

**FACTORS ASSOCIATED WITH BLOOD PRESSURE CONTROL
IN ESSENTIAL HYPERTENSIVE PATIENTS AT SUAK
PRIMARY CARE UNIT, NAN PROVINCE**

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ABSTRACT

There is a relationship between blood pressure control and risk factors in hypertensive patients. This study explores this relationship with the view to providing helpful indicators for better patient care.

A cross-sectional study was designed to determine risk factors of essential hypertensive patients with blood pressure control at Suak Primary Care Unit in Nan Province, who received hypertensive treatment there from 1 February to 30 April 2007. The total number of subjects was 310. Chi-square statistics were used in univariate and multivariate analysis by logistic regression with 95% confidence interval.

There were 115 men (37.1%) and 195 women (62.9%) with a mean age of 61.89 years. The factors such as having adequate income and savings ($OR_{adj} = 2.51$, 95%CI = 1.14-5.56, $p = 0.023$) and having no one to remind them to meet doctors or nurses ($OR_{adj} = 1.95$, 95%CI = 1.14-3.32, $p = 0.015$) were significantly associated with blood pressure control in this study.

The finding of this study shows the factors associated with hypertension in the Suak Primary Care Unit and provides useful knowledge for prevention and control of essential hypertension.

**KEY WORDS : ASSOCIATED/BLOOD PRESSURE CONTROL/
HYPERTENSION**

101 p.

ปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่
ทราบสาเหตุในหน่วยบริการปฐมภูมิตำบลสวน, จังหวัดน่าน (FACTORS ASSOCIATED
WITH BLOOD PRESSURE CONTROL IN ESSENTIAL HYPERTENSIVE
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บทคัดย่อ

การศึกษาชนิด CROSS-SECTIONAL นี้ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีผลต่อ การ
ควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ในหน่วยบริการปฐม
ภูมิตำบลสวน จังหวัดน่าน ระหว่างวันที่ 1 กุมภาพันธ์ ถึง 30 เมษายน 2550 กลุ่มตัวอย่างที่ศึกษาคือ
ผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ที่มารับการรักษาไม่น้อยกว่า 6 เดือน จำนวน 310 คน
วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา การทดสอบค่าไคว์-สแควร์ (Chi-square test) ในการ
วิเคราะห์ตัวแปรเดียวและการวิเคราะห์ตัวแปรเชิงซ้อน โดยการใช้ Multiple logistic regression
เพื่อทดสอบความสัมพันธ์ โดยคุณัยสำคัญทางสถิติ และใช้ค่าความเชื่อมั่น 95 เปอร์เซ็นต์

ผลการศึกษาพบว่ากลุ่มตัวอย่างเป็นเพศชายร้อยละ 37.1 และเพศหญิงร้อยละ 62.9 อายุ
เฉลี่ย 61.89 ปี เมื่อวิเคราะห์ด้วยตัวแปรเชิงซ้อน (Multiple logistic regression) โดยควบคุม
อิทธิพลของปัจจัยตัวอื่นๆพบว่า ปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของ
ผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุอย่างมีนัยสำคัญทางสถิติ ได้แก่ ความพอเพียงของ
รายได้ ($OR_{adj} = 2.51, 95\%CI = 1.14-5.56, p = 0.023$) และ การไม่มีคนคอยเตือนให้ไปพบ
แพทย์/พยาบาล ($OR_{adj} = 1.95, 95\%CI = 1.14-3.32, p = 0.015$)

จากผลการศึกษาในครั้งนี้แสดงให้เห็นถึงปัจจัยที่มีผลต่อการควบคุมระดับความดันโลหิตของ
ผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุในหน่วยบริการปฐมภูมิตำบลสวน จังหวัดน่าน จึงควร
นำผลที่ได้ไปใช้ในการป้องกันและควบคุมโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุต่อไป

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CHAPTER I

INTRODUCTION

Rational and background

The impact of changes in the development of economy, society, culture and lifestyle in various countries resulted in the epidemiological transition. The burden of non-communicable diseases (NCDs) is also increasing, NCDs are the major public health threat to every region of the world (1-2).

Hypertension is a non-communicable disease it is the most common public health problem and has impact on the economic importance (3). It is also one of the most important risk factors of cardiovascular disease, which is a powerful independent predictor of premature death and disability from cardiovascular complications and death from all causes (3-5). In 2001, there are at least 600 million hypertensive patients worldwide identified by the World Health Organization. In Asia, hypertensive patients were more than 15% of the population (6). In Thailand, Hypertension and stroke mortality rates have been continuously increasing and remain the top five cause of death (7).

The causes of essential hypertension vary, including solvable causes and unsolvable causes. Biological, genetic, demographic, behavior and psychological factor are associated with the development of hypertension (8,9-10). The problem of hypertension has no symptom at a first stage. Thus, high blood pressure is often labeled as “silent killer”. If hypertension is not treated, it will cause a non-reversible to damage to organ as heart, kidney, and brain. Death in hypertensive patients are most occurs from heart failure, chronic renal failure, and stroke (11). The treatment for hypertensive patients in Thailand reported 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(12) . From the study of Achananuparp et

al.(13), 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. The goal of prevention and management of hypertension is to reduce morbidity and mortality by the least intrusive means. This may be accomplished by achieving and maintaining systolic blood pressure (SBP) below 140 mmHg and diastolic blood pressure (DBP) below 90 mmHg(14,15). This goal may be achieved by life style modification; weight reduction, sodium restriction, exercise, moderation of alcohol intake, stopping smoking, relaxation, biofeedback, reduction stress or with pharmacologic treatment(16,17-20).

In Nan province 2005, hypertensive patients were 8.63% of population with age over 40 years old, hypertension was the first rank of NCDs morbidity, and it was ranked fourth among all cases of death in 2004(21). Sauk Primary Care Unit (PCU Sauk), Muang district in Nan province under Nan Contractive Unit for Primary Care (CUP Nan) has a hypertension clinic in Health Center to treat the patients who have blood pressure $\geq 140/90$ mmHg continuing 3 visits and also received hypertensive patients from Nan hospital. According to the survey data of hypertensive patients from Sauk Primary Care Unit, Muang district in Nan province (August 17, 2006), 27.2% of all individuals could control their blood pressure. Because the researcher realizes the importance of blood pressure control and interest in factors influencing blood pressure control, and the researcher hopes to use the results of the present research to provide better control and prevention of hypertension, as well as to improve and motivate the patients to seek treatment. Finally, it is anticipated that the results will be applicable, and thus, enables health-care providers to provide more effective public health services in the community for the prevention of complication and be able to control high blood pressure in order to improve quality of life in hypertensive patients.

Objectives of research

1. To study factors associated with blood pressure control in essential hypertensive patients which consist of:

- demographic and biological factors,
- health behavior
- treatment co-operation , and
- psychosocial factors

Research hypothesis

1. The essential hypertensive patients with different demographic and biological characteristics have a different blood pressure control.
2. The essential hypertensive patients with controlled blood pressure have better health behavior, treatment co-operation, social support and health perception than those of the patients with uncontrolled blood pressure.

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 Sauk Primary Care Unit in Nan province. Although there are different factors that have an influence on blood pressure control, the present study is limited to only demographic and biological factors, health behavior, treatment co-operation and psychosocial factors because these are factor which have received less attention in the past.

Variables of the research

1. Dependent variables:

Status of blood pressure control in the essential hypertensive patients

2. Independent variables:

2.1 Demographic and biological Factors

- Age
- Sex
- Education
- Marital status
- Occupation

- Adequacy of income
- Duration of hypertensive treatment
- Family history of hypertension
- BMI

2.2 Health behavior factors

- Eating habit
- Physical activity
- Stress management
- Alcohol consumption

2.3 Treatment co-operation factors

- Following nurse's appointment
- Drug usage

2.4 Psychosocial factors

- Social support
- Health belief

Definition of Terms

1. The essential hypertensive patients

The essential hypertensive patients, based on JNC VII, are the patients who have systolic blood pressure of 140 mmHg or higher or diastolic blood pressure of 90 mmHg or higher. The causes of hypertension are not renal disease, diabetic mellitus, heart disease, and endocrine system disorder. The individuals had received treatment at Sauk Primary Care Unit for at least six months and their OPD card did not specify the causes of hypertension.

2. Status of blood pressure control

The measurements of the status of disease control of the patients were the following conditions:

- Using blood pressure level on the interview day
- Measuring on the left arm and the subject was measured for blood pressure twice. The first measurement was taken approximately 5 minutes after the subjects

were seated, and second measurement taken approximately 1-2 minutes after the first. Additional reading should be averaged SBP and DBP.

- Using a sphygmomanometer

The categorization of hypertensive patients were based on the criteria for diagnosis of JNC VII:

2.1 Controlled blood pressure patients were patients with blood pressure level lower than 140/90 mmHg.

2.2 Uncontrolled blood pressure patients were patients with blood pressure level of 140/90 mmHg or higher.

3. Age is defined as the period of time beginning from 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 day to earn money.

5. Duration of hypertensive treatment is defined as the period of time starting from the date that the patient first received treatment at Sauk Public Health Center to the date of the interview. If the patients did not know the duration, the duration of disease were based from the medical record.

6. Family history of hypertension is having other hypertensive patients in his/her family.

7. Eating habit is defined as frequency of food consumption of high sodium foods, high fat foods and DASH foods on usual week.

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

9. 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).

10. Following nurse's appointment is defined as whether the hypertensive patients came to see the nurse consistently as evaluated from the OPD card of 3 months period. Missing appointment is defined as coming to follow up more than one week after the appointment date at least 1 visit.

11. Drug usage is compliance with the medicines prescribed by the nurse which was assessed from the interview.
12. Body Mass Index (BMI) is a measure of the relationship between weight (kg.) and height (meter²) that was used for evaluation of nutritional status on the interview day.
13. Social support is defined as information leading the subject to believe that they are care for and loved, that they are esteemed and valued, and that they belong to a network of communication and mutual obligation.
14. 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 disease.
15. Perceived susceptibility is defined as feeling, ideas and beliefs of a hypertensive patient regarding his/her probability of acquiring complications of hypertension.
16. Perceived severity is defined as feeling, ideas and beliefs of a hypertensive patient regarding the severity of his/her hypertension and its effect on their life.
17. Perceived benefits is defined as feeling, 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 disease

Benefit of the study

To provide a guideline for management of hypertension in Sauk Primary Care Unit , Muang district and nearby districts or Nan province.

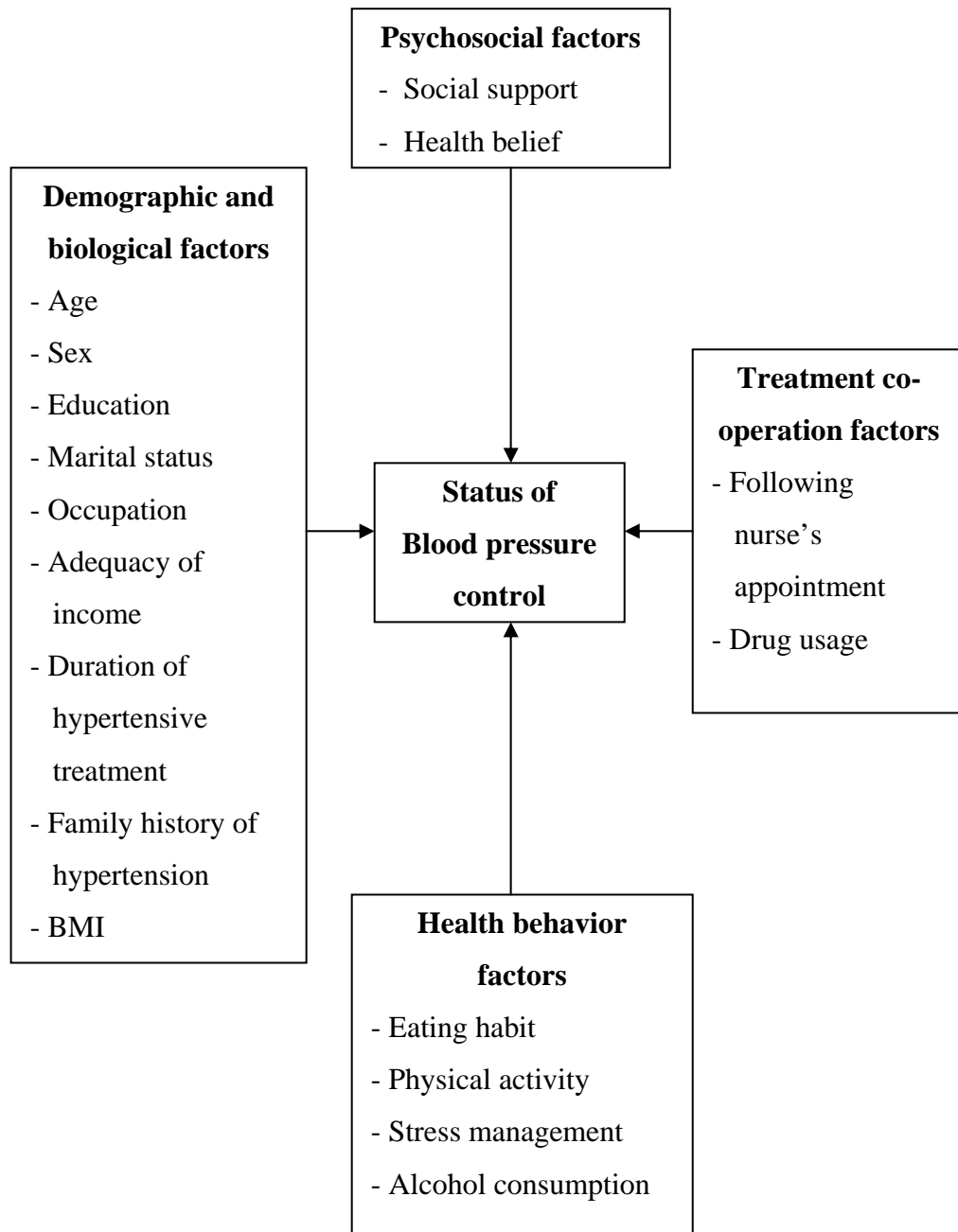


Figure 1. Conceptual Framework

CHAPTER II

LITERATURE REVIEW

The hypothesis and conceptual framework of this study were formulated by reviewing concepts, theories and findings previous from researches. Review of literatures consisting of the followings:

1. Theories of hypertension
2. Health behavior of hypertensive patients
3. Treatment co-operation and blood pressure control
4. Psychosocial factors and blood pressure control
5. Related research

Theories of hypertension

1. Definition of blood pressure

Blood pressure is defined as the pressure of the circulating blood against the wall of the blood; result 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 (22,23). There are two kinds of blood pressure as follow:

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

1.2 The diastolic pressure resulted 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. Definition of hypertension (15)

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

3. Classification of Hypertension

A. Classified by blood pressure

Table 1. Classified by blood pressure from JNC VII (15)

BP Classification	Systolic BP(mmHg)		Diastolic BP(mmHg)
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 (24)

WHO's Expert Committee classified hypertension to 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 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 90% of cases, the cause of high blood pressure is unknown (4, 23, 25, 26, 27). Although the specific cause is unknown, certain factors are recognized as contributing to the high blood pressure.

Non-modifiable factors (25, 28)

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

Race: Usually African Americans have high blood pressure than the whites. They develop high blood pressure at a relatively young 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 the family.

Gender: Generally, men have a greater possibility of developing high blood pressure than woman. This possibility varies according to age and ethnic groups.

Modifiable factors (25, 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 tend 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 the 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 (25, 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:

- Renal disease such as acute glomerulonephritis, pyelonephritis, diabetic nephropathy
- Hormone abnormalities involving the adrenal glands or pituitary gland
- Thyroid dysfunction
- Drug such as contraceptive pills hormones, steroid
- Coarctation of the aorta
- Pheochromocytoma
- Cushing's syndrome
- Primary aldosteronism
- Pre-eclamptic toxemia of pregnancy
- Tumors or other diseases of the adrenal gland

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.

5. Complication of hypertension (25, 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 cause the expansion of 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 rupture a weakened blood vessel 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 organs. The narrowing also makes the circulation more prone to blockage by blood clots thus 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.

6. Measurement of blood pressure

For measure the status of disease control was adapted from procedures recommended by the American Heart Association (32).

- The patient sit quietly with the back supported for 5 minutes and the arm supported at the level of the heart.
- No intake 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 mmHg, use the arm with the higher pressure and that arm should be used for future measure measurements. Additional readings should be averaged SBP and DBP.
- Inflate the bladder quickly to a pressure 20 mmHg above the systolic pressure and deflate the bladder 3 mmHg 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.

7. Management of hypertension (25)

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 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 patients who are more likely to have multiple associated disorders.

8. Goal 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 mmHg is associated with a decrease in CVD complications (15, 25, 30). The treatment of hypertension include both pharmacological treatment and non-pharmacological therapeutic, in which could 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 also 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 a 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 to 3 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 good deal with the stress, they could reduce the expenditure (33). Non-pharmacological treatment could reduce SBP to 10-15 mmHg and DBP to 6-10 mmHg. As many as 20 to 25% of patients with mild hypertensive can become normotensive with non-harmacologic interventions (34).

2. Pharmacological treatment

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

- Diuretics
- Beta-adrenergic receptor blocker
- Alpha-adrenergic receptor blocker
- 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 blocker are often used to decrease blood pressure and reduce water congestion in arteries along with diuretic and β -blockers. But Thiazide-type diuretics that enhance the antihypertensive efficacy of multidrug regimens, can be useful in achieving BP control, and are more 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 blocker (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 2 (15). 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 were done the use of a single drug fails to achieve the BP is more than 20/10 mmHg above goal, thus consideration should be given to initialing therapy with 2 drug, either as separate prescriptions or in fixed dose combinations (Figure 2). The initial of drug therapy with more than 1 agent may increase the possibility of achieving the BP goal in a more timely fashion, but particular caution is advised in those at risk for orthostatic hypertension, 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.

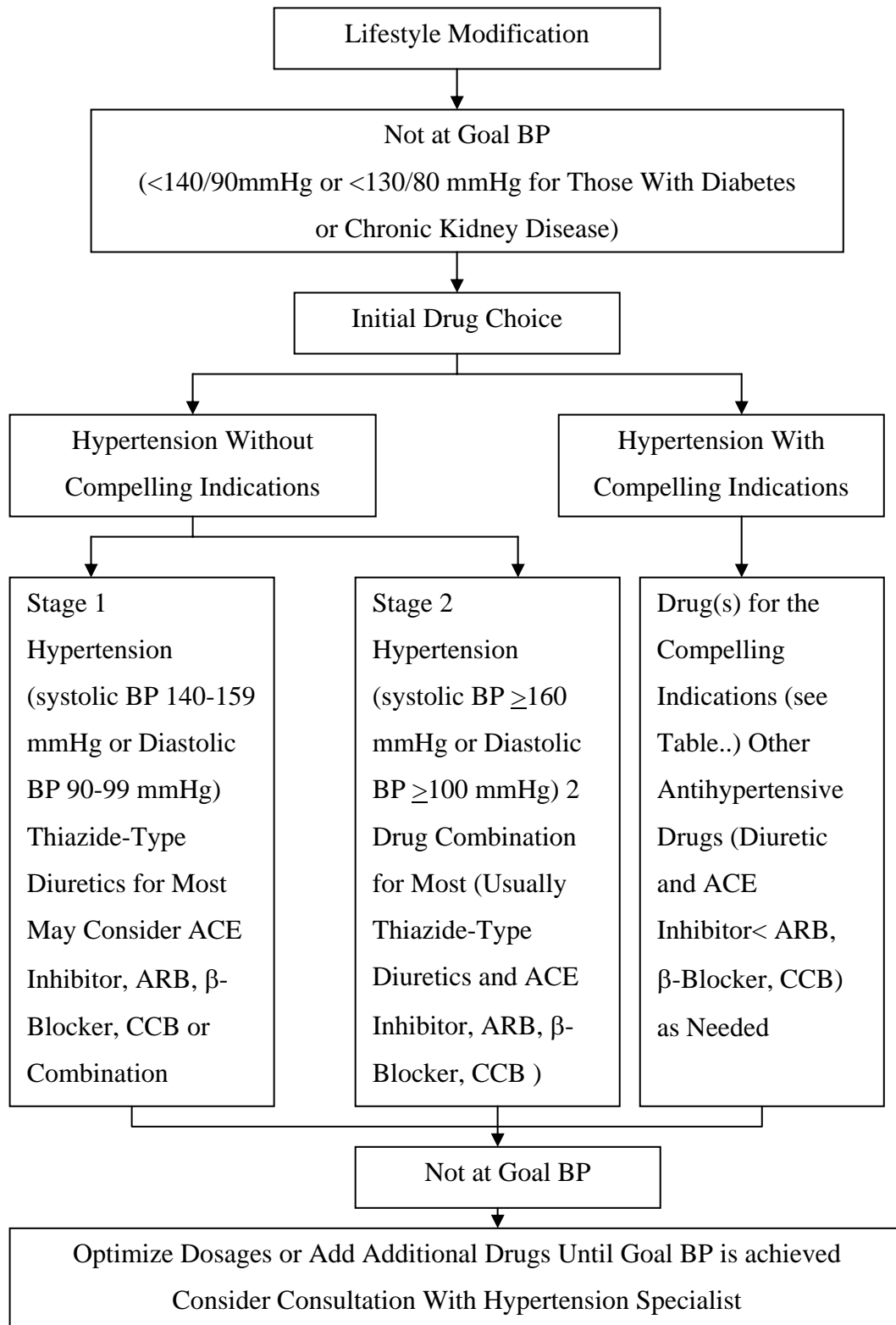


Figure 2. Algorithm for Treatment of Hypertension (15)

Table 2. Guideline Basis for Compelling Indications Drug Classes (15)

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	●		●			

Health behavior of hypertensive patients

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 a little cost and with minimal risk (37). Lifestyle modifications, as initial therapy for most patients at least for the first 3 to 6 months after recognition of their hypertension (38). Lifestyle modifications for hypertensive patients consist of:

1. Moderation of dietary sodium

Epidemiologic data demonstrate a positive association between sodium intake and level of blood pressure (39, 40). A high sodium intake may activate pressure mechanism and cause water retention. This increased 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 (41). Besides excess caloric consumption is the cause of dyslipidemia that is a major independent risk factor for coronary artery disease.

Dietary assessment methods

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

1. Dietary assessment method at the present

1.1 Dietary Records

The respondent records the food 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 size 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 respondents must weight all kinds of food before and after eating by themselves. Increase 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-hours 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 groups:

- 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 record 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 (4). 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. Moreover, exercise can also help to reduce the effects of psychological an emotional stress. The mechanisms of stress reduction are not well understood, and more research is being done to try to explain how exercise can reduces stress (45). 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 (15). Two types of exercise can be discussed (46).

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 (47).

2.2 Isometric exercise or passive muscle activity increase 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 theses 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 (11).

3. Management of stress

Taylor (48) 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 such as exposure to heat, cold, noise and other environment

conditions. Most have experienced problems with family members, concern over money, or argument with loved ones (49). Stress can effect the circulatory system. It can increase the resistance of blood vessels and cardiac output by stimulating the sympathetic nervous system. Resulting in increased vasoconstriction and heart rate (11). 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 norepinephine, which reduce heart rate, reduce blood pressure and reduce respiratory rate. These techniques have been used in the management of hypertensive patients. Then, patients should be used a technique comfortable to them, and do it 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 it can cause resistance to antihypertensive therapy (50), and also a risk factor for stroke (51). The hypertensive patients are recommended to limit their daily intake to not more than 1 oz (30 ml) of ethanol, which is equivalent to 24 oz (720ml) of beer, 10 oz (300ml) of wine, or 3 oz (90ml) of 100-proof whiskey (41). Because woman 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 (52).

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 (53). Tuck et al (54). Found a decrease in plasma rennin activity as well as aldosterone. Finally, weight reduction associated with increased insulin sensitivity and lowered insulin levels. In addition weight reduction leads to lower cardiac output without a significant alteration 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 (55). Many patients do not know what is 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 (41).

Treatment- cooperation or Compliance with treatment

Compliance or adherence can be defined as maintenance of assigned therapeutic regimen (56). The therapeutic regimen may include directions that are additive to the patient's lifestyle such as medications or exercise and restrictive diet.

McInnes (57) 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 (58) 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 are following nurse's appointment, compliance with medication taking and body weight control.

Essential hypertension is a chronic disease that can not be cured but blood pressure control to normal level can help if a patient receives treatment continuously 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 (59) and of those who remain under medical supervision only about 50% least 80% take their prescribed medications (60). Consequently because of noncompliance to antihypertensive treatment approximately 75% of patients with diagnosis of hypertension do not achieve optimum blood pressure control (61). Therefore, compliance with treatment for hypertensive patients is necessary to control the disease.

Methods to measure of compliance

No clinical measurement of compliance approaches is perfect but clinical information can be used to narrow 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 (62).

- 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 trials in which patients are required to come to a clinical to receive medicine each time it has 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 (63).

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 trials in which a placebo is used. That marker that is added must be (a) nontoxic at dose added (b) stable in biological fluids (c) easily detected by methods that are sensitive and specific and (d) biologically inert (62, 64). It is also important that absorption and kinetic parameters are similar to those of the medicine that 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, it can indicate spuriously high compliance if the patients know they are being tested (62, 65). In addition because of individual difference, 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 (65, 66).

1.4 Take-up follow-up appointment

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

2. Indirect measures

2.1 Pill counts

The actual number of tables or capsules in the drug container used by the patient is counted at each clinical visits and the expected number to be used is also determined. The ratio of actual pill 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 (63, 65) . The most obvious problem with the method is that failure to take the prescribed medication. Even in a hospital setting there is no guarantee that patients receive their medications unless the nurse is present when the medication is swallowed (64). However, pill counts of this rigor are impractical in most clinical setting and performed on medications patients brings with them to clinic visits over represent compliance when compare with more tamper-proof method (63).

2.2 Electronic counters

This method may demonstrate that patient 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 (62, 63).

2.3 Checking prescription records

Pharmacy records demonstrate whether patient refill their prescription at appropriate interval (67). When this method is available but sometimes patient stockpile medicines especially those they obtain at low cost or obtain prescription drugs from others (63, 66). Therefore obtaining refills of medicine according to a set schedule dose not ensure ingestion of those medicines on schedule.

2.4 Interviews

Interviews are the most widely application method of measuring compliance. Physician 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 (63). Patients often tend to overestimate because of embarrassment forgetfulness 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. Question 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 week?”

Thus to measure of compliance there exists no gold standard (68) but rather a multiplicity of assessment approaches each having its virtues and limitations.

From the study of Sackett (69) found that a nonthreatening clinical interview was 90% predictive of noncompliance in 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 setting.

Psychosocial factors and blood pressure control

1. Social supports

Cobb (70) has defined social supports as leading the subject to believe that they are cared for and loved, that they are esteemed and valued, and that they belong to a network of communication and mutual obligation.

Caplan (71) defines support systems as continuing social aggregates (namely, continuing interactions with another individual, a network, a group, or an organization) that provide individuals with opportunities for feedback about themselves and for validations about others, which may offset deficiencies in these communications within the larger community context. They offer three kinds of supportive provisions:

- a) The significant others help the individuals mobilize their psychological resources and master their emotional burdens.
- b) They share their tasks.

c) They provide them with extra supplies of money, material, tool, skills and cognitive guidance to improve their handling of their situation.

The level of social supports

Gottlieb (72) has classified social supports in 3 levels as follows:

1. Macro-level: It is the considering of participating in social measure from relationship with social institute, willingness to participate in any groups, informal lifestyle in social, and search for any service.

2. Meso-level: It focuses on structure and duty of social network by specific measuring into group of individuals who have consistent relationships such as group of friends.

3. Micro-level: It is a consideration of people who have close relationships. In this level, there is a belief that the quality of relationship is more important than network of structures. These supports are from husband, wife and family.

2. Health belief model

Belief refers to a person subjective probability judgements concerning some discriminable aspect of his world they deal with the person 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 relative 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 its severity and that it would not entail overcoming important psychological barriers such as cost, convenience, pain, embarrassment.

Kasl (77) suggests that behavior related to chronic illness such as diabetes, hypertension, etc. Because behavior related to chronic illness refines and distinguishes the concepts so far

1. The person "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 feel sick. Moreover, the sick-role behavior takes 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 (78) 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 measure 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 diagnosis 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 feeling of vulnerability to various other diseases.

Perceived severity

Although a person realizes susceptibility or complication of disease protective behavior does not act until the person believes 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 alternative 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.

Related research

1. Demographic and biological factors

1. Age

Age is positively and significantly associated with health supported behavior (79, 80-81), lifestyle pattern in early and late adult (82, 83) and self-care of the elderly found that the more aged they are, the less self-care they have (84). But age was not associated with the elderly lifestyle pattern. And age was not associated with blood pressure control in essential hypertensive patients (85, 86-87).

2. Sex

The study of hypertensive patients found that males want to be the leader or dominance more than females (88). Sex is directly related to health behavior and female has more positive behavior, avoid risk factors and have a good health protection more than males (89, 90). But in diabetic patients who required insulin treatment found that males significantly have a better self-care in exercise, calorie of dietary intake and have a higher average point in lifestyle than female (91, 92). Sex was not associated with elderly lifestyle pattern and not associated with the ability of self-care (93, 94), blood pressure control in essential hypertensive patients (85, 86-87).

3. Education

Different education level leads to the different self-care in myocardial infarction patients and in the elderly who have high education level have significantly higher average points in lifestyle than those with lower education level (92, 95-96). But basic education of essential hypertensive patients was not associated with taking care of health (97) and education level was not associated with blood pressure control in essential hypertensive patients (85, 86-87).

4. Occupation

The study of compared of lifestyle between the hypertension and the normal people found that people who are government officer and government enterprise significantly have the higher average points of lifestyle pattern than those with other

occupations (98). But in diabetic patients who have different occupation no difference of self-care behavior (99) and occupation was not associated with blood pressure control in essential hypertensive patients (85, 86-87).

5. Income and adequacy

Many studies found income is positive by associated with ability of self-care, incomes are associated with health supported behavior and different incomes have significantly different lifestyle (82, 92, 96, 100). But incomes were not associated with the elderly lifestyle (93), and were not associated with blood pressure control in essential hypertensive patients (85, 86-87).

6. Duration of disease

A study of diabetic patients who required insulin treatment found that over 10 years diabetic patients can report the activities better than the patients who have diabetes mellitus for less than 10 years. On the other hand, the patients with diabetes mellitus for less than 10 years have treatment co-operation better than the over 10 years diabetic patients (91). But in the diabetic patients who do not require insulin treatment found that there was no relationship between duration of disease and self-care behavior (101). And duration of disease was not associated blood pressure control in essential hypertensive patients (85, 86-87).

7. BMI

A number of studies have confirmed that BMI or body weight was significantly associated with both systolic and diastolic blood pressure (39, 86, 102-103). Poor blood pressure control was overwhelmingly due to lack of systolic control to goal (<140 mmHg) even among treated subjects. Covariates associated with a systolic control were older age, left ventricular hypertrophy and obesity ($BMI \geq 30 \text{ kg/m}^2$) (104). While, several clinical trials have also shown an effect of weight reduction in lowering blood pressure (53, 105-106). In contrast, BMI was not associated with blood pressure in essential hypertensive patients (85, 87)

2. Health behavior

1. Eating habit

Both epidemiological observations and clinical trials show an association between dietary sodium intake and blood pressure (39, 107-109). Meta-analysis of 56 clinical trials in hypertensive subjects revealed an SBP/DBP reduction of 3.7/0.9 mmHg in the hypertensive trials and 1/0.1 mmHg in the normotensive trials associated with a 100 mmol reduction in daily sodium intake after adjustment for measurement error of urinary sodium excretion (110). Moreover, in overweight adults with high-normal BP, reduction in sodium intake was effective in lowering blood pressure, especially in the short-term (6 months) (111). However, Ducher et al (112) found that no significant correlation between blood pressure and sodium intake.

2. 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 (25). A post-exercise reduction in mean arterial pressure for 12.7 hours independent of the exercise intensity in the hypertension group (113). Furthermore, mean arterial pressure was lower on exercise than on non-exercise days in the hypertension but not in the normotensive group. In controlled intervention studies, dynamic aerobic training was associated with mean net change of 5.3/4.8 mmHg for systolic and diastolic pressure, respectively (114). Meta-analysis of included studies supports the efficacy of progressive resistance exercise for reducing resting systolic and diastolic pressure in adults (115). Similar, a meta-analysis of 54 clinical trials in both hypertension and normotensive persons revealed aerobic exercise was associated with significant reduction in mean SBP 3.8 mmHg and DBP 2.6 mmHg (116). In contrast, exercise was not significantly associated with blood pressure control in essential hypertensive patients (85, 86-87, 117).

3. Stress

Emotional stress can raise blood pressure acutely. Well-controlled hypertensive patients had better health adjustment score and had lower blood pressure than in the uncontrolled group (118). Increased cardiovascular reactivity to behavioral challenges

was present among hypertensive patients than normotensives and among men than women (119). In a 10-year follow-up of 103 young men, 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 (120). 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 (121). Stress management is not just taking medicine, such as paracetamol, sleeping pills and muscle relaxant tablets, which will cause drug addiction and increased drug intake. Drinking alcohol, smoking, drinking coffee or tea and energy beverages are also not good ways. Some people eat desserts or a lot of food, and this will cause obesity and much more stress. Ways to reduce stress include:

- Meditation, enlightenment, and yoga made one peaceful and reduce the use of oxygen, so increasing relaxation.
- Relaxation training by lying down on the floor while listening to music.
- Massage is one of the ways to relax the muscles and the body. Face massage, especially, can be conducive to sleep.
- Change position to assist muscle relaxation while sitting, sleeping or working.
- Swim or float in water.
- Repeated exercise, such as Tai Chi Chuan, Chinese dancing, and slow dancing or classical Thai dancing.(122)

4. Alcohol consumption

Regular alcohol consumption raised blood pressure in both men and women in different ethnic group (25). Intersalt Cooperation Research Group (39, 123) 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 (124, 125). Risk is lowest among men who report one or two drinks daily on five or six days a week (123). 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 mmHg (50). A reduction in daily alcohol drinking of ethanol from 56 ml to

half that amount was feasible and effective in lowering blood pressure for non-treated mildly hypertensive patients who regularly consume alcohol (126). Binge drinking increases both SBP and DBP during periods of intoxication and decreases BP while reduce blood pressure alcohol levels (127). In contrast, alcohol consumption was not associated with blood pressure control in essential hypertensive patients (85, 86-87).

3. Treatment co-operation

1. 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 (85, 86-87, 117, 127), health condition (severity of disease and anxiety), adherence to follow-up schedule (117, 127). The compliance mean score of the experiment group was significantly higher than of the control group (compliance mean score 100) and the level of diastolic blood pressure was reduce significantly (128). A trial of strategies for improving compliance had fallen by 1.5% in the control group but rose 21.35 in the experimental group. Blood pressure fell in 17 of 20 experimental patients (to goal of DBP below 90 mmHg in 6) and in 10 of 18 control patients (to goal of DBP below 90 mmHg in 2) (129).

4. Psychosocial support

1. Social support

Caplan, et al (71). found that emotional support is a good variable to predict treatment co-operation, and a good social support group have high score of co-operation. Social supports from the spouses are positively associated with self-care of patients. Similar results were obtained in a study of patients who had head, neck and cervix cancer (94). Social supports are positively associated with self-care of the essential hypertensive patients who had received the treatment at Ramathibodi Hospital (OPD clinic), and giving knowledge of hypertension to the sample group and family who gave social support to the sample group are better methods to increase health belief. Important support is from the spouses (130). But social support was not associated with blood pressure condition and blood pressure control in essential hypertensive patients (85, 86-87).

2. Health belief

Perceived severity of disease associated with compliance behavior (130), there was positive relationship between perceived benefits and barriers and therapeutic compliance, but there was no significantly relationship between perceived severity and therapeutic compliance (96). However, there were non-significant relationship between perceived severity, health belief and therapeutic compliance (131, 132). While, health belief were not associated with blood pressure control in essential hypertensive patients (85, 86-87).

CHAPTER III

MATERIALS AND METHODS

Research Design

This study is a cross-sectional study of factors associated with blood pressure in essential hypertensive patients.

Studied Population

Participants in the study were the group of essential hypertensive patients who received treatment at Sauk Primary Care Unit in Nan Province, for at least six months before the beginning of the study.

Inclusion criteria of the sample

The characteristic of the sample selection is purposive sampling. The participants who took part in the study had to meet the following criteria:

1. Being diagnosed as having essential hypertension and having received treatment for at least six months.
2. Not having other diseases such as diabetes mellitus, heart disease, renal disease or endocrine system disorder.
3. Being willing to engage in an effective two-way communication with the researcher.
4. Accepting to participate in the research.

Sample size

All essential hypertensive patients who received treatment and were registered at Sauk Primary Care Unit , Nan province between February 1, 2007 and April 30, 2007. The sample size estimation was calculated by using the following formula

$$n = \frac{Z_{\alpha/2}^2 p(1-p)}{d^2}$$

where, n = the estimated sample size.

$Z_{\alpha/2}$ = The value from normal distribution associated with confidence interval
= 1.96 for 95% CI.

α = the level of statistical significance was set as 0.05.

p = the proportion of hypertensive patients with can controlled blood pressure lower than 140/90 mmHg, the value of 0.27 was determined from survey data of hypertensive patients from Sauk Primary Care Unit, Muang district in Nan province (August 17, 2006)

d = the absolute precision required on either side of proportion of the study, the value Of 5% was selected.

Then, we calculated sample size when $Z_{\alpha/2} = 1.96$, $p = 0.27$, and $d = 0.05$ as

$$n = \frac{(1.96)^2 \times (0.27) \times (0.73)}{(0.05)^2} = 303$$

Therefore, 303 (~310) patients were required for this study.

Research instrument

1. The questionnaires were specially designed based on the conceptual framework, tested and improved by the professional. It consisted of four parts as follows:

Part I: Data of demographic and biological characteristics questionnaire consist of gender, age, marital status, education, occupation, income. Adequacy of income, duration of disease, duration of hypertensive treatment, family history of hypertension, BMI and blood pressure.

Part II: Data of health behavior questionnaire consist of eating habit, physical activity, stress management and alcohol consumption.

Part III: Data of treatment co-operation: following nurse’s appointment and drug compliance.

Part IV: Psychosocial data: social support and health belief (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 literature and based on nutrition management for restrict sodium (133) and DASH food (15) adjusted food items to suit for people in Nan province. There were eighteen items. There were 11 items about high sodium foods (1-5, 7-8, 12-15), 4 items about high fat foods (6, 9-11) and 3 items about DASH foods (16-18). Each items was divided into five rating scales as follows:

	high sodium and high fat foods	DASH foods
Never	4	0
1-3 times/month	3	1
1-3 times/week	2	2
4-6 times/week	1	3
> 6 times/week	0	4

The range of score was between 0-72. Eating habit was determined by using the score percentile as a cut-off point, classified into 2 groups as follows:

Unhealthy eating habit = The subjects who had the score < 50th percentile (total score < 53)

Healthy eating habit = The subjects who had the score \geq 50th percentile (total score \geq 53)

2. Physical activity: This part was measured by short IPAQ questionnaire (134) which were summarized according to the physical activities recorded (walking, moderate* and vigorous activities**). 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 = 4.0 METs, vigorous = 8.0 METs). 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 were 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 METs-min/week

3. Healthy active

Any one of the following 2 criteria

- Vigorous intensity activity on at least 3 days and accumulating at least 1500 METs-min/week OR
- 7 or more days Of any combination of walking, moderate-intensity or vigorous intensity activity a minimum of at least 1500 METs-min/week.

3. Stress management : was modified from the Pornviriyasup’s questionnaire (135), which consisted of 9 items. Positive behavior was queried in items 1, 2, 3, 4, 6, 8 and 9, and negative behavior in items 5 and 7. Each items was divided into four rating scales as follows:

	Positive items	Negative items
Regularly	4	1
Often	3	2
Sometimes	2	3
Never	1	4

The range of score was between 0-36. Stress management was determined by using the score percentile as a cut-off point, classified into 2 groups as follows:

Poor stress management = The subjects who had the score < 50th percentile (total score < 26)

Good stress management = The subjects who had the score ≥ 50th percentile (total score ≥ 26)

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 atypical 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 average, using the following assumptions:

One bottle of spirits (amount 750 ml with 42% alcohol)

One bottle of liquor (amount 750 ml with 35% alcohol)

One bottle of beer (amount 660 ml with 6% alcohol)

One bottle of wine (amount 750 ml with 14% 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 3 groups as follows:

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

Moderate drinking = the subjects who was asked how many drinks they usually had during per day, they consumed no more than 2 drinks (e.g., 24 oz beer, 10 oz wine, 3 oz proof spirits or liquor) per day in most men, and to no more than 1 drink per day in women and lighter weight persons.

High drinking = the subjects who was asked how many drinks they usually had during per day, they consumed spirits, liquor, beer and wine more than 2 drinks per day in most men, and to more than 1 drink per day in women and lighter weight persons.

5. 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 2 groups as follows (136):

Normal weight is defined as BMI = < 25.0 Kg/m²

Overweight is defined as BMI = ≥ 25.0 Kg/m²

6. Health belief questionnaire

The content of 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 (62). 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 groups as follows:

Low health belief = the subjects who had the score < 34th percentile (total score < 15).

Moderate health belief = the subjects who had have the score 34th -66th percentile (total score = 15-17).

High health belief = the subjects who had the score equal or greater than the 67th percentile (total score \geq 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 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

second measurement taken approximately 5 minutes after the first. Additional reading should be averaged SBP and DBP.

- Inflate the bladder quickly to a pressure 20 mmHg above the systolic pressure and deflate the bladder 3 mmHg 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.

Materials used in this study were verified by :

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. And it was subsequently tested with the group of 30 hypertensive patients at Sauk Primary Care Unit, Nan province before data collection began.

2. The Sphygmomanometer and Sliding-weight scales were standardized by a technician.

Data collection

Data were collected from essential hypertensive patients who received treatment at Sauk Primary Care Unit in Nan Province, for at least six months before the beginning of the study. The questionnaires were distributed and used with all of the samples. Only one interviewer, the researcher, fill out all questionnaires and recorded some data from the patients's medical record (OPD card).

Protect of the human subjects

Before collecting data, the investigator provided the consent form (appendix) 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

The statistics used in data analysis are:

1. Descriptive statistics which showed frequency, percentage, mean and standard deviation.

2. Inferential statistics

- 2.1 Univariate analysis.

P-value from Chi-square or Fisher's exact test were used to compare each of the independent risk factors. This analysis is to test the relationships between factors and blood pressure control.

- 2.2 Multivariate analysis.

Logistic regression analysis was performed to simultaneously control the confounders and to assess possible interaction.

CHAPTER IV

RESULTS

Data collection was conducted at Suak Primary Care Unit, Nan province. Three hundred and ten hypertensive cases were recruited in this study.

The results of the study are presented as follows:

1. General and socio-demographic characteristics
2. Characteristic of variables associated with blood pressure control in essential hypertension (Univariate analysis)
3. Characteristic of variable associated with blood pressure control in essential hypertension by controlling other confounders (Multiple logistic regression analysis)

1. General and socio-demographic characteristics : general and socio-demographic characteristics consist of blood pressure control, demographic and biological characteristics, health behaviors, treatment co-operation and psychosocial characteristics.

1.1 Blood pressure control (Table 3)

About two-third of subjects showed either systolic blood pressure of 140 mmHg or greater or diastolic blood pressure of 90 mmHg or greater (65.2%). Only 34.8% of the subjects had blood pressure lower than 140/90 mmHg.

Table 3 : Number and percentage of essential hypertensive patients by blood pressure control

Blood pressure control	Subjects	
	Number (n=310)	Percentage
Blood pressure control		
Controllable (lower than 140/90 mmHg)	108	34.8
Uncontrollable (140/90 mm Hg or higher)	202	65.2

1.2 Demographic and biological characteristics of the subjects such as gender, age, marital status, education level, occupation, adequacy of income, duration of hypertensive treatment, family history of hypertension and body mass index (BMI) were presented in **Table 4**.

Gender

The majority of the subjects were female (62.9%), whereas the minority were male (37.1%).

Age

The largest age-group of subjects were 50 – 59 years. The second and third largest groups were older than 70 years and 60 – 69 years (29.0% and 25.5% respectively). Only 1.3% were less than 40 years. The mean age of the subjects was 61.89 ± 11.15 years.

Marital status

Most of the subjects were married (81.0%), 18.1% were widowed, divorced or separated and only 1.3% were single.

Education level

Most of the subjects had completed primary school (66.8%). Moreover, those with no education and those completing secondary school account were 30.0% and 2.6% respectively. Only the small group had completed high school (0.6%).

Occupation

The largest group of subjects were farmer (52.3%). The second and third largest groups were housewife or unemployed and laborer (40.6% and 3.9% respectively).

Adequacy of income

The majority of the subjects had an adequate income with no saving (59.4%), fewer had inadequate income (22.9%). The smallest group had adequate income with saving (17.7%).

Duration of hypertensive treatment

The majority of the subjects had hypertensive treatment for 1-5 years (83.2%), with fewer had 6-10 years (12.9%). Only 3.9% had hypertensive treatment for more than 10 years. The mean duration of hypertensive treatment was 3.94 ± 3.45 years.

Family history of hypertension

The majority of the subjects had no family history of hypertension (81.0%). Whereas the minority had family history of hypertension (19.0%).

Body mass index (BMI)

The majority group of the subjects had normal weight (75.8%). Whereas the minority had over weight (24.2%). The mean BMI was 22.28 ± 3.79 kg/m².

Table 4 : Number and Percentage of essential hypertensive patients by demographic and biological characteristics

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Gender						
- Female	70	41.9	45	31.5	115	37.1
- Male	97	58.1	98	68.5	195	62.9
P-value = 0.075						
Age (years)						
- < 40	1	0.6	3	2.1	4	1.3
- 40 – 49	18	10.8	23	16.1	41	13.2
- 50 – 59	54	32.3	42	29.4	96	31.0
- 60 – 69	50	29.9	29	20.3	79	25.5
- ≥ 70	44	26.3	46	32.2	90	29.0
Min.	39		37		37	
Max.	92		87		92	
Mean ± SD	62.37±10.45		61.26±11.93		61.89 ± 11.15	
P-value = 0.140						
Marital status						
- Married	3	1.8	0	0	3	1.3
- Single	133	79.6	118	82.5	251	81.0
- Widowed, Divorced, Separated	31	18.6	25	17.5	56	18.1
P-value = 0.260						
Education level						
- No education	49	29.3	44	30.8	93	30.0
- Primary school	113	67.7	91	63.6	207	66.8
- Secondary school	3	1.8	8	5.6	8	2.6
- High school	2	1.2	0	0	2	0.6
P-value = 0.080						

Table 4 : Number and Percentage of essential hypertensive patients by demographic and biological characteristics (continued)

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Occupation						
- Housewife or unemployed	78	46.7	48	33.6	126	40.6
- Farmer	73	43.7	89	62.2	162	52.3
- Laborer	9	5.4	3	2.1	12	3.9
- Office employee	2	1.2	0	0	2	0.6
- Vendor	2	1.2	3	2.1	5	1.6
- Enterprise	2	1.2	0	0	2	0.6
- Other	1	0.6	0	0	1	0.3
P-value = 0.014						
Adequacy of income						
- Inadequate	9	5.4	62	43.4	71	22.9
- Adequate but no saving	110	65.9	74	51.7	184	59.4
- Adequate with saving	48	28.7	7	4.9	55	17.7
P-value < 0.001						
Duration of hypertensive treatment (years)						
- 1- 5	145	86.8	113	79.0	258	83.2
- 6-10	16	9.6	24	16.8	40	12.9
- ≥ 10	6	3.6	6	4.2	12	3.9
Min.	1		1		1	
Max.	20		27		27	
Mean ± SD	3.58 ± 2.97		4.36 ± 3.90		3.94 ± 3.45	
P-value = 0.155						

Table 4 : Number and Percentage of essential hypertensive patients by demographic and biological characteristics (continued)

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Family history of hypertension						
- Yes	32	19.2	27	18.9	59	19.0
- No	135	80.8	116	81.1	251	81.0
P-value = 1.000						
Body Mass Index (BMI)						
- Normal weight	139	83.2	96	67.1	235	75.8
- Over weight	28	16.8	47	32.9	75	24.2
Min.	13.37		30.83		13.37	
Max.	13.79		36.34		36.34	
Mean ± SD	21.71±3.40		22.94±4.10		22.28±3.79	
P-value = 0.002						

1.3 Health behavior (Table 5)

Health behavior consisted of eating habit, physical activity, alcohol consumption and stress management.

Eating habit

More than half of subjects had healthy eating habit (53.9%) and a smaller group had unhealthy eating habit (46.1%).

Physical activity

The majority of the subjects had healthy active (80.6%), with fewer had sufficiently active (14.2%). Only the small group had insufficiently active (5.2%).

Alcohol consumption

The majority of the subjects did not drink alcohol (90.1%), with fewer had moderate drinking (5.5%) and 3.9% had high drinking.

Stress management

More than half of the subjects had good stress management (56.5%) and a smaller group had a poor stress management (43.5%).

Table 5 : Number and Percentage of essential hypertensive patients by health behaviors

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Eating habit						
- Healthy	106	63.5	61	42.7	167	53.9
- Unhealthy	61	36.5	82	57.3	143	46.1
	P-value < 0.001					
Physical activity						
- Healthy active	144	86.2	106	74.1	250	80.6
- Sufficiently active	16	9.6	28	19.6	44	14.2
- Insufficiently active	7	4.2	9	6.3	16	5.2
	P-value = 0.024					
Alcohol consumption						
- Non drinking	149	89.2	132	92.3	281	90.1
- Moderate drinking	15	9.0	2	1.4	17	5.5
- High drinking	3	1.8	9	6.3	12	3.9
	P-value = 0.002					
Stress management						
- Good stress management	121	72.5	54	37.8	175	56.5
- Poor stress management	46	27.5	89	62.2	135	43.5
	P-value < 0.001					

1.4 Treatment co-operation (Table 6)

Treatment co-operation consisted of following nurse's appointment and drug usage.

Following nurse's appointment

The most of the subjects kept the nurse's appointment (63.9%), whereas 36.1% missed the appointment.

Drug usage

The largest group of subjects used drug both in the day before interview and the day of the interview (62.6%). The second and third largest groups were not used drug both yesterday and the day of the interview, used drug in the day before interview but not used in the day of the interview (25.5%, 11.3% respectively). Only 0.6% not used drug in the day before interview but used in the day of the interview.

Table 6 : Number and Percentage of essential hypertensive patients by treatment co-operation

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Following nurse's appointment						
- Kept appointment	101	60.5	97	67.8	198	63.9
- Missed appointment	66	39.5	46	32.2	112	36.1
P-value = 0.179						
Drug usage						
- Yesterday and today	114	68.3	80	55.9	194	62.6
- Today but not yesterday	1	0.6	1	0.7	2	0.6
- Yesterday but not today	15	9.0	20	14.0	35	11.3
- Not yesterday and not today	37	22.2	42	29.4	79	25.5
P-value = 0.078						

1.5 Psychosocial support (Table 7)

Psychosocial support consisted of social support and health belief.

Social support

According to the research findings, 66.1% of the subjects had someone who reminded them to see doctor/nurse, 91.3% had someone who could take very good care of them, 93.9% had someone who relieved their work when they were sick, 87.1% had someone who supported them financially, and 96.1% had someone who advised them on their health.

Health belief

The largest group of subjects had high health belief (48.1%) and the second had low health belief (26.1%). The smallest group had moderate health belief (25.8%).

Table 7 : Number and Percentage of essential hypertensive patients by psychosocial support

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
Social support each items						
1. Have someone to remind them to see doctor/nurse						
- Yes	68	40.7	137	95.8	205	66.1
- No	99	59.3	6	4.2	105	33.9
P-value < 0.001						
2. Have someone can take very good care of them						
- Yes	143	85.6	140	97.9	283	91.3
- No	24	14.4	3	2.1	27	8.7
P-value < 0.001						

Table 7 : Number and Percentage of essential hypertensive patients by psychosocial support (continued)

Factors	Suak		Nasao		Total	
	Number	%	Number	%	Number (n=310)	%
3. Have someone to relieve their work when they are sick						
- Yes	150	89.8	141	98.6	291	93.9
- No	17	10.2	2	1.4	19	6.1
P-value = 0.003						
4. Have someone can support their financially						
- Yes	135	80.8	135	94.4	270	87.1
- No	32	19.2	8	5.6	40	12.9
P-value = 0.001						
5. Have someone can advise them on their health						
- Yes	156	93.4	142	99.3	298	96.1
- No	11	6.6	1	0.7	12	3.9
P-value = 0.017						
Health belief						
- Low	12	7.2	69	48.3	81	26.1
- Moderate	27	16.2	53	37.1	80	25.8
- High	128	76.6	21	14.7	149	48.1
P-value < 0.001						

2. The relationship between factors and blood pressure control by Univariate analysis

Demographic and biological characteristics (Table 8)

There was no association between gender, age, marital status, education, occupation, the duration of hypertensive treatment, family history of hypertension and body mass index and blood pressure control. However, adequacy of income and BMI were significantly associated with blood pressure control ($p = 0.002$ and 0.047 , respectively).

The subjects who had adequate income with saving were 3.28 times more to have controlled blood pressure than the subjects who had inadequate income (95% CI, 1.55-6.97) and the subjects who had normal weight were 1.80 times more to have controlled blood pressure than the subjects who had over weight (95% CI, 1.00-3.22).

Table 8 : Association between demographic and biological characteristics and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	P - value
	N	%	N	%			
	Gender						
- Female	70	35.9	125	64.1	1.00		
- Male	38	33.0	77	67.0	0.88	0.54-1.43	0.611
Age (years)							
- < 40	2	50.0	2	50.0	1.00		
- 40 – 49	20	48.8	21	51.2	0.95	0.12-7.42	0.963
- 50 – 59	29	30.2	67	69.8	0.43	0.06-3.22	0.414
- 60 – 69	23	29.1	56	70.9	0.41	0.06-3.09	0.388
- \geq 70	34	37.8	56	62.2	0.61	0.08-4.51	0.626

Table 8 : Association between demographic and biological characteristics and blood pressure control (continued)

Factors	Controlled group		Uncontrolled group		OR	95%CI	P - value
	N	%	N	%			
	Marital status						
- Married	86	34.3	165	65.7	1.00		
- Single	1	33.3	2	66.7	0.96	0.09-10.73	0.973
- Widowed, Divorced, Separated	21	37.5	35	62.5	1.15	0.63-2.10	0.646
Education level							
- No education	29	31.2	64	68.8	1.00		
- Primary school	78	37.7	129	62.3	1.33	0.79-2.25	0.278
- Secondary school and High school	1	10.0	9	90.0	0.25	0.03-2.03	0.192
Occupation							
- Housewife or unemployed	50	39.4	77	60.6	1.00		
- Farmer	49	30.2	113	69.8	0.67	0.41-1.09	0.106
- Laborer	6	50.0	6	50.0	1.54	0.47-5.04	0.476
- Office employee	1	50.0	1	50.0	1.54	0.09-25.19	0.762
- Vendor and Enterprise	2	28.6	5	71.4	0.62	0.12-3.30	0.571
Adequacy of income							
- Inadequate	18	25.4	53	74.6	1.00		
- Adequate but no saving	61	33.2	123	66.8	1.46	0.79-2.71	0.229
- Adequate with saving	29	52.7	26	47.3	3.28	1.55-6.97	0.002

Table 8 : Association between demographic and biological characteristics and blood pressure control (continued)

Factors	Controlled group		Uncontrolled group		OR	95%CI	P - value
	N	%	N	%			
	Duration of hypertensive treatment (years)						
- 1- 5	88	34.1	170	65.9	1.00		
- 6-10	14	35.0	26	65.0	1.04	0.52-2.09	0.912
- \geq 10	6	50.0	6	50.0	1.93	0.61-6.17	0.266
Family history of hypertension							
- Yes	17	28.8	42	71.2	1.00		
- No	91	36.3	160	63.7	0.71	0.38-1.32	0.282
Body Mass Index (BMI)							
- Normal wieght	89	37.9	146	62.1	1.00		
- Overweight	19	25.3	56	74.7	1.80	1.00–3.22	0.047

Health behaviors (Table 9)

There was no association between physical activity and stress management and blood pressure control. However, eating habit and alcohol consumption were significantly associated with blood pressure control (p-value = 0.019 and 0.048, respectively).

The subjects who had healthy eating habit were 1.77 times more to have controlled blood pressure than the subjects who had unhealthy eating habit (95% CI, 1.10-2.85) and the subjects who had moderate drinking were 9.78 times more to have controlled blood pressure than who had high drinking (95% CI, 1.02-93.50).

Table 9 : Association between health behaviors and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
	Eating habit						
- Unhealthy	40	28.0	103	72.0	1.00		
- Healthy	68	40.7	99	59.3	1.77	1.10-2.85	0.019
Physical activity							
- Insufficiently active	7	43.8	9	56.3	1.00		
- Sufficiently active	12	27.3	32	72.7	0.48	0.15-1.59	0.229
- Healthy active	89	35.6	161	64.4	0.71	0.26-1.97	0.512
Alcohol consumption							
- High drinking	1	8.3	11	91.7	1.00		
- Moderate drinking	8	47.1	9	52.9	9.78	1.02-93.50	0.048
- Non drinking	99	35.2	182	64.8	5.98	0.76-47.03	0.089
Stress management							
- Poor stress management	42	31.1	93	68.9	1.00		
- Good stress management	66	37.7	109	62.3	1.34	0.83-2.16	0.227

Treatment co-operation (Table 10)

There was no association between following nurse' appointment and drug usage and blood pressure control.

Table 10 : Association between treatment co-operation and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
	Following nurse's appointment						
- Missed appointment	36	32.1	76	67.9	1.00		
- Kept appointment	72	36.4	126	63.6	1.21	0.74-1.97	0.454
Drug usage							
- Not yesterday and not today	25	31.6	54	68.4	1.00		
- Yesterday but not today	12	34.3	23	65.7	1.13	0.49-2.62	0.781
- Yesterday and today & Today but not yesterday	71	36.2	125	63.8	1.23	0.70-2.14	0.471

Psychosocial support (Table 11)

Social support item 1 was significantly associated with blood pressure control ($p < 0.0001$). The subjects who had no one to remind them to see doctor/nurse were 2.45 times more to have controlled blood pressure than the subjects who had someone to remind them (95% CI, 1.50-4.00). But there were no association between blood pressure control and social support other items.

Health belief was significantly associated with blood pressure control ($p = 0.031$). The subjects who had high health belief were 1.93 times more to have controlled blood pressure than who had low health belief subjects (95% CI, 1.06-3.49).

Table 11 : Association between psychosocial support and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
	Social support each items						
1. Have someone to remind them to see doctor/nurse							
- Yes	57	27.8	148	72.2	1.00		
- No	51	48.6	54	51.4	2.45	1.50-4.00	<0.001
2. Have someone can take very good care of them							
- Yes	95	33.6	188	66.4	1.00		
- No	13	48.1	14	51.9	1.84	0.83-4.07	0.133
3. Have someone to relieve their work when they are sick							
- Yes	100	34.4	191	65.6	1.00		
- No	8	42.1	11	57.9	1.39	0.54-3.56	0.494
4. Have someone can support their financially							
- Yes	93	34.4	177	65.6	1.00		
- No	15	37.5	25	62.5	1.14	0.57-2.27	0.705

**Table 11 : Association between psychosocial support and blood pressure control
(continued)**

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
	5. Have someone can advise them on their health						
- Yes	103	34.6	195	56.4	1.00		
- No	5	41.7	7	58.3	1.35	0.42-4.37	0.614
Health belief							
- Low	21	25.9	60	74.1	1.00		
- Moderate	27	33.8	53	66.3	1.46	0.74-2.87	0.279
- High	60	40.3	89	59.7	1.93	1.06-3.49	0.031

3. The relationship between factors and blood pressure control by Multivariate analysis (Table 12)

The univariate analysis did not take into account the influence of confounding factors which may have affected the relationship between factors and blood pressure control in essential hypertensive patients. This problem could be solved by multiple logistic regression analysis. The factors used in the multivariate analysis were the ones with significant association in the univariate analysis. They were adequacy of income, eating habit, alcohol consumption, social support item 1 and health belief.

Finally, multivariate analysis was found two variables that had significant association with blood pressure control. They were adequacy of income and social support item 1 (Have someone to remind them to see doctor/nurse).

Table 12 : Association between factors and blood pressure control by using multiple logistic analysis

Factors	Adjust OR	95% CI	p-value
Adequacy of income			
- Inadequate	1.00		
- Adequate but no saving	1.15	0.60-2.20	0.677
- Adequate with saving	2.51	1.14-5.56	0.023
Social support item 1.			
Have someone to remind them to see doctor/nurse			
- Yes	1.00		
- No	1.95	1.14-3.32	0.015

The following variable were included in logistic regression analysis : adequacy of income and social support item1 (Have someone to remind them to see doctor/nurse) were showed statistically significant independent associations with blood pressure control.

In this study, data was collected from essential hypertensive patients who received treatment at Sauk Primary Care Unit (PCU Sauk) in Nan Province. PCU Suak had two health teams in two health centers. In this study the subjects who had received treatment from different health team had different blood pressure control (p-value <0.0001, 95% CI, 1.66 – 4.46). **(Table 13)**

Table 13 : Association between health team and blood pressure control

Factors	Controlled group		Uncontrolled group		OR	95%CI	p-value
	N	%	N	%			
	Public Health Team						
Team 1	33	23.1	110	76.9	1.00		
Team 2	75	44.9	92	55.1	2.72	1.66-4.46	<0.001

CHAPTER V

DISCUSSION

This study found only 2 factors named “adequacy of income” and “having no one to remind them to meet doctor/nurse” were significantly associated with blood pressure control in essential hypertensive patients (OR = 2.51 and 1.95, respectively), while the other factors were not. The details will be discussed as follows.

1. Discussion on study design and methodology

This study was designed as a cross-sectional study. The data were collected in a limited period of time (1 February 2007 – 30 April 2007). Health behavior, treatment co-operation, and psychosocial support of subjects were assessed by interview. Since this method was very subjective and difficult to get reliable data, the measurement may have some errors. The errors might be caused by the following matters.

- Non-standardization of instrument: The error might happen especially in health behavior data. Because it was recorded as usual health behaviors which may miss from the actual ones in the day of interview.

- Lacking of patient’s co-operation: Since the researcher is a health technician in Sauk Primary Care Unit, the subjects might be feared to answer the questions, especially the question about drug usage. Most subjects answered that they used drug in both the day of interview and the day before interview even though they did not use them. Moreover, they tended to reported only positive behaviors such as don’t drink alcoholic beverage, don’t consume high sodium and high fat food, and do regularly exercise.

- Quantification of health behavior: The health behavior cannot be quantified.

Chi-square was used to compare each of the independent risk factors. This analysis was used to test the association between factors and blood pressure control. The result showed that 5 factors named adequacy of income, eating habit, alcoholic beverage consumption, having no one to remind them to meet doctor/nurse, and health believe were associated with blood pressure control (OR= 3.28, 1.77, 9.78, 2.45 and 1.93, respectively). However, this outcome has an influence of confounding factors. The researcher solved this problem by using multiple logistic regression analysis instead. Then, it was found that only 2 factors named adequacy of income and having no one to remind them to meet doctor/nurse were significantly associated with blood pressure control (OR = 2.51 and 1.95, respectively).

2. Discussion on study results

2.1 Blood pressure control

In this study, the patients who can control their blood pressure means the patients who had blood pressure level lower than 140/90 mmHg on the day of interview. It was found that only 34.8% of patients could control their blood pressure while the other 65.2% could not. This result was much closed to the finding of Suthimeth (86) who conducted the study in Nonthaburi province which resulted 34.1% and 65.9% respectively. However, the finding of Sudarat (85) who conducted the study in Lopburi province resulted a bit different (43.2% and 56.8% respectively). Both studies of Suthimeth and Sudarat had used the same controlling criteria (140/90 mmHg) and measuring method as this study.

2.2 Demographic and biological factors

- Demographic characteristics

In this study, age, sex, marital status, educational level, occupation, the duration of treatment, and family's history of hypertension were not associated with blood pressure control. This result was not aligned with a previous study of Suthimate (86) which found that marital status was associated with blood pressure control. The

married subjects can better control their blood pressure than the single subjects (OR=5.48, 95%CI 1.217-24.670, $p = 0.027$).

Only adequacy of income that was significantly associated with blood pressure control ($p = 0.023$) in this study. This result was consistent with the previous studies (82, 92, 96, 100) which found that income had positive relation with self-care ability of patient, income were associated with health behavior support, and different income patients had significantly different lifestyle. In contrast, this result was inconsistent with some previous studies (85, 86-87) which found that income was not associated with blood pressure control in essential hypertensive patients.

- Biological factors

In this study, body mass index (BMI) was not associated with blood pressure control. The result was consistent with a previous study by Sudaratana (85), but it was inconsistent with a previous study by Suthimate (86) which found that BMI was associated with blood pressure control (OR=1.734, 95%CI 1.09-2.75, $p= 0.008$).

2.3 Health behavior

In this study, health behavior was assessed by interview. It was reported as usual health behavior which did not specify actual health behavior in recent day or the day of interview, while blood pressure level was measured in the day of interview. Moreover, this factor was very subjective and difficult to get a reliable data, because the subjects might have information bias. In addition, it was difficult to clearly estimate their sodium intake per day, energy expenditure per day and, quantity of alcohol intake. The details can be discussed as follows.

- Eating habit

Eating habit was not significantly associated with blood pressure control. This outcome may be caused by the measuring method. In this study, eating habit was assessed by recording the consumption frequency of high sodium, high fat, and DASH food of patients in usual day which might different from the actual consumption in the day of interview. In addition, because of data distort, in data analysis processing, the

researcher had included frequency of high sodium, high fat and DASH food consumption together. These might caused the non-significantly association.

- Physical activity

Physical activity was not associated with blood pressure control. The result of this study was inconsistent with the finding of previous studies (113, 114-116) which found that aerobic exercise could reduce SBP and DBP. It might be resulted from different study design since those studies were designed as interventional studies. However, this study was consistent with a previous study of Vipa (87) which found that the exercise was not associated with blood pressure control. The same way to this study, Vipa recorded style of physical activity, frequency of physical activity per week and, duration of physical activity per day by using a questionnaire. In addition, the obtained data might be missed from the actual data in the day of interview. Moreover, this study was difficult to get a reliable data especially frequency of activities, because the subjects might have information bias and could not clearly estimate their energy expenditure per day.

- Alcohol consumption

Alcohol consumption was not significantly associated with blood pressure control. It was inconsistent with some interventional studies in a review of literature which revealed that alcohol consumption related to blood pressure control (39, 50, 123, 126). However, the result might be caused by different study design. In contrast, this study was consistent with some previous studies (85, 86, 87) which used questionnaire in the same way of this study. They found that alcohol consumption was not associated with blood pressure control. The obtained data might be different from the actual data in the day of interview since they were recorded as consumption in usual. Therefore, this result might also be caused by the insufficient instrument. It had low reliability and had information bias as it could not directly measure quantity of alcohol consumption in the day of interview.

- Stress management

Stress management was not associated with blood pressure control. The result of this study was inconsistent with the finding of previous studies (85, 86, 87) which found that stress was associated with blood pressure control. This result might be caused by the different of exposure measurement. The previous studies (85, 86, 87) measured the stress by stress test questionnaire while this study measured by stress management questionnaire. In addition, the data were recorded as last 6 month management which might be missed from the actual data in recent day or the day of interview.

2.4 Treatment co-operation

- Nurse's appointment

Missing appointment was not associated with blood pressure control. The result was consistent with some previous studies (85, 86). This result might be caused by the definition of missing appointment. Because the missing appointment was defined as "patients who missed appointment one time in 3 last months." The subjects might miss the appointment in the first month but keep appointment in recently day or day of interview. Therefore, missing appointment had no relationship with blood pressure control in this study.

- Drug usage

In this study, drug usage was not associated with blood pressure control. The result was inconsistent with some previous studies (85, 86, 87), which found that drug usage or drug compliance was associated with blood pressure control. This difference might be caused by the different pattern or term of questionnaire. This study concentrated on drug usage only on the day of interview and the day before interview to correlate with blood pressure which was assessed on the day of interview. However, assessing drug usage by interview only might be caused by information bias as mentioned earlier.

- Lacking of patients' co-operation: Since the researcher is a

health technician in Sauk Primary Care Unit, the subjects might be feared to answer the questions, especially the question about drug usage. Most subjects answered that they used drug both the day of interview and the day before interview even though they did not use them.

- Researcher did not attend in doses and how to used antihypertensive drug. The subjects might take drug in inappropriate dose or time.

The researcher had later paid attention on health service system of hypertensive treatment in health center and found that Suak Primary Care Unit had hypertensive treatment guideline from Nan hospital, but the guideline was not clear about when to adjusted appropriate drugs to lower blood pressure. In addition, from OPD record, the researcher had randomized 30 patients who could not control their blood pressure to lower than 140/90 mmHg in continuous of 3 times, and found that they did not receive drug adjustment from nurse.

2.5 Psychosocial support

- Social support

Only social support item 1 (having no one to remind them to meet doctor/nurse) was associated with blood pressure control. However, this study found that social support item 1 was reverse association. It means that the subjects who have no one to remind them to meet doctor/nurse can better control their blood pressure than the subjects who have one to remind them to meet doctor/nurse (OR=1.95, 95%CI 1.14-3.32, $p = 0.015$). This result can not be explained.

- Health belief

In this study, health belief was not associated with blood pressure control. This study was consistent with some previous studies (85, 87), which found that health belief was not associate with blood pressure control. The error may happen since some questions were difficult to understand such as question 1.3-have a migraine headache (one side headache), 2.1-hypertention is not vitally harmful, 2.2-hypertension can be cured of, and 3.2-running with short step and aerobic dancing can increase the blood pressure level.

Limitation of the Study

1. A cross-sectional design was conducted for this study to explain the relationship between patient's variables and blood pressure control among essential hypertensive patients. Using this design, a conclusion about causal relationship cannot be drawn. This design also has a limitation in making an assessment of changes over times of blood pressure control.

2. This study was conducted among the patients at Sauk Primary Care Unit so that the result might not apply to other group.

3. In this study, health behavior was assessed by interview. It was reported as usual health behavior which did not specify actual health behavior in recent day or the day of interview, while blood pressure level was measured in the day of interview. Moreover, this factor was very subjective and difficult to get a reliable data, because the subjects might have information bias. These might caused the non-significantly association between health behavior and blood pressure control.

4. In this study researcher was concerned only about patient's factors, but data were collected from essential hypertensive patients who received treatment at Sauk Primary Care Unit (PCU Suak) in Nan Province, which divides two health teams in two health centers. There was the difference in health service and patient's characteristics between health team/center.* This issue may have influence on blood pressure control.

*In this study, data were collected from essential hypertensive patients who received treatment at Sauk Primary Care Unit (PCU Suak) in Nan Province. PCU Suak has two health teams in two health centers. Two health teams have the following differences.

- The number of staff
- Health service or treatment system
- Follow up and appointment system

Furthermore, the patients in two health centers have the following difference. **(Table 4 – 7)**

- Demographic and biological characteristics such as occupation, adequacy of income and BMI ($p = 0.014, < 0.001$ and 0.002 respectively).

- Health behavior such as eating habit, physical activity, alcohol consumption and stress management ($p < 0.001, = 0.024, 0.002$ and < 0.001 respectively).

- Psychosocial support such as social support item 1, 2, 3, 4, 5 ($p < 0.001$, < 0.001 , $= 0.003$, 0.001 and 0.017 respectively) and health belief ($p < 0.001$).

The above variables were included in multiple logistic regression analysis. There was the significant difference in blood pressure control between patients who was treated with different team/center ($p < 0.0001$, 95% CI, 1.66 – 4.46). (**Table 13**)

CHAPTER VI

CONCLUSION

This study was a cross-sectional study to find factors associated with blood pressure control in 310 essential hypertensive patients who received treatment at Sauk Primary Care Unit, Muang district in Nan province between February 1 and April 30, 2007. The objective of this study was to identify factors associated with blood pressure control. The investigator collected the data from subjects and also reviewed their medical records. The variables in this study included demographic and biological characteristics, health behavior, treatment co-operation and psychosocial support. After controlling confounder by using multiple logistic regression analysis, the result of this study showed that factors that had significant association with blood pressure control among were adequacy of income ($OR_{adj} = 2.51$, 95% CI 1.14-5.56, $p = 0.023$) and social support item1 which is having no one to remind them to meet doctor/nurse ($OR_{adj} = 1.95$, 95% CI 1.14-3.32, $p = 0.015$).

Recommendation based on study result

According to the findings, the subject who can not control their blood pressure to lower than 140/90 mmHg are 202 from 310 (65.2%), which is quite high. Therefore, the health providers should pay more attention to this problem. The result of this study have shown that few patient's factors were associated with blood pressure control (adequacy of income and social support item1 which is having no one to remind them to meet doctor/nurse). In this study, data were collected from essential hypertensive patients who received treatment at Sauk Primary Care Unit (PCU Suak) in Nan Province. PCU Suak has two health teams in two health centers. There was the significant difference in blood pressure control between patients who was treated with different team/center ($p < 0.0001$, 95% CI, 1.66 – 4.46). Therefore, it could be concluded that the different health team/center has influenced the blood pressure

control of patients. The subjects who had received treatment from different health team had different blood pressure control. This result have shown that health service system from health providers is very important for controlling the blood pressure of patients. Therefore, the health providers should have effective health service system which includes appointing, following up and providing the clear treatment guideline especially the guideline in anti-hypertensive drug adjustment, counseling and referring. It is very important that all health centers have to follow this guideline strictly.

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. The factors that should be added to future studies include:
 - 2.1 Health service system in health center
 - 2.2 Medication system of nurse in health center
3. Health behavior should be measured with an objective mean to reduce information bias and to increase acceptability of the study.
4. This kind of study should be repeated in other PCU or other district. This study enrolled patients at Sauk Primary Care Unit so that the result might not apply to other group.
5. Qualitative research method should be used for further study to explore the actual cause of health behavior and health belief.

REFERENCES

1. World Health Organization. The world Health Report 2003. Geneva: WHO 2003.
2. Murray CJ, Lopez AD. Global burden of disease and injury series, Vol.1: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factor in 1990 and projected to 2020. Geneva: WHO; 1996.
3. Mensah GA. the global burden of hypertension: good news and bad news. *Cardiol Clin* 2002; 20: 181-5.
4. สุพรชัย กองพัฒนากุล. เทคนิคการดูแลรักษาโรคความดันโลหิตสูง. พิมพ์ครั้งที่ 2. กรุงเทพฯ : โรงพิมพ์ชุมนุมสหกรณ์การเกษตรแห่งประเทศไทย; 2542.
5. Stamler J, Stamler R, Neaton JD. Blood pressure, systolic and diastolic, and cardiovascular risks. *Arch Intern Med* 1993; 153:598-615.
6. World Health Organization. Global strategy on diet, physical activity and health. 2nd ed. Geneva: WHO; 2003.
7. กระทรวงสาธารณสุข. สถิติสาธารณสุข พ.ศ.2544. กรุงเทพฯ: โรงพิมพ์องค์การทหารผ่านศึก; 2544.
8. McEnter M.A. and peddicord K. Coping with hypertension. *Nursing Clinics of North American* 1987;22:583-92..
9. World Health Organization. Primary prevention of essential hypertension. *Tech Rep Series*. 1983;687:5-39.
10. ไพรัตน์ พุกษชาติคุณากร. Psychiatric disorder and Cardiovascular diseases. ใน: จิตเวชศาสตร์ เล่ม 2. ไพรัตน์ พุกษชาติคุณากร, บรรณาธิการ. พิมพ์ครั้งที่ 2. โครงการตำราแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่. เชียงใหม่: ธนบรรณกา พิมพ์; 624-25

11. สมจิต หนูเจริญกุล, พรทิพย์ มาลาธรรม. การพยาบาลผู้ป่วยโรคความดันโลหิตสูง. ใน: สมจิต หนูเจริญ, บรรณาธิการ. การพยาบาลอายุรศาสตร์ เล่ม 2. พิมพ์ครั้งที่ 3. กรุงเทพฯ: วิ.เจ.พรินติ้ง; 2544.129-62.
12. ไพบูลย์ สุริยวงศ์ไพศาล. การค้นหาผู้ป่วยความดันโลหิตสูง. วารสารคลินิก 2534; 7: 189-92.
13. Achananuparp S, Suriyawongpaisal P, Suebwonglee S, Sakdisawasdi O, Nanna P, Khumtong N, et al. Prevalence, detection and control of hypertension in Thai population of a central rural community. J Med Assoc Thai 1989; 72 (suppl 1): 66-75.
14. World Health Organization. Hypertension control: report of a WHO expert committee. Geneva: 1996. WHO technical report series. no. 862.
15. Chobanian AV, Baakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. The seventh report of the Joint National Committee on prevention, Detection, evaluation, and treatment of high blood pressure. JAMA 2003; 289: 2560-71.
16. Asmer R, Vol S, Pannier B, Brisac A, Tichet J, Hasnaoui A EI. High blood pressure and associated cardiovascular risk factors in France. J Hypertens 2001; 19: 1727-32.
17. Marmot MG. Primary prevention of stroke. Lancet 1992; 339: 344-347.
18. Glodberd RJ, Burchfiel CM, Benfante R, Chiu D, Reed DM, Yano K. Lifestyle and biologic factors associated with atherosclerotic disease in middle-aged men. Arch Intern Med 1995; 155: 686-694.
19. Pocock SJ, McCormack V, Gueyffier F, Boutities F, Fagard RH, Boissel JP. A score for predicting risk of death from cardiovascular disease in adults With raised blood pressure, based on individual patient data from randomized controlled trials. BMJ 2001; 323:75-80.
20. Webber MA. Changing guidelines for the diagnosis and treatment of hypertension. In: J.H.Laragh and B.M.Brenner, eds. Hypertension Pathophysiology, Diagnosis and Management. Volume II. 2nd. New York: Ravan Press; 1995: p. 2501-7.
21. สำนักงานสาธารณสุขจังหวัดน่าน. การประเมินภาวะสุขภาพคนน่านปี 2548.

22. กวี เจริญลาภ, ชาลิต รัตนกุล. อาหารกับโรคความดันโลหิตสูง. ใน: เอกสารการสอนชุดวิชา
อาหารบำบัดโรค หน่วยที่ 9-15 สาขาวิชาคหกรรมศาสตร์
มหาวิทยาลัยสุโขทัยธรรมมาธิราช. พิมพ์ครั้งที่ 5 กรุงเทพฯ: กิ่งจันทร์การพิมพ์
; 2535. 541-51.
23. สุรเกียรติ อาชานานุภาพ. ตำราการตรวจรักษาโรคทั่วไป. พิมพ์ครั้งที่ 3 กรุงเทพฯ: สำนักพิมพ์
หมอชาวบ้าน; 2544.
24. World Health Organization. Arterial hypertension; report of a WHO expert
committee. Geneva: WHO; 1978. WHO technical report series. no. 628
25. World Health Organization. Hypertension control: report of a WHO expert
committee. Geneva: 1996. WHO technical report series. no. 862.
26. เกษม วัฒนชัย. การดูแลรักษาโรคความดันโลหิตสูง. กรุงเทพฯ: สำนักพิมพ์พัฒนาศึกษา; 532.
27. พิงใจ งามอุโฆษ. ความดันโลหิตสูง. ใน: วิทยา ศรีมาดา, บรรณาธิการ. ตำราอายุรศาสตร์ 2.
พิมพ์ครั้งที่ 2. กรุงเทพฯ: โรงพิมพ์ยูนิตีพับลิเคชั่น: 2539. 158-73.
28. Beevers DG, MacGregor GA. Hypertension in practice. London: Martin
Dunitx; 1987.
29. Pickering SG. Hypertension: Definition, natural histories, and consequences. In:
Laragh J.H., Brenner B.M., eds. Hypertension pathophysiology,
diagnosis and management. New York: Raven Press; 1995.
30. สมจิต หนูเจริญกุล, อรสา พันธุ์ภักดี. การพยาบาลโรคความดันโลหิตสูง. พิมพ์ครั้งที่ 13.
กรุงเทพฯ: โรงพิมพ์ชุมนุมสหกรณ์การเกษตรแห่งประเทศไทย; 2542.
31. Kaplan NM. Primary hypertension: Natural history and evaluation. In: Lieberman
E, ed. Kaplan's clinical hypertension. 8thed. Baltimore: William &
Willkins; 2002. p.136-75.
32. Perloff D, Grim C, Flack J, Frohlich ED, Hill M, McDold M, et.al. Human blood
pressure determination by sphygmomanometry. Circulation.
1993; 88(5pt1): 2460-70.
33. Frohlich ED. Initial pharmacologic therapy. In: Cooke JP, Frohlich ED, eds. Current
management of hypertensive and vascular disease. St. Louis: B.C.
Decker; 1992. p. 8-17.
34. Friedman R, Stuart EM, Benson H. Nonpharmacologic adjuncts to therapy. In:
Cooke JP, Frohlich ED, eds. Current management of hypertensive and
vascular disease. St. Louis: B.C. Decker; 1992. p.1-7.

35. Weber MA. Changing guides for the diagnosis and treatment of hypertension. In: Laragh JH, Brenner BM, eds. Hypertension pathophysiology, diagnosis and management. 2nded. New York: Raven Press; 1995. p. 2501-7.
36. Psaty BM, Manolio TA, Smith NL, Heckber SR, Gottdiener JS, Burke GL, et al. Time trends in high blood pressure control and the use of Antihypertensive medications in older adults. Arch Intern Med 2002; 162: 2325-32.
37. Appel LJ, Moore TJ, Obarzanek E, Vollmer WM, Svetkey LP, et al. A clinical trial of the effects of dietary patterns on blood pressure. N Engl J Med 1997; 336: 1117-24.
38. Sever P, Beevers G, Bulpitt C, Lever A, Ramsay L, Reid J, et al. Management guidelines in essential hypertension: report of the second working party of the British Hypertension Society. BMJ 1993; 306: 983-7.
39. Intersalt Cooperative Research Group. Intersalt: an international study of electrolyte excretion and blood pressure: results of 24 hour urinary sodium and potassium excretion. BMJ 1988; 297: 319-27.
40. Kesteloot H, Joossens JV. Relationship of dietary sodium, potassium, calcium, and magnesium with blood pressure. Hypertension 1988; 12: 594-9.
41. Joint National Committee. The sixth report of the Joint National Committee on prevention, Detection, evaluation, and treatment of high blood pressure (JNC VI). Arch Intern Med 1997; 157: 2413-46.
42. สมใจ วิชัยดิษฐ์. การประเมินภาวะโภชนาการ. ใน: เอกสารการสอนชุดวิชาโภชนาการกับชีวิตมนุษย์ หน่วยที่ 8-15. สาขาวิชาคหกรรมศาสตร์ มหาวิทยาลัยสุโขทัยธรรมาธิราช. พิมพ์ครั้งที่ 10. กรุงเทพฯ: สำนักพิมพ์มหาวิทยาลัยสุโขทัยธรรมาธิราช; 2536. 1012-77.
43. Thompson FE. Dietary assessment resource manual. J Nutr 1994; 124:2245s-317s.
44. ประณีต ผ่องแผ้ว. บรรณาธิการ. โภชนศาสตร์ชุมชน. กรุงเทพฯ: บริษัทพิลิวังทรานส์มีเดีย; 2539.
45. Prentice W. Health and wellness approach to fitness. In: Prentice W, ed. Fitness for college and life. 4thed. St.Louis: Mosby; 1994. p. 23-41.

46. Kochar MS, Daniels LM. Counselling the hypertensive. In: Kochar MS, Daniels LM, eds. Hypertension control: for nurses and other health professionals. St.Louis: Mosby; 1978. p. 85-109.
47. Paffenbarger RS, Hyde RT, Wing AL, Lee IM, Jung DL, Kampert JB. The association of changes in physical-activity level and other lifestyle characteristics with mortality among men. *N Eng J Med* 1993; 328: 538-45.
48. Taylor SE. Stress and coping. In: Vaicunas J, Holton T, eds. Health psychology. 2nded. New York: Mcgraw-Hill; 1991.191-229.
49. Prentice W. Management of stress. In: Prentice W, ed. Fitness for college and life. 4thed. St.Louis: Mosby; 1994: p. 267-78.
50. Puddey IB, Parker M, Beilin LJ, Vandongen R, Masarei JR. Effects of alcohol and caloric restrictions on blood pressure and serum lipids in overweight men. *Hypertension*. 1992; 20: 533-41.
51. Gill JS, Shipley MJ, Tsementzis SA, Hornby RS, Gill SK, Hitchcock ER, et al. Alcohol consumption-a risk factor for hemorrhagic and non-hemorrhagic Stroke. *Am J Epidemiol* 1991; 90: 489-97.
52. Frezza M, Padova C, Pozzto G, Terpin M, Baraona E, Lieber CS. High blood alcohol level in women: the role of decreased gastric alcohol dehydrogenase activity and first-pass metabolism. *N Eng J Med* 1990; 322: 95-9.
53. The Trials of Hypertension Prevention Collaborative Research Group. Effects of weight loss and sodium reduction intervention on blood pressure and hypertension incidence in overweight people with high-normal blood pressure: the trials of hypertension prevention, phase II. *Arch Intern Med*. 1997; 157: 657-67.
54. Tuck M, Sower J, Dornfeld L, Kledzik G, Maxell M. The effect of weight reduction on blood pressure, plasma renine activity, and plasma aldosterone levels in obese patients. *N Eng J Med* 1981; 304. 930-3.
55. Neaton JD, Grimm RH, Prineas RJ, Stamler J, Grandits GA, Elmer PJ, et al. For the treatment of mild hypertension study: final results. *JAMA* 1993;270: 713-24.

56. Kochar Ms, Daniels LM. Compliance with antihypertensive therapy. In: Kochar MS, ed. Hypertension control: for nurses and other health professionals. St.Louis: Mosby; 1978. p. 110-34.
57. McInnes GT. Integrated approaches to management of hypertension: promoting treatment acceptance. *Am Heart J* 1999; 138: s252-5.
58. Dracup KA, Meleis AI. Compliance: an interaction approach. *Nurs Res* 1981; 31: 31-6.
59. Mapes RE. Physicians's drug innovation and relinquishment. *Soc Sci Med* 1997; 11: 619-24.
60. Sackett DL, Haynes RB, Gibson ES, Hackett BC, Taylor DW, Roberts RS, et al. Randomized clinical trial of strategies for improving medication Compliance in primary hypertension. *Lancet* 1975; 1: 1205-7.
61. Burt VL, Whelton P, Roccella EJ, Brown X, Cutler JA, Higgins M. Prevalence of hypertension in the adult US population: result from the third national health and nutrition examination surveys, 1988-1991. *Hypertension* 1995; 25: 305-13.
62. Stephenson DB, Rowe BH, Haynes RB, Macharia WM, Leon G. Is this patient taking the treatment as rescribed? *JAMA* 1993; 269: 2779-81.
63. Spilker B. Methods of assessing and improving patient compliance in clinical trials. In: Cramen JA, Spilker B, eds. Patient compliance in medical practice and clinical trials. New York: Raven Press; 1991. p. 37-56.
64. Marson MV. Compliance with medical regimens : a review of the literature. *Nurs Res* 1970; 19: 312-23.
65. Becker MH. Patient adherence to prescribed theropics. *Med care* 1991; 23: 539-55.
66. Eraker SA, Kirscht JP, Becker MH. Understanding and improving patient compliance. *Ann of Intern Med* 1984; 100: 258-68.
67. Inui TS, Carter WB, Pecoraro RE, Pearlman RA, Dohan JJ. Variations in patient compliance with common long-term drugs. *Med care* 1980; 18: 986-93.
68. Rudd P. In search of the gold standard for compliance measurement. *Arch Intern Med* 1979; 139: 627-28.

69. Sackett DL, Haynes RB, Gibson ES. Patient compliance with antihypertensive regimens. *Patient Education and Counseling* 1978; 1: 16-20.
70. Cobb S, Social support as a moderator of life stress. *Psychosomatic Medicine* 1976; 38(5): 300-14.
71. Caplan, Robert D, et al. Adhering to medical regimen: Pilot experiment in patient education and social support.
72. Gottlieb, Benjamin H. Social network and social support: An overview of research, paratica and policy implication. *Health educ. Quarterly* 1985; 12: 5-22.
73. Fishbein M, Ajzen I. Belief, attitude, intention and behavior: an introduction to theory and research. Massachusetts: Addison-Wesley; 1975.
74. Strecher VJ, Rosenstock IM. The health belief model. In: Glanz K, Liwis FM, Rimer BK, eds. *Health behavior and health education*. 2nded. California: Jossey-Bass; 1997. p. 41-59.
75. Lewin K. The nature of field theory. In: Marx MH, ed. *Psychological theory*. New York: Mac millan; 1951. p. 50-62.
76. Rosenstock IM. Historical origins of the health belief model. *Health Educ Monogr* 1974; 2: 328-35.
77. Kasl SV. The health belief model and behavior related to chronic illness. *Health Educ Monogr* 1977; 2: 433-49.
78. Becker MH. The health belief model and sick role behavior. *Health Educ Monogr* 1974; 2: 409-19.
79. Pender NJ. *Health promotion in nursing practice*. 2nd edition, Norwalk, Connecticut: Appleton and Lange; 1987.
80. Orem DE. *Nursing: Concepts of Practice*. 3rd ed. New York: McGraw Hill, 1985.
81. Muhlenkamp AF, Sayes JA. Self-esteem, social support, and positive health practices. *Nursing Research* 1986; 35(6): 334-8.
82. Walker, et al. Health-promoting life styles of older adults: comparisons with young and middle-aged adults, correlates and patterns. *Advances in Nursing Science* 1988; 10: 76-80.
83. วรณวิมล เบลุจกุล. ความสัมพันธ์ระหว่างปัจจัยส่วนบุคคล การสนับสนุนกับแบบแผนชีวิตของผู้สูงอายุ. [วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาล]

- อายุรศาสตร์และศัลยศาสตร์]. เชียงใหม่: บัณฑิตวิทยาลัย มหาวิทยาลัยเชียงใหม่; 2535.
84. สุลี ทองวิเชียร, พิมพ์พรรณ ศิลปสุวรรณ. การดูแลตนเองของผู้สูงอายุในชุมชนเขตกรุงเทพฯ. รายงานการวิจัย ภาควิชาพยาบาลสาขาสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล. 2535: 9.
85. สุดารัตน์ ลิขิตภูมิ. ปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โรงพยาบาลท่าม่วง จังหวัดลพบุรี [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2544.
86. สุทธิเมธ ฐัชอบ. ความสัมพันธ์ระหว่างภาวะสุขภาพจิตกับผลการรักษาโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2545.
87. วิภา ลากบัวรุ่ง. พฤติกรรมสุขภาพและความเชื่อด้านสุขภาพกับภาวะการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2547.
88. O'Neill MF. Patients with hypertension: a study of manifest needs with self-actualization. *Nursing Research* 1976; 25(5):349-51.
89. Muhlenkamp AF, Broerman NA. Health beliefs, health value and positive health behaviors. *Western Journal of Nursing Research* 1988;10:637-646.
90. Nathanson CA. Sex roles as variables in preventive health behavior. *Journal of Community Health* 1977; 3(2): 142-55.
91. Glasgow RE, McCaul KD, Schafer LC. Self-care behaviors and glycemic control in type I diabetes. *Journal of Chronic Diseases* 1987; 40(5): 399-412.
92. ดวงพร รัตนอมรชัย. ความสัมพันธ์ระหว่างปัจจัยลักษณะส่วนบุคคล การรับรู้ภาวะสุขภาพและการรับรู้การควบคุมสุขภาพกับวิถีชีวิตของผู้สูงอายุในจังหวัดอ่างทอง. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาการพยาบาลสาธารณสุข]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2535.
93. Speake DL, Cowart ME, Pellet K. Health perception and lifestyles of the elderly. *Research in Nursing&Health* 1989; 12(2): 93-100.

94. จิรภา หงษ์ตระกูล. ความสัมพันธ์ระหว่างปัจจัยบางประการ แรงสนับสนุนทางสังคมกับความสามารถในการดูแลตนเองในผู้ป่วยในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาการพยาบาลสาธารณสุข]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2532.
95. ประภาเพ็ญ สุวรรณ. ทักษะการเปลี่ยนแปลงและพฤติกรรมอนามัย. กรุงเทพฯ: พีรพินา, 2526: 16-30.
96. นิตยา ภาสุนันท์. ความสัมพันธ์ระหว่างความเชื่อด้านสุขภาพและความรู้เกี่ยวกับการดูแลตนเองกับความร่วมมือในการรักษาของผู้ป่วยโรคหัวใจขาดเลือด [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาการพยาบาลอายุรศาสตร์และศัลยศาสตร์]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2529.
97. สุรยงค์ วรกุลสวัสดิ์. การดูแลสุขภาพตนเองของผู้ป่วยโรคความดันโลหิตสูง จังหวัดพังงา. บทคัดย่อโครงการวิจัยที่นำเสนอในการประชุมวิชาการประจำปี 2535 เรื่อง การวิจัยเพื่อพัฒนางานสาธารณสุข. สถาบันพัฒนาสาธารณสุขอาเซียน มหาวิทยาลัยมหิดล, 2535.
98. วาสนา ปุณณมณีวิวัฒน์. เปรียบเทียบแบบแผนชีวิตระหว่างผู้ป่วยความดันโลหิตสูงและผู้ที่มีความดันโลหิตปกติ. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาพยาบาลศาสตร์]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2532.
99. กาญจนา ประสานปราน. ความสัมพันธ์ระหว่างความสามารถในการดูแลตนเองกับพฤติกรรมการดูแลตนเองเกี่ยวกับการควบคุมอาหารในผู้ป่วยเบาหวาน. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต ภาควิชาพยาบาลศาสตร์โรงพยาบาลรามธิบดี]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2535: ก-8.
100. Steele JL, McBroom WH. Conceptual and empirical dimensions of health behavior. *Journal of health and social behavior* 1972; 13(4): 382-92.
101. สุนทรา หิรัญวรรณ. ปัจจัยที่มีผลต่อพฤติกรรมการดูแลตนเองและภาวะควบคุมระดับน้ำตาลในเลือดของผู้ป่วยเบาหวานชนิดไม่พึ่งอินซูลิน: ศึกษาเฉพาะในโรงพยาบาลแก่งคร้อ จังหวัดชัยภูมิ. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2538.
102. Mosaki KH, Curb JD, Petrovitch J, Rodriguez BL. Association of body mass index with blood pressure in elderly Japanese American men. *Hypertension* 1997; 29: 673-7.

103. He J, Klag MJ, Whelton PK, Chen JY, Qian MC, Je GQ. Body mass and blood pressure in lean population in southwestern China. *Am J Epidemiol* 1994; 139: 380-9.
104. Loyd-Jones DM, Evens JC, Larson MG, O'Donnell LJ, Roccella EJ, Levy D. Differential control of systolic and diastolic blood pressure: factors associated with lack of blood pressure control in the community. *Hypertension* 2000; 36: 594-9.
105. Langford HG, Davis BR, Blaufox D, Oberman A, Smoller SW, Hawkins M, et al. Effect of drug and diet treatment of mild hypertension on diastolic blood pressure. *Hypertension* 1991; 17: 210-17.
106. He J, Whelton PK, Appel LJ, Charlenton J, Klang MJ. Long-term effects of weight loss and dietary sodium reduction on incidence of hypertension. *Hypertension* 2000; 35: 544-9.
107. Gillum RF, Prineas RJ, Jeffery RW, Jacobs DR, Elmer PJ, Gomez O, et al. Nonpharmacologic therapy of hypertension: the independent effects of weight reduction and sodium restriction in overweight borderline hypertensive patients. *Am Heart J* 1983; 105: 128-33.
108. Kestellot J, Joossens JV. Relationship of dietary sodium, potassium, calcium, and magnesium with blood pressure. *Hypertension J* 1988; 12: 594-9.
109. The Trials of Hypertension Prevention Collaborative Research Group. The effects of nonpharmacologic interventions on blood pressure of persons with high normal levels. *JAMA* 1992; 267:1213-20.
110. Midgley JP, Matthew AG, Greenwood CM, Logan AG. Effect of reduced dietary sodium on blood pressure. *JAMA* 1996; 275: 1590-7.
111. Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, et al. Effects on blood pressure of reduced dietary sodium and the dietary Approaches to stop hypertension (DASH) diet. *N Eng J Med* 2001; 344: 3-10.
112. Ducher M, Feuvel JP, Maurin M, Laville M, Maire P, Pault CZ, et al. Salt intake and blood pressure in health individuals. *J Hypertens* 2003; 21:289-94.
113. Pescatello LS, Fargo AE, Leach CN, Scherzer JJ. Short-term effect of dynamic exercise on arterial blood pressure. *Circulation* 1991; 83: 1557-61.

114. Fagard RH. The roles of exercise in blood pressure control: supportive evidence. *J Hypertens* 1995; 13: 1223-7.
115. Kelly GA, Kelly KS. Progressive resistance exercise and resting blood pressure: a meta-analysis of randomized controlled trials. *Hypertension* 2000; 35: 838-43.
116. Whelton SP, Chin A, Xin X, He J. Effect to aerobic exercise on blood pressure: a meta-analysis of randomized controlled trials. *Ann Intern Med* 2002; 136: 493-503.
117. รุ่งทิพย์ ไชยฉัตรเชาวกุล. ปัจจัยที่มีความสัมพันธ์กับภาวะควบคุมโรคของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุในคลินิก โรงพยาบาลกุมภวาปี จังหวัดอุดรธานี [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2538.
118. Powers MJ, Jalowiec A. Profile of the well-controlled, well-adjusted hypertensive patient. *Nurs Res* 1987; 36: 106-10.
119. Markovic N, Matthews KA, Huston SL, Egbagbe E, Ukoli FA, Bunker CH. Blood pressure reactivity to stress varies by hypertensive status and sex in Nigerians. *Am J Epidemiol* 1995; 142: 1020-8.
120. Light KC, Girdler SS, Sherwood A, Bragdon EE, Brownley KA, West SG, et al. High stress responsivity predicts later blood pressure only in combination with positive family history and high life stress. *Hypertension* 1999; 33: 1458-64.
121. Vrikotte TG, Doornen LJ, Geus EJ. Effect of work stress on ambulatory blood pressure heart rate, and heart rate variability. *Hypertension* 2000; 35: 880 - 6.
122. ประโยชน์ บุญสินสุข. การผ่อนคลายความเครียด. หมอชาวบ้าน 2538; ปีที่ 17:62-3.
123. Marmot MG, Elliott P, Shipley MJ, Dyer AR, Ueshima H, Beevers DG, et al. Alcohol and blood pressure: the INTERSALT study. *BMJ* 1994; 308: 1263-7.
124. Keil U, Chamkless LE, Doring A, Filipiak B, Stieber J. The relationship of alcohol intake to coronary heart disease and all-cause mortality in a beer drinking population. *Epidemiology* 1997; 8: 150-6.

125. McElduff P, Dobson AJ. How much alcohol and how often? Population based case-control study of alcohol consumption and risk of a major coronary event. *BMJ* 1997; 314: 1259-64.
126. Seppa K, Sillanaukee P. Binge drinking and ambulatory blood pressure. *Hypertension* 1999; 33: 79-82.
127. ชูติมา อัครากรโกวิท. ความสัมพันธ์ระหว่างการให้ความร่วมมือในการปฏิบัติตนตามคำสั่งแพทย์และภาวะความดันโลหิตของผู้ป่วยความดันโลหิตสูงในคลินิกโรงพยาบาลศิริราช. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2534.
128. ปรีดา ปูนพันธ์ฉาย. ผลของการให้คำแนะนำแบบมีส่วนร่วมต่อความร่วมมือในการรักษาของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาการระบาด]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2540.
129. Haynes RB, Sackett DL, Gibson ES, Taylor DW, Hackett BC, Roberts RS, et al. Improvement of medication compliance in uncontrolled hypertension. *Lancet* 1976; 12: 1265-70.
130. จริยาวัตร คมพักษณ์. ผลการใช้วิธีการพยาบาลสาธารณสุขต่อความร่วมมือในการรักษา [วิทยานิพนธ์ปริญญาสาธารณสุขศาสตรดุษฎีบัณฑิต สาขาการพยาบาลสาธารณสุข]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2529.
131. สุภาพ ไบแก้ว. การศึกษาความสัมพันธ์ระหว่างความเชื่อด้านสุขภาพกับความร่วมมือในการรักษาของผู้ป่วยโรคความดันโลหิตสูง [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาสาขาการพยาบาลอายุรศาสตร์และศัลยศาสตร์]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2528.
132. Andreoli KG. Self-concept and health beliefs in compliant and noncompliant hypertensive patients. *Nurs Res* 1981; 30: 323-28.
133. ขวลิต รัตนกุล. อาหารจำกัดโซเดียม. ใน: ขวลิต รัตนกุล และคณะ. การปฏิบัติตัวทั่วไป หลักการและวิธีการควบคุมอาหารสำหรับผู้ป่วยโรคไตวายเรื้อรังระยะเริ่มต้นและระยะปานกลาง. กรุงเทพฯ: ระบบวิชาโรคไต ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย; 2536. 76-100.

134. IPAQ Research Committee. International physical activity questionnaire.
[Online]. Available from: URL: http://www.ipaq.ki.se/downloads/IPAQ_SHORT_LAST_7_SELF_ADM-revised_8-23-02.pdf [Accessed 2006 AUG 07].
135. เพ็ญศรี พรวิริยะทรัพย์. การศึกษาพฤติกรรมสุขภาพของผู้หญิงโรคเบาหวาน ภาคตะวันตก [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2540.
136. American College of Sports Medicine. ACSM's guidelines for exercise testing and prescription, 5th ed. Media, PA:Williams & Wilkins 1995:18-19.

APPENDIX

APPENDIX A

คำอธิบายโครงการแก่ผู้เข้าร่วมโครงการ

1. ชื่อโครงการวิจัย

“ปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ในหน่วยบริการปฐมภูมิตำบลสวน จังหวัดน่าน”

2. วัตถุประสงค์ของการวิจัย

1. เพื่อศึกษาปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ได้แก่

- ปัจจัยด้านชีวภาพและลักษณะส่วนบุคคล
- ปัจจัยด้านพฤติกรรมสุขภาพ
- ปัจจัยด้านความร่วมมือในรักษา และ
- ปัจจัยด้านจิตสังคม

3. เหตุผลที่เชิญชวนท่าน ซึ่งเป็นผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุเข้าร่วมให้ข้อมูลในโครงการวิจัยเพราะข้อมูลของท่านมีความสำคัญมาก เพราะผลของการศึกษาที่ได้จะเป็นประโยชน์ต่อเจ้าหน้าที่ในการจัดให้มีการให้บริการการรักษาโรคความดันโลหิตสูงที่มีประสิทธิภาพดียิ่งขึ้น อันจะเป็นประโยชน์ต่อตัวท่านซึ่งเป็นผู้รับบริการและผู้ป่วยคนอื่นที่มารับบริการในอนาคตอีกด้วย

4. ระยะเวลาที่ใช้ในการให้ข้อมูลการวิจัยประมาณ 30 นาที คือท่านจะได้รับการชั่งน้ำหนัก วัดส่วนสูง วัดความดันโลหิต และถูกสัมภาษณ์เกี่ยวกับข้อมูลส่วนตัวเช่น อายุ ระดับการศึกษา รายได้ อาชีพ เป็นต้น เกี่ยวกับพฤติกรรมสุขภาพ การรับการรักษาโรคความดันโลหิตสูงของท่าน และข้อมูลเกี่ยวกับจิตสังคม เช่น การสนับสนุนทางสังคม และความเชื่อด้านสุขภาพของท่าน

5. ประโยชน์ที่คาดว่าจะผู้เข้าร่วมการศึกษาจะได้รับ คือ ผลการวิจัยจะเป็นประโยชน์ต่อเจ้าหน้าที่ในการจัดให้มีการให้บริการการรักษาโรคความดันโลหิตสูงที่มีประสิทธิภาพดียิ่งขึ้น อันจะเป็นประโยชน์ต่อตัวท่านซึ่งเป็นผู้รับบริการและผู้ป่วยคนอื่นที่มารับบริการในอนาคตอีกด้วย

6. ความเสี่ยงที่อาจเกิดผลข้างเคียงหรือความไม่สบายใจที่คาดว่าจะเกิดขึ้นกับ ในการศึกษาวิจัยครั้งนี้ไม่มีความเสี่ยงหรืออันตรายใดๆ ที่อาจเกิดขึ้นจากการเข้าร่วมการศึกษาวิจัย จะมีเพียงการรบกวนเวลาที่ใช้ในการสัมภาษณ์ วัดความดันโลหิต ชั่งน้ำหนัก และวัดส่วนสูง ประมาณ 30 นาที ผู้เข้าร่วมโครงการวิจัยอาจเสียเวลา อึดอัด ซึ่งสามารถยุติและถอนตัวได้ตลอดเวลา

7. การเตรียมวัสดุอุปกรณ์ ที่ใช้ในโครงการวิจัย ได้แก่ เครื่องชั่งน้ำหนัก ที่วัดส่วนสูง เครื่องวัดความและดันโลหิตแบบปรอท ได้รับการตรวจสอบคุณภาพจากเจ้าหน้าที่ฝ่ายเทคนิคของโรงพยาบาลน่าน จึงเป็นเครื่องมือที่มีคุณภาพและไม่เป็นอันตรายต่อผู้เข้าร่วมโครงการวิจัยแต่อย่างใด
8. ทางเลือกในการรักษาหรือวิธีการตรวจวินิจฉัยอื่น ที่อาจเป็นประโยชน์แก่ผู้เข้าร่วมโครงการวิจัย คือ การตรวจวินิจฉัยทางห้องปฏิบัติการ เช่น การตรวจวัดระดับไขมันในเลือด ตรวจวัดระดับน้ำตาลในเลือด และปัสสาวะ เป็นต้น
9. ขอบเขตการดูแลรักษาความลับของข้อมูลต่างๆ ของผู้เข้าร่วมโครงการวิจัย ผู้วิจัยจะเก็บข้อมูลทั้งหมดเป็นความลับ โดยจะนำเสนอผลเฉพาะภาพรวมของการศึกษาเท่านั้น
10. การดูแลรักษาที่ผู้วิจัยจัดให้ ได้แก่ การชั่งน้ำหนัก วัดส่วนสูง และวัดความดันโลหิต ตลอดจนการให้ความรู้เกี่ยวกับโรคความดันโลหิตสูงแก่ผู้เข้าร่วมโครงการวิจัย
11. กรณีเกิดอันตรายหรือผลไม่พึงประสงค์จากการศึกษาวิจัย ผู้เข้าร่วมโครงการวิจัยจะได้รับการดูแลรักษาโดยไม่ต้องเสียค่าใช้จ่ายใดๆ ทั้งสิ้น และจะได้รับชดเชยรายได้ที่สูญเสียไประหว่างการรักษาพยาบาลดังกล่าว
12. ในกรณีเกิดอันตรายจากการวิจัยถึงขั้นพิการ หรือเสียชีวิต ผู้เข้าร่วมโครงการวิจัยจะได้รับเงินทดแทนความพิการหรือเสียชีวิต แต่ในโครงการวิจัยนี้ผู้เข้าร่วมโครงการวิจัยจะถูกสัมภาษณ์ วัดความดันโลหิต ชั่งน้ำหนัก และวัดส่วนสูง เท่านั้น จึงไม่มีอันตรายถึงขั้นพิการหรือเสียชีวิต
13. สิทธิผู้เข้าร่วมโครงการวิจัย จะถอนตัวออกจากโครงการวิจัยได้ทุกเมื่อ โดยจะไม่กระทบต่อการได้รับบริการรักษาโรคความดันโลหิตสูงของท่านจากสถานีนอนามัย
14. ผู้ทำการวิจัย
นางสาวคณิง คำรัมย์ สถานีนอนามัยตำบลสวก 98 หมู่ 3 ตำบลสวก อำเภอเมืองน่าน จังหวัดน่าน 55000 เบอร์โทรศัพท์ 054-701151 มือถือ 087-1761391
ผู้เข้าร่วมวิจัยสามารถติดต่อได้ทั้งในและนอกเวลาราชการ กรณีมีเหตุจำเป็นหรือฉุกเฉิน

แบบฟอร์มใบยินยอมให้ทำการวิจัย

โดยได้รับการบอกกล่าวและเต็มใจ (Informed Consent Form)

การวิจัยเรื่องปัจจัยที่มีความสัมพันธ์กับการควบคุมระดับความดันโลหิตของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ ในหน่วยบริการปฐมภูมิตำบลสวก จังหวัดน่าน

วันให้คำยินยอม วันที่ เดือน พ.ศ.

ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการวิจัย วิธีการวิจัย อันตราย หรืออาการที่อาจเกิดขึ้นจากการวิจัยหรือจากยาที่ใช้ รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียด และมีความเข้าใจดีแล้ว

ผู้วิจัยรับรองว่าจะตอบคำถามต่าง ๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจ ไม่ปิดบังซ่อนเร้น จนข้าพเจ้าพอใจ

ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ และเข้าร่วมโครงการวิจัยนี้โดยสมัครใจ และการบอกเลิกการเข้าร่วมการวิจัยนี้ จะไม่มีผลต่อการรักษาโรคที่ข้าพเจ้าจะพึงได้รับต่อไป

ผู้วิจัยรับรองว่าจะเก็บข้อมูลเฉพาะที่เกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยได้เฉพาะในรูปที่สรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่าง ๆ ที่เกี่ยวข้องกระทำ ได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ผู้วิจัยรับรองว่าหากเกิดอันตรายใด ๆ จากการวิจัยดังกล่าว ข้าพเจ้าจะได้รับการรักษาพยาบาลโดยไม่คิดมูลค่าตามมาตรฐานวิชาชีพ และจะได้รับการชดเชยรายได้ที่สูญเสียไประหว่างการรักษาพยาบาลดังกล่าว ตลอดจนเงินทดแทนความพิการที่อาจเกิดขึ้น

ผู้วิจัยรับรองว่าหากมีข้อมูลเพิ่มเติมที่ส่งผลกระทบต่อการศึกษา ข้าพเจ้าจะได้รับการแจ้งให้ทราบโดยไม่ปิดบังซ่อนเร้น

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว และมีความเข้าใจดีทุกประการ และได้ลงนามในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม ผู้ยินยอม

ลงนาม พยาน

ลงนาม พยาน

ในกรณีที่ผู้ยินยอมคนให้ทำการวิจัยไม่สามารถอ่านหนังสือได้ จะต้องได้รับการยินยอมในขณะที่ยังมีสติสัมปชัญญะ และระบุข้อความไว้ตามนี้ ข้าพเจ้าไม่สามารถอ่านหนังสือได้ แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้ว ข้าพเจ้าจึงลงนาม หรือประทับลายนิ้วแม่มือขวาของข้าพเจ้าในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม ผู้ยินยอม

ลงนาม พยาน

ลงนาม พยาน

7. () ข้าราชการหรือรัฐวิสาหกิจ 8. () อื่นๆ ระบุ.....
6. รายได้ของท่านพอใช้หรือไม่
1. () ไม่พอใช้ 2. () พอใช้ แต่ไม่เหลือเก็บ 3. () พอใช้ มีเหลือเก็บ
7. ท่านได้รับการรักษาโรคความดันโลหิตสูงมาเป็นระยะเวลา.....ปี.....เดือน
8. ในครอบครัวท่านมีผู้ป่วยโรคความดันโลหิตสูงอีกหรือไม่ (ไม่รวมท่าน)
1. () มี.....คน 2. () ไม่มี
9. วันนี้ท่านมีไข้หรือไม่
- () มี 2. () ไม่มี
10. วันนี้ท่านได้รับประทานยาแก้หวัด/แก้ไอหรือไม่
1. () รับประทาน 2. () ไม่ได้รับประทาน
11. วันนี้นำมาก่อนมาทำการวัดความดันโลหิตประมาณ 30 นาที ท่านดื่มชาหรือกาแฟหรือไม่
1. () ดื่ม 2. () ไม่ดื่ม
12. วันนี้นำมาก่อนมาทำการวัดความดันโลหิตประมาณ 30 นาที ท่านสูบบุหรี่หรือไม่
1. () สูบ 2. () ไม่สูบ
13. วันนี้ท่านดื่มสุรา/เบียร์หรือไม่
1. () ดื่ม 2. () ไม่ดื่ม
14. ระดับความดันโลหิต (สำหรับผู้สัมภาษณ์)

Timing	B.P			Assessment	
	mmHg			controlled	Un controlled
	1 st	2 nd	average		
- Date of Interview (Right arm)					
- Date of Interview (Left arm)					

15. คำนีมวลกาย

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

ส่วนที่ 2 ข้อมูลเกี่ยวกับพฤติกรรมสุขภาพ

2.1 แบบสอบถามความถี่ของพฤติกรรมการบริโภคอาหาร

คำชี้แจง : โปรดทำเครื่องหมาย ลงในช่องว่างหลังข้อความตามสภาพความเป็นจริงของผู้ตอบ

ข้อความ	ความถี่ในการบริโภคอาหาร				ไม่ บริโภค
	มากกว่า 6 ครั้ง/ สัปดาห์	4-6 ครั้ง/ สัปดาห์	1-3 ครั้ง/ สัปดาห์	1-3 ครั้ง/ เดือน	
โดยปกติท่านรับประทาน อาหารต่อไปนี้ บ่อยแค่ไหน					
หมูเนื้อสัตว์					
1. เนื้อเค็ม,ปลาเค็ม,ปลาร้า					
2. หมูแฮม,เบคอน,ไส้กรอก					
3. หมูแผ่น,หมูหยอง,หมู หวาน,กุนเชียง					
4. แหนม,ไส้กรอกอีสาน,ปลา ส้ม					
5. อาหารทะเล เช่น กุ้ง,หอย, ปู,ปลาหมึก					
6. ขาหมู,หมูสามชั้น,หนัง เป็ด/ไก่					
หมูผัก					
7. ผักดอง เช่น ผักกาดดอง, กระเทียมดอง, หน่อไม้ดอง					

ข้อความ	ความถี่ในการบริโภคอาหาร				ไม่ บริโภค
	มากกว่า 6 ครั้ง/ สัปดาห์	4-6 ครั้ง/ สัปดาห์	1-3 ครั้ง/ สัปดาห์	1-3 ครั้ง/ เดือน	
โดยปกติท่านรับประทานอาหาร ต่อไปนี้ บ่อยแค่ไหน					
หมู่ผลไม้					
8. ผลไม้แช่อิ่ม เช่น มะขามแช่อิ่ม, มะม่วงแช่อิ่ม					
หมู่ไขมัน					
9. แengใส่กะทิ เช่น แengคั่ว, แeng เผ็ด					
10. ขนมใส่กะทิ เช่น บัวลอย, กล้วยบัวคชี, ตะโก้					
11. อาหารทอด เช่น ไข่ทอด, กล้วยทอด, ปลาทอด					
เครื่องดื่ม					
12. น้ำเกลือแร่ทุกชนิด					
อื่นๆ					
11. อาหารทอด เช่น ไข่ทอด, กล้วยทอด, ปลาทอด					
13. อาหารที่มีรสจัด เช่น ส้มตำ, ยำ ต่างๆ, น้ำพริก					
14. ขนมอบต่างๆ เช่น เค้ก, คุกกี้, ขนมปัง					
15. การเติมน้ำปลา, ซีอิ๊วขาว, ซอส มะเขือเทศ, ซอส, พริก, เกลือปน ลงในอาหารที่ปรุงแล้ว					

ข้อความ	ความถี่ในการบริโภคอาหาร				ไม่ บริโภค
	มากกว่า 6 ครั้ง/ สัปดาห์	4-6 ครั้ง/ สัปดาห์	1-3 ครั้ง/ สัปดาห์	1-3 ครั้ง/ เดือน	
โดยปกติท่านรับประทาน อาหารต่อไปนี้ บ่อยแค่ไหน					
16. ผักสด หรืออาหารที่ทำ จากผักสด					
17. ผลไม้สด					
18. นมพร่องมันเนย หรือ โยเกิร์ตพร่องมันเนย					

2.2 การประเมินการเคลื่อนไหวร่างกายและการออกกำลังกาย

- ในช่วง 7 วันที่ผ่านมา ท่านได้ทำกิจกรรมที่ต้องออกแรงมากหรือออกกำลังกายหนัก จนทำให้รู้สึกเหนื่อยมาก โดยหายใจแรงและลึกหรือหัวใจเต้นเร็วและแรงมากขึ้น เช่น ขุดดิน, ยกของหนัก, เดินแอโรบิก, ขี่จักรยานเร็วๆ, วิ่งเร็วๆ โดยกระทำอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป
 - () ไม่มี (ข้ามไปตอบข้อ 3)
 - () มี.....วัน/สัปดาห์
- โดยเฉลี่ย ท่านใช้เวลานานเท่าใด ในการทำกิจกรรมที่ต้องออกแรงมากหรือออกกำลังกายหนัก
 - ().....ชั่วโมง/วัน
 - ().....นาที/วัน
 - () ไม่ทราบ/ไม่แน่ใจ
- ในช่วง 7 วันที่ผ่านมา ท่านได้ทำกิจกรรมที่ต้องออกแรงหรือออกกำลังกายปานกลาง จนทำให้รู้สึกเหนื่อยพอสมควรหรือพอสมควร โดยหายใจแรงกว่าปกติ เช่น ยกของที่ไม่นหนักมาก, ขี่จักรยานไปเรื่อยๆ, วิ่งเหยาะๆ, กวาดบ้านถูบ้าน โดยกระทำอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป

- () ไม่มี (ข้ามไปตอบข้อ 5)
- () มี.....วัน/สัปดาห์
4. โดยเฉลี่ย ท่านใช้เวลาานเท่าใด ในการทำกิจกรรมที่ต้องออกแรงหรือออกกำลังกายปานกลาง
- ().....ชั่วโมง/วัน
- ().....นาที/วัน
- () ไม่ทราบ/ไม่แน่ใจ
5. ในช่วง 7 วันที่ผ่านมา ท่านได้มีการเดิน ซึ่งรวมถึงการเดินในบ้าน, ที่ทำงาน และการเดินจากที่หนึ่งไปที่หนึ่ง เช่น เดินไปซื้อของ, เดินเล่นในสนามหญ้าหรือสวนสาธารณะ, เดินออกกำลังกาย โดยเดินอย่างต่อเนื่องเป็นเวลาตั้งแต่ 10 นาทีขึ้นไป
- () ไม่มี (ข้ามไปตอบข้อ 7)
- () มี.....วัน/สัปดาห์
6. โดยเฉลี่ย ท่านใช้เวลาในการเดินนานเท่าใด
- ().....ชั่วโมง/วัน
- ().....นาที/วัน
- () ไม่ทราบ/ไม่แน่ใจ
7. ในช่วง 7 วันที่ผ่านมา ท่านได้มีการนั่งอยู่กับที่ ซึ่งรวมถึงการทำงานในที่ทำงาน, นั่งทำการบ้านที่บ้าน และการนั่งพักผ่อน เช่น การนั่งที่โต๊ะทำงาน, การไปเยี่ยมเพื่อน, นั่งอ่านหนังสือ หรือการนั่งหรือนอนดูโทรทัศน์
-ชั่วโมง/วัน
-นาที/วัน
- () ไม่ทราบ/ไม่แน่ใจ

2.3 การดื่มแอลกอฮอล์

1. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเหล้ากี่วัน
1. () ไม่ดื่ม (ข้ามไปตอบข้อ 3)
2. () ดื่ม.....วัน
3. () เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
2. ในวันที่ดื่มเหล้า ท่านดื่ม.....ก็ก/กึ่งหรือเป๊ก/ขวดกลม/ขวดแบน

3. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเหล้าขาวกี่วัน
 1. () ไม่ดื่ม (ข้ามไปตอบข้อ 5)
 2. () ดื่ม.....วัน
 3. () เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
4. ในวันที่ดื่มเหล้าขาว ท่านดื่ม.....กึ่ง/กึ่งหรือเป็ก/ขวดกลม/ขวดแบน
5. โดยเฉลี่ยใน 1 สัปดาห์ท่านดื่มเบียร์กี่วัน
 1. () ไม่ดื่ม (ข้ามไปตอบข้อ 7)
 2. () ดื่ม.....วัน
 3. () เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
6. ในวันที่ดื่มเบียร์ ท่านดื่ม.....กึ่ง/กึ่งหรือเป็ก/ขวดกลม/ขวดแบน
7. โดยเฉลี่ยใน 1 สัปดาห์ ท่านดื่มไวน์กี่วัน
 1. () ไม่ดื่ม
 2. () ดื่ม.....วัน
 3. () เคยดื่ม.....วัน เลิกมา.....วัน/สัปดาห์/เดือน/ปี
8. ในวันที่ดื่มไวน์ ท่านดื่ม.....กึ่ง/กึ่งหรือเป็ก/ขวดกลม/ขวดแบน

2.4 แบบสัมภาษณ์วิธีการจัดการความเครียด

คำชี้แจง กรุณาใส่เครื่องหมาย ✓ ลงในช่องท้ายข้อความที่ตรงกับความคิดเห็นของท่านมากที่สุด

ในช่วงเวลา 6 เดือนที่ผ่านมา

- | | | |
|---------------------|---------|--|
| ปฏิบัติเป็นประจำ | หมายถึง | กิจกรรมนั้นผู้ตอบกระทำสม่ำเสมอหรือทุกครั้งหรือทุกวัน |
| ปฏิบัติเป็นส่วนใหญ่ | หมายถึง | กิจกรรมนั้นผู้ตอบกระทำบ่อยครั้ง หรือเกือบทุกครั้งหรือเกือบทุกวัน |
| ปฏิบัติเป็นบางครั้ง | หมายถึง | กิจกรรมนั้นผู้ตอบกระทำบางวันหรือเป็นส่วนน้อย |
| ไม่ปฏิบัติเลย | หมายถึง | กิจกรรมนั้นผู้ตอบไม่เคยกระทำเลย |

ข้อความ	ปฏิบัติ เป็นประจำ	ปฏิบัติ เป็น ส่วนใหญ่	ปฏิบัติ เป็น บางครั้ง	ไม่ปฏิบัติ เลย
1. ท่านทำจิตใจให้สบายไม่โมโหหรือ หงุดหงิดง่าย				
2. ท่านหลีกเลี่ยงเหตุการณ์ที่ก่อให้เกิด ความเครียด				
3. ท่านผ่อนคลายความเครียดโดยนั่ง สมาธิอ่านหนังสือฟังเพลงดูโทรทัศน์				
4. ท่านระบายความคับข้องใจ ความ วิตกกังวล กับบุคคลที่ท่านไว้ใจ				
5. ท่านไม่อยากพูดคุยหรือสนทนากับ บุคคลอื่น				
6. ท่านปฏิบัติกิจกรรมต่าง ๆ ร่วมกับ สมาชิกในครอบครัว				
7. ท่านต้องรับประทานยานอนหลับ เมื่อนอนไม่หลับ				
8. ท่านเข้าร่วมกิจกรรมต่าง ๆ กับ สมาชิกในชุมชน				
9. ท่านออกกำลังกายอย่างสม่ำเสมอ				

ส่วนที่ 3 ความร่วมมือในการรักษา

3.1 การมารับการรักษาตามนัด (จาก OPD card และ บัตรประจำตัวคนไข้)

1. ในรอบ 3 เดือน, มารับการรักษาตามนัด.....ครั้ง
ไม่มารับการรักษาตามนัด.....ครั้ง
2. การประเมินการมารับการรักษาตามนัด
 - () มารับการรักษาตามนัด
 - () ไม่มารับการรักษาตามนัด

3.2 ความร่วมมือในการรับประทานยา (สัมภาษณ์)

1. เมื่อวานนี้ท่านกินยาลดความดันโลหิตหรือไม่
 1. () รับประทาน
 2. () ไม่ได้รับประทาน
2. วันนี้ท่านรับประทานยาลดความดันโลหิตหรือไม่
 1. () รับประทาน
 2. () ไม่ได้รับประทาน

ส่วนที่ 4 แรงสนับสนุนทางจิตสังคม

4.1 แรงสนับสนุนทางสังคม

คำชี้แจง : โปรดทำเครื่องหมาย ✓ ลงใน () หรือเติมคำลงในช่องว่าง

1. ท่านมีคนคอยเตือนท่านให้ไปพบแพทย์/เจ้าหน้าที่หรือไม่

() มี ระบุ..... () ไม่มี
2. ท่านมีคนคอยดูแลท่านเป็นอย่างดีหรือไม่

() มี ระบุ..... () ไม่มี
3. ท่านมีคนช่วยเหลือท่านเรื่องงานเวลาท่านเจ็บป่วยหรือไม่

() มี ระบุ..... () ไม่มี
4. ท่านมีคนช่วยเหลือทางการเงินหรือไม่

() มี ระบุ..... () ไม่มี
5. ท่านมีคนให้คำปรึกษาเรื่องสุขภาพหรือไม่

() มี ระบุ..... () ไม่มี

4.2 ความเชื่อด้านสุขภาพ

คำชี้แจง: โปรดทำเครื่องหมาย ✓ ลงในช่องว่างตามความรู้สึก, ความคิดเห็นหรือความเชื่อของท่าน

เห็นด้วย หมายถึง ข้อความในประโยคนั้นตรงกับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านทั้งหมด

ไม่เห็นด้วย หมายถึง ข้อความในประโยคนั้นไม่ตรงกับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านทั้งหมด

ไม่แน่ใจ หมายถึง ข้อความในประโยคนั้นตรงกับความรู้สึก ความคิดเห็น หรือความเชื่อของท่านบางส่วน

ข้อความ	เห็นด้วย	ไม่เห็นด้วย	ไม่แน่ใจ
1. การรับรู้ถึงโอกาสเสี่ยงต่อการเกิดโรคแทรกซ้อน			
- หากท่านไม่สามารถควบคุมความดันโลหิตให้ต่ำกว่า 140/90 มิลลิเมตรปรอทได้ ท่านมีโอกาสดังกล่าวต่อไปนี้			
1.1 เป็นอัมพาตหรือพิการ เนื่องจากเส้นเลือดในสมองแตก
1.2 ไตวายเนื่องจากไตของท่านต้องทำงานหนัก
1.3 ปวดศีรษะแบบไมเกรน(ปวดศีรษะข้างเดียว)
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 การวิ่งเหยาะๆหรือเดินแอโรบิกจะทำให้ความดันโลหิตเพิ่มได้
3.3 การควบคุมน้ำหนัก อาจทำให้ความดันโลหิตเพิ่มได้
3.4 การมาตรวจตามนัดอย่างสม่ำเสมอ ทำให้ท่านได้ทราบสภาพความเจ็บป่วยของตนเอง

BIOGRAPHY

NAME	Miss.Kanung Komrungsee
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PLACE OF BIRTH	Nan, Thailand
INSTITUTIONS ATTEND	public health college, Phitsanulok province, : Diploma of public health (Dental health) ChainMai University, : Bachelor of public health Mahidol University, 2005 - 2007 : Master of science (Epidemiology)
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POSITION AND OFFICE	Muang district public health office, Nan, Thailand