had a lot of impacts. This indicated that a higher level of perceived control and consequence could stimulate or motivate the patients to adhere to health behaviors, as supported by the concept of Self-Regulatory Model.

However, another study has reported contradictorily results about the role of illness perceptions on medication compliance in patients with hypertension. In 2004, Ross, Walker, and MacLeod found that the perception of consequence was negatively associated with medication adherence, whereas the perception of treatment control was positively associated with medication adherence in hypertensive patients who also had medical history of ischemic heart disease, cerebrovascular disease, peripheral vascular disease, diabetes mellitus, etc. Similarly, a study by Chen, Tsai, and Lee (2009) assessed the effects of illness perceptions on adherence to the prescribed medications and recommendations of self-management of hypertensive patients who were mostly elderly persons (mean age = 67 years), who had been living with hypertension for ten years on average, and more than half of whom were afflicted with at least one other disease. The results revealed that control (personal and treatment) was positively associated with adherence scores, whereas cyclical timeline and consequences were negatively correlated to adherence. This means that the patients who had high perception about the impacts of hypertension were going to have low adherence to medications. Such findings possible highlight the significant of perceived serious impacts of hypertension, particularly when the comorbidity or hypertension-related complications were involved that they may elicit an emotional response and maladaptive coping strategies such as denial or avoidance (Hagger & Orbell, 2003), resulting in poor adherence in some hypertensive patients.

According to the literature review, it has been discovered that among the dimensions of illness perceptions, identity, control, and consequence could mostly explain medication-taking behaviors in patients with chronic diseases. However, identity seems to be likely associated with medication adherence in patient with chronic diseases that have obviously exacerbating symptoms such as coronary heart disease or chronic heart failure rather than asymptomatic diseases such as hypertension, which the symptoms are non-specific symptoms (e.g. headache, dizziness, fatigue, etc.) and might difficult for the patients to label.

2.4.2 Medication beliefs

Medication beliefs could be grouped under two categories: perception of *necessity* or personal need for the medication, and *concern* about negative effects (e.g. concern about becoming dependent on the medication or concern that regular use would lead to long-term adverse effects). Perceived necessity is assumed to be positively associated with adherence, whereas concern is the opposite (Horne, 2003). Both of these variables have been used to explore medication taking behaviors as in the following:

Belief about necessity

Belief about necessity is one of the factors that influence medication adherence in the patient, particularly in patients with chronic diseases, which make most patients stay with the prescriptions for the rest of their life. Therefore, perception of necessity of medication in maintaining their condition is an important factor to make the patients adhere to their prescribed medications in the long term. This idea has been proved by previous studies. For example, a cross-sectional study had been designed to investigate personal beliefs about necessity of prescribed medications and reported adherence among 324 patients of four chronic illness groups (asthma, renal, cardiac, and cancer). It was found that higher necessity scores were correlated with higher reports of medication adherence ($r=0.21$, $n=324$, $p<0.01$) (Horne & Weinman, 1999). This is possible because those conditions are labeled as serious characteristics, leading to the obvious and specific symptomatic exacerbation such as dyspnea, edema, chest pain, etc. However, there could be considerable improvements of these symptoms after the medications were prescribed. In this situation, an effective outcome may convince the patients that medications were necessary for them and this should lead to a good adherence to medication.

In patients with diabetes mellitus, Broadbent et al. (2011) investigated the association between beliefs about necessity of anti-hyperglycemic medications and adherence. The findings indicated that patients who had positive beliefs in necessity of anti-hypoglycemia drugs reported higher adherence to medications and resulted in more controlled blood sugar levels. This is incongruence with the study of Rujisatian (2009) which showed that the necessity of medications ($r = 0.26$, $p = 0.05$) was

significantly positively correlated with adherence to anti-hyperglycemic medications. Conversely, doubt about the necessity of medication was found to be associated with non-adherent behaviors in the patients (Horne & Weinman, 2002).

In patients with hypertension, a previous study conducted by Ross and colleagues explored the relationship between medication beliefs and medication adherence among 514 hypertensive patients who had developed complications or had co-morbidities. The Belief Medication Questionnaires (BMQ) revealed that patients who had high specific necessity scores were more likely to be compliant (OR 3.2, P< 0.001). Similar finding were reported in a pilot study that had examined medication beliefs and antihypertensive adherence among older adults who mostly had been stricken with hypertension for 11 years and had been taking under five tablets of daily prescribed medication on average. The results indicated that a stronger belief in the necessity of medications was related to being adherent to antihypertensive medication (odds ratio: 2.027, CI 1.09-3.75) (Ruppar, Dobbels, & De Geest, 2012).

When comparing hypertension to diabetes mellitus, it could be seen that the natural characteristics of hypertension are mostly asymptomatic. Thus, taking anti-hypertensive drug may not make the patients see obvious differences in the outcomes. However, having co-morbidity or hypertension-related complication and taking a large number of medications may make the patients more acceptable that they are ill, so they may pay more attention to medication-taking routine (Gao et al., 2009), resulting in a good adherence to medications.

Concern about medication

Concern about medication is a negative belief about medication such as side effects, drug dependence, and substance accumulation which could have a negative effect on medication adherence, particularly in the patients with chronic conditions, who need long-term drug administration. Therefore, patients with a high level of medication tend to stop taking their medications, especially when they think that the medication is the cause of more negative effects than positive effects or benefits.

For example, a study has investigated the role of medication beliefs on adherence to anti-hyperglycemic drug among patients with diabetes mellitus in

primary care units. The analysis showed that worrying about side-effects of diabetes medicines (OR = 3.3; 1.3–8.7) and feeling medicines were hard to take (OR = 14.0; 4.4–44.6) were predictors of poor adherence to anti-hyperglycemic drugs (Mann, Ponieman, Leventhal, & Halm, 2009). This is consistent with a study that indicated that poor adherence to anti-hyperglycemic drugs was significantly related to concern about medication (r = -.43, p =.01) (Rujisatian, 2009). It is possible that receiving educational message about side effects or having direct experience of anti-hyperglycemic medications after taking anti-hyperglycemic drugs may lead to negative beliefs about medication and result in poor medication adherence in patients with diabetes mellitus.

As for patients with hypertension, adverse effects of antihypertensive medications are not severe compared to hypoglycemic effects of anti-hyperglycemic medications. However, coughing, polyuria, and ankle edema seem to be frequently reported as mild to moderate negative effects of antihypertensive medications by the patients. To explore the association between negative beliefs and adherence to antihypertensive medications, a pilot study explored the relationship between medication beliefs and demographic variables, and antihypertensive medication adherence in a sample of older adults (median age = 74 years) who had had hypertension for 11 years on average and who mostly had a concomitant cardiovascular disease or other chronic diseases. Medication beliefs were measured with the Beliefs about Medicines Questionnaire-Specific, developed by Horne and Weinman (1999). The findings revealed that non-adherent participants reported more concerns about their antihypertensive medications (e.g. addictive and long-term effects) more than adherent participants (Ruppar, Dobbels, & De Geest, 2012). Similarly, Ross et al (2004) had tested the role of illness perceptions and medication beliefs on medication adherence among 514 elderly hypertensive patients. The results was indicated that patients who had high-specific-concern scores were less likely to be compliant (OR 0.6, P = 0.028) (Ross et al., 2004). Likewise, another study also indicated that the individuals who perceived side effects from medication were more likely to discontinue their initial medication by two folds [HR 1.91; 95% (CI) 1.47–2.47] compared to the individuals without perception of side effects (Grégoire et al., 2002). Therefore, the participants might have believed that living with the

medications' adverse effects was more physically debilitating than having hypertension, hence possibility resulting in discontinuing medication (Lewis, Askie, Randleman, & Shelton-Dunston, 2010).

Based on the literature review about factors related to medication adherence in hypertensive patients, the previous studies indicated that the dimensions of illness perceptions (consequence and control) and medication beliefs (necessity and concern) are closely associated with medication adherence in hypertensive patients. However, none of those studies had been conducted in a specific group of hypertensive population such as in a group of hypertensive patients without complications or co-morbidities diseases. Thus, study carried out particularly with these patients is called for.

2.5 Summary of literature review

Based on the literature review, hypertension is known as a major risk of cardiovascular events and its incidence gradually increase year by year. This may lead to a greater burden on existing healthcare systems and the country's economy in the future. Therefore, to prevent future impacts of hypertension, drug administration is very helpful to control and manage this condition. However, poor medication adherence has been known as an obstacle in achieving blood pressure control by mean of drug administration. Medication-taking behaviors have been reported to be implicated with many factors.However, it is not clear whether the factor of illness perceptions and medication beliefs are highly related to and influence individuals' coping behaviors such medication adherence, particularly in the population with chronic diseases including hypertension. However, previous studies on the implication between illness perception and medication beliefs do not put their focus on specific groups of patients such as those with hypertension without complications. This is because; having less severity and symptoms may cause distortion in perception of the disease and its treatment. Consequently, the patients in this group may view their illness and medications in different ways, possibly resulting in use of different strategies to cope with health treats according to the concept of the Self-Regulatory Model. Therefore, it is anticipate that the findings of this study would lead to better

understanding of perceptions of illness and treatment in hypertensive patients without complications. More insightful information derived in the present study would yield baseline data that could be utilized by healthcare providers to encourage hypertensive patients to regulate and manage their condition, and maintain their medication adherence for as long as possible in order to protect themselves from further complications.

CHAPTER III
METHODOLOGY

A descriptive design was used in this study to investigate the factors influencing medication adherence in patients with essential hypertension, based on the conceptual framework of Treatment Beliefs and the Self-Regulatory Model, by Horne (Leventhal, Brissette, & Leventhal, 2003).

Population and Sampling

The population of this study consisted of patients with essential hypertension, both males and females, who were older than 18 years old and had sought out treatment or medical consultation at the Primary Care Unit (PCU) in Siriraj Hospital. Convenience sampling was used to draw samples according to the following criteria:

Inclusion Criteria

1) Being diagnosed with essential hypertension by a physician.
2) Ability to communicate using Thai language.
3) Self- administered medications.
4) No history of mental illness diagnosed by a physician.

Exclusion criteria

1) Secondary hypertension

2) Systolic blood pressure less than 180 and/or diastolic blood pressure less than 110 mmHg.

3) Have pre-existing condition or diagnosis of comorbid disease such as diabetes, cancer, COPD.

4) Have hypertensive-related complications diagnosed by physician, such as ischemic heart disease, stroke, chronic heart failure, peripheral artery disease, and kidney disease.

Sample Size

The sample sizes for the multiple regression analyses were determined by using power analysis, which is a method for reducing the risk of Type II errors, wrongly accepting false null hypotheses (Polit & Beck, 2008). The coefficient of determinant (R^2 = .13) from the earlier research, which is designed to predict the effects of illness perception on adherence to the therapeutic regimens of patients with hypertension (Chen, Tsai & Lee, 2009) —was used to calculate the effect size index (f^2) in the following formula:

$$f^2 = \left[\frac{R2}{1-R2}\right]$$

The effect size index (f^2) was 0.15. The effect size index 0.15 was plugged into the formula for multiple regressions as follows:

$$n = \left|\frac{L}{f2}\right| + k + 1$$

When; n = sample size

L = 11.8 [a value from Power Analysis Table for Multiple Regression by Polit and Beck (2008, p.623) at α = .05 and Power = 0.80]

k = number of predictors

f^2 = effect size index

Therefore, with four predictor's variables, the total sample size consisted of 85 subjects.

Research Setting

The study was conducted at Siriraj Hospital in the Primary Care Unit (PCU), a health care unit specifically responsible for patients who have health insurance under the Universal Health Care Coverage (UCS). This Social Health Protection Scheme provides health care coverage to Thai citizens around Bangkok Noi area who are neither covered by neither the Servant Medical Benefit Scheme (CSMBS) nor the Social Security Scheme (SSS). The PCU provides services, including curative services, health promotion and disease prevention services, and rehabilitation service for the patients. To access the service, patients with entitled to coverage under the UCS can come to the PCU as the first point of contact for reception of medical services. The PCU can refer patients to the Out Patient Department (OPD) for advanced care if their illness /health condition becomes serious or is of high severity. The PCU is most frequently used by the poorest segment of the population to access medical services (Sakunphanit, 2006).

In order to maintain routine tasks, the PCU has arranged for 5 to 6 general physicians and 10 registered nurses to offer services from 8.00 am to 6.00 pm, Monday through Friday. Most patients schedule medical appointments for chronic conditions. Hypertension is at the top of the list of chronic conditions that scheduled for follow-up appointments for continual monitoring and management of treatment. It was estimated that 720 hypertensive patients come for follow up care each month (Medical Statistic Record, Siriraj Hospital, 2012).

Research Instruments

The data were collected by using the following questionnaires:

1) The Demographic Data Questionnaire.

The demographic data questionnaire was developed by the researcher. It consisted of two sections:

1.1 Personal information was collected data, such as gender, age, marital status, level of education, occupation and income, etc.

1.2 Medical information was collected to provide medical data for weight, height, body mass index (BMI), blood pressure, duration of diagnosis, and prescribed medication, etc.

2) The Brief Illness Perception Questionnaires

The Brief Illness Perception Questionnaire (Brief IPQ) was developed by Broadbent, Petrie, Main, and Weiman (2006), from the Illness Perception Questionnaire – Revised (IPQ-R), which consists of eighty items and imposed a heavy time burden on patients. Brief IPQ was developed and translated into Thai by Sowattanangoon (2006). This questionnaire was designed for quick evaluation of the dimensions of cognitive representation and emotional representation of illness, based on the Self-Regulatory Model. It consists of nine items, including consequence (item 1), timeline (item 2), personal control (item 3), treatment control (item 4), identity (item 5), concern about illness (item 6), coherence (item 7), emotional response (item 8), and causal (item 9). Three of these items, consequence, personal control, and treatment control, were used in the present study.

Responses to questions item 1 (consequence), item 3 (personal control) and item 4 (treatment control), were rated by using a continuous linear scale of 0 to 10. A higher score corresponds to a higher perception in that dimension.

3) The Beliefs about Medicines Questionnaire (BMQ)

The Beliefs about Medicines Questionnaire (BMQ) was developed by Horne and Weinman (1999) based on the Common-sense of Self-Regulation Model. The BMQ consists of 10 questions, which were developed to assess patients' beliefs about the necessity of and concerns about prescribed medication. The BMQ was divided into two parts: the Beliefs about Medicine Questionnaire-Necessity (BMQ-Necessity) and Beliefs about Medicines Questionnaire-Concern (BMQ-Concern), which are defined been explained as follows:

1) BMQ-Necessity is designed to evaluate the patients' belief in the necessity of prescribed medications. BMQ-Necessity is the first part of the BMQ. It consists of five questions, in which the sample responds to statements using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Range	Meaning
Strongly disagree	perception of the sample was mostly inconsistent with the statement given.
Disagree	perception of the sample was inconsistent with the statement given.
Uncertain	perception of the sample was ambiguous, regarding the statement given.
Agree	perception of the sample was mostly consistent with the statement given.
Strongly agree	perception of the sample was totally consistent with the statement given.

The BMQ-Necessity score ranges from 5 to 25. A higher score indicated a stronger belief in the necessity of medications.

2) BMQ-Concern is designed to evaluate concerns about any negative consequence of taking prescribed medications, e.g., side effects, long-tern dangers, addiction, dependence, etc. BMQ-Concern is second part of the BMQ. It consists of five questions, answered using a 5-point Likert score, ranging from 1 (strongly disagree) to 5 (strongly agree).

Range	Meaning
Strongly disagree	perception of the sample was mostly inconsistent with the statement given.
Disagree	perception of the sample was inconsistent with the statement given.
Uncertain	perception of the sample was ambiguous, regarding the statement given.
Agree	perception of the sample was mostly consistent with the statement given
Strongly agree	perception of the sample was totally consistent with the statement given

The BMQ-Concern score ranged from 5 to 25. A higher score indicated a stronger belief of concern about medication.

Previously, BMQ had been translated into Thai by Rujisatian (2009) and used to measure medications beliefs regarding use in the patient with type 2 diabetes. In this study, the BMQ- Necessity and BMQ-Concern questionnaires were modified to assess medication beliefs in the context of hypertension.

4) The eight-item medication adherence scale (8-item MMAS)

The 8-item MMAS was developed by Morisky (2008). This questionnaire was used to predict medication adherence in patients with primary hypertension (Morisky, Ang, Krousel-Wood & Ward, 2008). The 8-item MMAS was translated into Thai by the researcher. The questionnaire consists of eight items. The first seven items of 8-item MMAS are opened-end questions. Question numbers 1, 2, 3, 4, 6 and 7 are negative questions (n=1), while question number 5 is a positive question (yes=1).

The last item requires a response of frequency to the question, "How often do you have difficulty remembering to take all your blood pressure medication?" The answer divided into 5 levels of response, as follows:

Level of Frequency	Scoring
Never	1.00
Rarely	0.75
Sometimes	0.50
Often	0.25
Always	0.00

The total score of 8-item MMAS was figured by calculating the scale of all items. Thus, the total scale ranged from 0 to 8 points (Morisky, Ang, Krousel-Wood, & Ward, 2008), which can be interpreted as follows.

Total Score	Meaning
< 6	Low Adherence
6 - <8	Medium Adherence
8	High Adherence

Psychometric properties of the Instruments

Validity of instruments

Content validity was checked by three evaluators; a medical doctor, a nursing teacher, and a nurse case manager in DM and HT. The instruments evaluated included the Beliefs about Medicines Questionnaire (BMQ) and the eight-item medication adherence scale (8-item MMAS), submitted to assess the content validity of the instruments. The content validity index (CVI) for each questionnaire was figured at 0.8 and 0.75, respectively. Afterwards, the opinions and recommendations provided by the experts were reviewed and applied to improve the validity of instruments prior to implementation.

Reliability of instruments

After checking for content validity, reliability was checked by testing 30 individuals with hypertension, who had the same characteristics as the sample in the Primary Care Unit. The Cronbach's alpha coefficient of Illness perception questionnaires, BMQ-Necessity, BMQ-Concern, and MMAS were 0.85, 0.72, 0.70, and 0.75, respectively.

Protection of the Human Rights

Prior to data collection, the research proposal was submitted for approval to the Ethics Committee of Siriraj Hospital, Mahidol University. After permission was granted, the researcher started to collect the required data at the Primary Care Unit, Siriraj Hospital. At this time, the participants were informed of both the objectives and procedures of data collection in regards to the principles of individuality, and the benefits and risks of being a subject. An informed consent agreement was presented for patients to sign if they understood and felt free to participate in the study.

Participants were informed of their right to refuse or withdraw from the study at any time, if they wished. This decision would not affect the standard treatment they would receive from the healthcare providers. Lastly, the participants were assured

that their information would be kept completely confidential and reported only as group information.

Data Collection

When permission had been granted for data collection, the researcher was introduced to the head nurse of the Primary Care Unit (PCU). The researcher explained the details about objectives and the process of data collection to the head nurse, requesting their assistance and cooperation in data collection. The data collection was conducted using the following steps;

1) The day prior to data collection; the researcher went to the Primary Care Unit to access the computer database to review the list of hypertensive patients, who had been scheduled for a medical appointment with the doctor within the next day.

2) The day of data collection; the researcher met staff nurses at the screening station, explaining to them the inclusion criteria of the study. Staff nurses were asked for their cooperation in screening potential subjects.

3) Potential participants were invited to meet with the researcher, who self-introduced, described the research's purpose, explained about the procedure of data collection and estimated time requirements. This step was undertaken before the scheduled medical appointment with physician. An informed consent agreement was provided for patients, who are willingness to participate in the study, to sign. The researcher explained each of the three questionnaires to the patients sequentially including demographic data, Brief Illness Perception Questionnaire (Brief IPQ), Belief about Medication Questionnaire (BMQ), and 8-item Morisky Medication Adherence Scale (MMAS 8-items). Before the patients were asked to complete the questionnaires, the researcher was careful to avoid interfering with patients' scheduled appointment for that day.

4) The researcher was present with the participants while they completed the questionnaires. The questions were read aloud by the researcher when participants had trouble with reading and comprehension. The time required to complete the questionnaire were around 30 to 45 minutes, for each person. Upon completion, the researcher thanked each participant for their cooperation in the study.

5) The process of data collection was repeated until the required sample size was reached.

6) The data obtained were analyzed by using a statistical analysis and represented as a whole picture.

Data Analysis

Data were analyzed by using statistical analyses as follows.

1) Demographic data. Personal and clinical information was analyzed using descriptive statistics including frequency, percentage, min-max, mean and standard deviation.

2) Medication adherence, illness perception and beliefs regarding medication use, were analyzed by using mean and standard deviation.

3) Multiple regression analysis (MRA) was developed, using an Enter method to identify the influence of independent factors on medication adherence after meeting the criteria of basic assumptions.

CHAPTER IV
RESULTS

A prospective, descriptive research study was designed to explore the influence of illness perception and medication beliefs on medication adherence in hypertensive patients, who came for a medical appointment at the Primary Care Unit, Siriraj Hospital from March to May, 2013. The sample was comprised of 85 hypertensive patients. The findings were presented in two parts as the following: 1) description of sample, and 2) the influence of illness perception and medication beliefs on medication adherence in hypertensive patients without complications.

Part I: Demographic Characteristics of Sample

1. Demographic characteristics

The participants consisted of more females (74%) than males (26%) and the average age of the participants was 63 years old (SD=8.9). The majority of the participants were aged at 60 years old or greater (64.71%). Most of participants were married (38%) and had had a primary school education (54%). The majority of the patients were housekeepers or unemployed (43%) and vendor (33%). Forty-three percent had monthly incomes between 5,000 to 10,000 baht, whereas another 40% had income less than 5,000 baht of per month **(Table 4.1)**

Table 4.1 Demographic Characteristics of participants (n=85).

Characteristics	Frequency	%
Gender		
Female	63	74
Male	22	26
Age		
18-35	0	0.00
36 - 59	30	35.29
≥ 60	55	64.71
Min = 45, Max = 81, Mean = 62.91, SD = ±8.90		
Marriage status		
Single	19	22.35
Married	32	37.65
Divorce	19	22.35
Widow	15	17.00
Education		
Illiterate	4	4.71
Primary school	43	50.59
Secondary school	24	28.24
Bachelor degree	14	16.47
Occupation		
Housekeeper/unemployed	37	43.53
Vendor	28	32.94
Handyman	6	7.06
Employee	6	7.06
Other (e.g. agriculture, retired)	8	9.42
Income (THB/month)		
≤ 5,000	34	40.00
5,001 - 10,000	37	43.53
10,001 - 15,000	6	7.06
>15,000	8	9.41
Min = 2,000, Max = 35,000, Mean = 8,630, SD = ±6,904		

2. Clinical data

Table 3 shows the clinical data of the sample group, including body mass index (BMI), blood pressure level, duration of disease and treatment, and formula of prescription. The range of body mass index (BMI) was 17.5 to 36.9 kg/m^2 with a mean of 26.3 kg/m^2 (SD=4.1). More female participants than males had BMIs of greater than 25 kg/m^2. More than half (55%) had been diagnosed with hypertension for more than 5 years (mean=6.8), which is similar to the duration of treatments (mean=6.53). The number of participants who could not maintain a blood pressure level below 140/90 mmHg in the last visit (n=48, 56.74%), was higher than in the visit before last (n=33, 38.82%).

Most of the participants were prescribed combination therapy (n=52, 61%). Most of the participants (n= 64, 75.29%) took medication once daily, averaging 2.00 tablets per person, per day, of anti-hypertensive drugs.

Table 4.2. Clinical Characteristics of participants (n=85)

Clinical Data	**Frequency**	**%**
Body Mass Index (kg/m^2)		
Min = 17.50, Max = 36.90, Mean = 26.87, SD = ±4.31		
Body Mass Index (kg/m^2) of female		
< 18.50	1	1.59
18.50 - 24.99	18	28.57
25.00 - 29.99	32	50.79
≥ 30.00	12	19.05
Min = 17.53, Max = 36.98, Mean = 26.87, SD = ±4.31		
Body Mass Index (kg/m^2) of male		
< 18.50	0	0.00
18.50 - 24.99	13	59.09
25.00 - 29.99	7	31.82
≥ 30.00	2	9.09
Min = 20.35 , Max = 31.26, Mean = 24.85, SD = ±3.05		

Table 4.2 Clinical Characteristics of participants (n=85) (cont.)

Clinical Data	Frequency	%
Present Blood Pressure (mmHg)		
< 120/80	23	27.06
120-139 and/or 80-89	14	16.47
140-159 and/or 90-99	34	40.00
160-179 and/or 100-109	14	16.47
SBP; Min = 93, Max = 179, Mean = 140.76, SD = ± 17.65		
DBP; Min = 58, Max = 102, Mean = 77.74, SD = ± 10.71		
Last Blood Pressure (mmHg)		
< 120/80	9	10.59
120-139 and/or 80-89	43	50.59
140-159 and/or 90-99	22	25.88
160-179 and/or 100-109	11	12.94
SBP; Min = 102, Max = 179, Mean = 136.89, SD = ± 16.19		
DBP; Min = 53, Max = 118, Mean = 77.68, SD = ± 10.15		
Duration of Disease (year)		
<5	30	35.29
5-10	47	55.29
≥ 11	8	9.41
Min =1, Max =30, Mean = 6.76, SD = ±5.26		
Duration of Treatment (year)		
<5	30	35.29
5-10	48	56.47
≥ 11	8	8.23
Min =1, Max =30, Mean = 6.53, SD = ±5.26		
Formula of Prescription		
Mono-therapy	33	38.82
Combination Therapy	52	61.18

Table 4.2 Clinical Characteristics of participants (n=85) (cont).

Clinical Data	Frequency	%
Daily dose of anti-hypertensive medication		
Once per day	64	75.29
Twice per day	16	18.82
Three times per day	5	5.58
Min =1, Max =30, Mean = 6.76, SD = ±5.26		
Number of anti-hypertensive drugs		
1	33	38.82
2	35	41.18
3	12	14.12
4	5	5.88
Min= 1, Max = 4, Mean = 2 , SD = ± 0.87		

3. Illness perception

Table 4.3 shows the descriptive statistics of the participants' illness perceptions, specifically, perceptions of consequence and control.

The consequence scale ranged from 0 to 10, with a mean of 2.89 (SD = 2.71). This indicates that most of the participants perceived that hypertension had a small impact on their lifestyles.

The control scale ranged from 3 to 10, with a mean of 6.70 (SD=1.93). The personal control scale ranged from 1 to 10, with a mean of 5.98 (SD=2.50), which was lower than the treatment control scale ranged from 1 to 10, with a mean of 7.45 (SD=2.02). This indicated that most of the participants perceived that hypertension could be moderately well controlled by themselves and well controlled by treatments, respectively.

Table 4.3 Descriptive Statistic of Illness perceptions about hypertension in terms of Consequence and Control (n=85).

Variables	Range		Mean	SD
	Normal	Actual		
Consequence	0 - 10	0 - 10	2.89	2.71
Control	0 - 10	3 - 10	6.70	1.93
- Personal control	0 - 10	1 - 10	5.98	2.50
- Treatment control	0 - 10	3 - 10	7.45	2.02

4. Medication beliefs

Table 4.4 shows the frequencies, means, and standard deviations of response scores regarding patients' belief in the necessity of anti-hypertensive medications. 88% (n=75) of participants reported they "agree" that anti-hypertensive drugs could protect them from becoming worse. 64% (n=55) and 67% (n=57), respectively, agreed that their health in the present and in the future is dependent upon antihypertensive medication. The scoring results regarding patients' beliefs in the necessity of antihypertensive medications ranged from 12 to 23, out of 25, with a mean of 17.41 (SD=2.62).

Table 4.4 Frequencies, mean and standard deviation of belief about necessity of medications (n=85).

Question items	Frequency (%)				
	Strongly Disagree	**Disagree**	**Un-certain**	**Agree**	**Strongly Agree**
1. My health, at present, depends on my medicines.	1 (1.18%)	13 (15.29%)	14 (16.47%)	55 (64.71%)	2 (2.35%)
2. My life would be impossible without my medicines.	1 (1.18%)	33 (38.82%)	16 (18.82%)	34 40.00%)	1 (1.18%)
3. Without my medicines I would become very ill.	0 (0.00%)	15 (17.56%)	20 (23.58%)	48 (56.47%)	2 (2.35%)
4. My health in the future will depend on my medicines.	0 (0.00%)	10 (11.76%)	17 (23.53%)	57 (67.06%)	1 (1.18%)
5. My medicines protect me from becoming worse.	0 (0.00%)	2 (2.35%)	7 (8.24%)	75 (88.27%)	1 (1.18%)
Normal range = 5-25, Actual range = 12-23, Mean = 17.41, SD = ±2.62					

Table 4.5 shows the frequencies, means, and standard deviations of responses regarding respondents' concerns about anti-hypertensive medications. 82.35% (n=70) of participants reported they "disagree" that medicines are disrupting their lives. Seventy-six percent of participants (n=65) also responded that they– "disagree" that having to take medicine worries them. Conversely, almost half of the participants reported they "agree" that medicines are a mystery to them and that they are sometimes worried about the long-term effects of antihypertensive medications. Respondents scores regarding concerns about anti-hypertensive medications ranged from 8 to 20 out of 25, with a mean of 13.59 (SD=2.74).

Table 4.5. Frequencies of Concern about antihypertensive medications (n=85).

Question items	Frequency (%)				
	Strongly Disagree	**Disagree**	**Un-certain**	**Agree**	**Strongly Agree**
6. Having to take medicines worries me.	2 (2.35%)	65 (76.47%)	8 (9.41%)	10 (11.76%)	0 (0.00%)
7. I sometimes worry about the long-term effects of my medicines.	0 (0.00%)	34 (40.00%)	11 (12.94%)	39 (45.88%)	1 (1.18%)
8. My medicines are a mystery to me.	0 (0.00%)	27 (31.36%)	16 (18.82%)	39 (45.88%)	3 (3.53%)
9. My medicines disrupt my life.	2 (2.35%)	70 (82.35%)	2 (2.35%)	10 (11.76%)	1 (1.18%)
10. I sometimes worry about becoming too dependent on my medicines.	2 (2.35%)	46 (54.12%)	13 (15.29%)	22 (25.88%)	2 (2.35%)
Normal range = 5-25, Actual range = 8-25, Mean = 13.59, SD = ± 2.74					

5. Medication adherence

Table 4.6 shows frequencies, means, and standard deviations of response regarding participants' medication adherence. 87.06% (n=74) of participants did not feel that sticking to their blood pressure treatment plans was a problem. Eighty-three percent (n=71) of participants never cut back or stopped taking medication without telling their physician. However, seventy-four percent (n=63), and thirty-six percent (n=31) of participants reported that they sometimes forgot to take anti-hypertensive drugs and forgot to bring medications along with them when they were traveling or leaving home. One- fourth of participants (n=22) still reported that they sometimes stopped taking medications when they felt that their blood pressure was under control.

Table4.6. Frequencies of Medication Adherence questionnaires in each item (n=85).

Items	**Frequency (%)**	
	Yes	**No**
1. Do you sometimes forget to take your high blood pressure pills?	63 (74.12%)	22 (25.88%)
2. Over the past two weeks, were there any days when you did not take your high blood pressure medicine?	34 (40.00%)	51 (60.00%)
3. Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?	14 (16.47%)	71 (83.53%)
4. When you travel or leave home, do you sometimes forget to bring along your medications?	31 (36.47%)	54 (63.53%)
5. Did you take your high blood pressure medicine yesterday?	80 (94.12%)	5 (5.88%)
6. When you feel like your blood pressure is under control, do you sometimes stop taking your medicine?	22 (25.88%)	63 (74.12%)
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?	11 (12.94%)	74 (87.06%)
8. How often do you have difficulty remembering to take all your blood pressure medication?		
Never (72)	84.71%	
Rarely (n= 10)	11.76%	
Sometime (n= 1)	1.18%	
Usually (n=0)	0.00%	
Always (n=2)	2.36%	

Table 4.7 presents the frequencies and percentages of responses regarding participants' medication adherence. The MMAS score of participants ranged from 1 to 8, with a mean of 5.92 (SD=1.71). Forty-three percent (n=37) of participants reported medium adherence and 36.47% (n=31) reported low adherence (MMAS<6). Only

21.18% of the participants in this study reported study that were high adherence (MMAS=8).

Table 4.7. Frequency of 8-item Morisky Medication Adherence Scale (8-item MMAS) in Hypertensive patients (n=85).

MMAS 8-itens Score	Frequency	%
<6 (Low adherence)	31	36.47
6 - <8 (Medium adherence)	37	43.53
8 (High adherence)	17	20.00
Normal range = 0-8, Actual range = 2-8 , Mean = 5.92, SD = 1.71		

Table 4.8 shows the correlation between the independent variables, consequence, control, belief in necessity, and concerns about medication and a dependent variable, medication adherence. The results shows that beliefs in necessity had a significantly positive relationship with medication adherence ($r=.215$, $p<.05$), while, concerns about medication had a significantly negative relationship with medication adherence ($r= -.397$, $p<.01$).

Table 4.8. The correlation coefficient among independent variables and dependent variable (n=85).

Variables	1	2	3	4	5
1. Consequence	1.000				
2. Control	.069	1.000			
3. Belief about Necessity	.147	.141	1.000		
4. Concern about medication	.140	-.197	-.370**	1.000	
5. Medication adherence	-.078	-.001	.215*	-.397**	1.000

*p<.05, **p<.01

Part II. The influence on medication adherence in hypertensive patients

Table 4.9 shows that consequence, control, belief in necessity, and concerns about medication explained only 17 percent (R^2=0.172) of the variance in the participants' medication adherence. Concern about medication was the only independent variable that had significant influence on medication adherence (beta = -.374; t= -3.291; p<.001) in hypertensive patients without complications. The, variables consequence, control, and belief in necessity did not have significant influent on medication adherence.

Table 4.9 Multiple regression analysis of the variables studied on medication adherence.

Variables	B	SE	β	t	p- value
Constant	8.711	1.599		4.322	0.000
Consequence	-.021	.067	-.033	-.315	.753
Control	-.098	.119	-.086	-.823	.413
Beliefs of Necessity	.061	.073	.094	.834	.407
Concern of Medication	-.234	.071	-.374	-3.291	.001**

R= .414; R^2.172; Adjust R^2 =.130; F= 4.140; *p-value* < .004

**p < .01

CHAPTER V
DISCUSSION

This chapter presents discussion of the findings which is divided into four parts as follows:

I. The characteristics of the study sample

II. Medication adherence in essential hypertensive patients without complications

III. The perceptions of consequence, control, as well as medication beliefs in essential hypertensive patients without complications

IV. The influence of illness perceptions in terms of consequence and control, as well as medication beliefs on medication adherence in essential hypertensive patients without complications

Part I: Characteristics of the sample

Demographic characteristics

The participants in this study consisted of 85 persons with hypertension. Almost two-thirds of the participants (65%) were in their late adulthood (mean age = 62.91, SD=8.90). This is congruent with a study of Prakobchai (2010) which found that high prevalence of hypertension was found in Thai people who are between 56 and 65 years old. This finding was also consistent with a study conducted by Chen, Tsai, & Lee (2008) which had found that the prevalence of hypertension among the Taiwanese was high in people who were around 66 years old. Similarly, the Seventh Report of the Joint National Committee on Prevention, Detection: JNC 7 (2003) has also documented that the prevalence of hypertension increases with advancing age. It has been estimated that more than half of the people who are between 60 and 69 years old and approximately three-fourths of those who are 70 years old and older are

affected by hypertension. One possible explanations of a high prevalence rate of hypertension in elderly persons is vascular-aging degeneration such as increase in media : lumen diameter ratio of small arteries (Heagerty, 2007; Schiffrin, 2012), as well as increasing damage of vascular endothelial layer resulting in endothelial dysfunction (Vanhoutte, 2009). These degenerations can lead to an increase in peripheral vascular resistance in elderly persons, hence high blood pressure levels.

In this study, there were more female (74%) than male (26%) participants. This finding was also consistent with a survey conducted by Bureau of Health Policy and Strategy (2008), which has discovered that the prevalence of hypertension was higher in female (35.7%) than in male population (26.7%). This could be explained that, in women, who are from 56 to 65 years old, the estrogen hormone level is diminished, which is known as the "post-menopausal" period. In fact, estrogen has engaged in several mechanisms that protect against hypertension, such as activation of the vasodilator pathway mediated by nitric oxide and prostacyclin as well as inhibition of the vasoconstrictor pathway mediated by the sympathetic nervous system and angiotensin (Ashraf & Vongpatanasin, 2006). Therefore, a decreasing estrogen level can be a possible reason of higher prevalence of hypertension among female participants in this study.

With regard to educational background, 54% of the participants in this study finished primary education and 40% had a monthly income less than 5,000 Baht (mean=8,630 Bath). Such findings were not consistent with the finding of a study conducted in the setting of Out-patient Departments (OPDs) which and found that most patients graduated from a secondary school and received an average income of 14,079 Baht per month (Prakobchai, 2010). In contrast, the present study was conducted at a Primary Care Unit (PCU), which provides medical cares for patients who receive a welfare from the government called "universal coverage," which is normally reserved for the people who are poorly educated, unemployed, and retired (Sakunphanit, 2006). Therefore, when considering the setting, it was not surprising that most of the participants in this study were poor and were not highly educated.

Clinical information

The body mass index (BMI) of the participants in this study ranged from 17.5 to 36.9 kg/m^2 with the mean of 26.87 kg/m^2 (SD=4.3). Female participants had average BMI at 26.87 kg/m^2, greater than that of male participants (mean=24.85kg/m^2). This finding was consistent with findings of previous studies, which had reported that the prevalence of overweight and obesity in Thai older adults was found to be higher in females compared with males, particularly in urban areas (Nattinee, 2008). The present findings indicated that both female and male tend to be overweight and obese. This may have because people who are living in an urban area usually have more sedentary lifestyle, less physical activities, and frequently changes in their dietary patterns, which might account for the obesity trend in urban residents (Nattinee, 2008). However, transition times such as menopause, when females' body is going to undergo deleterious changes in inflammatory markers, adipokines (Lee et al., 2009), and estrogen levels (Lee et al., 2009; Pallottini, Bulzomi, Galluzzo, Martini, & Marino, 2008) may make females are more susceptible to be overweight compared with males.

Regarding the duration of hypertension, 53.29% of the participants had been diagnosed with hypertension for five to ten years (mean=6.76, SD=5.26). This could be explained that the present study was conducted with hypertensive patients who had currently been diagnosed with hypertension but were still free from hypertension-related complications. Similarly, the duration of pharmacological treatments was 6.5 years on average. This may have been because, after hypertension was detected, most participants may have been unsuccessful in achieving optimal blood pressure by lifestyle modifications. This may have been due to the fact that lifestyle modifications may have lower efficacy in lowering blood pressure levels compared with antihypertensive medications (Gibson, Fritz, & Kachur, 2009). In addition, the factors such as advance aging and overweight also made blood pressure become difficult to control (Buranakitjaroen, 2011) by lifestyle modification only. Therefore, antihypertensive drugs were prescribed immediately after hypertension is diagnosed, which was consistent with a treatment guideline of hypertension by the Thai Guideline on the Treatment of Hypertension (2012), which indicated that hypertensive patients with a mild to moderate level of blood pressure have to start

antihypertensive mediations if they could not achieve blood pressure control (≤ 140/90 mmHg) after starting lifestyle modifications for two to three months.

Regarding drugs administration, the study found that 61.18% of the participants received combination therapy, and 75.29% of those were prescribed with a once-daily dose. One plausible explanation is that prescribing antihypertensive medication as a combination therapy can reduce adverse effects of maximum doses of monotherapy (Law, Wald, Morris, & Jordan, 2003). On the other hand, prescribing a once-daily dose may help to improve medication adherence because it causes less burden and is more convenient for the patients. Likewise, a systematic review by Coleman et al. (2008) has indicated that the patients with chronic diseases appear to have more adherences with once-daily medication when they are compared to patients with more frequently scheduled medication regimens. However, this relationship could not be confirmed by the present findings. This is because, it was found that medication adherence scores were still considered to be low (mean=5.92, SD=1.71) even when the medications were prescribed as a one-daily dose.

In terms of blood pressure, although 65% of the participants in this study were using combination therapy to control blood pressure, more than half of them, or 56%, continued to have blood pressure levels greater than 140/90 mmHg, which was considered uncontrollable in persons with hypertension without complications (Thai Guidelines on the Treatment of Hypertension Update, 2012). In addition, 16% of the participants had blood pressure in a high normal range (120/80 to 130/89 mmHg), which meant they were at risk of developing hypertensive-related complications (Chobanian et al., 2003), even when most of them were prescribed with two different types of antihypertensive medications. This may have been possible due to aging-related factors accompanied with low medication adherence. All of these factors may have led to the reduction in the effectiveness of treatments. Consequently, more than half of the participants in this study may have been at risk of developing hypertensive-related complications. This is due to the fact that it was found that blood pressure values between 130/85 and 139/89 mmHg were associated with a more than twofold increase in relative risk from cardiovascular disease (CVD) (Chobanian et al., 2003).

Part II: Medication adherence in essential hypertensive patients without complications

Medication adherence refers to the appropriate use of antihypertensive regimens according to the time, dosage, and frequency, which are indicated on the label. In this study, medication adherence scores ranged from 2 to 8 points, with the mean of 5.92 points (SD=1.71), which was regarded as low according to the cut-off point of the 8-item Morisky Medication Adherence Scale. This indicated that most patients in this study seemed to lack adherence to antihypertensive medications, which may be associated with two aspects: unintentional and intentional aspects. As for unintentional aspect, the results of this study indicated that 74.12% of the participants reported that "they sometime forget to take antihypertensive drugs," and 36.47% "forget to bring medications along when leaving home or travelling". One possible reason is cognitive decline, resulting from two causes: advanced age and pathogenesis of hypertension. These may place the patients are susceptible to be forgetfulness (Salthouse, 2009). Such findings were consistent with most previous studies which found that forgetfulness was often reported as a barrier of taking medication in the older adult patients (Chambers et al., 2011; Gregoire, Moisan, Guibert, Ciampi, & Milot, 2006; Nair et al., 2011).

In addition, some of the participants in this study held negative views about medication and hence tended to forget taking their medication. This is because the evidence had indicated that the people were more likely to forget to take medication if they had a negative attitude towards medication (Schüz et al., 2011). Both factors could be possible reasons for unintentional non-adherence in this study.

With regard to the intentional aspect, it was surprising that approximately one-fourth, or 25.88%, of the participants reported that they had stopped taking medication when they felt that their blood pressure was under control. The possible season is when no symptoms are noticed, people tend to believe that they are free from hypertension and therefore it is not necessary for them to continue the treatment (Kirdphon, 2003). Furthermore, the present study also found that 16.47% of the participants still reported cutting back or stopping intake medication because they felt worse when they took it. Such a finding yielded to the concept proposed by Horne

(1997), which indicates that perceived side effects of medication were associated with lower rates of self-reported medication adherence.

The findings regarding intentional non-adherence of the present study were inconsistent with the finding reported by Ross et al. (2004), which found that most hypertensive patients had good medication adherence. One possible explanation is the difference between demographic characteristics of the study samples. Ross and colleagues conducted a study with hypertensive patients who had similar age (mean age=60, SD=12.16) to those in the present study (mean age=60, SD=8.90). However, about half of the patients in Ross's study had medical histories of co-morbidities such as ischemic heart disease, cerebrovascular disease, peripheral vascular disease, or diabetes mellitus, which inevitably led to complexity of treatments. In this circumstance, the patients who were more seriously ill might have perceived a higher risk of complications if they did not take their medications as prescribed. In other words, higher disease severity is associated with high motivation in taking medications, thus resulting in higher medication adherence (Hughes, 2004). Moreover, taking a large number of antihypertensive medications together with numerous tablets for co-morbidities may have forced a higher level of attention to medication-taking routine in the patients in Ross' study, resulting in fewer missed doses (Shalansky & Levy, 2002).

However, when considering number of participants who had medication adherence scores higher more than 6 points (n=64, or 63.53%), it coulde be concluded that the majority of the participants in this study may have had a moderate to high level of medication adherence. On the other hand, only 36.47 % (n=31) of the participants had medication adherence scores lower than 6. However, to calculate the mean value, these scores also had to be used. Therefore, medication adherence in this study seemed to be low according to the cut-off point of 8- item Morisky Medication Adherence Scale, which had been associated with both intentional and unintentional behaviors.

Part III: Perceptions of consequence, control, and beliefs about antihypertensive medications in essential hypertensive patients without complications

Perception of consequence

Perception of consequence refers to patients' view toward the impacts of hypertension on their lifestyle such as physical activity, family, finances, and economic. In this study, the perceived consequence scale scores ranged from 0 to 10 points, with the mean of 2.89 points (SD=2.71), which indicated that most participants perceived that hypertension rarely had impacts on their lives. This could be explained that the present study was conducted with the patients who were diagnosed with hypertension for more than five years, when complications had not yet developed, with currently physically asymptomatic or with on warning signs of hypertension. This may have made the hypertensive patients perceived that the disease did not influence their lifestyle and was not an issue of concern compared to other health conditions (Samranbua, 2011). These findings were consistent with previous studies which found that hypertensive patients usually perceived that hypertension had low impacts on their lives (mean scores ranging from 2.50 to 2.69) (Chen et al., 2009; Ross et al., 2004). Likewise, a qualitative study carried out by Kirdporn (2003) indicated that many hypertensive patients usually perceived and evaluated the impacts of a disease through its signs and symptoms.

Perception of control

Perception of control refers to patients' view toward personal (e.g. diet control, exercise, emotional control, etc.) and treatments to control blood pressure. In this study, scores of control ranged from 3 to 10 points with the mean sore of 6.67 points (SD=1.91). As for each aspect of control, the treatment control had the mean score of 7.45 points (SD=2.02), which was greater than that of the personal control aspect at 5.40 points (SD=2.50). These finding indicated that most participants in this study slightly perceived that hypertension could be controlled by treatments rather than individuals' ability. One possible explanation is that the participants might have

perceived that antihypertensive medication had a high magnitude of therapeutic effects because it could make the blood pressure level go down in a short time compared with lifestyle modifications. This is consistent with a study that found a good adherence for antihypertensive medications for seven days could decrease systolic blood pressure level between 12 and 15, and diastolic blood pressure between 7 and 9 mmHg (Lynch et al., 2012), whereas two months of lifestyle interventions such as improved diet, aerobic exercise, alcohol, and sodium restriction could decrease systolic blood pressure between 3.8 and 6.0 and diastolic blood pressure between 2.5 and 5.0 mmHg (Dickinson et al., 2006).

In addition, all participants in the present study remained free from hypertensive-related complications, having few symptoms e.g. headache, visual change, palpitation, etc. These may have made the participants perceive or evaluate their condition as being well controlled or turning to normal. Likewise, a qualitative study carried out by Kirdporn (2003) had indicated that many hypertensive patients used detection of symptoms as an indicator to determine the effectiveness of treatment and disease's control.

Beliefs about necessity

Beliefs about necessity are the perception of personal needs of medication in maintenance of patients' condition. In this study, beliefs about necessity scores ranged from 12 to 23 out of the total of 25 points (mean=17.41, SD=2.62), which indicated that most participants in this study were likely to have a high level of belief about necessity of antihypertensive drugs in maintaining hypertension. This was evidence from the fact 88% of the participants believed that medicines prevented their condition from becoming worse and 67% believed that their health in the future would depend on medicines. Such finding lent support the model proposed by Horne (1997) which indicate that patients not only form their own views about the illness but also the necessity of treatments they have received. Similarly, previous studies found that necessity scores ranged between 18.4 and 19.7 points (Ross et al., 2004; Rupar et al., 2012). However, co-morbidities and/or hypertensive-related complications in those previous studies might have made the patients perceive a slightly higher level of necessity of medications compared to that found in the present study, where

hypertension was mostly uncomplicated and asymptomatic. Therefore, the patients may have interpreted their condition as more benign than it actually was, and then perceived a slightly different level of belief about the necessity of medication.

Concerns about medication

Concerns about medication are a negative belief about medication such as side effects, or substance accumulation particularly in the patients with chronic conditions. In this study, scores of concern about medication ranged from 8 to 20 out of 25 point (mean=13.59, SD=2.74), which indicated that the participants seemed to believe that antihypertensive medicines caused negative effects. However, 49.31% of the participants agreed that they did not have much understanding or knowledge about antihypertensive medications, and 12.94% were unsure that they had enough knowledge or understanding about antihypertensive medication. Additionally, 47.06% of the participants agreed that antihypertensive medications made them worry about the long-term effects such as kidney dysfunctions or liver damages, whereas 18.82% were uncertain about long-term effects of the medication. Moreover, some patients also reported adverse effects after taking antihypertensive medications, e.g. dizziness, coughing, increased urination, etc., while experience with symptoms of hypertension was rarely reported. As such, the patients may have thought that living with side effects of medications would be more interruptive than actual physical symptoms of hypertension, hence development of negative beliefs about medications. Such findings were consistent with the findings of previous studies which had reported that most patients believed that living with the medications' adverse effects was more physically debilitating than living with symptoms caused by hypertension itself (Lewis, Askie, Randleman, & Shelton-Dunston, 2010; Li, Kuo, Hwang, & Hsu, 2012).

Part IV: The influence of perceptions of consequence and control as well as medication beliefs on medication adherence among essential hypertensive patients.

Multiple regression analysis revealed that the independent variables of consequence, control, beliefs about necessity, and concern about medication could explain the variance of medication adherence in hypertensive patients without complications by 17% (R^2=0.172, F=4.140). Concern about medication was only one independent variable, which had an influence on medication adherence with statistical significance (beta = -0.374; $p < 0.01$), whereas the independent variables of consequence, control, and beliefs about necessity did not statistically have an influence on medication adherence. Therefore, the findings partially supported the study hypothesis. Such findings could be explained as follows.

Concern about medication

In this study, concern about medication could explain medication adherence with statistical significance (β = 0-.374; p 0<.001), which could be interpreted that hypertensive patients without complications who were strongly concerned about antihypertensive drugs lack adherence to medication.

The findings of this study were consistent with the findings of previous studies which were carried out with diabetic patients and found that poor adherence to anti-hyperglycemic drugs in the patients was significantly associated with worrying about side effects of hypoglycemic medications (Mann, 2009; Rujisatian, 2009). As for patients with hypertension, a study by Ross et al., (2004) has also indicated that patients who had high specific-concern about antihypertensive drugs were less likely to have medication adherence (OR 0.6, P = 0.028). In this study, almost half of hypertensive patients were diagnosed with hypertensive-related complications or co-morbidities. Consequently, they needed to take multiple medications, which caused them to be worried about the negative impacts of medications. Furthermore, the patients with high specific-concern about medications tended to lack adherence to medications. However, the aspects that the participants in the present study used to be worried about medications are possibly different. In this study, although the

participants had no complications and took fewer medications (mean = 2, SD = ±.87), when they were compared with patients in a previous study by Ross et al. (2004), it was noted that nearly half of the participants in the present study (49.41%) reported that medication was a mystery to them and made them worry about its long-term effects (47.06%). This may have possibly been related to the demographic characteristics of the population in this study, as most of them were in their late adulthood (mean=62.91, SD=8.90) with poor educational background. These may have be a barrier in developing appropriate understanding about the negative effects of medication. Therefore, the participants might have believed that living with the medications' adverse effects was more physically debilitating than having to live with the symptom of hypertension (Lewis, et al., 2010). This then resulted in maladaptive coping by discontinuing medications (Hagger & Orbell, 2003). Likewise, a study by Gregiore (2002) found that individuals seemed to be two times more likely to discontinue their initial medication if they held negative concerns about medication.

However, according to the findings of the present study, other independent variables including belief about necessity, consequence, and control did not significantly have an influence on medication adherence in hypertensive patients without complications. Such findings could be explained as follows.

Belief about necessity

The variable of belief about necessity (mean=17.41, SD=2.62) did not statistically significantly explain medication adherence in this study, which meant that the perception of personal needs of antihypertensive medications did not influence medication adherence in hypertensive patients without complications. One possible reason is due to the fact that the present study was conducted with hypertensive patients who did not have complications or co-morbidities. Furthermore, hypertensive symptoms were mild and unobvious. As such, the patients might have been uncertain about the necessity of medications for their condition, resulting in less belief about the necessity of medication. This was consistent with the Treatment beliefs and Self-Regulation Model that indicated "at one level, symptoms may stimulate medication use by reinforcing beliefs about it necessity. Conversely, the absence of severe symptoms might cause one to interpret their condition as benign, and hence to doubt in

the need of treatment" (Laventhal, 2003: p.145). This finding,, however, was incongruent with previous studies that investigated medication adherence among patient with general chronic diseases (Horne & Weimann, 1999; Broadent, 2011; Schüz et al., 2010) and patients with hypertension in particular (Ross, Walker, & MacLeod, 2004; Ruppar, Dobbels, & De Geest, 2012), which found that a stronger belief in the necessity of medications was related to adherence to antihypertensive medications.

As for patients with general chronic diseases, for example, Horne & Weimann (1999) found that higher necessity scores were correlated with a higher report of medication adherence in patients with asthma, cardiovascular disease, chronic renal failure, and cancer. The patients could notice the significantly different outcomes such as less dyspnea, less duration, and/ -or less intensity of chest pain, etc. after taking medications. In this context, the patients might have appraised and believed that medications had beneficial effects on their situation and then developed positive adaptation by adherence to medication.

Similar to studies conducted with patients with hypertension, a number of previous studies have indicated that patients who reported higher belief in the necessity of medication were more likely to be compliant (Ross, Walker, & MacLeod, 2004; Ruppar, Dobbels, & De Geest, 2012). This could be explained that both previous studies had been conducted with patients who had been diagnosed with hypertension for a long time (mean=11 years) and most of them reported having at least five co-morbidities and/or hypertensive-related complications. Therefore, having a long duration of hypertension and high complexities of diseases might make patients believe that they are ill, which then and leads to acceptance and positive coping. For this reason, they are more likely to take medications to maintain or correct their health (Huge, 2003).

Perception of consequence

In this study, the consequence scores were low (mean=2.89, SD=2.71), and consequently did not statistically significantly explain medication adherence. This meant that consequence could explain the variance of the medication adherence in hypertensive patients without complications in this study less than other variables. In

other words, perceiving negative impacts of hypertension did not have an influence on how well hypertensive patients without complications adhered to their anti-hypertensive medications. This finding was consistent with the finding of a study carried out by Ross et al. (2004) which found that perception of serious consequences of hypertension was low and it could not predict medication adherence. It could be explained that general characteristics of hypertension are silent and there are un-specific symptoms, so most patients can continue living their normal life and carry out daily routines just as healthy persons do, particularly when the complications have not developed yet. These factors may have contributed to lower perception about the impacts of hypertension on their lives, which in turn, did not stimulate patients' responsibility for their own health. This indicated that hypertensive patients without complications may have perceived hypertension as having less or even no health risks. Therefore, they did not need to act or perform any health behaviors (e.g. taking medication). Such finding was inconsistent with the Common-Sense Model of Self-Regulation, which indicates that perceiving high impact or consequence of the threat will stimulate the patients to have good adherence to health behaviors in order to minimize the potential impacts of the threat. This relationship could be observed in patients with chronic conditions with acute exacerbation such as coronary arteries disease (Stafford, Jackson, & Berk, 2008) or chronic heart failure (MacInnes, 2011), with study finding pointing out that a higher scale of consequences better predicts adherence among patients. This may have been due to the characteristics of coronary arteries disease and chronic heart failure which are definitely symptomatic and highly severe, so they could create a great impact on patients' lives, based on symptoms or perceptions of symptoms, which in turn, would activate the perception of the impacts of the disease on patients' lives, thus consequently increasing patients' responsibility for their health by being adherent to medications.

Perception of control

In this study, the control scores were rather high (mean=6.71, SD=1.93), but control did not statistically significantly explain medication adherence in this study, which meant that perception toward personal ability and efficacy of treatments did not influence medication adherence among hypertensive patients without

complications. In contrast, previous studies have found that perception of control was a significant predictor that exhibited direct effects on both prescribed medications and self-management among hypertensive patients (Chen, Tsai, & Chou, 2011; Feng, 2009). Put another way, patients who thought their treatment would help them control blood pressure were more likely to be compliant (Chen, Tsai, & Chou, 2011; Chen, Tsai, & Lee, 2009; Ross, 2004). This could be explained that the present study was conducted with hypertensive patients who had fewer symptoms and less complexity of the disease. They could continue having a normal lifestyle similar to that of normal healthy persons. In this situation, the patients may have evaluated their condition as being well—controlled (mean=6.69, SD=1.93) or they were turning back to being normal. Therefore, the patients might have appraised that medications were no longer necessary for them, leading to negative adaptation by discontinuing taking medication prescribed (mean=5.92, SD=1.71), which was inconsistent with the Common-Sense Model of Self-Regulation that indicates high control will stimulate the patients to have high adherence to health behaviors in order to minimize their health threat.

In contrast, previous studies have been conducted with hypertensive patients, some of whom had already developed at least one complication. In this circumstance, the patients may have noticed more sign and symptom of high blood pressure such as uncontrolled blood pressure levels, palpitation, frequency, and headache or dizziness (Franklin, 2010) or symptoms from co-morbidities or complications However, those sign and symptom may have obviously been improved after drug administration or lifestyle adjustment. For these reasons, the patients may have developed the perception that their condition could be controlled by treatment and personal ability, resulting in good adherence to health behaviors.

In summary, the present study revealed that hypertensive patients without complication had a low level of medication adherence. The variable of illness perceptions in terms of consequence and control, as well as medication beliefs—beliefs about necessity and concern about medication, were assumed to have an influence on medication adherence among hypertensive patients without complication based on the conceptual framework of Treatment beliefs and the Self-Regulatory model. However, the findings showed that concern about medication was only one variable that could explain medication adherence, whereas the variables of belief about

necessity, consequence, and control did not significantly influence medication adherence in this study.

CHAPTER VI
CONCLUSION

Summary of the Study

This descriptive research study is aimed to investigate the influence of illness perceptions; consequence and control, and medication beliefs on medication adherence among essential hypertensive patients without complications.

The sample consisted of 85 people with essential hypertension, who sought out treatment or medical appointment at Primary Care Unit (PCU), Siriraj Hospital from March to May, 2013. The instruments used in this study consisted of four parts; the demographic data questionnaire, The Brief Illness Perception Questionnaires (Brief-IPQ), the Belief about Medicine Questionnaire (BMQ), and the 8-item Morisky Medication Adherence Scale (8-item MMAS). Cronbach's alpha was calculated to ensure the reliability of the instruments, in which the results indicated an acceptable range of alpha's coefficients. The data was collected by the researcher who informed the participants about the objectives and procedures of the data collection. Informed consent was asked to be signed and by the patients if they felt comfortable participating in the study. The questionnaire answering process was completed within approximately 30 to 45 minutes for each person, while the patients were waiting for the medical appointment with their physician. The data was analyzed by using frequency, percentage, mean, and standard deviation, Pearson's correlation coefficients, and multiple regression analysis.

Results

1) It was found that most of the participants were female (74%) with a mean age of 63 years old. Most of the participants were married (38%) and had primary school education (54%). The majority occupations were

housekeeper/unemployed (43%) and vendor (33%), with average income for 8,630 baht per month.

The clinical information was indicated that females had a higher percentage of being overweight than males (50% vs. 32%). Most participants have had hypertension between 5 and 10 years, which was not different from the years of receiving pharmacological treatments. For 61% of the participants were receiving at least two tablets of antihypertensive medications on average, and were mostly (75.29%) prescribed as a daily dose. In terms of blood pressure, 40% of the participants had systolic blood pressure levels between 140 and 159 mmHg and diastolic blood pressure between 90 and 99 mmHg, with a mean of 141/80 mmHg.

2) Regarding the part of the dimensions of illness perceptions, the mean of consequence and control score were 2.89 and 6.71 points, respectively. This could be explained that most of participants rather perceived that hypertension had a small impact on their lifestyles and it could be well controlled by personal ability or treatments. In terms of medication beliefs, a mean of beliefs about necessity and concern about medication was 17.41 and 13.59 respectively. This result indicated that the participants were believed about necessity of anti-hypertensive drugs than concern about their negative impacts. Regarding to adherence, most of participants in this study had low to moderate level (mean=5.92, SD=1.71) of medication adherence. The main barrier of adherence in this study was forgetfulness.

3) Multiple regression analysis revealed that all of the independent variables could explain the variance of medication adherence in hypertensive patients without complications by 17.2% with statistical significant (R^2=.172, $p < .01$). Concern about medication was only one independent variable which had an influence on medication adherence (beta = -.374; $p < .01$).

Recommendations

Recommendations for nursing care

1) The study found that concern about medication was a negative influencing factor on medication adherence among hypertensive patients without

complications. Almost half (46%) of the patients thought that anti-hypertensive medications is a mysterious and possibility result in adverse effects with long term use. Therefore, to minimize concern about medication in order to improve medication adherence, nursing intervention would need to be focused prior on assessing negative beliefs that the patients have through their prescribed medications before giving education about medications.

2) The study found that around sixty-five percent of patients in Primary Care Unit (PCU) were late adulthood (mean=63, SD=8.90) and highly reported that they sometimes forget to take their medication. Therefore, improving medication adherence in this population may have to extend to their caregivers or families. In addition, nursing innovation about reminding techniques would be considered.

Recommendations for further study

1) The patients were late adulthood, unemployed, had limited education, and earn a low income. Therefore, in the future studies, the confounding factors such as health literacy, cognitive decline, self-efficacy, personally, social, and cultural norms are possibly used to explore medication adherence in hypertensive patients without complications.

2) The present study has been restricted to assessment only two dimensions of illness perceptions. That is consequence and control, whereas other three dimensions were not included. Therefore, the future studies may design to explore these dimensions of illness perceptions, which may better explained of the variance in treatment uptake and adherence among hypertensive patients without complications.

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APPENDICES

APPENDIX A
LIST OF EXPERTS

The content of the research instrument were validate by five experts as the following.

1. Assoc.Prof.Dr.Kanaungnit Pongthavornkamol Ph.D. (Nursing)
Department of Medical Nursing, Faculty of Nursing, Mahidol University

2. Dr. Anchalee Tantawiwat, M.D.
Primary Care Unite, Siriraj Faculty of Medicine, Siriraj Hospital, Mahidol University.

3. Miss Walairat Onjuti B.N.S. (Family Nurse Practitioner)
Nurse Case Manager, Primary Care Unite, Siriraj Faculty of Medicine, Siriraj Hospital, Mahidol University.

APPENDIX B

DOCUMENTARY PROOF OF ETHICAL CLEARANCE

2 ถนนพรานนก บางกอกน้อย
กรุงเทพฯ 10700

โทร (662) 4196405-6
โทรสาร (662) 4196405

คณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล

เอกสารรับรองโครงการวิจัย

หมายเลข Si 055/2013

ชื่อโครงการภาษาไทย : ปัจจัยที่มีอิทธพลต่อความร่วมมือในการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

รหัสโครงการ : 640/2555(EC1)

หัวหน้าโครงการ / หน่วยงานที่สังกัด : นางสาวปิ่นทอง ผึ้งดอกไม้
คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

สถานที่ทำวิจัย : คณะแพทยศาสตร์ศิริราชพยาบาล

เอกสารที่รับรอง :

1. แบบขอรับการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล
2. เอกสารชี้แจงผู้เข้าร่วมการวิจัย / อาสาสมัคร
3. หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย
4. แบบสอบถาม
5. ประวัติผู้วิจัย

วันที่รับรอง : 22 มกราคม 2556

วันหมดอายุ : 21 มกราคม 2557

คณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล ดำเนินการให้การรับรองโครงการวิจัยตามแนวทางหลักจริยธรรมการวิจัยในคนที่เป็นสากล ได้แก่ Declaration of Helsinki, the Belmont Report, CIOMS Guidelines และ the International Conference on Harmonization in Good Clinical Practice (ICH-GCP).

ลงนาม .....
(ศาสตราจารย์ แพทย์หญิงชารุพิมพ์ สูงสว่าง)
ประธานคณะกรรมการจริยธรรมการวิจัยในคน

29 ส.ค. 2556
.....
วันที่

ลงนาม .....
(ศาสตราจารย์คลินิก นายแพทย์อุดม คชินทร)
คณบดี คณะแพทยศาสตร์ศิริราชพยาบาล

29 ส.ค. 2556
.....
วันที่

หน่วยพิมพ์โรงพยาบาลศิริราช 2342 / 3,000 แผ่น / ก.ย 51 / Mat. 10023253

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MAHIDOL UNIVERSITY
Since 1888

Siriraj Institutional Review Board

Certificate of Approval

COA no. Si 055/2013

Protocol Title : Factors Influencing Medication Adherrence in Pateints with Essential Hypertension

Protocol number : 640/2555(EC1)

Principal Investigator/Affiliation : Miss Pinthong Pungdokmai
Faculty of Nursing, Mahidol University

Research site : Faculty of Medicine Siriraj Hospital

Approval includes :

1. SIRB Submission Form
2. Participation Information Sheet
3. Informed Consent Form
4. Questionnaire
5. Principle Investigator's curriculum vitae

Approval date : January 22, 2013

Expired date : January 21, 2014

This is to certify that Siriraj Institutional Review Board is in full Compliance with international guidelines for human research protection such as the Declaration of Helsinki, the Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP).

Jarupim Soongswang

(Prof. Jarupim Soongswang, M.D.)
Chairperson

29 JAN 2013
date

Udom Kachintorn

(Clin. Prof. Udom Kachintorn, M.D.)
Dean of Faculty of Medicine Siriraj Hospital

29 JAN 2013
date

หน่วยพิมพ์โรงพยาบาลศิริราช 2341 / 3,000 แผ่น / ก.ย 51 / Mat. 10023252

APPENDIX C
PERMISSION LETTERS FOR DATA COLLECTING

คณะแพทยศาสตร์ศิริราชพยาบาล
สำนักงานรองคณบดีฝ่ายวิจัย
บางกอกน้อย กรุงเทพฯ 10700
โทร. 0 2419 2680

ที่ ศธ 0517.07/ 3597
วันที่ 19 กุมภาพันธ์ 2556
เรื่อง ยินดีให้ความอนุเคราะห์ข้อมูลประกอบการทำวิทยานิพนธ์

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล
อ้างถึง หนังสือ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล
ที่ ศธ 0517.05/03633 ลงวันที่ 15 ตุลาคม 2555

ตามที่ หลักสูตรพยาบาลศาสตรมหาบัณฑิต คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล ได้ขอความอนุเคราะห์ให้ นางสาวปิ่นทอง ผึ้งดอกไม้ นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล เข้าเก็บข้อมูลด้วยวิธีการตอบแบบสอบถามกับผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ไม่มีภาวะแทรกซ้อน อายุตั้งแต่ 18 ปีขึ้นไป ทั้งเพศหญิงและชายที่มารับการตรวจตามนัดที่หน่วยปฐมภูมิ โรงพยาบาลศิริราช เพื่อเป็นข้อมูลประกอบการทำวิทยานิพนธ์ เรื่อง "ปัจจัยที่มีอิทธิพลต่อความร่วมมือในการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ" ความละเอียดดังแจ้งแล้วนั้น

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล พิจารณาแล้วยินดีอนุมัติให้ นางสาวปิ่นทอง ผึ้งดอกไม้ เข้าเก็บข้อมูลได้ตามที่ขอความอนุเคราะห์มา ทั้งนี้ได้ผ่านการรับรองโครงการวิจัยจากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์ศิริราชพยาบาล เมื่อวันที่ 22 มกราคม 2556

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(ศาสตราจารย์ นายแพทย์ประสิทธิ์ วัฒนาภา)
รองคณบดี ปฏิบัติงานแทน
คณบดีคณะแพทยศาสตร์ศิริราชพยาบาล

สำเนาเรียน รองคณบดีฝ่ายวิจัย, ผู้อำนวยการโรงพยาบาล, หัวหน้างานการพยาบาลปฐมภูมิ

APPENDIX D
INFORMATION CONSENT FORM

เอกสารชี้แจงผู้เข้าร่วมการวิจัย/อาสาสมัคร

(Participant Information Sheet)

ในเอกสารนี้อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามหัวหน้าโครงการวิจัย หรือผู้แทนให้ช่วยอธิบายจนกว่าจะเข้าใจดี ท่านอาจจะขอเอกสารนี้กลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนสนิท แพทย์ประจำตัวของท่าน หรือแพทย์ท่านอื่น เพื่อช่วยในการตัดสินใจเข้าร่วมการวิจัย

ชื่อโครงการวิจัย ปัจจัยที่มีอิทธิพลต่อความร่วมมือในการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

ชื่อหัวหน้าโครงการวิจัย นางสาวปิ่นทอง ผึ้งดอกไม้

สถานที่วิจัย หน่วยบริการปฐมภูมิ โรงพยาบาลศิริราช

สถานที่ทำงานและหมายเลขโทรศัพท์ของหัวหน้าโครงการวิจัยที่ติดต่อได้ทั้งในและนอกเวลาราชการ สถานพยาบาลสุขภาพชีวาศรม อินเตอร์เนชันเนล เฮลท์ รีสอร์ท ต.หนองแก อ.หัวหิน จ. ประจวบคีรีขันธ์

เบอร์โทรศัพท์ที่ติดต่อได้ 24 ชม. 087-8091552

ผู้สนับสนุนทุนวิจัย ไม่มี

ระยะเวลาในการวิจัย 1 กุมภาพันธ์ 2556- 30 สิงหาคม 2556

ที่มาของโครงการวิจัย โรคความดันโลหิตสูงเป็นโรคที่มีแนวโน้มเพิ่มสูงขึ้นจากตัวเลขทางสถิติ แต่เนื่องด้วยธรรมชาติของโรคที่ไม่มีอาการ ทำให้ผู้ป่วยขาดความตระหนักและการรับรู้ที่ถูกต้องเกี่ยวกับโรคและยาที่ได้รับ ส่งผลกระทบต่อความร่วมมือในการรับประทานยาที่ลดลง และมีความเสี่ยงในการเกิดภาวะแทรกซ้อนที่รวดเร็วและเพิ่มขึ้น จากความร่วมมือในการรับประทานยาที่มีแนวโน้มลดลง และจำนวนผู้ป่วยที่เพิ่มมากขึ้นตามลำดับ ดังนั้นการศึกษาเกี่ยวกับปัจจัยที่มีผลต่อการรับรู้เกี่ยวกับโรคและความเชื่อเกี่ยวกับยาในกลุ่มผู้ป่วยโรคความดันโลหิตสูงที่ยังไม่มีภาวะแทรกซ้อน ซึ่งมีอยู่จำนวนมาก จะช่วยให้พยาบาลมีความเข้าใจเกี่ยวกับการรับรู้เรื่องโรคและยาในผู้ป่วยกลุ่มดังกล่าวเพิ่มขึ้น ซึ่งอาจนำไปใช้เป็นแนวทางในการวางแผนการพยาบาลเพื่อส่งเสริม

พฤติกรรมการรับประทานยาตามแผนการรักษาตั้งแต่ระยะเริ่มแรก ซึ่งนอกจากจะช่วยผู้ป่วยในการชะลอภาวะแทรกซ้อนของโรค ยังสามารถช่วยลดภาระค่ารักษาพยาบาลที่มีแนวโน้มที่เพิ่มขึ้นในการดูแลภาวะแทรกซ้อนที่เกิดจากโรคความดันโลหิตสูง

วัตถุประสงค์ของโครงการวิจัย ศึกษาอิทธิพลของการรับรู้เกี่ยวกับโรคและความเชื่อเกี่ยวกับยา ต่อพฤติกรรมความร่วมมือในการรับประทานยา ในผู้ป่วยโรคความดันโลหิตสูงซึ่งอยู่ในระยะที่ยังไม่มีภาวะแทรกซ้อน โดยผลที่ได้จะนำมาซึ่งความเข้าใจเกี่ยวกับโรคและความเชื่อเกี่ยวกับยาในมุมมองของผู้ป่วย ซึ่งสามารถนำไปเป็นข้อมูลในการวางแผนการพยาบาลเพื่อส่งเสริมพฤติกรรมการรับประทานยาในผู้ป่วยโรคความดันโลหิตสูง โดยมีเป้าหมายหลักคือป้องกันหรือชะลอภาวะแทรกซ้อนอันเนื่องมาจากโรค

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้เนื่องจาก ท่านมีคุณมีลักษณะทั่วไปคล้ายกับกลุ่มผู้ป่วยโรคความดันโลหิตสูงที่ผู้วิจัยกำลังศึกษาคือ

1. ได้รับการวินิจฉัยว่าเป็นโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุโดยแพทย์
2. มีอายุตั้งแต่ 18 ขึ้นไป
3. สามารถสื่อสารได้ด้วยภาษาไทย
4. ความดันซิสโทลิกน้อยกว่าหรือเท่ากับ 180 มิลลิเมตรปรอท หรือ/และ ความดันไดแอสโทลิกน้อยกว่าหรือเท่ากับ 110 มิลลิเมตรปรอท ณ วันที่มาตรวจ
5. ไม่เคยได้รับการวินิจฉัยเกี่ยวกับการเจ็บป่วยทางจิตโดยแพทย์

โดยจะมีผู้ร่วมวิจัย/อาสาสมัครนี้ทั้งสิ้นประมาณ 85 ราย

หากท่านตัดสินใจเข้าร่วมการวิจัยแล้ว จะมีขั้นตอนการวิจัยดังต่อไปนี้คือ

ในระหว่างที่รอพบแพทย์ ผู้เข้าร่วมวิจัยจะได้รับแบบสอบถาม 1 ชุด โดยแบบสอบถามที่ท่านได้รับจะประกอบไปด้วยคำถามทั้งหมด 4 ส่วนคือ

<u>ส่วนที่ 1</u> เป็นคำถามเกี่ยวกับข้อมูลส่วนบุคคลของท่าน เช่น เพศ อายุ สถานภาพสมรส ระดับการศึกษา อาชีพ รายได้ เป็นต้น

<u>ส่วนที่ 2</u> เป็นคำถามเกี่ยวกับการรับรู้ของท่านที่มีต่อโรคความดันโลหิตสูง ประกอบด้วยคำถาม 9 ข้อ

<u>ส่วนที่ 3</u> เป็นคำถามเกี่ยวกับความเชื่อของท่านที่มีต่อยาลดความดันโลหิตที่ท่านรับประทาน ประกอบด้วยคำถาม 10 ข้อ

<u>ส่วนที่ 4</u> เป็นคำถามเกี่ยวกับความร่วมมือในการรับประทานยาลดความดันโลหิต ประกอบด้วยคำถามทั้งหมด 8 ข้อ

โดยผู้วิจัยจะขอให้ท่านตอบแบบสอบถามทั้ง 4 ส่วน ระหว่างการตอบแบบสอบถาม ถ้าท่านมีข้อสงสัยหรือไม่เข้าใจเกี่ยวกับข้อคำถาม สามารถซักถามได้โดยตรงจากผู้วิจัย ซึ่งการตอบแบบสอบถามจะใช้เวลาทั้งหมดประมาณ 20 นาที

ความเสี่ยงที่อาจจะเกิดขึ้นเมื่อเข้าร่วมการวิจัย ในการตอบแบบสอบถาม ท่านอาจรู้สึกอึดอัด ไม่สบายใจกับบางคำถาม หรืออาจทำให้ท่านเสียเวลากับการตอบแบบสอบถาม อย่างไรก็ตามท่านมีสิทธิ์ที่จะไม่ตอบคำถามเหล่านั้นได้ โดยการปฏิเสธเข้าร่วมหรือถอนตัวจากโครงการวิจัย ดังกล่าวจะไม่ส่งผลกระทบใดๆต่อการรักษาที่ท่านจะได้รับ

หากท่านไม่เข้าร่วมในโครงการวิจัยนี้ ท่านก็จะได้รับการตรวจเพื่อการวินิจฉัยและรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐานคือ การได้รับยาลดความดันโลหิตไปรับประทานต่อเนื่องที่บ้าน ร่วมกับการนัดตรวจติดตามอาการและผลการรักษาจากแพทย์ รวมทั้งการได้รับคำแนะนำที่ถูกต้อง เหมาะสมเกี่ยวกับโรคและการปฏิบัติตัวจากทีมสุขภาพ

4. หากมีข้อสงสัยที่จะสอบถามเกี่ยวข้องกับการวิจัย หรือหากเกิดผลข้างเคียงที่ไม่พึงประสงค์จากการวิจัย ท่านสามารถติดต่อ นางสาวปิ่นทอง ผึ้งดอกไม้ เบอร์โทร 087-8091552

ประโยชน์ที่คิดว่าจะได้รับจากการวิจัย

ประโยชน์ที่คิดว่าจะได้รับจากการวิจัย

ผู้เข้าร่วมการวิจัยอาจไม่ได้รับประโยชน์โดยจากการวิจัยครั้งนี้ แต่ผลการวิจัยจะใช้เป็นข้อมูลในการวางแผนการดูแลผู้ป่วยโรคความดันโลหิตสูงที่ยังไม่มีภาวะแทรกซ้อนให้มีการรับรู้ที่ถูกต้องเกี่ยวกับโรคและยาที่ได้รับ ซึ่งจะช่วยส่งเสริมความร่วมมือในการรับประทานยาตามแผนการรักษา อันจะส่งผลในการชะลอการเกิดภาวะแทรกซ้อนในผู้ป่วยโรคความดันโลหิตสูง ซึ่งจะเป็นประโยชน์ต่อสังคมหรือส่วนรวมในอนาคตต่อไป

ค่าตอบแทนที่ผู้ร่วมวิจัย/อาสาสมัครจะได้รับ ไม่มี

ค่าใช้จ่ายที่ผู้ร่วมวิจัย/อาสาสมัครจะต้องรับผิดชอบเอง ไม่มี

หากมีข้อมูลเพิ่มเติมทั้งด้านประโยชน์และโทษที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ทราบโดยรวดเร็วและไม่ปิดบัง

ข้อมูลส่วนตัวของผู้ร่วมวิจัย/อาสาสมัคร จะถูกเก็บรักษาไว้เป็นความลับและจะไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวมโดยไม่สามารถระบุข้อมูลรายบุคคลได้ ข้อมูลของผู้ร่วมวิจัย/อาสาสมัครเป็นรายบุคคลอาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ เช่น ผู้ให้ทุนวิจัย ผู้กำกับดูแลการวิจัย สถาบันหรือองค์กรของรัฐที่มีหน้าที่ตรวจสอบ รวมถึงคณะกรรมการจริยธรรมการวิจัยในคน เป็นต้น โดยไม่ละเมิดสิทธิของผู้ร่วมวิจัย/อาสาสมัครในการรักษาความลับเกินขอบเขตที่กฎหมายอนุญาตไว้

ผู้ร่วมวิจัย/อาสาสมัครมีสิทธิ์ถอนตัวออกจากโครงการวิจัยเมื่อใดก็ได้ โดยไม่ต้องแจ้งให้ทราบล่วงหน้า และการไม่เข้าร่วมการวิจัยหรือถอนตัวออกจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการบริการและการรักษาที่สมควรจะได้รับตามมาตรฐานแต่ประการใด

หากท่านได้รับการปฏิบัติที่ไม่ตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงนี้ ท่านสามารถร้องเรียนไปยังประธานคณะกรรมการจริยธรรมการวิจัยในคนได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน อาคารเฉลิมพระเกียรติ ๘๐ พรรษา ๕ ธันวาคม ๒๕๕๐ ชั้น 2 โทร.0 2419 2667-72 โทรสาร 0 2411 0162

ลงชื่อ..... ผู้ร่วมวิจัย/อาสาสมัครวันที่.....

(.....)

หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย

(Consent Form)

วันที่..... เดือน..... พ.ศ.....

ข้าพเจ้า..... อายุ.....ปี อาศัยอยู่บ้านเลขที่.....ถนน..... แขวง/ตำบล..... เขต/อำเภอ.....จังหวัด.....รหัสไปรษณีย์..... โทรศัพท์ .....

ขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัยเรื่อง ปัจจัยที่มีอิทธิพลต่อความร่วมมือในการรับประทานยา ในผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

โดยข้าพเจ้าได้รับทราบรายละเอียดเกี่ยวกับที่มาและจุดมุ่งหมายในการทำวิจัย รายละเอียดขั้นตอนต่างๆ ที่จะต้องปฏิบัติหรือได้รับการปฏิบัติ ประโยชน์ที่คาดว่าจะได้รับของการวิจัย และความเสี่ยงที่อาจจะเกิดขึ้นจากการเข้าร่วมการวิจัย รวมทั้งแนวทางป้องกันและแก้ไข โดยได้อ่านข้อความที่มีรายละเอียดอยู่ในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอด อีกทั้งยังได้รับคำอธิบายและตอบข้อสงสัยจากหัวหน้าโครงการวิจัยเป็นที่เรียบร้อยแล้ว ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้

หากข้าพเจ้ามีข้อข้องใจเกี่ยวกับขั้นตอนของการวิจัย หรือหากเกิดผลข้างเคียงที่ไม่พึงประสงค์จากการวิจัยขึ้นกับข้าพเจ้า ข้าพเจ้าจะสามารถติดต่อกับ นางสาวปิ่นทอง ผึ้งดอกไม้ สถานที่ทำงาน สถานพยาบาลสุขภาพชีวาศรม อินเตอร์เนชันเนลเฮลท์ รีสอร์ท ต.หนองแก อ.หัวหิน จ.ประจวบคีรีขันธ์ เบอร์โทรศัพท์ที่ติดต่อได้ 24 ชม. 087-8091552

หากข้าพเจ้าได้รับการปฏิบัติไม่ตรงตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย ข้าพเจ้าสามารถติดต่อกับประธานคณะกรรมการจริยธรรมการวิจัยในคนได้ที่ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน อาคารเฉลิมพระเกียรติ ๘๐ พรรษา ๕ ธันวาคม ๒๕๕๐ ชั้น 2 โทร.02-4192667-72 โทรสาร 02-4110162

ข้าพเจ้าได้ทราบถึงสิทธิ์ที่ข้าพเจ้าจะได้รับข้อมูลเพิ่มเติมทั้งทางด้านประโยชน์และโทษจากการเข้าร่วมการวิจัย และสามารถถอนตัวหรืองดเข้าร่วมการวิจัยได้ทุกเมื่อโดยไม่ต้องแจ้งล่วงหน้าหรือระบุเหตุผล โดยจะไม่มีผลกระทบต่อการบริการและการรักษาพยาบาลที่ข้าพเจ้าจะได้รับต่อไปในอนาคต และยินยอมให้ผู้วิจัยใช้ข้อมูลส่วนตัวของข้าพเจ้าที่ได้รับจากการวิจัย แต่จะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล โดยจะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

ข้าพเจ้าได้เข้าใจข้อความในเอกสารชี้แจงผู้เข้าร่วมการวิจัย และหนังสือแสดงเจตนายินยอมนี้โดยตลอดแล้ว จึงลงลายมือชื่อไว้

ลงชื่อ..... ผู้ร่วมวิจัย/อาสาสมัครหรือผู้แทนโดยชอบธรรม/วันที่.....

(.....)

ลงชื่อ.....ผู้ให้ข้อมูลและขอความยินยอม/หัวหน้าโครงการวิจัย/วันที่.....

(.....)

ในกรณีผู้ร่วมวิจัย/อาสาสมัคร อ่านหนังสือไม่ออก มีพยานซึ่งไม่มีส่วนได้เสียอยู่ด้วยตลอดระยะเวลาที่มีการให้ข้อมูลและผู้ร่วมวิจัย/อาสาสมัครหรือผู้แทนโดยชอบธรรมให้ความยินยอมเข้าร่วมการวิจัย พยานขอยืนยันว่าข้อมูลในหนังสือแสดงเจตนายินยอมหรือข้อมูลที่ได้รับและเอกสารอื่นได้รับการอธิบายอย่างถูกต้อง และผู้ร่วมวิจัย/อาสาสมัครหรือผู้แทนโดยชอบธรรมแสดงว่าเข้าใจรายละเอียดต่างๆ พร้อมทั้งให้ความยินยอมโดยสมัครใจ จึงได้ลงลายมือชื่อไว้เป็นพยาน

ลงชื่อ..... พยาน/วันที่.....

(.....)

APPENDIX E

PERMISSION LETTER TO USE THE QUESTIONAIRES

RE: Permission for using MMAS 8

To see messages related to this one, group messages by conversation.

Dr. Morsiky 1/15/2013

To: pinthong pungdokmai

Hi Ms. Pinthong and the waiver of fee agreement you signed did give your permission to use the copyrighted MMAS-8 without any license fee. Since this is part of a student requirement, you are getting a waiver of fee. I have also provided you with a waiver of the translation fee, as I generally do not provide this waiver to any student or investigator as this fee is used to offset the very high initial cost of the original translation. So please do not share or even publish this version, as it is a violation of the copyright agreement you have signed. If you are interested in receiving copies of research articles that have used the MMAS-8 in different health areas, please let me know so I can forward these to you.

Best wishes,

Professor Morisky

Dear Khun Pinthong,

Thank you for your interest in using the brief IPQ. Yes, you have my permission to use the Brief IPQ (Thai version).

Good luck for your thesis.
Best regards,
Napaporn

From: pinthong pungdokmai <pinthong142@hotmail.com>
To: nsow001@yahoo.com
Sent: Sunday, January 6, 2013 7:30 AM
Subject:

Dear Khun Napaporn,

I am a nursing student in Master degree of Nursing Faculty, Mahidol University. My name is Pinthong.
At the moment, I am developing my thesis about illness perception in hypertnesive patient.

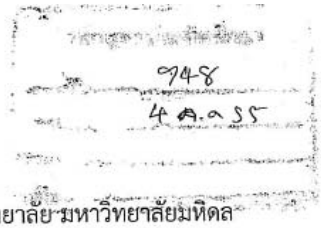
According the reason above, *I would be appreciated if you could give me the permission in using Thai version of Breief IPQ, which was develpoed by you.*

Your permission will give a great benefit for my study.

Look forword to hear from you

Best,

Miss Pinthong Pungdokmai
Nursing Student, Nursing Faculty,
Mahidol University, Thailand



บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล
๒๕/๒๕ ถ.พุทธมณฑลสาย ๔ ศาลายา นครปฐม ๗๓๑๗๐
โทร. ๐๒๔๔๑-๔๑๒๕ ต่อ ๑๐๙-๑๑๑ โทรสาร ๐๒-๔๔๑๙๘๓๔

ที่ ศธ ๐๕๑๗.๐๒ / ๔๒๑๙
วันที่ ๓ กรกฎาคม ๒๕๕๔
เรื่อง อนุญาตให้ใช้เครื่องมือวิจัย
เรียน ประธานหลักสูตรพยาบาลศาสตรมหาบัณฑิต
สาขาวิชาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์

ตามที่ นางสาวปิ่นทอง ผึ้งดอกไม้ นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล มีความประสงค์จะขออนุญาตใช้เครื่องมือวิจัย คือ แบบสอบถามความเชื่อเกี่ยวกับลดระดับน้ำตาล ซึ่งเป็นส่วนหนึ่งของวิทยานิพนธ์ตามหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลผู้ใหญ่ ภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี พ.ศ. ๒๕๕๒ เรื่อง "ความสัมพันธ์ระหว่างการรับรู้ต่อความเจ็บป่วยและความเชื่อ เกี่ยวกับยากับความสม่ำเสมอในการรับประทานยาลดระดับ น้ำตาลของผู้ที่เป็นเบาหวานชนิดที่ 2 (THE RELATIONSHIP OF ILLNESS REPRESENTATIONS AND BELIEFS ABOUT MEDICATIONS TO ADHERENCE TO ORAL HYPOGLYCEMIC MEDICATIONS IN PERSONS WITH TYPE 2 DIABETES.)" ซึ่งมี ผศ.ดร.พรทิพย์ มาลาธรรม ทำหน้าที่อาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก

บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล ได้พิจารณาแล้วไม่ขัดข้องอนุญาตให้ นางสาวปิ่นทอง ผึ้งดอกไม้ ใช้เครื่องมือวิจัยดังกล่าวได้ เนื่องจากเป็นการศึกษาวิจัยทางด้านวิชาการ แต่ทั้งนี้ขอได้โปรดระบุให้ชัดเจนด้วยว่า เครื่องมือวิจัยดังกล่าว มาจากวิทยานิพนธ์ของนักศึกษาบัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล และมีอาจารย์ท่านใดทำหน้าที่อาจารย์ที่ปรึกษาวิทยานิพนธ์หลัก และต้องปฏิบัติตามระเบียบของหลักสูตรพยาบาลศาสตรมหาบัณฑิต ภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี ซึ่งกำหนดให้ผู้ขออนุญาตใช้เครื่องมือวิจัยต้องดำเนินการตามระเบียบการขอใช้เครื่องมือวิจัย (ตามแบบฟอร์มที่แนบมาพร้อมนี้) และผู้ขออนุญาตใช้เครื่องมือวิจัยต้องชำระค่าบริการการขอใช้เครื่องมือ จำนวน ๒๐๐ บาท (สองร้อยบาทถ้วน) ต่อเครื่องมือวิจัย ๑ ฉบับ (หลักสูตรฯ จะถ่ายเอกสารส่งให้ผู้ขอเครื่องมือวิจัย) **โดยโอนเงินเข้าบัญชีธนาคารไทยพาณิชย์ จำกัด (มหาชน) สาขารามาธิบดี ชื่อบัญชี " หลักสูตรการศึกษาพยาบาล ปริญญาโทรามาธิบดี "** เลขที่บัญชี ๐๒๖-๔-๓๕๑๘๓-๗ การติดต่อหลักสูตรฯ โทร. ๐๒-๒๐๑-๒๐๑๘ หรือ ๐๒-๒๐๑-๑๖๗๓ หรือ ๐๒-๔๔๑ -๔๒๓๔-๔๗ ต่อ ๕๐๑

จึงเรียนมาเพื่อโปรดทราบ และดำเนินการต่อไปด้วย จักขอบพระคุณยิ่ง

ขอแสดงความนับถือ

(รองศาสตราจารย์ ทพญ.ดร.อารยา พงษ์หาญยุทธ)
รองคณบดีฝ่ายวิชาการ
ปฏิบัติงานแทน คณบดีบัณฑิตวิทยาลัย

สำเนาเสนอ อ.ที่ปรึกษา หลัก
และนักศึกษาต่อไป
4 ก.ค.55

APPENDIX F
DATA COLLECTION INSTRUMENT

เครื่องมือที่ใช้ในการศึกษา

ส่วนที่ 1 แบบสอบถามข้อมูลส่วนบุคคล

<u>คำชี้แจง</u> โปรดเติมคำหรือตัวเลขลงในช่องว่าง หรือใส่เครื่องหมาย ✓ ใน ( ) หน้าข้อความที่เป็นจริงเกี่ยวกับตัวท่าน

<u>ข้อมูลส่วนบุคคล (สำหรับผู้ป่วย)</u>

1. เพศ ( ) ชาย ( ) หญิง

2. อายุ ..... ปี

3. สถานภาพสมรส ( ) โสด ( ) หย่า/แยก ( ) คู่
( ) หม้าย ( ) อื่นๆ

4. ระดับการศึกษา ( ) ไม่ได้เรียนหนังสือ ( ) ประถมศึกษา ( ) มัธยมศึกษา
( ) ปริญญาตรี ( ) สูงกว่าปริญญตรี

5. อาชีพหลัก ( ) เกษตรกร ( ) พนักงานบริษัท ( ) ค้าขาย
( ) รับจ้าง ( ) เกษียณ ( ) อื่นๆ

6.รายได้เฉลี่ยต่อเดือน..... บาท

7. ระยะเวลาที่ได้รับการวินิจฉัยว่าเป็นโรคความดันโลหิตสูง..... ปี

8. ท่านรักษาโรคความดันโลหิตสูงด้วยการรับประทานยามาแล้วเป็นเวลา..... ปี

<u>ข้อมูลส่วนบุคคล (สำหรับผู้วิจัย)</u>

1. น้ำหนัก (BW) ..... kg ส่วนสูง (Ht) .....cm ดัชนีมวลกาย (BMI) ..... kg/m^2

2.ระดับความดันโลหิต (BP)

- จากการตรวจครั้งล่าสุด (Last visit) ..... mmHg
- จากการตรวจครั้งนี้ (Present visit) ..... mmHg

3. ยารักษาโรคความดันโลหิตสูงที่ผู้ป่วยได้รับ (ชื่อยา ขนาด และวิธีการใช้)

1)…… 4)……

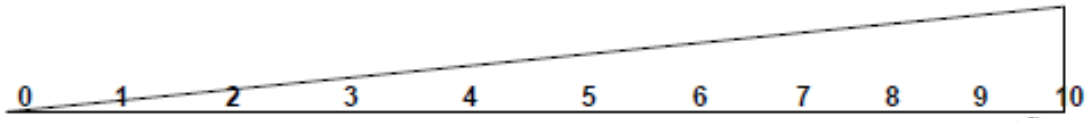
2)…… 5)……

3)…… 6)……...

ส่วนที่ 2 แบบสอบถามความคิดเห็นเกี่ยวกับความเจ็บป่วยอย่างย่อ

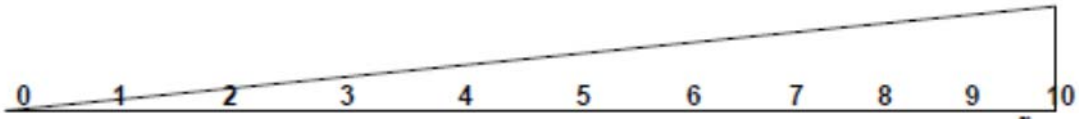
<u>คำชี้แจง</u> โปรดทำเครื่องหมาย O ล้อมรอบตัวเลขที่แสดงถึงความคิดเห็นของท่าน

1. โรคความดันโลหิตสูงมีผลกระทบต่อการดำเนินชีวิตของท่านมากน้อยเพียงใด



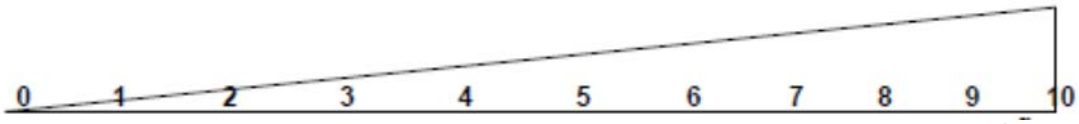
ไม่มีผลกระทบ มีผลกระทบมากที่สุด

2. ท่านคิดว่าโรคความดันโลหิตสูงของท่านจะคงอยู่นานเท่าไร



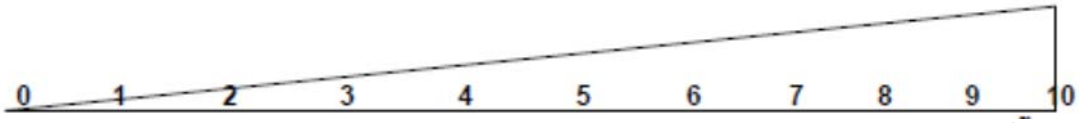
หายขาด ตลอดชีวิต

3. ท่านรู้สึกว่าตัวของท่านสามารถควบคุมโรคความดันโลหิตสูงได้มากน้อยเพียงใด



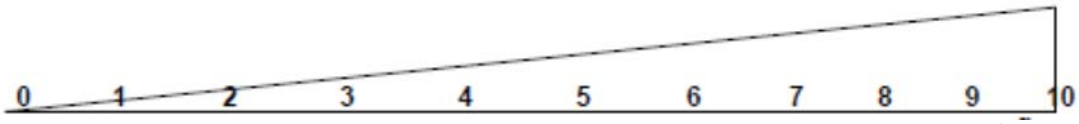
ไม่สามารถควบคุมได้ สามารถควบคุมได้ดีที่สุด

4. ท่านคิดว่ายามีส่วนช่วยรักษาโรคความดันโลหิตสูงได้มากน้อยเพียงใด



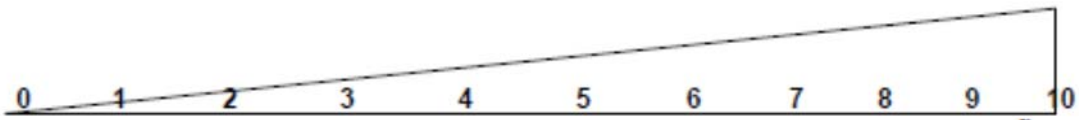
ไม่มีส่วนช่วยรักษาเลย มีส่วนช่วยรักษามากที่สุด

5. ท่านมีอาการอันเนื่องมาจากโรคความดันโลหิตสูงมากน้อยเพียงใด



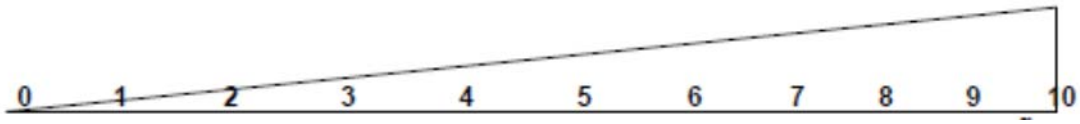
ไม่มีอาการใดๆเลย มีอาการรุนแรงมากที่สุด

6. ท่านกังวลเกี่ยวกับโรคความดันโลหิตสูงของท่านมากน้อยเพียงใด



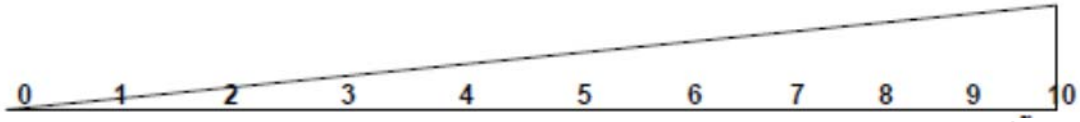
ไม่กังวลเลย กังวลมากที่สุด

7. ท่านรู้สึกเข้าใจโรคความดันโลหิตสูงของท่านดีเพียงใด



ไม่เข้าใจเลย เข้าใจชัดเจนมาก

8. โรคความดันโลหิตสูงมีผลกระทบต่ออารมณ์ของท่านมากน้อยเพียงใด



ไม่มีผลกระทบทางอารมณ์เลย มีผลกระทบต่ออารมณ์มากที่สุด

9. ท่านเชื่อว่าอะไรเป็นสาเหตุของโรคความดันโลหิตสูง โปรดเรียงลำดับตามความสำคัญจาก 1-3

1. _____
2. _____
3. _____

<u>ส่วนที่ 3 แบบสอบถามวัดความเชื่อเกี่ยวกับยาลดความดันโลหิตสูง</u>

<u>คำชี้แจง</u> โปรดใส่เครื่องหมาย ✓ ลงในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด

การเลือกให้ถือเกณฑ์ดังนี้

ไม่เห็นด้วยอย่างยิ่ง หมายถึง ท่านไม่เห็นด้วยกับข้อความนั้นอย่างมาก

ไม่เห็นด้วย หมายถึง ท่านไม่เห็นด้วยกับข้อความในประโยคนั้น

ไม่แน่ใจ หมายถึง ท่านไม่แน่ใจว่าเห็นด้วยหรือไม่เห็นด้วยกับข้อความนั้น

เห็นด้วย หมายถึง ท่านเห็นด้วยกับข้อความในประโยคนั้น

เห็นด้วยอย่างยิ่ง หมายถึง ท่านเห็นด้วยกับข้อความนั้นอย่างมาก

ข้อ	ข้อความ	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วย	ไม่แน่ใจ	เห็นด้วย	เห็นด้วยอย่างยิ่ง
ความจำเป็นเกี่ยวกับการใช้ยา (1-5)						
1.	สุขภาพของฉันขณะนี้ขึ้นอยู่กับยาลดความดันโลหิต					
2.	ฉันไม่สามารถมีชีวิตปกติได้ ถ้าขาดยาลดความดันโลหิต					
3.	ถ้าขาดยาลดความดัน.....					
4.	.....					
5.	.....					
ข้อกังวลเกี่ยวกับยา (6-10)						
6.	การใช้ยาลดความดันโลหิตสร้างความกังวลใจให้กับฉัน					
7.	บางครั้ง ฉันกังวลเกี่ยวกับผลที่จะเกิดในระยะยาวจากการใช้ยาลดความดันโลหิต					
8.	ฉันยังไม่มีความรู้					
9.	.....					
10.	.....					

ส่วนที่ 4 แบบสอบถามความสม่ำเสมอในการรับประทานยา

คำชี้แจง โปรดทำเครื่องหมาย ✓ ในช่อง " ใช่" หรือ "ไม่ใช่" หรือในช่อง ( ) ที่ตรงกับประสบการณ์ในการรับประทานยาลดคความดันของท่านตามความเป็นจริง

ข้อที่	คำถาม	ใช่	ไม่ใช่
1.	มีบางครั้งที่คุณลืมรับประทานยาลดความดันโลหิตใช่หรือไม่		
2	ใน 2 อาทิตย์ที่ผ่านมา มีบางวันที่คุณไม่ได้รับประทานยาลดความดันโลหิตใช่หรือไม่		
3.	คุณเคยปรับลดขนาดหรือหยุดรับประทานยาลดความดันโลหิตโดยไม่ได้บอกแพทย์ เนื่องจากคุณ.....		
4.	เมื่อคุณต้องเดินทางหรือออกจากบ้าน.....		
5.	.....		
6.	.....		
7.	.....		
8.	.....		

APPENDIX G
ASSUMPTION TESTING OF MULTIPLE REGRESSION ANALYSIS

There are four principle assumptions have to be tested before using multiple regression models, in order to establish validity of the result (Osborne & Waters, 2002).

1. Linearity: there should be a linear relationship between the dependent variable and the independent variables.

2. Normality: there should be normal distributions of residual error.

3. Homoscedasticity: there should be an equal variance of errors across all levels of the independent variables, which mean that errors are spread out consistently between the variables.

4. Multicollinearity: the independent variables should be not be highly correlated with one another.

The results for each assumption were presented as follows;

1. Scatter plot in this study was showed the linear relationship between the dependent variable and the independent variables as the following figure.

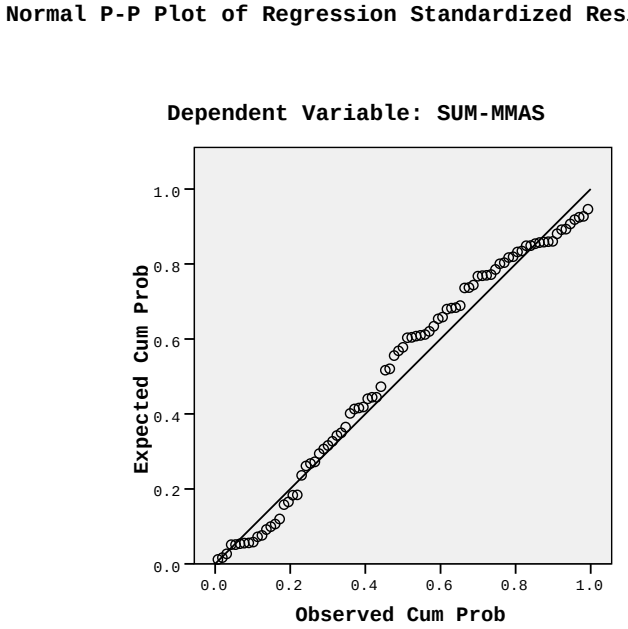


Figure 7. Scatterplots showing linear relationships with standardized residuals by predicted values.

2. Normality can further be checked through histograms or P-Plot of regression standardized residual. In this study, histograms and P-Plot had been showed normal distribution by the following figures.

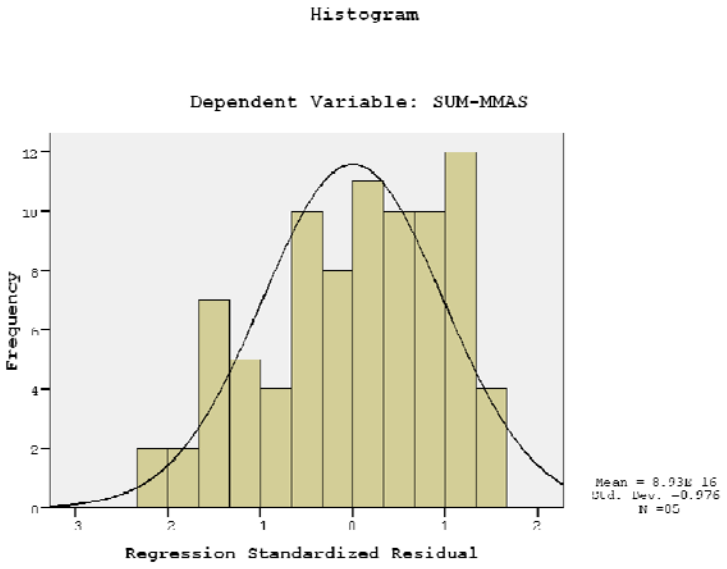


Figure 8. Histogram with normal distribution

3. The scatterplots of residuals were even distribution around zero (the horizontal line) indicated an equal variance of errors (homoscedasticity).

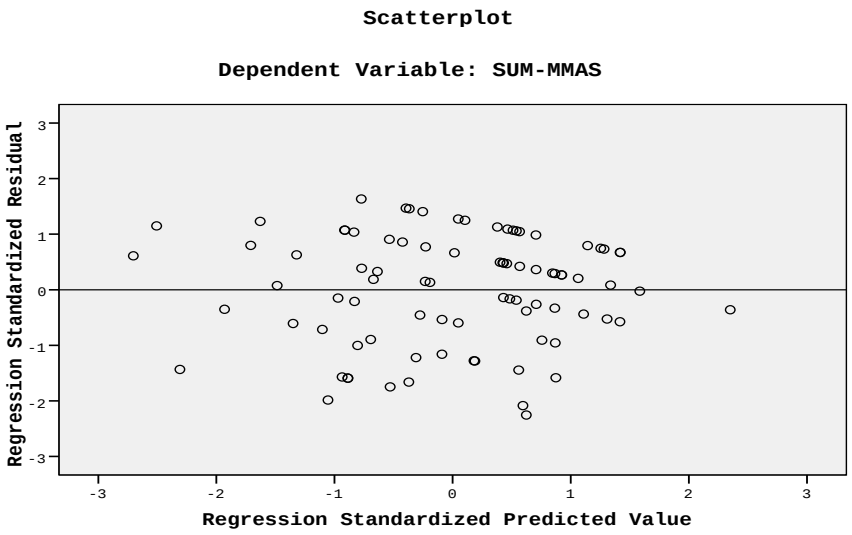


Figure9. Scatterplot indicated Homoscedasticity data

4. In this study, low multicollinearity was evidence by;

4.1) The Pearson's product moment correlation revealed that there was no high correlation coefficient among the independent variables, which was presented in the following figure.

Correlations

		ill1_ Consequence	Control	SUM Necessity Score	SUM Concern Score	SUM-MMAS
ill1_Consequence	Pearson Correlation	1	.121	.147	.140	-.078
	Sig. (2-tailed)		.269	.180	.202	.479
	N	85	85	85	85	85
Control	Pearson Correlation	.121	1	.097	-.158	-.001
	Sig. (2-tailed)	.269		.376	.149	.994
	N	85	85	85	85	85
SUM Necessity Score	Pearson Correlation	.147	.097	1	-.370**	.215*
	Sig. (2-tailed)	.180	.376		.000	.048
	N	85	85	85	85	85
SUM Concern Score	Pearson Correlation	.140	-.158	-.370**	1	-.397**
	Sig. (2-tailed)	.202	.149	.000		.000
	N	85	85	85	85	85
SUM-MMAS	Pearson Correlation	-.078	-.001	.215*	-.397**	1
	Sig. (2-tailed)	.479	.994	.048	.000	
	N	85	85	85	85	85

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

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

4.2) The Variance Inflation Factors (VIF), an index of the amount that the variance of each regression coefficient, was less than 10. Additionally, Tolerance levels for correlations was ranged from 0.8 to 0.9 (normal rang 0-1). All was evidence that multicollinearity was not in concern.

4.3) Durbin-Watson value was 1.791 (normal rang 1.5 to 2.5), which indicated non-autocorrelation among independent variables.

All was presented in the following.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	8.711	2.016		4.322	.000		
	ill1_ Consequence	-.021	.067	-.033	-.315	.753	.928	1.078
	Control	-.098	.119	-.086	-.823	.413	.949	1.054
	SUM Necessity Score	.061	.073	.094	.834	.407	.820	1.219
	SUM Concern Score	-.234	.071	-.374	-3.291	.001	.800	1.250

a. Dependent Variable: SUM-MMAS

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.414[a]	.172	.130	1.59977	.172	4.140	4	80	.004	1.791

a. Predictors: (Constant), SUM Concern Score, ill1_Consequence, Control, SUM Necessity Score

b. Dependent Variable: SUM-MMAS

In conclusion, there were evidences that the data in this study was met the criteria of basic assumptions of multiple regression models. Then, the enter method of multiple regression was performed.

The mean and standard deviation of Illness perceptions

Dimension	Mean	SD
1. Consequence	2.89	±2.71
2. Timeline	7.65	± 2.93
3. Personal control	5.98	±2.50
4. Treatment control	7.45	±2.02
5. Identity	3.02	±2.69
6. Concern	2.72	±2.66
7. Coherence	6.71	±1.77
8. Emotional	2.81	±2.55
9. Causes	1. Stress 2. Diet 3. Smoking	

BIOGRAPHY

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