HEALTH BEHAVIOR AND HEALTH BELIEF ON BLOOD PRESSURE CONTROL AMONG ESSENTIAL HYPERTENSIVE PATIENTS

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HEALTH BEHAVIOR AND HEALTH BELIEF ON BLOOD PRESSURE CONTROL AMONG ESSENTIAL HYPERTENSIVE PATIENTS

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ABSTRACT

The study was a cross-sectional analytic study. The purpose of this study was to determine the association between health behavior, health belief, and blood pressure control among essential hypertensive patients who were treated at the hypertension clinic, Out-patient Department, Somdejprachoataksinmaharaj hospital in Tak province from April 26, 2004 to August 27, 2004. The total number of subjects was 310. Data were analyzed by descriptive statistics, univariate analysis by chi-square statistics and multivariate analysis by forward stepwise, and logistic regression with 95% confidence interval, all of which were done by the SPSS program.

Results showed that only 24.2% of the subjects were able to reduce their blood pressure below 140/90 mmHg. Multiple logistic regression was applied to calculate adjusted odd ratios (OR_{adj}). Factors associated with blood pressure control among essential hypertensive patients were stress (OR_{adj} = 3.51, 95%CI = 1.56-7.91, P-value = 0.002), and drug compliance (OR_{adj} = 3.15, 95%CI = 1.82-5.44, P-value < 0.001).

The findings of this research showed factors associated with blood pressure control among essential hypertensive patients. Health teams should provide health education in a participatory manner focusing on physical health care, drug compliance, and stress management in order to increase effectiveness of prevention, and control of essential hypertension.

KEY WORDS: HEALTH BEHAVIOR / BLOOD PRESSURE CONTROL

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พฤติกรรมสุขภาพและความเชื่อด้านสุขภาพกับภาวะการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ (HEALTH BEHAVIOR AND HEALTH BELIEF ON BLOOD PRESSURE CONTROL AMONG ESSENTIAL HYPERTENSIVE PATIENTS)

วิภา ลาภบำรุง 4536934 SIEP / M

วท.ม. (วิทยาการระบาด)

คณะกรรมการควบคุมวิทยานิพนธ์: ประเสริฐ อัสสันตชัย, M.D. (Hons), F.R.C.P. (London), เรวดี จงสุวัฒน์, Ph.D.(Food, Nutrition, and Dietetics), กมล อุดล, M.D. (Hons), M.Sc. (Clin Epidemiol.)

บทคัดย่อ

การศึกษาชนิด cross-sectional analytic study ครั้งนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างพฤติกรรมสุขภาพและความเชื่อด้านสุขภาพกับภาวะการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ที่คลินิกความดันโลหิตสูง แผนกผู้ป่วยนอก โรงพยาบาลสมเด็จพระเจ้าตากสินมหาราช จังหวัดตาก ระหว่างวันที่ 26 เมษายน ถึงวันที่ 27 สิงหาคม 2547 กลุ่มตัวอย่างที่ศึกษาคือผู้ป่วยความดันโลหิตสูงจำนวน 310 ราย วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา ทดสอบความสัมพันธ์โดยใช้สถิติไคล์สแควร์ และวิเคราะห์ตัวแปรเชิงซ้อนโดยการใช้ Multiple logistic regression เพื่อทดสอบขนาดและทิศทางความสัมพันธ์โดยการคำนวณหาค่าอัตราความเสี่ยงสัมพัทธ์ และดูนัยสำคัญทางสถิติโดยใช้ค่าความเชื่อมั่น 95 เปอร์เซนต์. ใช้โปรแกรมสำเร็จรูป SPSS ในการวิเคราะห์ข้อมูล

ผลการศึกษา พบว่า มีเพียงร้อยละ 24.2 เท่านั้นที่สามารถควบคุมความดันโลหิตให้ต่ำกว่า 140/90 mmHg เมื่อวิเคราะห์ตัวแปรเชิงซ้อน โดยควบคุมอิทธิพลของปัจจัยอื่นๆ พบว่า ปัจจัยที่มีความสัมพันธ์กับภาวะการควบคุมระดับความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ คือการมีความเครียด (OR_{adj} = 3.51, 95%CI = 1.56-7.91, P-value = 0.002) และความร่วมมือในการรับประทานยา (OR_{adj} = 3.15, 95%CI = 1.82-5.44, P-value < 0.001).

ผลการศึกษาครั้งนี้แสดงให้เห็นถึงปัจจัยที่มีความสัมพันธ์กับภาวะการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ บุคลากรทางการแพทย์ควรให้ความรู้แก่ผู้ป่วยที่มารับบริการให้ระมัดระวังในปัจจัยดังกล่าว โดยเน้นในเรื่องความร่วมมือในการรับประทานยาและการจัดการกับความเครียดเพื่อเพิ่มประสิทธิภาพในการป้องกันและควบคุมโรคความดันโลหิตสูงต่อไป

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CHAPTER I
INTRODUCTION

Rational and background

The emergence of epidemics of non-communicable diseases (NCDs) is the result of demographic and epidemiological transitions, along with increases in levels of risk factors resulting from social and economic changes. NCDs have been of major importance in developed countries for several decades. Now they are becoming recognized as a major public health threat in the developing world. For example, over the next 30 years, the burden of disease from NCDs in developing and newly industrialized countries is expected to rise by more than 60% (1).

Hypertension is a non-communicable disease that is the most common public health problem and economic importance (2). It is one of the most important risk factors of cardiovascular disease, which are a powerful independent predictor of premature death and disabilities from cardiovascular complications and death from all causes (2-4). The problem of hypertension is no symptom at first stage. Thus, high blood pressure often is labeled “the silent killer”. If hypertension is not treated, there will be organ damage to heart, kidneys, and brain which is generally not reversible. Death in persons with hypertension most often occurs from heart failure, chronic renal failure, and stroke (5).

In 2001, there are at least 600 million hypertensive worldwide identified by World Health Organization. In Asia hypertensive patients were found over 15 % of population (6). In 1987-1997, a few studies in various particular Thai populations have shown the prevalence of hypertension as show in Table 1 (7-10).

Table 1: Prevalence of hypertension in 1987-1997

Years	Researcher	Area	Criteria	Number	Age	Prevalence
1987	Phanpit Sakornpant	Samutsakorn Provice	≥ 160/95	2,082	30-59	5.8
1989	Chirt Sittiamorm	Kongteoy Slum	≥ 160/95	976	≥30	17.3
		Kongteoy Flat		909	≥30	14.0
1991	Ministry of Public Health	All whole country	≥ 160/95	15,125	>15	5.4
1997	Ministry of Public Health	All national	≥ 140/90	30,225	>15	11.6

WHO reported that worldwide, high blood pressure is estimated to cause 7.1 million deaths, about 13% of the total cause of death in 2001 (6). The mortality rate due to hypertension and cardiovascular disease were increased from 13.3 to 24.5 per hundred thousand of the population that been report from the Ministry of Public Health from 1997 to 2001. The trend of mortality rate has been increase. Hypertension and cardiovascular disease are in the fourth rank of disease causing death, following disease of the heart, accident and poisonings and malignant neoplasm, all forms, respectively (11).

In recent years, gains in hypertension awareness, treatment, and control in the population of American have leveled off. Data from the Third National Health and Nutrition Examination Survey (NHANES III, phase 2, performed in 1991 to 1994) indicated that 68% of hypertensives were aware, only 53.6% were treated and only 27.4% were controlled to goal levels (BP <140/90 mm Hg) (12).

The treatment for hypertensive patients in Thailand had been a report about high blood pressure control as the “rule of halves” which stated that half of all hypertensive were unaware of their condition; of those who were aware, half were under treatment; and of those under treatment, only about half were under adequate control (13). From the study of Achananuparp et al. (14) found that 58.6% of the hypertensive was unaware of having the disease; and only 30.1% of the cases were under treatment. It yielded only 24.7% of the treated cases whose BP was under control. These data showed under adequate control of hypertension. Control of

hypertension is a complex, multidimensional process. The primary goal in treatment of hypertension is to reduce morbidity and mortality rate by decreasing systolic blood pressure and diastolic blood pressure to targets that are less than 140/90 mm Hg to prevent cardiovascular disease (15,16). The major problem of hypertensive patients is inadequate control of blood pressure. The previous studies showed that the reasons for poor blood pressure control even in concern with health behavior e.g., dietary of sodium and caloric intake, alcohol consumption, overweight, stress and noncompliance with prescribed medical regimen (17-20). In this study the investigator conducted the health belief model (21) that explained the perceptions and beliefs causal of compliance with health and medical care recommendations. Therefore, the goal may achieved by lifestyle modification, alone or with pharmacological treatment include compliance with prescribed medical regimen (16)

Somdejprachoataksinmaharaj hospital is a general hospital in Tak province that there is the hypertension clinic in the Outpatient Department of the hospital. The number of visits this clinic was 1,991, 2,143 and 2,690 respectively in 2000 to 2002 (22). From the pilot survey (May 8, 2002), 30 of hypertensive patients were examined blood pressure, indicated that 56.66% was uncontrolled blood pressure to goal level (BP>140/90 mm Hg). Because the investigator realizes the importance of blood pressure control and is interested health behavior and health belief affecting blood pressure control among essential hypertensive patients in Somdejprachoataksinmaharaj hospital. Finally, the results of this study will be used as basic information and guidelines in strategical planning for an appropriate approach to the prevention of complication and control high blood pressure in order to improve quality of life in hypertensive patients.

Objectives of the research

1. To examine the association between health behavior, health belief and blood pressure control among essential hypertensive patients.

2. To estimate the prevalence of blood pressure control among essential hypertensive patients at hypertension clinic, Somdejprachoataksinmaharaj hospital, Tak province.

Research hypothesis

1. There was an association between health behavior including eating habit, physical activity, stress, alcohol consumption, drug compliance, weight management and blood pressure control among essential hypertensive patients.

2. There was an association between health belief including perceived susceptibility, perceived severity, and perceived benefits and blood pressure control among essential hypertensive patients.

Scope of the research

The research study was conducted in a group of essential hypertensive patients who had received treatment for at least six months at the hypertension clinic, Somdejprachoataksinmaharaj hospital, Tak province.

Variables of the research

1. Dependent variable is blood pressure control among essential hypertensive patients.

2. Independent variables are:

   2.1 Health behavior

   - Eating habit
   - Physical activity
   - Stress
   - Alcohol consumption
   - Drug compliance
   - Weight management

   2.2 Health belief

- Perceived susceptibility
- Perceived severity
- Perceived benefits

Definition of Terms:

1. The essential hypertensive patients are defined as patients who have been diagnosed by a physician that they have essential hypertension. The causes of hypertension are not heart disease, renal disease or endocrine system disorder. The individuals have to receive treatment at the hypertension clinic in Somdejprachoataksinmaharaj hospital for at least six months and their OPD cards do not specify the causes of hypertension.

2. Blood pressure control is defined as the measurements of the status of disease control. Then, the patients were divided into 2 groups as follows:

- **Controlled group** is the hypertensive patients who had an average blood pressure lower than 140/90 mm Hg in at least 2 out of 3 visits during the study.
- **Uncontrolled group** is the hypertensive patients who had an average systolic blood pressure of 140 mm Hg or greater or an average diastolic blood pressure of 90 mm Hg or greater in at least 2 out of 3 visits during the study.

3. Age is defined as the period of time beginning form the date of birth until the date of the interview. The duration between the last birthday and the date of interview that was six months or more would be counted as one year.

4. Occupation is defined as the principal activity with which the patient spends most time of the day to earn money.

5. Income is defined as the average amount of money (Bath) that a patient earns in each month.

6. Duration of disease is defined as the period of time beginning form the date that a physician diagnosed the patients to have hypertension until the date of the interview. Duration of six months or more would be counted as one year.

7. Duration of hypertensive treatment is defined as the period of time starting form the date that the patient first received treatment at the hypertension clinic

in Somdejprachoataksinmaharaj hospital until the date of the interview. Duration of six months or more would be counted as one year.

8. Health behavior is defined as behavior or the actions of an individual in daily life that may affect blood pressure control including eating habit, physical activity, stress, alcohol consumption, drug compliance, and weight management.

9. Eating habit is defined as frequency of food consumption of high sodium foods and high fat foods on usual week, which was divided into six aspects e.g., meat and nut products group, vegetable group, fruit group, fat group, beverage, and others.

10. Physical activity is defined as all movements in everyday life, including work, recreation, exercise and sport activities.

11. Stress is defined as response of the body or mental to events (as harmful, threatening, or challenging). The emotional response to stress includes feelings as anxiety, irritability, anger, embarrassment, depression, and hostility.

12. Alcohol consumption is defined as the amount (in bottles or glasses per day) and frequency (day/week) of each type of alcoholic beverage. Total alcohol consumption express in g of pure alcohol per day (g/day).

13. Drug compliance is compliance with the prescribed regimen, which was assessed from the interview.

14. Weight management represented by body mass index (BMI), which is a measure of the relationship between weight (in kilograms) and height (in meters square) that was used for evaluation of the nutritional status on the interview day.

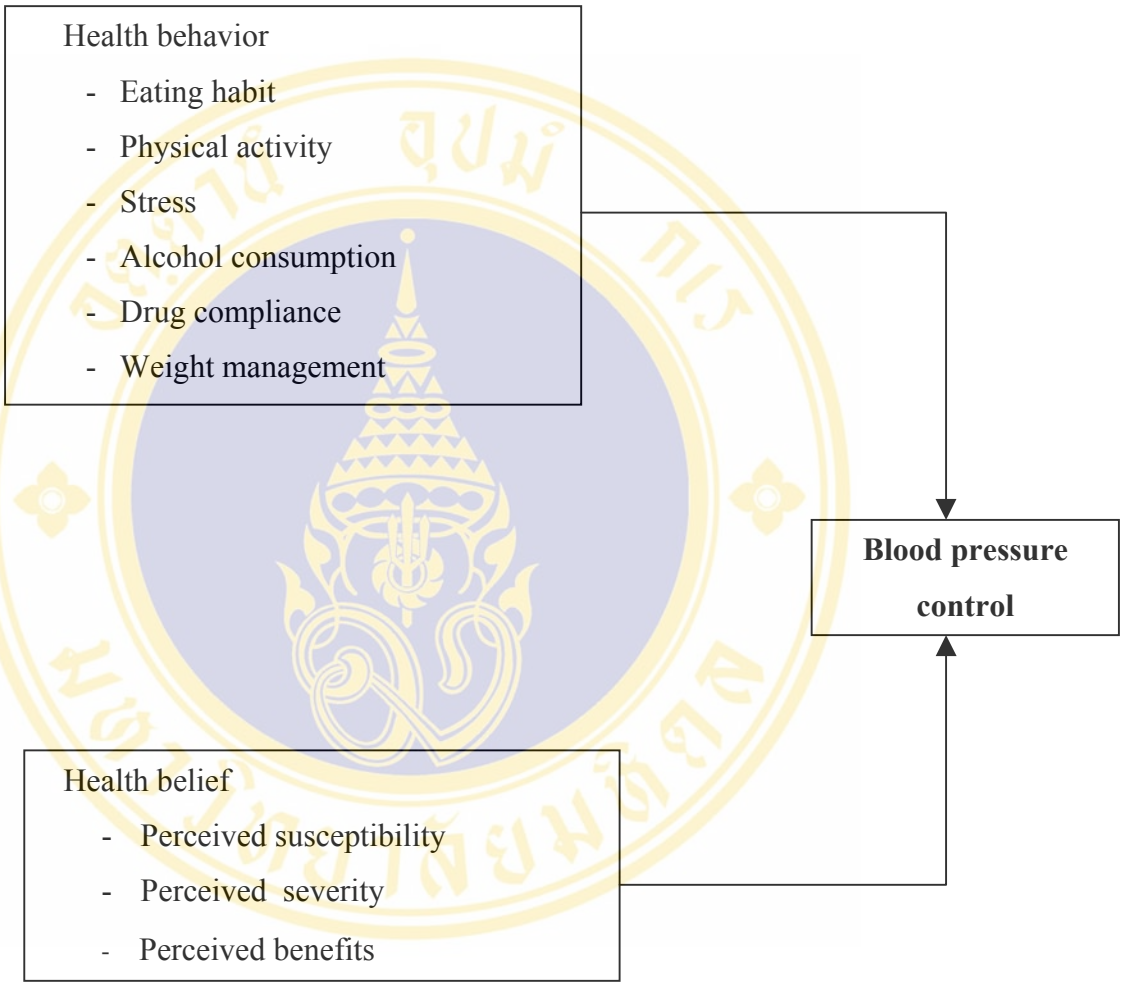
15. Health belief is defined as a set of perceptions an individual holds about susceptibility to disease, the severity of disease, and the benefits of taking an action to reduce the threat of the disease.

16. Perceived susceptibility is defined as feelings, ideas and beliefs of a hypertensive patient regarding his/her probability of acquiring complications of hypertension.

17. Perceived severity is defined as feelings, ideas and beliefs of a hypertensive patient regarding the severity of his/her hypertension and its effect on their life.

18. Perceived benefits is defined as feelings, ideas and beliefs of a hypertensive patient regarding the advantage of following instructions from health care providers, in order to reduce risk and severity of the disease.

Figure 1: Conceptual framework



CHAPTER II
LITERATURE REVIEW

This chapter reviews the literature consisting of the followings:

1. Theories of hypertension
2. Health behavior of hypertensive patients
3. Health belief model
4. Related research

2.1 Theories of hypertension

2.1.1 Definition of blood pressure

Blood pressure is defined as the pressure of the circulating blood against the wall of the blood; results from the systole of the left ventricle of the heart. Blood pressure is not always consistent. Blood pressure can increase sometimes but it will become to normal level. (23,24). There are two kinds of blood pressure as follow:

1. The systolic pressure results from contraction of the left ventricle of the heart, forcing blood into the aorta and out into its branches that form the systemic arterial circulation. The pressure wave of this contraction is measured peripherally.

2. The diastolic pressure results from relaxation of the left ventricle of the heart, and the pressure diminishes to a level sustained by the residual pressure retained by the elasticity of the arterial system.

2.1.2 Definition of hypertension (16)

Hypertension is defined as a systolic blood pressure of 140mm Hg or greater or diastolic blood pressure of 90 mm Hg or greater.

2.1.3 Classification of Hypertension

A. Classified by blood pressure

Table 2. Classified by blood pressure from JNCVII (16)

BP Classification	Systolic BP (mm Hg)		Diastolic BP (mm Hg)
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Stage 1 hypertension	140-159	or	90-99
Stage 2 hypertension	≥160	or	≥100

B. Classified by the organ damage (25)

WHO's Expert Committee classifies hypertension in 3 stages:

Stage I: No manifestations of organic change

Stage II: At least one of the following manifestations of organ involvement

- Left ventricular hypertrophy (detected by radiogram, electrocardiogram etc.)
- Generalized and focal narrowing of the retinal arteries
- Micro-albuminuria, proteinuria and/or slight elevation of the plasma creatinine concentration

Stage III: Both symptoms and signs have appeared as a result of organ damage. These include:

- Heart failure
- Stroke
- Retinal hemorrhages
- Renal failure
- Dissecting aneurysm

C. Classified by cause

1. Primary or essential or idiopathic hypertension

In the other 90% of cases, the cause of high blood pressure is not known (3,15,24,26,27). Although the specific cause is unknown, certain factors are recognized as contributing to high blood pressure.

Non-modifiable factors (15,28)

Age: The older you get the greater the likelihood that you will develop high blood pressure. This is largely due to atherosclerosis, or "hardening of the arteries."

Race: African Americans have high blood pressure more often than whites. They develop high blood pressure at a relatively younger age. Their high blood pressure and complications tend to be more severe as well.

Socioeconomic status: High blood pressure is also more common among the less educated and among lower socioeconomic groups. Residents of the southeastern United States, both whites and blacks, are more like to have high blood pressure than Americans from other regions.

Family history (heredity): The tendency to have high blood pressure appears to run in families.

Gender: Generally, men have a greater likelihood of developing high blood pressure than women. This likelihood varies according to age and among various ethnic groups.

Modifiable factors (15,28)

Overweight (obesity): Obesity is defined as being 30% or more over your healthy body weight. It is very closely related to high blood pressure. Medical professionals strongly recommend that all obese people with high blood pressure lose weight until they are within 15% of their healthy body weight.

Sodium (salt) sensitivity: Some people have high sensitivity to sodium (salt), and their blood pressure goes up if they use salt. Reducing sodium intake tends to lower their blood pressure. Fast foods and processed foods contain particularly high amounts of sodium. Read labels to find out how much sodium are contained in food items. Avoid those with high sodium levels.

Alcohol use: Drinking more than 1 ounce of alcohol per day tends to raise blood pressure in those who are sensitive to alcohol.

Birth control pills (oral contraceptive use): Some women who take birth control pills develop high blood pressure.

Lack of exercise (physical inactivity): A sedentary lifestyle contributes to the development of obesity and sometimes high blood pressure.

Drugs: Certain drugs, such as amphetamines (stimulants), diet pills, and some pills used for cold and allergy symptoms, tend to raise blood pressure.

2. Secondary hypertension (15,29,30)

In about 10% of people, high blood pressure occurs as a symptom of another disease. In such cases, when the root cause is treated, blood pressure usually returns to normal. These causes include the following conditions:

2.1 Renal disease such as acute glomerulonephritis, pyelonephritis, diabetic nephropathy

2.2 Hormone abnormalities involving the adrenal glands or pituitary gland

2.3 Thyroid dysfunction

2.4 Drug such as contraceptive pills hormones, steroid

2.5 Coarctation of the aorta

2.6 Pheochromocytoma

2.7 Cushing's syndrome

2.8 Primary aldosteronism

2.9 Pre-eclamptic toxemia of pregnancy

2.10Tumors or other diseases of the adrenal gland

2.1.4 Symptoms

High blood pressure usually causes no symptoms. People who have high blood pressure typically don't know it until their blood pressure is measured. Sometimes people with high blood pressure have the following symptom (30):

1. Headache: headache in hypertensive patients is rarely found. The pain is usually at the occipital area in the morning. Nausea and blurred vision are usually found in severe or accelerated hypertensive cases.

2. Migraine: hypertensive patients suffer from migraine more than normal people.

3. Epistaxis: this symptom is rarely found in-patients without previous nasal disease that can be cured by controlling blood pressure.

2.1.5 Complication of hypertension (15,31)

1. Heart: high blood pressure makes the left ventricular work hard by increasing the resistance in the vascular. In the first stage, the heart is dilated which leads to an increase in left ventricular diameter. In the long term, the myocardium will lose flexibility, which causes the expansion of the left ventricular and becomes dysfunctional. The myocardium will finally be dilated and chronic heart failure occurs at this time

2. Stroke: hypertension is the leading risk factor for stroke. Very high blood pressure can make a weakened blood vessel rupture and bleed into the brain, causing a stroke. A blood clot blocking a narrowed artery can also cause a stroke.

3. Chronic kidney disease: hypertension is the second leading cause of chronic kidney disease (diabetes is the first). Hypertension not only causes kidney disease, but it also speeds the deterioration of kidney function to the point where life-saving measures, such as dialysis or kidney transplant, are needed.

4. Blood vessel damage: constant high blood pressure can damage the lining of the blood vessels. The damage can also accelerate accumulation of fatty material on blood vessel walls (atherosclerosis). This build-up, also known as plaque, narrows the walls of the blood vessels, reducing the amount of blood flowing to the body's organs. The reduced blood flow makes the heart and kidneys work harder, and over time can damage body organs. The narrowing also makes the circulation more prone to blockage by blood clots leading to heart attacks and strokes.

5. Retinopathy (eye damage): high blood pressure can cause a blood vessel to burst or bleed. This can lead to impairments such as blurred vision, or even blindness.

2.1.6 Measurement of Blood Pressure

The measurements of the status of disease control use a protocol adapted from procedures recommended by the American Heart Association (32).

- The patient should sit quietly with the back supported for 5 minutes and the arm supported at the level of the heart.

- No drink alcohol, coffee/tea, cigarette smoking and exercise for at least 30 minutes before their BP measurement.

- A standardized mercury sphygmomanometer is used, and the appropriate cuff size must be used to ensure accurate measurement. The bladder within the cuff should encircle at least 80% of the arm.

- On each occasion, take pressure in both arms; if the pressure vary by more than 5 mm Hg, use the arm with the higher pressure and that arm should be used for future measurements. Additional readings should be averaged SBP and DBP.

- Inflate the bladder quickly to a pressure 20 mm Hg above the systolic pressure and deflate the bladder 3 mm Hg every second.

- Record the first appearance (phase I) is used to define systolic blood pressure and the disappearance (phase V) is used to define diastolic blood pressure.

2.1.7 Management of hypertension (15)

In general, there is no identifiable cause for most patients with sustained arterial hypertension. If the cause is identified it should be treated in the appropriate manner. Since treatment for hypertension is usually for life, the patient and the physician are committed to a long association. It is also important to integrate the treatment of the hypertension into an overall program of management for associated risk factors and conditions, particularly in elderly patents who are more likely to have multiple associated disorders.

2.1.8 Goals of treatment

The goal of treatment should be the maximum tolerated reduction in blood pressure. Treating SBP and DBP to targets that are less than 140/90 mm Hg is associated with a decrease in CVD complications (15,16,30). The treatments of

hypertension include both pharmacological treatment and non-pharmacological therapeutic, in which may be achieved by lifestyle modification.

1. Non-pharmacological treatment

The control of hypertension with changing habits concerning health perspective. Not only they could reduce the blood pressure, they could reduce the complications in which endanger the crucial organs. The basis of treatment for all patients with hypertension is a practical implementation of non-pharmacological therapeutic modalities. These include reduction of body weight to levels as close to the "ideal" as is possible (less than 15% of ideal body weight), restriction of daily dietary sodium intake to less than 100 mmol (approximately 2 to3 g of sodium or approximately 5 g of salt), avoidance of all tobacco products, moderation in the use of alcohol (to less than 1 oz of distilled spirits or their equivalent daily), exercise, and deal with the stress, they could reduce the expenditure (33). Non-pharmacological treatment could reduce SBP 10-15 mm Hg and DBP 6-10 mm Hg. As many as 20 to 25% of patients with mild hypertensive can become normotensive with nonpharmacologic interventions (34).

2. Pharmacological treatment

Nowadays, the medicines to control hypertension could be categorized into 7 groups, which are:

- Diuretics
- Beta-adrenergic receptor blockers
- Alpha- adrenergic receptor blockers
- Centrally acting adrenergic inhibiting compounds
-Angiotensin Converting Enzyme inhibitor (ARBs) or ACE inhibitor
- Calcium antagonist
- Vasodilator

Weber (35) suggest that in early stage of treatment, Vasodilator, ACE inhibitor, Calcium antagonist, Alpha- adrenergic receptor blockers are often used to decrease blood pressure and reduce water congestion in arteries in addition diuretic and β- blockers. But Thiazide-type diuretics enhance the antihypertensive efficacy of multidrug regimens, can be useful in achieving BP control, and are more affordable than other antihypertensive agents. Despite these findings, diuretics remain underused

(36). Diuretics should be used as initial therapy for most patients with hypertension, either alone or in combination with 1 of the other classed (ACE inhibitor, ARBs, β-blockers, Calcium channel blockers (CCBs)) demonstrated to be beneficial (33). The lists of compelling indications requiring the use of other antihypertensive drugs as initial therapy are listed in Table 3 (16). If a drug is not tolerated or is contraindicated, then 1 of the other classes proven to reduce cardiovascular events should be used instead. Most patients with hypertension will require 2 or more antihypertensive medications to achieve their BP goals. Addition of a second drug from when use of a single drug inadequate doses fails to achieve the BP is more than 20/10 mm Hg above goal, consideration should be given to initialing therapy with 2 drugs, either as separate prescriptions or in fixed dose combinations (Figure 1). The initial of drug therapy with more than 1 agent may increase the likelihood of achieving the BP goal in a more timely fashion, but particular caution is advised in those at risk for orthostatic hypotension, such as patients with diabetes, autonomic dysfunction, and some older persons. Use of generic drugs or combination drugs should be considered to reduce prescription costs.

Figure 2. Algorithm for Treatment of Hypertension (16)

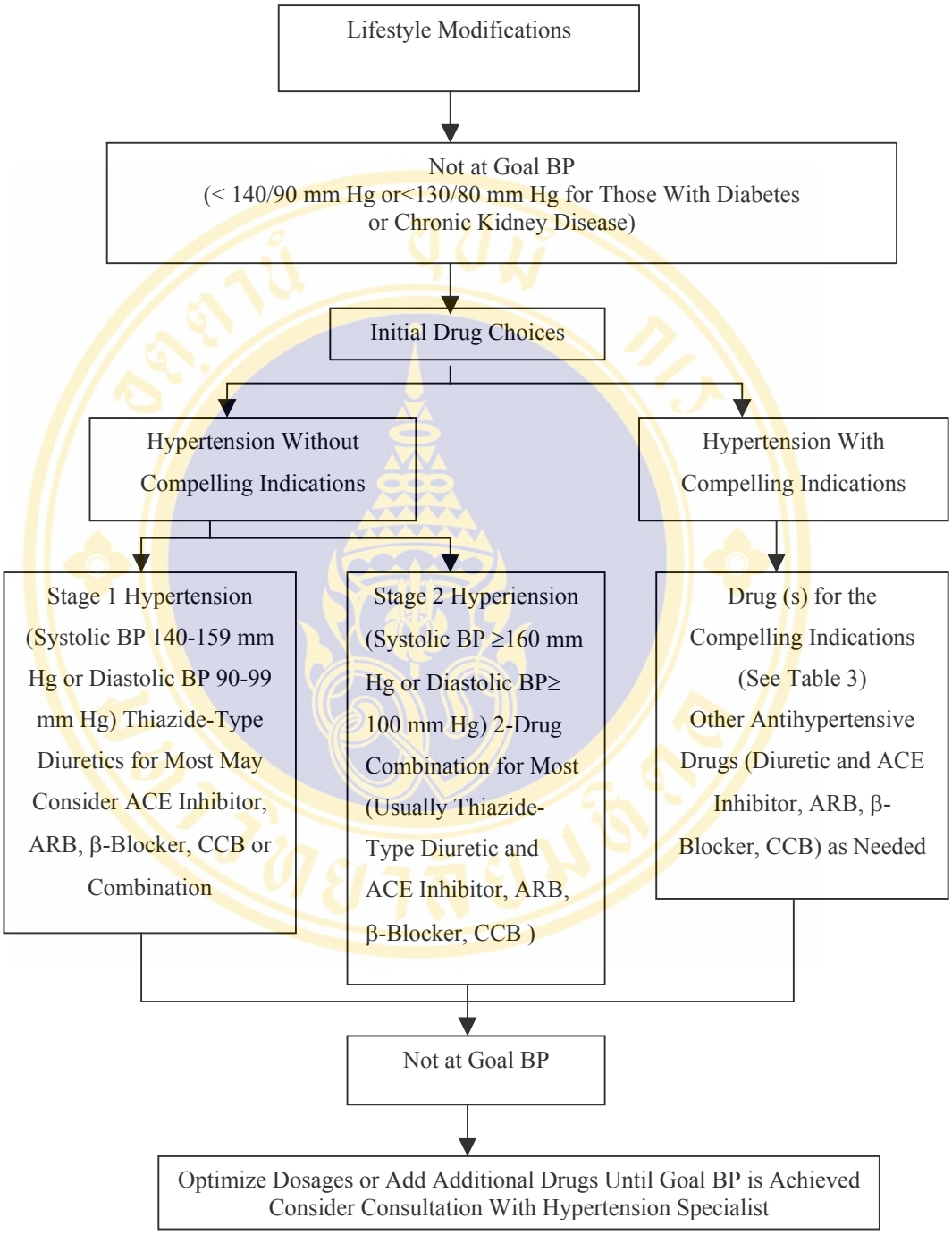


Table 3. Guideline Basis for Compelling Indications Drug Classes (16)

High-Risk Conditions With Compelling Indication	Recommended Drugs					
	Diuretic	β-Blocker	ACE Inhibitor	ARB	CCB	Aldosterone Antagonist
Heart failure	•	•	•	•		•
Post-myocardial infarction		•	•			•
High coronary disease risk	•	•	•		•	
Diabetes	•	•	•	•	•	
Chronic kidney disease			•	•		
Recurrent stroke prevention	•		•			

2.2 Health behavior of hypertensive patients

2.2.1 Definition of health behavior

Suwan (37) defined the meaning of health behavior as the same general behaviors but focused only on health characteristics, for example, performance in keeping clean, taking a bath, and brushing teeth.

Lukpoua & Duangcumsawat (38) defined the meaning of health behavior as the performance and mental status of person in conducting or not conducting something that may affect his health. An individual will use his knowledge, comprehension, attitudes and suitable health behaviors for maintaining health status.

Health behavior refers to those actions (or inaction) we take that directly or indirectly affect our health status or well being (39,40).

In this study, health behaviors are defined as actions or daily activities that may control and prevent complications, and maintain health status.

Health behavior consist of (39,40):

1. Preventive Behavior denotes those actions undertaken by persons who believe they are well, and who are not experiencing any signs or symptoms of illness, for the purpose of remaining well. This usage confines "health behavior" to preventive actions. These behaviors are duration of sleep; eating habits, weight management, physical recreational activity, including active sport, swimming or walking, hunting or fishing, consumption of alcoholic beverages, not smoking, wearing seat belts and motor cycle helmets.

2. Illness Behavior comprises those actions undertaken by persons who are uncertain about whether they are well; who are troubled or puzzled by bodily sensations or feelings that they believe may be sings or symptoms of illness; who want to clarify the meaning of these experiences**.** Illness behavior include – but are not limited to- responses to bodily signs and symptoms; seeking opinions and advice from persons who are believed to have health expertise, whether they are officially recognized by the larger society (health care professionals); and advice from relatives, friends, neighbors, colleagues; as well as doing nothing but waiting to see whether the unusual sings or symptoms go away.

3. Sick-Role Behavior denotes those actions undertaken by persons who have already been designated as being sick, either by others or by themselves. Such behaviors include – but are not limited to- acceptance of a medically prescribed regimen; limitation of activity and actions related to recovery and rehabilitation.

2.2.2 The Relationship between lifestyle and health behavior (41)

Health behaviors are part of lifestyle, which is a broader concept encompassing not only behaviors and attitudes, but also an outlook or philosophy of life. Life-style is a person's way of life. Some aspects of life-style are chosen by the individual, while others may be determined. Life-style and health behaviors are closely interrelated so changes in one usually affect the other. Therefore, as changes occur throughout the life cycle, modifications occur in both life-style and health behavior to accommodate the life change.

2.2.3 Lifestyle modifications for hypertensive patients

Adoption of healthy lifestyles by all individuals is critical for the prevention of high BP and can reduce other cardiovascular risk factors at little cost and with minimal risk (42). Lifestyle modifications, as initial therapy for most patients- at least for the first 3 to 6 months after recognition of their hypertension (43). Lifestyle modifications for hypertensive patient consist of:

1. Moderation of dietary sodium

Epidemiologic data demonstrate a positive association between sodium intake and level of blood pressure (17,44). A high sodium intake may active pressure mechanism and cause water retention. This increase blood pressure may be caused by the increased blood volume. Sodium, in the form of sodium chloride or table salt. Individual response of blood pressure to variation in sodium intake differs widely. Seventy-five percent of sodium intake is derived from processed food. Moderate sodium reduction to a level of 2.4 grams per day (6 grams of sodium chloride per day or 110 mmol per day) for prevention and treatment of hypertension (45). Besides excess caloric consumption is the cause of dyslipidemia that is a major independent risk factory coronary artery disease.

Dietary assessment methods (46-48)

Assessment of food consumption and nutrient intake can be classified as follows:

1. Dietary assessment method at the present

1.1 Diet Records

The respondent records the foods and beverages and the amounts of each consumed over a period of days. The amounts consumed may be measured, with a scale or estimated using model, and pictures. Typically, no more than 3 or 4 consecutive days are included. This method has the potential for providing quantitatively accurate information on food consumed during the recording period, if the respondents were recalling portion sizes of foods eaten previously. But recording periods of more than 7 consecutive days are usually unsatisfactory because of respondent fatigue and may be underestimated.

1.2 Weight inventory

The respondent must weight all kinds of food before and after eating by themselves. Incase such the foods were not illustrated in the Nutritive Value of Thai Foods Table, its must be collected for analysis by a chemical method, a good method of nutrition survey in population.

2. Dietary assessment method in the past

2.1 Recall of actual intake or 24-hour recall

The respondent is asked to remember and report all the foods and the beverages consumed in the preceding 24 hours. The recall typically is conducted by personal interview. Because of the immediacy of the recall period, respondents generally are able to recall most of their dietary intake. But individuals may not report their food consumption accurately for various reasons related to memory and the interview situation.

2.2 Recall of usual intake or dietary history

Diet assessment method about usual pattern of eating, a food list asking for frequency usually eaten, divided into 2 group:

- Food frequency questionnaires (FFQ): This method approach asks respondents to report their usual frequency of consumption of each food from a list of foods for a specific period such as number of time per day or per week. This most commonly are used to rank or group study subjects of the purpose of assessing the association between dietary intake and disease risk. Because the costs of data collection and processing and the respondent burden are typically much lower than multiple diet records or recalls.

- Semiquantitative food frequency questionnaires: This method is used to indicate general food frequency questionnaires that allow for and specify portion sizes as part of each question.

2. Increased physical activity

Regular aerobic physical activity can prevent and control hypertension (3). Because exercise maintains the elasticity of the arterial walls and thus retards the arteriosclerotic process (hardening of the arteries). It also increases the efficiency of peripherals blood distribution and return. Moreover, exercise can also help to reduce

the effects of psychological an emotional stress. The mechanisms of stress reduction are not well understood, and much research is being done to try to explain how exercise reduces stress (49). Blood pressure can be lowered with moderately intense physical activity, such as brisk walking at least 30 minutes per day, most day of the week (16). Two types of exercise can be discussed (50).

2.1 Isotonic exercise is active muscle movement involving a change in the muscle length with minimal tension difference. This includes swimming, running, brisk walking, bicycle, golf, walking with arm swing, aerobic dance, jogging and other physical exercise. Regular aerobic physical activity – achieve at least a moderate level of physical fitness – can enhance weight loss and functional health status and reduce the risk for cardiovascular disease and all – cause mortality (51).

2.2 Isometric exercise or passive muscle activity increases muscle tension. There is minimal change in the length. This includes lifting heavy objects, weights (barbells and dumbbells) or pressing weights. The neuralgic reflexes arising from these tense muscles mediate vasoconstriction and increase the pumping action of the heart with a rapid and considerable elevation in blood pressure. Therefore, the hypertensive patient should be avoided from isometric exercise (5).

3. Management of stress

Taylor (52) said that stress is the process of appraising events (as harmful, threatening, or challenging), of assessing potential responses, and of responding to those events; response may include physical, emotional, cognitive, and behavioral changes.

There are many different types of stressors. Each day individuals encounter stressful situations that may be exposure to heat, cold, noise and other environment conditions. Most have experienced problems with family members, concern over money, or arguments with loved ones (53). Stress can affect the circulatory system. It can increase the resistance of blood vessels and cardiac output by stimulating the sympathetic nervous systems. Resulting in increased vasoconstriction and an increased heart rate (5). Patients can practice relaxation skills i.e. progressive muscle relaxation, mediation, yoga and biofeedback, etc. which important for patients. Practice relaxation can make response to plasma

norepinephrine, which reduce heart rate, reduce blood pressure and reduce respiratory rate. These techniques have been sued in the management of hypertensive patients. Then, patients should be used a technique comfortable to them, and to do once or twice daily for twenty minutes (30).

4. Moderate of alcohol intake

Excess alcohol intake is an important risk factor for high blood pressure can cause resistance to antihypertensive therapy (18), and a risk factor for stroke (54). The hypertensive patients are recommended to limit their daily intake to no more than 1 oz (30ml) of ethanol, which is equivalent to 24 oz (720ml) of beer, 1 oz (300ml) of wine, or 3 oz (90ml) of 100-proof whiskey (45). Because women absorb more than men and lighter weight people are more susceptible than heavier people to the effects of alcohol, these groups should be counseled to limit their intake to no more than 0.5 oz (15ml) of ethanol per day (55).

5. Weight reduction

Excess body weight is correlated closely with increased blood pressure. Weight reduction, of as little as 4.5 kg (10lb.), reduces blood pressure in a large proportion of overweight persons with hypertension (56). Tuck et al. (57) found that decrease in plasma renin activity as well as aldosterone. Finally, weight reduction associated with increased insulin sensitivity and lowered insulin levels. In addition, weight reduction leads to a lower cardiac output without a significant alternation in peripheral vascular resistance. In overweight patients with hypertension, weight reduction enhances the blood pressure-lowering effect of concurrent antihypertensive agents and can significantly reduce concomitant cardiovascular risk factors, such as diabetes and dyslipidemia (58). Many patients do not know what their desirable weight should be. Therefore, all patients with hypertension who are above their desirable weight should be prescribed an individualized, monitored weight reduction program involving caloric restriction and increased physical activity (45).

2.2.4 Compliance with treatment

Compliance or adherence can be defined as maintenance of an assigned therapeutic regimen (59). The therapeutic regimen may include directions that are additive to the patient's lifestyle, such as medications or exercise, and restrictive diet.

McInnes (60) defined the meaning of compliance as acting in accordance with a desire or request, and implying that patients are simply acquiescing to their physician's instructions.

Dracup and Meleis (61) defined the meaning of compliance as the extent to which an individual chooses behaviors that coincide with a clinical prescription.

In this study, compliance with treatment is defined as the performance of hypertensive patients who compliance with medication taking and body weight control.

Essential hypertension is a chronic disease that can not be cured but can blood pressure control to normal level if a patient receives treatment continually and have proper self-care. Despite the availability of effective treatment, over half of the patients being treated for hypertension drop out of care entirely within a year of diagnosis (62) and of these who remain under medical supervision only about 50% take at least 80% of their prescribed medications (63). Consequently, because of noncompliance to antihypertensive treatment, approximately 75% of patients with diagnosis of hypertension do not achieve optimum blood pressure control (64). Therefore, compliance with treatment of hypertensive patients is necessary for treatment of the control of the disease.

Methods to measure of compliance

No clinical measurement of compliance approaches perfection, but clinical information can be used to marrow down the situations in which compliance measurement is most likely to be important for the care of the patient. A three-step sequence will identify most noncomplier (65).

- Nonattendance at a scheduled appointment is the first step.
- Lack of responsiveness to a usually adequate dose of treatment.

- For patients whose compliance is in doubt, particularly those who come to attention through steps 1 and 2, use the most appropriate methods as follow:

1. Direct measures

1.1 Observation

This approach would be limited to a few inpatient trials or those outpatient trails in which patients are required to come a clinic to receive medicine each time it is to be taken. Even in those situations, some patients are not compliant. For example, they may " check" their medicine or merely pretend to put it in their mouth. If this is suspected, it may be possible to assay blood or urine samples (66).

1.2 Biological Markers

Markers are sometimes added as a means of determining compliance when assays are unavailable to measure the level of medicine or its metabolites present in a plasma or urine sample. Markers are also considered for clinical trails in which a placebo is used. That marker that is added must be (a) nontoxic at doses added, (b) stable in biological fluids, (c) easily detected by methods that are sensitive and specific, and (d) biologically inert (65,67). It is also important that absorption and kinetic parameters are similar to those of the medicine it is combined with.

1.3 Levels in biological fluids

This method are most accurate, but they are often costly and available for only a small number of medications, can indicate spuriously high compliance if the patients know they are being tested (65,68). In addition, because of individual differences, variation occurs in blood level of a drug even under conditions of perfect compliance, and interpretation as a measure of compliance is complicated by potential pharmacokinetic differences between drugs and patients (68,69).

1.4 Take-up follow-up appointment

Measure compliance and count the number of missed and canceled appointment.

2. Indirect measures

2.1 Pill counts

The actual number of tablets or capsules in the drug container used by the patient is counted at each clinic visits, and the expected number to be used is also

determined. The ratio of actual pill use divided by expected pill use (time 100) give a figure that may be referred to as percent compliance. Care must be used in determining these figures, because patients often switch medicines between bottles (e.g., a "purse" bottle may be created by the patient), which could affect the numbers counted (66,68). The most obvious problem with this method is that failure to take the prescribed medication. Even in a hospital setting, there is no guarantee that patient receive their prescribed medications unless the nurse is present when the medication is swallowed (67). However, pill counts of this rigor are impractical in most clinical settings and performed on medications patients brings with them to clinic visits overrepresent compliance when compare with more tamper-proof method (66).

2.2 Electronic counters

This method may demonstrate that patients open the container the correct number of times. Despite the inability to know with certainly that patients have ingested the correct dose of medicine each time the bottle is opened. The approach is expensive, therefore often impractical for large clinical trials (65,66).

2.3 Checking prescription records

Pharmacy records demonstrate whether patients refill their prescriptions at appropriate interval (70). When this method is available but sometimes patients stockpile medicines, especially those they obtain at low cost or obtain prescription drugs from others (66,69). Therefore, obtaining refills of medicine according to a set schedule does not ensure ingestion of those medicines on schedule.

2.4 Interviews

Interviews are the most widely applicable method of measuring compliance. Physicians questions patients informally about whether the patient remembers to take their medicines as prescribed, and the physician believes the patient's compliance to be acceptable (66). Patients often tend to overestimate because of embarrassment, forget fullness, or fear. However, it is always worthwhile to ask, because the substantial numbers of patients who do admit to noncompliance are usually providing correct reports. The method of asking likely affects the accuracy of the response. Questions about compliance should not be threatening, accusative or embarrassing such as " Have you missed taking any of your medicine?" or, somewhat

indirectly and possibly in a less threatening manner, " How many pills you have missed during the previous day and week?" (65,66)

Thus, to measurement of compliance, there exits no gold standard (71) but rather a multiplicity of assessment approaches, each having its virtues and limitations.

From the study of Sackett (72) found that a nonthreatening clinical interview was 90% predictive of noncompliance in a group of hypertensive patients. Therefore, in this study, the investigator used interview method to assess compliance with treatment. Because this method the appropriate strategies in clinical settings.

2.3 Health belief model

Belief refers to a person's subjective probability judgements concerning some discriminable aspect of his world; they deal with the person's understanding of himself and his environment (73). The model that used belief indicates health behavior- The Health Belief Model (HBM) was developed initially in the 1950s by a group of social psychologists in the U.S. Public Health Service. The model explained the widespread failure of people to accept disease preventives or screening tests for the early detection of asymptomatic disease (74).

The Model was derived from social-psychological theory, primarily the work of Lewin, who conceptualized that the life spaces. Lewin (75) said that the world of the perceiver that determines what he will do and not the physical environment. An individual exists was composed of regions, some of which were positively valence, negatively valence, and relatively neutral. Illness was conceived to be regions of negative valence, which could be expected to exert a force moving the person away from that region. Regions of positive valence which pull by positive forces to that region.

Rosenstock (76) explain characteristics of the model that in order for an individual to take action to avoid a disease he would need to believe that

1. He was personally susceptible to it.
2. The occurrence of the disease would have at least moderate severity on some component of his life.
3. Taking a particular action would in fact be beneficial by reducing his susceptibility to the condition or, if the disease occurred, by reducing it severity, and

that it would not entail overcoming important psychological barriers such as cost, convenience, pain, embarrassment.

Kasl (77) suggest that behavior related to chronic illness such as diabetes, hypertension etc. Because behavior related to chronic illness refinements and distinctions in the concepts so far

1. The person's " at risk" status, in which he feels well, does not fit the conceptual definitions of either health behavior or ill behavior.

2. Staying in treatment and complying with treatment regimen in order to bring about reduction in risk requires sick-role behavior from a person who does not fell sick. Moreover, the sick-role behavior take place in a treatment setting which has minimum social and institutional support.

3. A doctor who prescribes treatment, which consists of alteration of personal habits (smoking and eating), is prescribing treatment which is less obviously medical, and where the sanctions available to the doctor are weaker.

HBM is modified by Becker (21) for predicting and explaining sick role behaviors. The model consists of:

Perceived susceptibility

In the case of sick role behaviors, some diagnosis of illness has already occurred; thus, the concept and measures of personal susceptibility must be modified. Three approaches have been employed:

- Examining the individual's estimate of the accuracy of the diagnosis; where the disease is very threatening, where there is lack of confidence in the physician or diagnostic procedure, and thus maintain a distorted view of personal susceptibility to the disease.
- The likelihood of recurrence of the illness
- Measuring the individual's subjective feelings of vulnerability to various other diseases.

Perceived severity

Although a person realizes susceptibility or complication of disease, protective behavior dose not acts until the person beliefs that disease is dangerous, can

destroy life or their ability and can affect family and community. Perceived severity refers to the person's subjective rather than to some medical or "objective" estimate of how serious the illness may be. He would thus be concerned with a disease could lead to his death, or reduce his physical for long periods of time to treatment, or disable him permanently include complex implications as the effect of disease on his job, on his family life, and social relationship. The presence of physical symptoms probably exerts an elevating or realistic affect on perceived severity, motivating the patient to follow the physician's instructions as the organic indications of illness persist. However, it should be noted that, at extremely high or low levels of anxiety, individuals remember less of the physician's instruction, and are less likely to follow those they can recall.

Perceived benefits

The acceptance of one's susceptibility to disease that is also believed to be serious was thought to provide a force leading to action. The direction that the action takes was thought to be influenced by beliefs regarding the relative effectiveness of known available alternatives and the probable effectiveness of the recommended action in reducing the disease threat. At the same time see that action itself as being inconvenient, expensive, unpleasant, painful or upsetting and time required.

2.4 Related research

2.4.1 Health behavior

Eating habit

Both epidemiological observations and clinical trails show an association between dietary sodium intake and blood pressure (17,78,79,80). Meta-analysis of 56 clinical trials in hypertensive subjects revealed an SBP/DBP reduction of 3.7/0.9 mm Hg in the hypertenive trials and 1/0.1 mm Hg in the normotensive trials associated with a 100 mmol reduction in daily sodium intake after adjustment for measurement error of urinary sodium excretion (81). Moreover, in overweight adults with high-normal BP, reduction in sodium intake was effective in lower blood pressure,

especially in the short-term (6months)(82). However, Ducher et al. (83) found that no significant correlation between blood pressure and sodium intake.

Physical activity

Regular aerobic physical activity, adequate to achieve at least a moderate level of physical fitness have been shown to be beneficial for both prevention and treatment of hypertension (15). Pescatello et al. (84) found a postexercise reduction in mean arterial pressure for 12.7 hours independent of the exercise intensity in the hypertensive group. Furthermore, mean arterial pressure was lower on exercise than on nonexercise days in the hypertension but not in the normotensive group. In controlled intervention studies, dynamic aerobic training was associated with a mean net change of 5.3/4.8 mm Hg for systolic and diastolic blood pressure, respectively (85). Meta-analysis of included studies supports the efficacy of progressive resistance exercise for reducing resting systolic and diastolic pressure in adults (86). Similar, a meta-analysis of 54 clinical trials in both hypertension and normotensive persons revealed aerobic exercise was associated with a significant reduction in mean SBP 3.8 mm Hg and DBP 2.6 mm Hg (87). In contrast, Chatchaichoavakul (88) and Lijutipoom (89) found that exercise was no significant associated with blood pressure control.

Stress

Emotional stress can raise blood pressure acutely. Power and Jalowice (90) found that well-controlled hypertensive patients had better health adjustment score and had lower blood pressure than in the uncontrolled group. Markovic et al (91) demonstrated increased cardiovascular reactivity to behavioral challenges was present among hypertensives than normotensives and among men than women. In a 10-year follow-up of 103 young men, Light et al. (92) found the highest rises in BP over time among those who responded most to laboratory stresses and who also had a positive family history of hypertension and were exposed to higher levels of daily stress. While, Vrijkottle et al. (93) found the detrimental effects of work stress are partly mediated by increased heart rate reactivity to a stressful workday, an increase in systolic blood pressure level.

Alcohol consumption

Regular alcohol consumption raises blood pressure in both men and women in different ethnic group (15). Intersalt Cooperation Research Group (17,94) demonstrated that heavy alcohol intake (3-4 or more drinks/day) had strong, significant independent associated with blood pressure in individual subjects. Frequency and quantity of alcohol consumption are important in assessing the risk of a major coronary event (95,96). Risk is lowest among men who report one to four drinks daily on five or six days a week and among women who report one or two drinks daily on five or six days a week (94). A randomized factorial study revealed that restricted alcohol intake of 440 ml/wk to 374 ml/wk led to an SBP/DBP reduction of 4.8/3.3 mm Hg (18). A reduction in daily alcohol drinking of ethanol from 56 ml to half that amount was feasible and effective in lowering blood pressure for nontreated mildly hypertensive patients who regularly consume alcohol (97). Bringe drinking increases both SBP and DBP during periods of intoxication and decreases BP while reduce blood pressure alcohol levels (98). In contrast, Lijutipoom (89) and Roochob (99) found that alcohol consumption was not associated with blood pressure control.

Compliance with treatment

Noncompliance has been identified or the predominant reason for failure of hypertension therapy. Factors associated with blood pressure control was compliance with treatment i.e. drug compliance (20,88,89,99), health condition (severity of disease and anxiety), adherence to follow-up schedule (20,88). Poonpunchai (100) found that the compliance mean score of the experiment group was significantly higher than of the control group and the level of diastolic blood pressure was reduced significantly. A trial of strategies for improving compliance found that six months later, average compliance had fallen by 1.5% in the control group but rose 21.3% in the experimental group. Blood pressure fell in 17 of 20 experimental patients (to goal of DBP below 90 mm Hg in 6) and in 10 of 18 control patients (to goal of DBP below 90 mm Hg in 2) (101).

BMI

A number of studies have confirmed that BMI or body weight was significantly associated with both systolic and diastolic blood pressure (17,19,99,102). Poor blood pressure control was overwhelmingly due to lack of systolic control to goal (<140 mm Hg) even among treated subjects. Covariates associated with lack of systolic control were older age, left ventricular hypertrophy and obesity (BMI ≥ 30 kg/m2) (103). While, several clinical trials have also shown an effect of weight reduction in lowering blood pressure (56,104,105). In contrast, Lijutipoom (89) found that BMI was not found associated with blood pressure.

Health belief

Kompayak (106), which found that perceived severity of disease associated with compliance behavior. Pasunant (107) found that there was positive relationship between perceived susceptibility, perceived benefits and barriers and therapeutic compliance, but there was no significant relationship between perceived severity and therapeutic compliance. However, Bikaew (108) and Andreoli (109) found that there were nonsignificant relationship between health beliefs and therapeutic compliance. While, Lijutipoom (89) found that health perceptions were not associated with BP control.

CHAPTER III
MATERIALS AND METHODS

Research design

This study was designed as a hospital–based cross–sectional analytic study to study the effects of health behavior and health belief on blood pressure control among essential hypertensive patients.

Study population

The target populations in this study were essential hypertensive patients who had been treated for hypertension at hypertension clinic in Somdejprachoataksinmaharaj hospital, Tak province, for at least 6 months before the beginning of the study.

Sample selection

Purposive sampling was used in this study. Inclusion and exclusion criteria for selecting subjects for this study were as follows:

Inclusion Criteria

1. The samples had to be diagnosed as essential hypertensive patients by a physician and had been treated at hypertension clinic in Somdejprachoataksinmaharaj hospital, Tak province, for at least 6 months.

2. Aged ≥ 35 years.

Exclusion Criteria

1. Aged < 35 years. To prevent misclassification because it is difficult to differentiate between essential hypertension and secondary hypertension. Essential hypertension is usually found after the age of 35.

2. Patients who did not want to participate in this study.

3. Patients who could not communicate in Thai.

4. Patients who were diagnosed as secondary hypertension e.g. coarctation of the aorta, pheochromocytoma, cushing's syndrome etc.

Study sample

The samples were divided into two groups: controlled and uncontrolled groups. Blood pressure was assessed by the average of two measurements. The subject was scheduled for follow-up visit monthly for 3 month during the study. Then, the samples were classified into 2 groups based on the following criteria:

Case (controlled group) was the hypertensive patients who had an average blood pressure lower than 140/90 mm Hg in at least 2 out of 3 visits during the study.

Control (uncontrolled group) was the hypertensive patients who had an average systolic blood pressure of140 mm Hg or greater or an average diastolic blood pressure of 90 mm Hg or greater in at least 2 out of 3 visits during the study.

Sample size estimation

The sample size estimation in each group was calculated by using the following formula (110).

$$n \equiv \frac{\left[Z_{\alpha/2}\sqrt{(c+1)\bar{P}(1-\bar{P})} + Z_{\beta}\sqrt{cP_1(1-P_1)+P_0(1-P_0)}\right]^2}{c(P_1-P_0)^2}$$

Where n = Sample size estimation in case group

Z_α = Standard statistical value, under normal distribution curve, which represent the type I error with significant level at $\alpha = .05$ ($Z_{\alpha/2} = 1.96$)

Z_β = Standard statistical value, under normal distribution curve, which represent the type II error within the acceptable level. The β value is set at 20%; $Z_\beta = 0.84$

P_0 = Exposure rate in non-case.

P_1 = $(OR \times P_0) / (OR \times P_0) + (1 - P_0)$

$$P = P_1 + C P_0 / (C+1)$$

Then, C = Ratio of control to case (57:43) = 1.32

From a pilot survey (May 8, 2002), 30 hypertensive patients were examined blood pressure, indicated that 56.66% was uncontrolled blood pressure to goal level (BP>140/90 mm Hg).

In this study, 95% confidence level and set power of test at 80%. The sample size based on Roochob's study conducted at Sainoi hospital, Nonthaburi province (99). It showed that salt intake, drug compliance were associated with blood pressure control. When the sample size was calculated by the above formula, and the sample size in each variable that is shown as in Table 4.

Table 4: The sample size in each variable.

Variable	P_0	OR	Sample size
Salt intake	0.71	2.5	105
Drug compliance	0.66	2.2	118

According to the sample size table, drug compliance was found to require the largest sample size. Therefore, the estimated sample size was 118 subjects. Because the ratio of case to control population use 1:c. Then, the total sample size of the study was 275. The sample size of 275 was selected plus 10% of the sample to compensate for anticipated incomplete responses. Therefore, the total sample size was 303 (~310).

Setting

The setting is hypertension clinic in Somdejprachoataksinmaharaj hospital, Tak province, which is a general hospital in the northern part of Thailand. This hospital provides services in all major departments e.g., gynecology, pediatrics, medicine, surgery, orthopedic, etc. Hypertension clinic is opened four days per week between 8.00-12.00 A.M. on Tuesday to Friday.

Research instrument

1. The instrument questionnaire of this study consisted of three parts as follows:

Part I: The demographic characteristics questionnaire consist of gender, age, marital status, education, occupation, income, adequacy of income, duration of disease, duration of hypertensive treatment, other concomitant diseases, and blood pressure.

Part II: Health behavior questionnaire consists of eating habit, physical activity, stress, alcohol consumption, drug compliance, and weight management.

Part III: Health belief questionnaire consists of: perceived susceptibility, perceived severity, and perceived benefits.

2. OPD card
3. The register of hypertensive patients
4. Mercury sphygmomanometer and stethoscope
5. Sliding-weight scale and height scales

Measurement of variables

1. Eating habit: was evaluated by means of food frequency questionnaire (FFQ) to evaluate frequency of food consumption of high sodium foods and high fat foods on usual week. The questionnaire was modified from a review of the literature and based on nutrition management for restrict sodium (111) and adjusted food items to suit for people in Tak province. There were fifteen items. There were 11 items about high sodium foods (1-5, 7-8, 12-15) and 4 items about high fat foods (6, 9-11). Each item was divided into five rating scales as follows:

Never	4
1-3 times/month	3
1-3 times/week	2
4-6 times/week	1
>6 times/week	0

The range of the score was between 0-60. Eating habit was determined by using the score percentile as a cut-off point, classified into 2 group as follows:

Unhealthy eating habit = the subjects who had the score < 50th percentile (total score<44).

Healthy eating habit = the subjects who had the score ≥ 50th percentile (total score≥44)

.

2. Physical activity: This part was measured by short IPAQ questionnaire (112) which were summarized according to the physical activities recorded (walking, moderate* and vigorous activity**). The short form data was used to estimated total weekly physical activity by weighting the reported minutes per week within each activity category by a MET energy expenditure estimate assigned to each category of activity. The weighted MET-minutes per week (MET-min/week) were calculated as duration ×frequency per week×MET intensity (walking=3.3 METs, moderate 4.0METs, vigorous=8.0METs). Then, total MET-min/week show as follows:

Total MET-min/week = (walk METs ×min×days)+(mod METs ×min×days)+ (vig METs ×min×days)

[** Vigorous physical activities refer to activities that take hard physical effort at least 10 minutes at a time and make breathe much harder than normal.

* Moderate physical activities refer to activities that take moderate physical effort at least 10 minutes at a time and make breathe somewhat harder than normal.]

Three levels of physical activity are proposed

1. Insufficiently active
   - No activity is reported **OR**
   - Some activity is reported but not enough to meet categories 2 or 3.
2. Sufficiently active

   Any one of the following 3 criteria

   - 3 or more days of vigorous activity of at least 20 minutes
   - 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day **OR**
   - 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activity a minimum of at least 600 MET-min/week.

3. Highly active

Any one of the following 2 criteria

- Vigorous intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**

- 7 or more days of any combination of walking, moderate-intensity or vigorous intensity activity a minimum of at least 1500 MET-min/week.

3. Stress was measured by Thai stress test (TST) questionnaire (113). It was a two-dimensional rating scale. Each scale was composed of 12 items.

The negative items were items 1-12.

The positive items were items 13-24.

There were three rating scales for each item.

	Positive item	Negative item
Often	3	0
Sometimes	1	1
Never	0	3

The following matrix in Table5 shows how the two scores are then combined to form the index of TST.

Table 5 Matrix table for the index of TST

Negative Scales score (Sum of Iem 1-12)	Positive Scales score (Sum of Iem 13-24)				
	12-36	9-11	6-8	3-5	0-2
0-1	1	2	3	4	5
2-3	2	3	4	5	6
4-5	3	4	5	6	7
6-7	4	5	6	7	8
8-36	5	6	7	8	9

Classification of stress level is based on the index of TST as follows:

Index or TST	Stress indicator
1	Excellent mental health
2,3,4	Normal mental health
5,6	Mild stress
7,8,9	Stressful

4. Alcohol consumption

Alcohol consumption was assessed by a questionnaire. Subjects were asked about type, amount (in bottles or glasses per day), and days of drinking in a typical week. Intake of alcohol (expressed in g of pure alcohol per week) was estimated from the average number of ml of ethanol in a measure of each type of alcoholic beverage, using the following assumptions:

One bottle of spirits (amount 750 ml with 40% alcohol)

One bottle of liquor (amount 750 ml with 40% alcohol)

One bottle of beer (amount 750 ml with 40% alcohol)

One bottle of wine (amount 750 ml with 40% alcohol)

The amount of alcohol consumed was calculated in [volume (ml/wk) × ml of pure alcohol × specific gravity of alcoholic (0.8)] for each type of drink. Total alcohol consumption express in g/week was translated into g of pure alcohol per day (g/day) by divided by 7 days.

Subjects were classified into 2 group as follows:

Non-drinking = the subjects who never drank alcohol in the past or quit drinking for at least 1 month.

Current drinking = the subjects who was asked how many drinks they usually had during per day, they consumed spirits, liquor, beer and wine.

5. Drug compliance: This part was modified from Morisky et. al. (114). There were 4 items in this part, and the range of the score is between 0-4. And the assessment criteria are as follows:

Item 1,3,4 If answer " Yes " = 0, " No " = 1

Item 2 If answer " Yes " = 1, " No " = 0

The levels of drug compliance were divided into 3 level by calculating as follow:

Low compliance = The subjects who had the score 0-1.

Moderate compliance = The subjects who had the score 2-3.

High compliance = The subjects who have the score 4.

6. BMI: This part used as an index of body fat and health risk. This was calculated by weight in kilograms divided by the height in meter squared, classified into 5 group as follows (115)

Underweight is defined as BMI = < 18.5 kg/m^2:

Normal weight is defined as BMI 1 = 18.5- 22.9 kg/m^2

Overweight is defined as BMI = 23- 24.9 kg/m^2

Obesity I is defined as BMI = 25- 29.9 kg/m^2

Obesity II is defined as BMI = ≥ 30 kg/m^2

7. Health belief questionnaire

The content of the Health Belief Questionnaire was derived from a review of the literature and based on the Health Belief Model for predicting and explaining the sick role behavior described by Becker (21). The Health Belief Questionnaire consisted of 12 items on which a person was asked to rate himself in three categories of health beliefs: perceived susceptibility, perceived severity, perceived benefits and the range of the score was between 0-24.

There were 6 positive items (1.1,1.2,2.3,2.4,3.1,3.4) and 6 negative items (1.3,1.4,2.1,2.2,3.2,3.3).

There were three rating scales for each item.

	Positive item	Negative item
Agree	2	0
Unsure	1	1
Not-agree	0	2

Health belief was determined by using the score of percentile as a cut-off point. Subjects were classified into 3 group as follows:

Low health belief = the subjects had the score < 34th percentile (total score <16).

Moderate health belief = the subjects who had have the score 34-66th percentile (total score = 16-17).

High health belief = the subjects who had the score equal or greater than the 67th percentile (total score ≥ 18).

Measurement of blood pressure

The investigator measured blood pressure in all subjects. The measurements of the status of disease control used a protocol adapted from procedures recommended by the American Heart Association (32)

- All subjects was asked to refrain from vigorous exercise, no drink coffee/tea/alcohol, and smoking at least 30 minutes before their blood pressure measurement.

- A standardized mercury sphygmomanometer with an appropriate cuff size was used to ensure accurate measurement. The bladder within the cuff encircled at least 80% of the arm.

- The subjects should sit quietly with the back supported for 5 minutes and so the midpoint of the upper arm is at the level of the heart.

- The subject was measured blood pressure for two times in every visit. The first measurement was taken approximately 5 minutes after the subjects were seated, and the second measurement taken approximately 5 minutes after the first. Additional readings should be averaged SBP and DBP.

- Inflate the bladder quickly to a pressure 20 mm Hg above the systolic pressure and deflate the bladder 3 mm Hg every second.

- Record the first appearance (phase I) was used to define systolic blood pressure and the disappearance (phase V) is used to define diastolic blood pressure.

- Body weight was measured by sliding-weight scales and the subjects must wear light clothes, take off shoes; and not carry heavy objects.

Validity and Reliability

1. Content validity

The questionnaires were inspected by principle adviser and co-adviser to validate the content in accordance with the objective of the research. Then, the questionnaires were improved according to their recommendations.

2. Reliability

Reliability was calculated by using test-retest reliability 1 week later in 30 subjects who had similar characteristics to those of the subjects at hypertension clinic of Somdejprachoataksinmaharaj hospital. The intraclass correlation coefficients in each part of the questionnaire were as follows:

Eating habit	=	0.82
Stress	=	0.90
Drug compliance	=	0.84
Health belief	=	0.71

3. The mercury sphygmomanometer and sliding-weight scales were standardized by the technician working in Somdejprachoataksinmaharaj hospital.

Data Collection

Steps in data collection were as follow:

1. The introduction letter from the Dean of the Faculty of Graduate Studies, Mahidol University was presented to the director of Somdejprachoataksinmaharaj hospital for permission to collect the data. In addition, the investigator explained the objectives of the research about the detail of data collection to the head nurses and the head of the outpatient department, and physician for their collaboration.

2. The investigator selected the patients who followed up at hypertension clinic from OPD cards according to inclusion and exclusion criteria.

3. Before the patients met the physician according to their appointment, the investigator introduced her to the patients; explained the objectives of the research; and asked for their cooperation. Inform consent was obtained from each participant before data collection.

4. The first measurement was taken approximately 5 minutes after the subjects were seated, and the second measurement taken approximately 5 minutes after the first. Blood pressure was assessed by the average of two measurements. The investigator collected the data by an interview and recorded data in the interviews including the demographic characteristic data, data from medical record, data of health behavior, and data of health belief. During the interview, if the patients did not understand the questions, the investigator explained until the patients clearly understand them.

5. After the interviews had been conducted for about 15-20 minutes, the investigator checked the answers for completeness. If there were not completeness in any item, the investigator would ask the patients to complete the interviews. Finally, the investigator thanked the patients for their cooperation.

Protect of the human subjects

Before collecting data, the investigator provided the consent form (Appendix A) to the subjects for protection of the human subjects. The participants were free to refuse to answer any question that they did not want to discuss. The individual answer would be kept confidential and only whole result would be reported.

Data Analysis

Data were analyzed by Statistical Package of Social Science (SPSS/PC+) for windows version 10.0. A P -value <0.05 obtained in a two-tailed test was considered to be statistically significant. Statistics used for analysis (116-118);

1. Descriptive statistics: frequency, percentage, mean, median, standard deviation, and interquartile range were calculated to describe demographic characteristics.

2. Analytic statistics

2.1 Univariate analysis were used to find the association between health behavior and health belief in blood pressure control by using Chi-square test (χ^2) and finding the Odd Ratio with statistical significance by using 95% CI and P-value.

2.2 Multivariate analysis (multiple logistic regression analysis method) was used to reduce the affect of confounders on blood pressure control.

CHAPTER IV
RESULTS

Data collection was conducted at Somdejprachoataksinmaharaj Hospital. Three hundred and ten hypertensive cases were recruited in the study.

The results of study are presented as follows:

1. Blood pressure control
2. Demographic characteristics
3. Univariate analysis of various variables associated with blood pressure control.
4. Multiple logistic regression analysis of various variables predicting blood pressure control.

1. Blood pressure control (Table 6)

About three-quarters of the subjects had either systolic blood pressure 140 mmHg or greater or diastolic blood pressure of 90 mmHg or greater (75.8 %). Only 24.2 % of the subjects had blood pressure lower than 140/90 mm Hg.

Table 6: Number and percentage of essential hypertensive patients by blood pressure control

Blood pressure control	Subjects	
	Number (n = 310)	Percent
- Controllable (lower than 140/90 mm Hg)	75	24.2
- Uncontrollable(140/90 mm Hg or higher)	235	75.8

2. Demographic characteristics

Demographic characteristics and comparison gender, age, marital status, education, occupation, income, adequacy of income, duration of disease, duration of treatment, and other concomitant diseases between controlled and uncontrolled groups were presented in Table 7.

Gender

More than halves of subjects in controlled and uncontrolled groups were female (78.7% and 64.3% respectively). The ratio of male to female in controlled and uncontrolled groups were 1:3.69 and 1:1.80. There was gender difference between controlled and uncontrolled group.

Age

The largest age group of both controlled and uncontrolled groups was 60 – 69 years old (38.7% and 32.8% respectively). Only 2.7% of controlled group and 1.7% of uncontrolled group were in the age group of 40 years or younger. The mean age of controlled group was 63.65 years old (SD = 10.01). The mean age of uncontrolled group was 62.40 years old (SD = 10.10). Age distribution and mean age were not different between controlled and uncontrolled group.

Marital status

About two third of the controlled and uncontrolled groups were married (61.3% and 66.0% respectively). The smaller group of controlled and uncontrolled groups were widowed, divorced or separated (38.7% and 29.4% respectively). Marital status was not different between controlled and uncontrolled group.

Education

The largest group of controlled and uncontrolled groups had completed primary school (77.3% and 66.0% respectively). A smaller group of controlled and uncontrolled group had completed secondary school (10.7% and 13.6% respectively). Education was not different between controlled and uncontrolled groups**.**

Occupation

The majority of controlled and uncontrolled groups worked at home (64.0% and 63.8% respectively). A smaller group of controlled and uncontrolled groups were

vendor (12.0% and 14.5% respectively). Occupation was not different between controlled and uncontrolled group.

Income

Almost half of controlled group (48.0%) and uncontrolled group (45.1%) had income of 1,001 to 5,000 bahts per month. A smaller group of controlled and uncontrolled group had income equal or lower than 1,000 bahts per month (29.3% and 29.8% respectively). Controlled group had income range between 0 and 30,000 bahts per month. Uncontrolled group had income between range 0and 27,000 bahts per month. The median income of controlled and uncontrolled groups was 2,000 bahts per month. There was no difference between controlled and uncontrolled groups in terms of income distribution and median income.

Adequacy of income

The majority of controlled and uncontrolled groups had inadequate income (41.3% and 40.4% respectively). The smaller group of controlled and uncontrolled group had adequate income but no saving (40.0% and 39.1% respectively). Adequacy of income was not different between controlled and uncontrolled group.

Duration of disease (Table 8)

About half of controlled group (57.3%) and uncontrolled group (50.2%) had had hypertension for 1 to 5 years. The smaller group of controlled group had had hypertension for 6 to10 years (18.7%) while the smaller group of uncontrolled group had had hypertension for 10 years or more (23.4%). Controlled group had hypertension ranged from 1 to 31 years. The median duration of disease within controlled group was 4 years. Uncontrolled group had hypertension ranged from 1 to 29 years. The median duration of disease within uncontrolled group was 5 years. Duration of disease was not different between controlled group and uncontrolled group.

Duration of hypertensive treatment (Table 8)

A little more than half of controlled group (56.0%) and uncontrolled group (51.9%) had treatment for 1 to 5 years. The smaller group of controlled and uncontrolled groups had treatment for 6 to10 years (18.7% and 20.9% respectively). Controlled group had treatment ranging from 1 to 31 years. The median duration of hypertensive treatment of controlled group was 4 years. Uncontrolled group had

treatment ranging from 1 to 29 years. The median duration of hypertensive treatment of uncontrolled group was 5 years. Duration of hypertensive treatment was not different between controlled and uncontrolled groups.

Concomitant diseases (Table 8)

Coronary artery disease

Almost all of controlled and uncontrolled groups did not have coronary artery disease (82.7% and 87.7% respectively). The minority of controlled and uncontrolled groups had coronary artery disease (17.3% and 12.3% respectively). Prevalence of coronary artery disease was not different between controlled and uncontrolled groups.

Stroke

Almost all of controlled and uncontrolled groups did not have stroke (92.0% and 88.5% respectively). The minority of controlled and uncontrolled groups had stroke (8.0% and 11.5% respectively). Prevalence of stroke was not different between controlled and uncontrolled groups.

Diabetes

The majority of controlled and uncontrolled groups did not have diabetes (73.3% and 70.6% respectively). The minority of controlled and uncontrolled groups had diabetes (26.7% and 29.4% respectively). Prevalence of diabetes was not different between controlled and uncontrolled groups.

Chronic renal failure

All of uncontrolled group (100.0%) and almost all of uncontrolled group (98.7%) did not have chronic renal failure. The minority of uncontrolled group had chronic renal failure (1.3%). Prevalence of chronic renal failure was not different between controlled and uncontrolled groups.

Congestive heart failure

Almost all of controlled and uncontrolled groups did not have congestive heart failure (94.7% and 96.2% respectively). The minority of controlled and uncontrolled groups had congestive heart failure (5.3% and 3.8% respectively). Prevalence of congestive heart failure was not different between controlled and uncontrolled groups.

Table 7: Demographic characteristics of controlled and uncontrolled groups.

Factors	Controlled group (%) N = 75	Uncontrolled group (%) N = 235	p-value
Gender			
- Male	16 (21.3)	84 (35.7)	0.029
- Female	59 (78.7)	151 (64.3)	
Age			
- < 40 years	2 (2.7)	4 (1.7)	0.528 #
- 40 – 49 years	5 (6.7)	21 (8.9)	
- 50 – 59 years	16 (21.3)	71 (30.2)	
- 60 –69 years	29 (38.7)	77 (32.8)	
- ≥ 70 years	23 (30.7)	62 (26.4)	
Range (years)	38-87	36-88	
Mean age (years), SD	63.65, 10.01	62.40, 10.10	0.349ϕ
Marital status			
- Single	0 (0)	11 (4.7)	0.072 #
- Married	46 (61.3)	155 (66.0)	
- Widowed, divorced, separated	29 (38.7)	69 (29.4)	
Education			
- No education	2 (2.7)	18 (7.7)	0.253#
- Primary school	58 (77.3)	155 (66.0)	
- Secondary school	8 (10.7)	32 (13.6)	
- Diploma	3 (4.0)	20 (8.5)	
- Bachelors' degree	4 (5.3)	10 (4.3)	

#Pearson chi-square, ϕ t-test

Table 7: Demographic characteristics of controlled and uncontrolled groups (Cont.)

Factors	Controlled group (%) N = 75	Uncontrolled group (%) N = 235	p-value
Occupation			
- Housewife or unemployed	48 (64.0)	150 (63.8)	0.587#
- Farmer	5 (6.7)	13 (5.5)	
- Laborer	7 (9.3)	15 (6.4)	
- Vendor	9 (12.0)	34 (14.5)	
- Enterprise	3 (4.0)	4 (1.7)	
- Government and office employee	3 (4.0)	19 (8.1)	
Monthly income			
- ≤1,000 bahts	22 (29.3)	70 (29.8)	0.310#
- 1,001 – 5,000 bahts	36 (48.0)	106 (45.1)	
- 5,001 – 10,000 bahts	4 (5.3)	29 (12.3)	
- ≥10,001 bahts	13 (17.3)	30 (12.8)	
Min-Max	0-30,000	0-27,000	
IQR** (bahts)	1,000-5,000	1,000-5,800	
Median (bahts)	2,000	2,000	0.785M
Adequacy of income			
- Inadequate	31 (41.3)	95 (40.4)	0.947#
- Adequate but no saving	30 (40.0)	92 (39.1)	
- Adequate with saving	14 (18.7)	48 (20.4)	

#Pearson chi-square, ** Interquartile range (IQR) = $Q_1 - Q_3$

M Mann-Whitney test

Table 8: Health history of controlled and uncontrolled groups

Factors	Controlled group (%) (N = 75)	Uncontrolled group (%) (N = 235)	p-value
Duration of disease			
- < 1 years	6 (8.0)	11 (4.7)	0.335#
- 1 – 5 years	43 (57.3)	118 (50.2)	
- 6 – 10 years	14 (18.7)	51 (21.7)	
- > 10 years	12 (16.0)	55 (23.4)	
Min-Max	1-31	1-29	
IQR** (years)	2-8	2-10	
Median (years)	4	5	0.066M
Duration of hypertensive treatment			
- < 1 years	7 (9.3)	17 (7.2)	0.774#
- 1 – 5 years	42 (56.0)	122 (51.9)	
- 6 – 10 years	14 (18.7)	49 (20.9)	
- > 10 years	12 (16.0)	47 (20.0)	
Min-Max	1-31	1-29	
IQR** (years)	2-7	2-10	
Median (years)	4	5	0.254M
Concomitant diseases			
Coronary heart disease			
- Yes	13 (17.3)	29 (12.3)	0.365
- No	62 (82.7)	206 (87.7)	
Stroke			
- Yes	6 (8.0)	27 (11.5)	0.523
- No	69 (92.0)	208 (88.5)	

#Pearson chi-square, ** Interquartile range (IQR) = $Q_1 – Q_3$, M Mann-Whitney test

Table 8: Health history of controlled and uncontrolled group (Cont.)

Factors	Controlled group (N = 75)	Uncontrolled group (N = 235)	p-value
Diabetes			
- Yes	20 (26.7)	69 (29.4)	0.762
- No	55 (73.3)	166 (70.6)	
Chronic renal failure			
- Yes	0 (0)	3 (1.3)	1.00[E]
- No	75 (100)	232 (98.7)	
Congestive heart failure			
- Yes	4 (5.3)	9 (3.8)	0.582[E]
- No	71 (94.7)	226 (96.2)	

[E] Fisher Exact Test

In this study during data was collected for 1 month. The investigator found that the subjects who compatible with inclusion and exclusion criteria were four hundred and forty-one. Three hundred and ten hypertensive cases were recruited in the study but the other was not recruited. When compared the demographic characteristic of study and non-study groups found that gender, age marital status, occupation, duration of disease, duration of hypertensive treatment and concomitant diseases were not different between study and non-study groups (Table 9-10). So that, the study population could represented the general hypertensive patients in Somdejprachoataksinmaharaj hospital.

Table 9: Demographic characteristics of study and non-study groups.

Factors	Study group (%) N = 310	Non-study group (%) N = 131	p-value
Gender			
- Male	100 (32.3)	40 (30.5)	0.808
- Female	219 (67.7)	91 (69.5)	
Age			
- < 40 years	6 (1.9)	2 (1.5)	0.913 #
- 40 – 49 years	26 (8.4)	9 (6.9)	
- 50 – 59 years	87 (28.1)	42 (32.1)	
- 60 –69 years	106 (34.2)	42 (32.1)	
- ≥ 70 years	85 (27.4)	36 (27.5)	
Range (years)	36-88	38-82	
Mean age (years), SD	62.70, 10.01	62.9, 9.66	0.672ϕ
Marital status			
- Single	11 (3.5)	3 (2.3)	0.780 #
- Married	201 (64.8)	87 (66.4)	
- Widowed, divorced, separated	98 (31.6)	41 (31.3)	
Occupation			
- Housewife or unemployed	198 (63.9)	83 (63.4)	0.968#
- Farmer	18 (5.8)	6 (4.6)	
- Laborer	22 (7.1)	9 (6.9)	
- Vendor	43 (13.9)	22 (16.8)	
- Enterprise	7 (2.3)	3 (2.3)	
- Government and office employee	22 (7.1)	8 (6.1)	

#Pearson chi-square, ϕ t-test

Table 10: Health history of study and non-study groups

Factors	Study group (%) N = 310	Non-study group (%) N = 131	p-value
Duration of disease			
- < 1 years	17 (5.5)	8 (6.1)	0.661#
- 1 – 5 years	161 (51.9)	64 (48.9)	
- 6 – 10 years	65 (21.0)	24 (18.3)	
- > 10 years	67 (21.6)	35 (26.7)	
Min-Max	1-31	1-29	
IQR** (years)	2-10	2-10	
Median (years)	5	5	0.515M
Duration of hypertensive treatment			
- < 1 years	24 (7.7)	13 (9.9)	0.439#
- 1 – 5 years	164 (52.9)	64 (48.9)	
- 6 – 10 years	63 (20.3)	22 (16.8)	
- > 10 years	59 (19.0)	32 (24.4)	
Min-Max	1-31	1-29	
IQR** (years)	2-10	2-10	
Median (years)	5	5	0.696
Concomitant diseases			
Coronary heart disease			
- Yes	42 (13.5)	17 (13.0)	0.994
- No	268 (86.5)	114 (87.0)	
Stroke			
- Yes	277 (89.4)	121 (92.4)	0.425
- No	33 (10.6)	10 (7.6)	

#Pearson chi-square, ** Interquartile range (IQR) = $Q_1 - Q_3$, M Mann-Whitney test

Table 10: Health history of study and non-study groups (Cont.)

Factors	Study group (%) (N = 75)	Non-study group (%) (N = 235)	p-value
Diabetes			
- Yes	89 (28.7)	38 (29.40	1.000
- No	221 (71.3)	93 (71.0)	
Chronic renal failure			
- Yes	3 (1.0)	2 (1.5)	0.636[E]
- No	307 (99.0)	129 (98.5)	
Congestive heart failure			
- Yes	13 (4.2)	5 (3.8)	1.000[E]
- No	297 (95.8)	126 (96.2)	

[E] Fisher Exact Test

3. The association between factors and blood pressure control by univariate analysis

3.1 Health behavior (Table 11)

Eating habit

Eating habit was divided into 2 groups: 1) the patients with the score equal or greater than the 50th percentile (total score ≥ 44) had healthy eating habit, 2) the patients with the score lower than the 50th percentile (total score <44) had unhealthy eating habit. About half of controlled group and uncontrolled group had healthy eating habit (50.7% and 51.5% respectively). A smaller group of controlled and uncontrolled groups had unhealthy eating habit (49.3% and 34.5% respectively). There was no significant association between blood pressure control and eating habit (p-value = 1.00).

Physical activity

Physical activity was categorized into 3 levels according to the score from IPAQ short form instrument: 1) highly active, 2) sufficiently active, and 3) insufficiently active. Most of controlled and uncontrolled groups had insufficiently activity (46.7% and 47.2%respectively). A smaller group of controlled and uncontrolled groups had sufficient activity (38.7% and 40.9% respectively). There was no significant association between physical activity and blood pressure control (p-value = 0.813)

Stress

Stress was categorized into 2 groups: non-stress group (excellent or normal), and stress group (mild stress or stressful). It could not be divided into four groups because the sample size was inadequate. Most of controlled and uncontrolled group was in stress group (81.3% and 93.6% respectively). Uncontrolled group had stress 3.37 times more than controlled group. (OR = 3.37, 95%CI = 1.54 – 7.36, p-value = 0.004).

Alcohol consumption

Alcohol consumption was categorized into 2 groups: 1) Non-drinking included the patients who drank alcohol less than 0.5 g/day or quit drinking for at least 1 month. 2) Current drinking included the patients who drank alcohol 0.5 g/day or more. Most of controlled and uncontrolled groups did not drink alcohol (93.3% and 94.9% respectively). A smaller group of controlled and uncontrolled groups drank alcohol (6.7% and 5.1% respectively). There was no significant association between alcohol drinking and blood pressure control (p-value = 0.822).

Drug compliance

Drug compliance was categorized into 2 groups: 1) high drug compliance, 2) moderate or low drug compliance. It could not be divided into three groups because the sample size was inadequate. Most of controlled group had high drug compliance (54.7%) while uncontrolled group had moderate or low drug compliance (71.9%). Controlled group was 3.09 times more than uncontrolled group to have high drug compliance. (OR = 3.09, 95%CI = 1.81 – 5.28, p-value < 0.001).

Body mass index

About half of controlled and uncontrolled groups had obesity (53.3 % and 59.6 % respectively). The smaller group of controlled group had underweight or normal weight (30.7%) while those of uncontrolled group had overweight (20.9%). The mean BMI of controlled group was 25.51 kg/m^2 (SD = 4.26) and the mean BMI of uncontrolled group was 26.07 kg/m^2 (SD = 4.17). There was no significant association between BMI and blood pressure control (p-value = 0.226).

Table 11: Association between health behavior and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
Eating habit							
- Healthy	38	50.7	121	51.5	0.97	0.58-1.63	1.00#
- Unhealthy*	37	49.3	114	48.5	1.00		
Physical activity							
- Highly active	11	14.7	28	11.9	1.25	0.56-2.76	0.813#
- Sufficiently active	29	38.7	96	40.9	0.96	0.55-1.68	
- Insufficiently active*	35	46.7	111	47.2	1.00		
Stress							
- Excellent or normal	14	18.7	15	6.4	3.37	1.54-7.36	0.004#
- Mild stress or stressful*	61	81.3	220	93.6	1.00		
Alcohol consumption							
- No	70	93.3	223	94.9	0.75	0.26-2.21	0.822
- Yes*	5	6.7	12	5.1	1.00		
Drug compliance							
- High	41	54.7	66	28.1	3.09	1.81-5.28	<0.001#
- Moderate or low*	34	45.3	169	71.9	1.00		

*Reference group, #Pearson chi-square

Table 11: Association between health behavior and blood pressure control (Cont.)

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
Body mass index							
- Underweight or normal weight	23	30.7	46	19.6	1.75	0.95-3.23	0.122#
- Overweight	12	16.0	49	20.9	0.86	0.42-1.77	
- Obesity	40	53.3	140	59.6	1.00		
Range (kg/m^2)	18.02-35.06		15.51-46.05				
Mean, SD (kg/m^2)	25.51(4.26)		26.07 (4.17)				0.312ϕ

*Reference group, #Pearson chi-square, ϕ t-test

3.2 Health belief (Table 12)

Health belief was divided into 3 groups: 1) the patients with the score equal or greater than the 67th percentile (total score ≥ 18) had high health belief, 2) the patients with the score between the 34th - 66th percentile (total score = 16-17) had moderate health belief, and 3) the patients with the score lower than the 34th percentile (total score <16) had low health belief. Most of controlled group had equal between high and low health belief (36.0%) in the same extent while uncontrolled group had high health belief (37.9%). A smaller group of controlled group had moderate health belief (28.0%) and uncontrolled group had low health belief (32.3%). There was no significant association between health belief and blood pressure control (p-value = 0.842).

Table 12: Association between health belief and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
Health belief							
- High	27	36.0	89	37.9	0.85	0.46-1.58	0.842#
- Moderate	21	28.0	40	29.8	0.84	0.44-1.63	
- Low*	27	36.0	76	32.3	1.00		

*Reference group, #Pearson chi-square

4. The association between factors and blood pressure control by multivariate analysis.

Multiple logistic regression analysis was used to adjust for possible confounding factors. The factors used in the multiple logistic regression analysis by Forward Stepwise Method (LR) were gender, marital status, duration of disease, stress, and drug compliance. After adjusting for other variables, stress was still significantly associated with blood pressure control (p-value = 0.002) and drug compliance (p-value < 0.001) but gender, marital status and duration of disease were not associated with blood pressure control (Table 13).

Table 13: Association between protective factors and hypertensive patient with blood pressure control by Multivariate analysis [A].

Factors	Adjusted OR	95%CI	p-value
Stress			
- Excellent or normal mental health	3.51	1.56-7.91	0.002
- Mild stress or stressful[*]	1.00		
Drug compliance			
- High	3.15	1.82-5.44	< 0.001
- Moderate or low[*]	1.00		

[*]Reference group

[A] Adjusted for gender, marital status, duration of disease, stress, and drug compliance.

CHAPTER V
DISCUSSION

This study were discussed in two parts as follows:

Part 1. Discussion of the research methodology

Part 2. Discussion on study results

Part 1. Discussion of the research methodology

1. Research design: This research was a cross-sectional analytic study to investigate the association between health behavior, health belief and blood pressure control among hypertensive patients. This method cannot reveal the direction of association because the measurement of exposure and outcome are made at the same time. A hospital–based was used in this study because it was more convenient to collect sampling cases than directly collecting population–based data. The disadvantage of this study was that the sample population could not represent the general hypertensive patients in the whole country. The data were collected from essential hypertensive patients and the outcome was measured three times at different periods, so that the mean could be used to assess blood pressure control with more accuracy.

2. The subjects: The subjects were essential hypertensive who were diagnosed by the physician and treated at hypertension clinic of Somdejprachoataksinmaharaj hospital. This study had limited cases that fitted the inclusion and exclusion criteria (p.33-34). The subjects were selected by purposive sampling. The reasons for selecting adult aged over 35 years old because from the literature review it was found that essential hypertesive is usually found after the age of 35 years old (15,24). Moreover, the patients who were diagnosed as secondary hypertension e.g. coarctation of the aorta, pheochromcytoma, Cushing ’syndrome etc

were excluded. Because they may have distorted the findings of the study if they had been included in this study.

3. Research instrument: The interview questionnaire used in this study was both closed-ended and open-ended. The interview questionnaires consisted of 3 parts: demographic characteristics, health behavior, and health belief. All of these interview questionnaires were examined for validity by three thesis advisors, and also had test-retest reliability done 1 week later with 30 subjects aged over 35 years old who had similar characteristics to those of the subjects. The results of test-retest reliability in each part of the interview questionnaires were higher than 0.7. This meant that the interview questionnaires were reliable and could be used for data collection.

4. Data collection: Data was collected by interview. The interview was conducted in private room by the investigator. The investigator filled out all questionnaires and recorded some data from the medical record. Sometimes local dialect had to be used during conversation. This facilitated accurate communication and understanding. The benefit of interview was to gain complete and appropriate data. The investigator could explain more about the questions to the subjects. In this way, a good relationship was developed between the investigator and the subjects. Therefore, the information given by the subject would be reliable. Moreover, the interview had been conducted for 15-20 minutes. This did not to make the subjects tired and could avoid data error.

5. Statistical analysis: Chi-square was used to find the association between health behavior and health belief with blood pressure control, but it did not removed the effects of potentially confounding factors. Consequently, the only feasible method available for removing the effects of confounding factors is using multiple logistic regression analysis. It was used to determine strength of association and control all confounding factors.

Part 2. Discussion on study results

Health behavior

Eating habit

Eating habit was not significantly associated with blood pressure control. The result was inconsistent with previous studies (17,78,79,81) which found that sodium intake was associated with blood pressure control. For example, meta-analysis of 56 clinical trials in hypertensive subjects revealed an SBP/DBP reduction of 3.7/0.9 mm Hg in the hypertenive trials and 1/0.1 mm Hg in the normotensive trials associated with a 100 mmol reduction in daily sodium intake after adjustment for measurement error of urinary sodium excretion (81). In contrast, some study have reported that sodium intake was not associated with blood pressure control (83,89). This difference may be due to study design and exposure measurement. This study was difficult to get a reliable data especially frequency of eating habit, because the subjects may have recall bias and could not clearly estimate their sodium intake per day or variation in food processing.

In this study, uncontrolled group had unhealthy eating habit (48.5%, Table 11). The hypertensive patients should be concerned about choosing food that would benefit their health. However, most of the subjects had had hypertension for more than 1 year, so they knew what kind of food that they should eat. Eventhough, the health care provider gave them some health education, during visit, some details may not be highlighted. Although most of the subjects had completed primary school, they knew what they could not eat such as salty food, high-fat diet. However, they did not know what kind of food has high fat and salt content. Therefore, the health care provider should provided nutrition education including food choice details, it would be the best for these patients' health.

Physical activity

Physical activity was not associated with blood pressure control. The results of this study do not support the finding of previous studies (84,85,86,87) which found that aerobic exercise reduce SBP and DBP. However, this study was consistent with that of previous study by Chatchaichovakul (88), which found that exercise was not

associated with blood pressure control. This difference may be many factors such as study design and exposure measurement. The study of Chatchaichovakul was cross-sectional study. Exercise was measured by questionnaire such as duration of exercise, style of exercise, and number of day per week of exercise. In this study definition of physical activity and research design were inconsistent with other studies. Furthermore, most of uncontrolled group had insufficient activity (47.2%, Table 11), because the majority of subjects were elderly. So, they were more restricted in exercise and other inconvenient activities than the younger patients. However, aerobic exercise can prevent and control hypertension (3). Aerobic exercise- associated blood pressure decrease will reduce both cardiac afterload and total peripheral resistance (119).

Stress

This study, based on a univariate analysis, showed that stress was associated with blood pressure control (OR = 3.37, 95%CI = 1.54-7.36, p-value = 0.003) and the association still existed after controlling for confounder (OR_{adj} = 3.51, 95%CI = 1.56-7.91, p-value = 0.002). This result agrees with that of previous study by Power and Jalowice (90) which found that well-controlled hypertensive patients had better health adjustment score and had lower blood pressure than in the uncontrolled group. In a 10-year follow-up of 103 young men, Light et al. (92) found the highest rises in BP over time among those who responded most to laboratory stresses, positive family history of hypertension and exposed to higher level of daily stress.

Stress may result in adverse physical and mental health. This may be explained that stress may activate the sympathetic nervous system directly; and sympathetic nervous system contributes to high blood pressure related to hyperdynamic circulatory states (15). This can be seen clearly in their response to the items “Do you feel anxious at all time?” (17.0% reported often, 40.0% reported sometimes), “Do you feel that your mentality is normal?” (71.9% reported never, 22.6% reported sometimes) (Appendix C1). Among those who had stress in uncontrolled group more than half was female (63.2%). About one third of them was 60-69 years old (32.3%). About two third of them were married (66.8%) and had completed primary school (64.1%). In term of the occupation, about two third of them

were housewife or unemployed (62.7%). Almost half of them had income of 1,001-5,000 baht/month (45.0%) and adequate income but no saving (39.5%) (Appendix C4). Thus, the health care provider should pay more attention to those who have the above characteristics.

Alcohol consumption

Alcohol consumption was not significantly associated with blood pressure control. However, a review of literature revealed that alcohol consumption related to blood pressure control (17,18,94,97,98). In contrast, some studies have reported that alcohol consumption was not associated with blood pressure control (89,99). This difference may be due to lack of direct measurement of alcohol consumption. The present study showed that almost all uncontrolled groups (94.9%, Table 11) did not drink alcohol and majority of subjects were female (78.7%). This may be explained that female usually do not drink alcohol. But, heavy drinking (more than six drinks daily) can lead to sudden, presumably by inducing cardiac arrhythmia, ventricular tachycardia (120).

Drug compliance

This study confirmed the association between drug compliance and blood pressure control. After controlling the other effects, those who had their blood pressure controlled had higher drug compliance 3.15 times more than those who could not control their high blood pressure (95%CI = 1.82-5.44, p-value < 0.001). This result was consistent with previous studies (20,88,89,99) which found that drug compliance associated with blood pressure control. One hundred and sixty nine persons within uncontrolled group (71.9%, Table 11) had low drug compliance. This can be seen clearly in their response to the items “Do you ever forget to take your medicine?”(39.1% reported yes), “When you feel better do you sometimes stop taking your medicine?” (24.3% reported yes) (Appendix C2). Thus, the subjects should not forget to take medicine and stop taking medicine. Among those who had poor drug compliance in uncontrolled group more than half were females (65.1%). About one third of them were 60-69 years old (33.1%). About two third of them were married

(65.7%) and had completed primary school (66.3%). In term of the occupation, about two third of them were housewife or unemployed (60.4%). Almost half of them had income of 1,001-5,000 baht/month (48.5%) and adequate income but no saving (37.9%) (Appendix C5). Thus, the health care should pay more attention to those who have the above characteristics.

Body mass index

In this study, body mass index did not associate with blood pressure control. The result was inconsistent with that of previous studies (17,19,99,102,103). But the result was consistent with the study of Lijutipoom (89) who found that body mass index did not associate with blood pressure. Because this study used the new recommendations that the cut off point of body mass index for obesity in Asian population (115), this might lead to different finding compared to previous study. This study showed that the majority of uncontrolled group had obesity (59.6%, Table 11). This revealed that the subjects who are obese, may have hypertension more often than those who are not obese. Obesity is one of the most common factors responsible for hypertension. In the National Health and Nutrition Examination Survey III, a progressive increase in the prevalence of hypertension was seen with increasing BMI at all age groups (64). Obese hypertensive subject tends to have an augmented stroke volume and an increased cardiac output, whereas peripheral vascular resistance often decreases (31).

Health belief

In this study, health belief did not associate with blood pressure control. The result was different from a previous study by Kompayak (106), which found that perceived severity of disease associated with compliance behavior. Pasunant (107) found that there were positive relationship between perceived susceptibility, perceived benefits and barriers and therapeutic compliance, but there was no significant relationship between perceived severity and therapeutic compliance. This study consistent with the study of Lijutipoom (89), which found that health belief was not associate with blood pressure control.

This difference may be due to most of the subjects had had hypertension for more than 1 year, so they knew which behavior is appropriate for hypertensive patients. Furthermore, about one third of uncontrolled group (32.3%, Table12) had low health belief. This may be explained that the majority of uncontrolled group had completed primary school (66.0%, Table7). Thus, they had less correct perceived susceptibility, perceived severity, and perceived benefits. This can be seen clearly in their response to the items "If your blood pressure is not under control, you have more chance of migraine"(67.7% reported agreed, and 20.0% reported not sure), "If your blood pressure is not under control, you have chance of renal failure" "(40.4% reported not sure), "Eating no salt can reduce blood pressure "(6.8% reported not agree, and 8.9% reported not sure) (Appendix C3). Other reason, it might be explained that although a person realizes susceptibility or complication of disease, healthy behavior might not he practiced. The presence of physical symptoms probably not only exerts an elevating or realistic effect on perceived severity, but also motivates the patient to follow the physician's instructions as the organic indications of illness persist. However, it should be noted that, at extremely high or low levels of anxiety, individuals remember less of the physician's instruction, and are less likely to follow those they can recall (21).

CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

This study was a hospital – based cross - sectional analytic study of the association between health behavior and health belief with blood pressure control. The study population was 310 essential hypertensive patients who were treated at hypertension clinic of Somdejprachoataksinmaharaj hospital, Tak province from April 26 to August 27, 2004. The investigator collected the data, and their medical records were reviewed. The variables in this study included demographic characteristic, health behavior, and health belief. After controlling confounder by using multiple logistic regression analysis, the results of this study showed that factors that had significant association with blood pressure control among essential hypertensive patients were stress (OR_{adj} = 3.51, 95% CI = 1.56-7.91, P-value =0.002) and drug compliance (OR_{adj} = 3.15,95% CI = 1.82-5.44, P-value < 0.001).

Recommendations based on study result

1. About 75.8% of 310 patients failed to control blood pressure (Table 6). Health care providers should provide health education in a participatory manner focusing on drug compliance and clarify the effect consequence of non-compliance to treatment, and stress management. Health education among hypertensive patients should be interactive and apply interpersonal communication, which is proved to be the most effective way for health education.

2. The majority of uncontrolled group had stress (93.6%, Table 11). Health care provider should suggest how to manage stress such as calming down emotion or counseling a nurse.

3. Pharmacists can play an important role in recommending and reinforcing drug compliance for hypertensive patients. They could integrate drug knowledge into

concise consultations to improve drug compliance. They may bridge the gap between the wishes of the physician and the special problems of the patient.

Recommendation for further study

1. The further study may use other of study design such as cohort study in order to increase acceptability of the study.

2. This kind of study should be repeated in other province. This study enrolled patients at hospital in Tak province so that the result might not apply to other group.

3. Sodium intake of the hypertensive patients should be measured with an objective mean to reduce information bias and to increase acceptability of the study. Finally, sodium intake should be measured by biochemical method such as 24-hour urinary excretion of sodium.

4. Qualitative research method should be used for further study to explore the actual cause of health behavior and health belief.

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APPENDIX A

Consent form

Consent form

My name is Vipa Lapbamrung. I am a master student at the Faculty of Medicine, Siriraj hospital, Mahidol University. I am studying about the health behavior and health belief on blood pressure control among essential hypertensive patients.

You are one of the hypertensive patients, and I would like to invite you to participate in the study. Your answer will be secret and will not have any effect on your treatment. It is very important for the success of this study. The results from this study will help nurses and other health care providers improve and provide better care of you, other patients and society in the future.

If you have any questions relate with this study, please ask me or discuss them with me. The interview will take 15-20 minutes. You can free to withdraw at any time. Your decision to either participate or not, will not affect the service you receive from the hospital.

Thank you for considering my request.

Sincerely,
Vipa Lapbamrung

For the participant

I understand the explanation of this study and I voluntarily agree to consent to participate in this study.

…..……
(Signature of the participant' s)
Date..……

APPENDIX B

Instruments

ID. NO…….

QUESTIONNAIRE

Health behavior and health belief on blood pressure control among essential hypertensive patients

Faculty of Medicine, Siriraj hospital, Mahidol University

Name……..HN……

Address……

Telephone no. ……

Date of interview……

Part I: Demographic characteristic data

Explanation: Please mark √ into □ or fill up the word into the blanks.

1. Gender

   1. □ Male 2. □ Female

2. Age……..…years (Full years)

3. Marital status

   1. □ Single 2. □ Married 3. □ Widow, Divorced, Separated

4. Education

   1. □ No education 2. □ Primary school 1-4
   3. □ Primary school 5-7 4. □ Secondary school 1-3.
   5. □ Secondary school 4 –6 6. □ Diploma
   7. □ Bachelor's degree 8. □ Other (please specify)……..

5. Current occupation

1. □ Housewife or unemployed 2. □ Farmer
3. □ Laborer 4. □ Office employee
5. □ Vendor 6. □ Enterprise
7. □ Government 8. □ Other…….

6. Monthly income……..baht/month
7. Is adequacy of income?

1. □ Inadequate 2. □ Adequate but no saving 3.□ Adequate with saving

8. You have known that you have hypertension for ……year…….month
9. You have been treated for hypertension for ……year…….month
10. Concomitant diseases

- Coronary artery disease

□ Yes 2. □ No 3. □ Unknown

- Stroke

□ Yes 2. □ No 3. □ Unknown

- Diabetes

□ Yes 2. □ No 3. □ Unknown

- Chronic renal failure

□ Yes 2. □ No 3. □ Unknown

- Heart failure

□ Yes 2. □ No 3. □ Unknown

11. Blood pressure (Follow-up 3 months)

Date	Blood pressure		The average of two measurement
	I	II	
Visit 1			
Visit 2			
Visit 3			

Part II Data of health behavior

2.1 Frequency of eating habit questionnaire

Explanation: Please mark √ into the blanks.

Food items	Frequency of eating habit				Never
	> 6 time/week	4-6 time/week	1-3 time/week	1-3 time/month	
For each of the following, how many times do you eat it?					
1.Salty meat, salty fish					
2.Ham, bacon, sausage					
3. Dried pork slices, shredded pork, a kind of Chinese sausage					
.					
.					
.					
11. Cake, cookie, bread					
12. Add fish sauce, sauce, soy sauce in food					

2.2 Physical activity

1. During the **last 7 day**s, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling? **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

_____No vigorous physical activities ***Skip to question 3***

_____ Days per week

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ Hours per day

_____ Minutes per day

_____Don't know/Not sure

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

_____ No moderate physical activities ***Skip to question 5***

_____ Days per week

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ Hours per day

_____ Minutes per day

_____Don't know/Not sure

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time? This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

_____ No walking

_____Days per week

6. How much time did you usually spend **walking** on one of those days?

_____ Hours per day

_____ Minutes per day

2.3 Thai stress test

These questions are your feelings that you may have in daily living. Please answer every questions by marking (x) in the blank that describes yours feelings			
Items	**Often**	**Sometimes**	**Never**
1. Do you feel lonely?			
2. Do you feel unhappy?			
3. Do you feel boring, discouraged or lose of interest to do anything?			
4. Do you feel agitated at all the time?			
5. Do you feel anxious at all the time?			
6. Do you feel unhappy without any reason?			
7. Do you lose your concentration to do anything?			
8. Have you lose interest to carry on routine activity?			
9. Do you want to be left alone?			
10. Do you feel disheartened?			
11. Do you feel hopeless?			
12. Do you feel loss of self-esteem?			
13. Are you proud of your skilful ability?			
14. Are you proud of your competence?			
15. Are you proud that you are not inferior to other person?			
16. Have you lose interest to carry on routine activity?			
17. Do you still find something nice around you?			
18. Are you pleased and satisfied with some of your success?			

2.4 Thai stress test(Cont.)

Items	Often	Sometimes	Never
19. Do you have lots of enthusiasm to do routine activity?			
20. Do you have fun in talking with someone around you?			
21. Do you feel that your thinking and judgement is still normal as it was?			
22. There is always hope in your life.			
23. Do you always want to improve your future life?			
24. Do you feel that your mentality is normal?			

2.4 Alcohol consumption

1. During the last 7 days, do you drink spirits?
   1. □ Never (skip to question 3)
   2. □ Still drinking …….day
   3. □ Used to drinking…… day
      Quit drinking……..…….day/ week/ month/ year
2. You drink spirits ……. glass (es)/ bottles (s)
3. During the last 7 days, do you drink liquor?
   1. □ Never (skip to question 5)
   2. □ Still drinking …….day
   3. □ Used to drinking…… day
      Quit drinking……..day/ week/ month/ year
4. You drink liquor ……..glass (es)/ bottles (s)

5. During the last 7 days, do you drink beer?
   1. □ Never (skip to question 7)
   2. □ Still drinking …….day
   3. □ Used to drinking…… day
      Quit drinking……..day/ week/ month/ year
6. You drink beer …….. glass (es)/ bottles (s)
7. During the last 7 days, do you drink wine?
   1. □ Never
   2. □ Still drinking …….day
   3. □ Used to drinking…… day
      Quit drinking……..day/ week/ month/ year
8. You drink wine ……..glass (es)/ bottles (s)

2.5 Drug compliance (1 month ago**)**

1. Have you ever forgotten to take your medicine?
   1. □ Yes 2. □ No
2. Are you careless at time about taking your medicine?
   1. □ Yes 2. □ No
3. When your feel better do you sometimes stop taking your medicine?
   1. □ Yes 2. □ No
4. Sometimes if you feel worse when you take the medicine do you stop taking?
   1. □ Yes 2. □ No

2.6 Body mass index

Body weight……..kg. Height……..cm.

Part III Health belief

Explain: Please mark √ into the blank after the phrase as your feeling, your opinion or your belief about hypertension by following answers:

Agree means you think that the message is same to all your feeling, your opinion or your belief.

Not agree means you think that the message is not same to all your feeling, your opinion or your belief.

Unsure means you think that the message is same to partial your feeling, your opinion or your belief.

Items	Agree	Unsure	Not agree
Perceived susceptibility Are you aware of the following diseases, which may occur if your blood pressure is not under control?			
1. Stroke			
2. Renal failure			
3. Migraine			
4. Diabetes mellitus			
Perceived severity			
5. Hypertension is not harmful to your life.			
6. Hypertension is a curable disease.			
7. The rapid-rising blood pressure can be fatal.			
8. The longer high blood pressure persists, the more severity of disease develops.			

Health belief (Cont.)

Items	Agree	Unsure	Not agree
Perceived benefits			
9. Reducing salty food intake can decrease blood pressure.			
10. Jogging or aerobic exercise can increase blood pressure.			
11. Body weight control may increase blood pressure.			
12. Regular follow-up at the clinic keeps you informed about your hypertension.			

แบบสัมภาษณ์เลขที่……

แบบสัมภาษณ์

เรื่อง พฤติกรรมสุขภาพและความเชื่อด้านสุขภาพกับภาวะการควบคุมระดับความดันโลหิต

ของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

ชื่อ-สกุล……..HN……..

ที่อยู่……หมู่……ตำบล……อำเภอ……จังหวัด……

เบอร์โทรศัพท์ ……

วันที่สัมภาษณ์……..

ส่วนที่ 1 ข้อมูลเกี่ยวกับลักษณะส่วนบุคคล

คำชี้แจง : โปรดกาเครื่องหมาย √ ลงใน □ หรือเติมคำลงในช่องว่าง

1. เพศ
   1. □ ชาย 2. □ หญิง
2. อายุ……..…ปี (อายุปีเต็ม) หรือ วัน เดือน ปี เกิด……
3. สถานภาพสมรส
   1. □ โสด 2. □ คู่ 3. □ หม้าย หย่า แยกกันอยู่
4. การศึกษาสูงสุดของท่าน
   1. □ ไม่ได้เรียนหนังสือ 2. □ ประถมศึกษา 1-4
   3. □ ประถมศึกษา 5-7 4. □ ม.1 – ม.3 หรือ มศ.1 – มศ.3
   5. □ ม.4 – ม.6 หรือ มศ.4 – มศ.5 6. □ ประกาศนียบัตรหรืออนุปริญญา

7. ☐ ปริญญาตรีหรือสูงกว่า 8. ☐ อื่นๆ ระบุ……..

5. อาชีพหลักของท่านในปัจจุบัน

1. ☐ งานบ้าน 2. ☐ เกษตรกรรม
3. ☐ รับจ้างแรงงานหรือกรรมกร 4. ☐ รับจ้างในสำนักงาน
5. ☐ ค้าขาย 6. ☐ ธุรกิจส่วนตัว
7. ☐ ข้าราชการหรือรัฐวิสาหกิจ 8. ☐ อื่นๆ ระบุ…….

6. รายได้ของท่านเฉลี่ย……..บาท/ เดือน

7. รายได้ของท่านพอใช้หรือไม่

1. ☐ ไม่พอใช้ 2. ☐ พอใช้ แต่ไม่เหลือเก็บ 3. ☐ พอใช้ มีเหลือเก็บ

8. ท่านได้รับการวินิจฉัยจากแพทย์ว่าเป็นโรคความดันโลหิตสูงมาเป็นระยะเวลา……ปี…….เดือน

9. ท่านได้รับการรักษาโรคความดันโลหิตสูงมาเป็นระยะเวลา……ปี…….เดือน

10. โรคประจำตัวอื่นๆ

ท่านเจ็บป่วยด้วยโรคต่อไปนี้หรือไม่

- โรคเส้นเลือดหัวใจตีบ/หัวใจขาดเลือด/กล้ามเนื้อหัวใจตาย (coronary artery disease)

☐ เป็น 2. ☐ ไม่เป็น 3. ☐ ไม่ทราบ

- อัมพาต/อัมพฤกษ์/เส้นเลือดสมองแตก/เส้นเลือดสมองตีบ (stroke)

☐ เป็น 2. ☐ ไม่เป็น 3. ☐ ไม่ทราบ

- เบาหวาน

☐ เป็น 2. ☐ ไม่เป็น 3. ☐ ไม่ทราบ

- ไตเสื่อม/ไตวาย

☐ เป็น 2. ☐ ไม่เป็น 3. ☐ ไม่ทราบ

- หัวใจล้มเหลว/น้ำท่วมปอด (heart failure)

☐ เป็น 2. ☐ ไม่เป็น 3. ☐ ไม่ทราบ

11. ระดับความดันโลหิต (จากการติดตามการมาตรวจตามนัดในช่วง 3 เดือน)

วัน เดือน ปี	ความดันโลหิต		ค่าเฉลี่ยความดันโลหิต
	ครั้งที่ 1	ครั้งที่ 2	
วันที่สัมภาษณ์			
1 เดือนต่อมา			
2 เดือนต่อมา			

ส่วนที่ 2 ข้อมูลเกี่ยวกับพฤติกรรมสุขภาพ

2.1 แบบสอบถามความถี่ของพฤติกรรมการบริโภคอาหาร

คำชี้แจง : โปรดกาเครื่องหมาย √ ลงในช่องว่างหลังข้อความตามสภาพความเป็นจริงของผู้ตอบ

ข้อความ	ความถี่ในการบริโภคอาหาร				ไม่บริโภค
	มากกว่า 6 ครั้ง/สัปดาห์	4-6 ครั้ง/สัปดาห์	1-3 ครั้ง/สัปดาห์	1-3 ครั้ง/เดือน	
โดยปกติท่านรับประทานอาหารต่อไปนี้บ่อยแค่ไหน					
หมู่เนื้อสัตว์					
1. เนื้อเค็ม, ปลาเค็ม, ปลาร้า					
2. หมูแฮม, เบคอน, ไส้กรอก					
3. หมูแผ่น, หมูหยอง, หมูหวาน, กุนเชียง					
4. แหนม, ไส้กรอกอีสาน, ปลาส้ม					
5. อาหารทะเล เช่น กุ้ง, หอย, ปู, ปลาหมึก					
6. ขาหมู, หมูสามชั้น, หนังเป็ด/ไก่					
หมู่ผัก					
7. ผักดอง เช่น ผักกาดดอง, กระเทียมดอง, หน่อไม้ดอง					
หมู่ผลไม้					
8. ผลไม้แช่อิ่ม เช่น มะขามแช่อิ่ม, มะม่วงแช่อิ่ม					
หมู่ไขมัน					
9. แกงใส่กระทิ เช่น แกงคั่ว, แกงเผ็ด					
10. ขนมใส่กระทิ เช่น บัวลอย, กล้วยบวดชี, ตะโก้					
11. อาหารทอด เช่น ไก่ทอด,กล้วยทอด, ปาท่องโก๋					
เครื่องดื่ม					
12. น้ำเกลือแร่ทุกชนิด					
อื่นๆ					
13. อาหารที่มีรสจัด เช่นส้มตำ, ยำต่างๆ, น้ำพริก					
14. ขนมอบต่างๆ เช่น เค้ก, คุกกี้, ขนมปัง					
15. การเติมน้ำปลา, ซีอิ๊วขาว, ซอสมะเขือเทศ, ซอสพริก, เกลือป่น ลงในอาหารที่ปรุงแล้ว					

2.2 การประเมินการเคลื่อนไหวร่างกายและการออกกำลังกาย

1. ในช่วง 7 วันที่ผ่านมา ท่านได้ทำกิจกรรมที่ต้องออกแรงมากหรือออกกำลังกายหนัก จนทำให้รู้สึกเหนื่อยมาก โดยหายใจแรงและลึกหรือหัวใจเต้นเร็วและแรงมากขึ้น เช่น ขุดดิน, ยกของหนัก, เต้นแอโรบิก, ขี่จักรยานเร็วๆ,วิ่งเร็ว โดยกระทำอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป
   - ☐ ไม่มี (ข้ามไปตอบข้อ 3)
   - ☐ มี .....วัน/สัปดาห์
2. โดยเฉลี่ย ท่านใช้เวลานานเท่าใด ในการทำกิจกรรมที่ต้องออกแรงมากหรือออกกำลังกายหนัก
   - ☐ .....ชั่วโมง/วัน
   - ☐ .....นาที/วัน
   - ☐ ไม่ทราบ/ไม่แน่ใจ
3. ในช่วง 7 วันที่ผ่านมา ท่านได้ทำกิจกรรมที่ต้องออกแรงหรือออกกำลังกายปานกลาง จนทำให้รู้สึกเหนื่อยพอประมาณหรือพอสมควร โดยหายใจแรงกว่าปกติ เช่น ยกของที่ไม่หนักมาก, ขี่จักรยานไปเรื่อยๆ,วิ่งเหยาะๆ, กวาดบ้านถูบ้าน โดยกระทำอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป
   - ☐ ไม่มี (ข้ามไปตอบข้อ 5)
   - ☐ มี .....วัน/สัปดาห์
4. โดยเฉลี่ย ท่านใช้เวลานานเท่าใด ในการทำกิจกรรมที่ต้องออกแรงหรือออกกำลังกายปานกลาง
   - ☐ .....ชั่วโมง/วัน
   - ☐ .....นาที/วัน
   - ☐ ไม่ทราบ/ไม่แน่ใจ
5. ในช่วง 7 วันที่ผ่านมา ท่านได้มีการเดิน ซึ่งรวมถึงการเดินในบ้าน, ที่ทำงาน และการเดินจากที่หนึ่งไปที่หนึ่ง เช่นเดินไปซื้อของ, เดินเล่นในสนามหญ้าหรือสวนสาธารณะ, เดินออกกำลังกาย โดยเดินอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป
   - ☐ ไม่มี
   - ☐ มี .....วัน/สัปดาห์
6. โดยเฉลี่ย ท่านใช้เวลาในการเดินนานเท่าใด
   - ☐ .....ชั่วโมง/วัน
   - ☐ .....นาที/วัน
   - ☐ ไม่ทราบ/ไม่แน่ใจ

2.3 แบบวัดความเครียด

คำถามต่อไปนี้เป็นความรู้สึกที่ท่านอาจมีในชีวิตประจำวัน ซึ่งแต่ละท่านจะมีความรู้สึกที่แตกต่างกัน ขอให้ท่านเลือกข้อที่ตรงกับความรู้สึกของท่านที่เป็นอยู่ในขณะนี้ โดยกาเครื่องหมาย X ในแต่ละช่องที่ต้องการ			
ข้อความ	**รู้สึกบ่อยๆ**	**รู้สึกเป็นครั้งคราว**	**ไม่เคยรู้สึกเลย**
1. ท่านรู้สึกเหงาและว้าเหว่			
2. ท่านรู้สึกไม่มีความสุขเลย			
3. ท่านรู้สึกความรู้สึกเบื่อหน่าย ท้อแท้ ไม่อยากทำอะไรเลย			
4. ท่านรู้สึกกระวนกระวายเกือบตลอดเวลา			
5. ท่านรู้สึกกังวลเกือบตลอดเวลา			
6. ท่านรู้สึกไม่สบายใจโดยหาสาเหตุไม่ได้			
7. ท่านรู้สึกไม่ค่อยมีสมาธิในการกระทำสิ่งต่างๆ			
8. ท่านรู้สึกไม่อยากทำในสิ่งที่เคยสนใจทำเป็นประจำ			
9. ท่านอยากจะถอยหนี ไม่อยากพบปะพูดคุยกับคนอื่น			
10. ท่านรู้สึกหมดกำลังใจ			
11. ท่านรู้สึกสิ้นหวัง			
12. ท่านรู้สึกว่าตนเองไม่มีคุณค่า			
13. ท่านรู้สึกภาคภูมิใจว่า ท่านเป็นคนเก่ง			
14. ท่านรู้สึกภาคภูมิใจว่า ท่านเป็นคนที่มีความสามารถ			
15. ท่านรู้สึกภาคภูมิใจว่า ท่านไม่ได้ด้อยไปกว่าใคร			
16. ท่านรู้สึกพอใจกับชีวิตความเป็นอยู่ในขณะนี้			
17. ท่านรู้สึกว่าสิ่งต่างๆรอบตัวท่านยังมีอะไรบางอย่างที่ทำให้ท่านมีความสนใจเป็นพิเศษอยู่			
18. ท่านรู้สึกยินดีและพึงพอใจกับการที่ตนเองได้รับความสำเร็จในบางสิ่งบางอย่าง			
19. ท่านรู้สึกกระตือรือร้นในการกระทำสิ่งต่างๆ ในชีวิตประจำวัน			

แบบวัดความเครียด (ต่อ)

ข้อความ	รู้สึกบ่อยๆ	รู้สึกเป็นครั้งคราว	ไม่เคยรู้สึกเลย
20. ท่านยังรู้สึกสนุกสนานกับการพบปะพูดคุยกับคนอื่นที่อยู่รอบตัวท่าน			
21. การคิดและการตัดสินใจของท่านยังเป็นปกติเหมือนก่อน			
22. ท่านรู้สึกว่าชีวิตนี้ยังมีความหวัง			
23. ท่านรู้สึกมีกำลังใจที่จะปรับปรุงเปลี่ยนแปลงตนเองในทางที่ดีหรือก้าวหน้าขึ้น			
24. ท่านรู้สึกว่าจิตใจของท่านเป็นปกติ			

2.4 การดื่มแอลกอฮอล์

1. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเหล้ากี่วัน
   1. ☐ ไม่ดื่ม (ข้ามไปตอบข้อ3)
   2. ☐ ดื่ม .....วัน
   3. ☐ เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
2. ในวันที่ท่านดื่มเหล้า ท่านดื่ม.....กั๊ก/ก๊งหรือเป๊ก/ขวดกลม/ขวดแบน
3. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเหล้าขาวกี่วัน
   1. ☐ ไม่ดื่ม(ข้ามไปตอบข้อ5)
   2. ☐ ดื่ม .....วัน
   3. ☐ เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
4. ในวันที่ท่านดื่มเหล้าขาว ท่านดื่ม.....กั๊ก/ก๊งหรือเป๊ก/ขวดกลม/ขวดแบน
5. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเบียร์กี่วัน
   1. ☐ ไม่ดื่มดื่ม(ข้ามไปตอบข้อ7)
   2. ☐ ดื่ม .....วัน
   3. ☐ เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
6. ในวันที่ท่านดื่มเบียร์ ท่านดื่ม.....กั๊ก/ก๊งหรือเป๊ก/ขวดกลม/ขวดแบน

7. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มไวน์กี่วัน
   1. ☐ ไม่ดื่ม
   2. ☐ ดื่ม .....วัน
   3. ☐ เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
8. ในวันที่ท่านดื่มไวน์ ท่านดื่ม.....ก๊ก/ก๊งหรือเป๊ก/ขวดกลม/ขวดแบน

2.5 ความร่วมมือในการรับประทานยา (ในรอบ 1 เดือนที่ผ่านมา)

1. ท่านเคยลืมกินยาลดความดันโลหิตหรือไม่
   1. ☐ เคย 2. ☐ ไม่เคย
2. ท่านกินยาลดความดันโลหิต ตรงตามเวลาที่แพทย์สั่งหรือไม่
   1. ☐ ใช่ 2. ☐ ไม่ใช่
3. เมื่อแพทย์บอกท่านว่าระดับความดันโลหิตปกติ ท่านเคยหยุดกินยาลดความดันโลหิตหรือไม่
   1. ☐ เคย 2. ☐ ไม่เคย
4. เมื่อท่านมีอาการผิดปกติ เนื่องมาจากการกินยา เช่นคลื่นไส้, อาเจียนหรือผื่นคัน ท่านเคยหยุดกินยาเอง, เพิ่มหรือลดจำนวนยาด้วยตนเอง โดยไม่ได้ปรึกษาแพทย์ก่อนหรือไม่
   1. ☐ เคย 2. ☐ ไม่เคย

2.3 ดัชนีมวลกาย

ปัจจุบันนี้น้ำหนักตัว.....กิโลกรัม ส่วนสูง.....เซนติเมตร

ส่วนที่ 3 ความเชื่อด้านสุขภาพ

<u>คำชี้แจง</u> กรุณาขีดเครื่องหมาย √ ลงในช่องว่างตามความรู้สึก, ความคิดเห็นหรือความเชื่อของท่าน

เห็นด้วย หมายถึง ข้อความในประโยคนั้นตรงกับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านทั้งหมด

ไม่เห็นด้วย หมายถึง ข้อความในประโยคนั้น**ไม่ตรง**กับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านทั้งหมด

ไม่แน่ใจ หมายถึง ข้อความในประโยคนั้นตรงกับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านบางส่วน

ข้อความ	เห็นด้วย	ไม่เห็นด้วย	ไม่แน่ใจ
1.การรับรู้ถึงโอกาสเสี่ยงต่อการเกิดโรคแทรกซ้อน			
-หากท่านไม่สามารถควบคุมความดันโลหิตให้ต่ำกว่า 140/90 มิลลิเมตรปรอทได้ ท่านมีโอกาสเกิดภาวะต่อไปนี้			
1.1 เป็นอัมพาตหรือพิการ เนื่องจากเส้นเลือดในสมองแตก	.....	.....	.....
1.2 ไตวายเนื่องจากไตของท่านต้องทำงานหนัก	.....	.....	.....
1.3 ปวดศีรษะแบบไมเกรน(ปวดแบบข้างเดียว)	.....	.....	.....
1.4 เบาหวาน	.....	.....	.....
2. การรับรู้ถึงความรุนแรงของโรค			
2.1 โรคความดันโลหิตสูงเป็นโรคที่ไม่เป็นอันตรายต่อชีวิต	.....	.....	.....
2.2 โรคความดันโลหิตสูงเป็นโรคที่สามารถรักษาให้หายขาดได้	.....	.....	.....
2.3 ระดับความดันโลหิตสูงขึ้นโดยฉับพลันอาจทำให้เสียชีวิตได้	.....	.....	.....
2.4 ถ้าระดับความดันโลหิตสูงขึ้นเป็นระยะเวลานานจะทำให้อาการของโรครุนแรงขึ้น	.....	.....	.....
3.การรับรู้ประโยชน์ในการปฏิบัติตัว			
3.1 การงดรับประทานอาหารเค็ม จะทำให้ความดันโลหิตลดลงได้	.....	.....	.....
3.2 การวิ่งเหยาะหรือการเต้นแอโรบิคจะทำให้ความดันโลหิตเพิ่มได้	.....	.....	.....
3.3 การควบคุมน้ำหนัก อาจทำให้ความดันโลหิตเพิ่มได้	.....	.....	.....
3.4 การมาตรวจตามนัดอย่างสม่ำเสมอ ทำให้ท่านได้ทราบสภาพความเจ็บป่วยของตนเอง	.....	.....	.....

APPENDIX C

Item analysis

Table C1: Percentages of controlled and uncontrolled groups by Thai stress test.

Items	Controlled group (Percentages)			Uncontrolled group (Percentages)		
	Often	Sometimes	Never	Often	Sometimes	Never
1.Do you feel lonely?	18.7	42.7	38.7	10.2	41.7	48.1
2.Do you feel unhappy?	18.7	33.3	48.0	8.5	29.8	61.7
3.Do you feel boring, discouraged or lose of interest to do anything?	24.0	34.7	41.3	11.5	43.8	44.7
4.Do you feel agitated at all the time?	20.0	40.0	40.0	11.5	37.4	51.1
5.Do you feel anxious at all the time?	22.7	38.7	38.7	17.0	40.0	43.0
6.Do you feel unhappy without any reason?	26.7	29.3	44.0	11.9	37.4	50.6
7.Do you lose your concentration to do anything?	24.0	38.7	37.3	12.3	41.3	46.4
8.Have you lose interest to carry on routine activity?	20.0	22.7	57.3	10.6	38.7	50.6
9.Do you want to be left alone?	13.3	24.0	62.7	12.8	26.4	60.9
10. Do you feel disheartened?	14.7	25.3	60.0	11.8	27.2	61.3
11. Do you feel hopeless?	16.0	20.0	64.0	11.1	18.7	70.2
12. Do you feel loss of self-esteem?	17.3	24.0	58.7	11.5	22.1	66.4
13. Are you proud of your skilful ability?	25.3	36.0	38.7	26.4	36.6	37.0
14. Are you proud of your competence?	22.7	34.7	42.7	23.8	37.0	39.1
15. Are you proud that you are not inferior to other person?	18.7	37.3	44.0	20.4	39.6	40.0
16. Have you lose interest to carry on routine activity?	10.7	25.3	64.0	7.7	23.0	69.4

Table C1: Percentages of controlled and uncontrolled groups by Thai stress test (Cont.)

Items	Controlled group (Percentages)			Uncontrolled group (Percentages)		
	Often	Sometimes	Never	Often	Sometimes	Never
17. Do you still find something nice around you?	17.3	32.0	50.7	23.0	41.7	35.3
18. Are you pleased and satisfied with some of your success?	8.0	29.3	62.7	7.7	33.6	58.7
19. Do you have lots of enthusiasm to do routine activity?	21.3	21.3	57.3	16.2	22.6	61.3
20. Do you have fun in talking with someone around you?	8.0	21.3	70.7	6.8	23.0	70.2
21. Do you feel that your thinking and judgement is still normal as it was?	14.7	25.3	60.0	10.6	26.0	63.4
22. There is always hope in your life.	18.7	26.7	54.7	19.1	26.8	54.0
23. Do you always want to improve your future life?	26.7	32.0	41.3	23.0	23.0	54.0
24. Do you feel that your mentality is normal?	10.7	20.0	69.3	5.5	22.6	71.9

Table C2: Percentages of controlled and uncontrolled groups by drug compliance

Items	Controlled group (Percentages)		Uncontrolled group (Percentages)	
	Yes	No	Yes	No
1. Have you ever forgotten to take your medicine?	36.0	64.0	39.1	60.9
2. Are you careless at time about taking your medicine?	100.0	-	1.7	98.3
3. When your feel better do you sometimes stop taking your medicine?	14.7	85.3	24.3	75.7
4. Sometimes if you feel worse when you take the medicine do you stop taking?	13.3	86.7	18.3	81.7

Table C3: Percentages of controlled and uncontrolled groups by health belief

Items	Controlled group (Percentages)			Uncontrolled group (Percentages)		
	Agree	Un sure	Not agree	Agree	Un sure	Not agree
Perceived susceptibility Are you aware of the following diseases, which may occur if your blood pressure is not under control?						
1. Stroke	70.7	20.0	9.3	73.2	20.4	6.4
2. Renal failure	50.7	44.0	5.3	50.6	40.4	8.9
3. Migraine	65.3	24.0	10.7	67.7	20.0	12.3
4. Diabetes mellitus	41.3	42.7	16.0	42.1	40.0	17.9
Perceived severity						
5. Hypertension is not harmful to your life.	17.3	5.3	77.3	20.4	11.5	68.1
6. Hypertension is a curable disease.	21.3	28.0	50.7	28.1	20.9	51.1
7. The rapid-rising blood pressure can be fatal.	93.3	4.0	2.7	95.7	3.0	1.3
8. The longer high blood pressure persists, the more severity of disease develops.	90.7	8.0	1.3	90.2	8.1	1.7
Perceived benefits						
9. Reducing salty food intake can decrease blood pressure.	80.0	12.0	8.0	84.3	8.9	6.8
10. Jogging or aerobic exercise can increase blood pressure.	46.7	22.7	30.7	39.6	26.8	33.6
11. Body weight control may increase blood pressure.	32.0	25.3	42.7	25.1	30.2	44.7
12. Regular follow-up at the clinic keeps you informed about your hypertension.	96.0	1.3	2.7	95.3	3.8	0.9

Table C4: Stress of uncontrolled group by demographic characteristics

Factors	Uncontrolled group	
	N =220	Percentage
Gender		
- Male	81	36.8
- Female	139	63.2
Age		
- < 40 years	4	1.8
- 40 – 49 years	21	9.5
- 50 – 59 years	64	29.1
- 60 –69 years	71	32.3
- ≥ 70 years	60	27.3
Marital status		
- Single	10	4.5
- Married	147	66.8
- Widowed, divorced, separated	63	28.6
Education		
- No education	17	7.7
- Primary school	141	64.1
- Secondary school	32	14.5
- Diploma	20	9.1
- Bachelors' degree	10	4.5

Table C4: Stress of uncontrolled group by demographic characteristics (Cont.)

Factors	Uncontrolled group	
	N =220	Percentage
Occupation		
- Housewife or unemployed	138	62.7
- Farmer	13	5.9
- Laborer	14	6.4
- Vendor	32	14.5
- Enterprise	4	1.8
- Government and office employee	19	8.6
Monthly income		
- ≤1,000 bahts	63	28.6
- 1,001 – 5,000 bahts	99	45.0
- 5,001 – 10,000 bahts	28	12.7
- ≥10,001 bahts	30	13.6
Adequacy of income		
- Inadequate	86	39.1
- Adequate but no saving	87	39.5
- Adequate with saving	47	21.4

Table C5: Drug compliance of uncontrolled group by demographic characteristics

Factors	Uncontrolled group	
	N =220	Percentage
Gender		
- Male	59	34.9
- Female	110	65.1
Age		
- < 40 years	4	2.4
- 40 – 49 years	18	10.7
- 50 – 59 years	53	31.4
- 60 –69 years	56	33.1
- ≥ 70 years	38	22.5
Marital status		
- Single	8	4.7
- Married	111	65.7
- Widowed, divorced, separated	50	29.6
Education		
- No education	11	6.5
- Primary school	112	66.3
- Secondary school	24	14.2
- Diploma	14	8.3
- Bachelors' degree	8	4.7

Table C5: Drug compliance of uncontrolled group by demographic characteristics (Cont.)

Factors	Uncontrolled group	
	N =220	Percentage
Occupation		
- Housewife or unemployed	102	60.4
- Farmer	8	4.7
- Laborer	15	8.9
- Vendor	26	15.4
- Enterprise	4	2.4
- Government and office employee	14	8.3
Monthly income		
- ≤1,000 bahts	48	28.4
- 1,001 – 5,000 bahts	82	48.5
- 5,001 – 10,000 bahts	17	10.1
- ≥10,001 bahts	22	13.0
Adequacy of income		
- Inadequate	73	43.2
- Adequate but no saving	64	37.9
- Adequate with saving	32	18.9

BIOGRAPHY

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