# THE EFFECTS OF MIND-BODY TRAINING PROGRAM TO REDUCE STRESS AND BLOOD PRESSURE IN ESSENTIAL HYPERTENSIVE PATIENTS

**WALAIPORN RUNGRUEANG**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR**
**THE DEGREE OF MASTER OF NURSING SCIENCE**
**(FAMILY NURSE PRACTITIONER)**
**FACULTY OF GRADUATE STUDIES**
**MAHIDOL UNIVERSITY**
**2010**

Copyright © by Mahidol University

**COPYRIGHT OF MAHIDOL UNIVERSITY**

Thesis
entitled

# THE EFFECTS OF MIND-BODY TRAINING PROGRAM TO REDUCE STRESS AND BLOOD PRESSURE IN ESSENTIAL HYPERTENSIVE PATIENTS

Walaiporn Rungrueang

Miss.Walaiporn Rungrueang
Candidate

Nantawon Suwonnaroop

Asst. Prof. Nantawon Suwonnaroop,
Ph.D. (Nursing)
Major-advisor

Penchun Sareewiwatthana

Assoc. Prof. Penchun Sareewiwatthana,
M.Sc. (Anatomy)
Co-advisor

Nantiya Watthayu

Lect. Nantiya Watthayu,
Ph.D. (Nursing)
Co-advisor

Rungsunn Tungtrongchitr

Assoc. Prof. Rungsunn Tungtrongchitr,
Ph.D. (Trop. Med.)
Acting Dean
Faculty of Graduate Studies
Mahidol University

Yajai Sitthimongkol

Assoc. Prof. Yajai Sitthimongkol,
Ph.D. (Nursing)
Program Director
Master of Nursing Science
Faculty of Nursing
Mahidol Uiversity

Thesis
entitled

# THE EFFECTS OF MIND-BODY TRAINING PROGRAM TO REDUCE STRESS AND BLOOD PRESSURE IN ESSENTIAL HYPERTENSIVE PATIENTS

was submitted to the Faculty of Graduate Study, Mahidol University
for the degree of Master of Nursing Science (Family Nurse Practitioner)
on
April 30, 2010

Walaiporn Rungrueang
Miss. Walaiporn Rungrueang
Candidate

Yajai Sitthimongkol
Assoc. Prof. Yajai Sitthimongkol,
Ph.D. (Nursing)
Chair

Varunyupa Roykulcharoen
Asst. Prof. Varunyupa Roykulcharoen,
Ph.D. (Nursing)
Member

Nantawon Suwonnaroop
Asst. Prof. Nantawon Suwonnaroop,
Ph.D. (Nursing)
Member

Penchun Sareewiwatthana
Assoc. Prof. Penchun Sareewiwatthana,
M.Sc. (Anatomy)
Member

Nantiya Watthayu
Lect. Nantiya Watthayu,
Ph.D. (Nursing)
Member

Rungsunn Tungtrongchitr
Assoc. Prof. Rungsunn Tungtrongchitr,
Ph.D. (Trop. Med.)
Acting Dean
Faculty of Graduate Studies
Mahidol University

Fongcum Tilokskulchai
Assoc. Prof. Fongcum Tilokskulchai,
Ph.D. (Nursing)
Dean
Faculty of Nursing
Mahidol University

# ACKNOWLEDGEMENTS

I wound like to express my gratitude to my major advisor, Asst. Prof. Dr. Nantawon Suwonnaroop, and my co-advisor, Dr. Nantiya Watthayu and Assoc. Prof. Penchun Sareewiwatthana, for their supervisions, guidance, and support from the initial to the final stage of this research.

I also would like to thank Assoc. Prof. Dr. Yajai Sitthimongkol and Asst. Prof. Dr. Varunyupa Roykulcharoen for their constructive comments. Grateful appreciation is extended to all experts, who carefully evaluated the content and language uses in the questionnaires. I gratefully acknowledge all nurses and health care team in the Nonghan Hospital and Bandung Crown Prince Hospital for their co-operations and assistance. Many thanks go in particular to all patients who were willing to participate in this study.

I am grateful to all teachers of Faculty of Nursing, Mahidol University for their great teaching during my two years of the master program.

Finally, I am grateful to my family for their financial support, entirely care, and love. The usefulness of this thesis, I dedicate to my father, my mother and all the teachers who have taught me since my childhood.

Walaiporn Rungrueang

Copyright by Mahidol University

THE EFFECT OF MIND- BODY TRAINING PROGRAM TO REDUCE STRESS AND BLOOD PRESSURE IN ESSENTIAL HYPERTENSIVE PATIENTS

WALAIPORN RUNGRUANG 4836926 NSFN / M

M.N.S.( FAMILY NURSE PRACTITIONER)

THESIS ADVISORY COMMITTEE: NANTAWON SUWONAROOP, Ph. D. (NURSING), NANTIYA WATTHAYU, Ph.D. (NURSING), PENCHAN SAREEWIWATTANA, M.Sc. (ANATOMY)

## ABSTRACT

This quasi-experimental study aimed to evaluate the effects of the Mind-Body Program on stress and blood pressure in essential hypertensive patients. A total of 60 hypertensive patients with blood pressure > 140 / 90 mmHg. and who had been taking medication more than 2 months were recruited from hypertensive clinics of Nonghan hospital as an experimental group and Bandung Crown Prince Hospital as a control group. There were 30 subjects in each group. The experimental group received a yoga mind-body program for a period of 11 weeks whereas the control group received routine nursing care. All participants were assessed at 1 and 12 weeks to measure stress levels and blood pressure.

A total of 21 experimental subjects and 30 control subjects completed the study. The results showed that the experimental group significantly reduced mean stress scores at 12 weeks and had significantly lower mean stress scores than the control group. Means of systolic blood pressure and diastolic blood pressure decreased significantly in the experimental group and were significantly lower at 12 weeks than in the control group.

This finding showed the potential benefit of yoga exercise in the management of hypertension. Health care providers should apply the mind-body exercise techniques in hypertensive patients to prevent and delay potential complications.

KEY WORDS: MIND- BODY TRAINING / SELF EFFICACY / STRESS / BLOOD PRESSURE / ESSENTIAL HYPERTENSION

109 pages

Copyright by Mahidol University

ผลของโปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

THE EFFECTS OF MIND-BODY TRAINING PROGRAM TO REDUCE STRESS AND BLOOD PRESSURE IN ESSENTIAL HYPERTENSIVE PATIENTS

วลัยพร รุ่งเรือง 4836926 NSFN / M

พย.ม. ( การพยาบาลเวชปฏิบัติครอบครัว )

คณะกรรมการที่ปรึกษาวิทยานิพนธ์ : นันทวัน สุวรรณรูป, Ph.D. (Nursing), นันทิยา วัฒายุ, Ph.D. (Nursing), เพ็ญจันทร์ เสรีวิวัฒนา, วทม. (กายวิภาคศาสตร์)

บทคัดย่อ

การศึกษาครั้งนี้เป็นการวิจัยกึ่งทดลอง เพื่อศึกษาผลของโปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โดยกลุ่มทดลองเป็นผู้ป่วยความดันโลหิตสูงที่มารับบริการที่คลินิกความดันโลหิตสูงโรงพยาบาลหนองหาน จำนวน 30 ราย และกลุ่มควบคุมเป็นผู้ป่วยความดันโลหิตสูงที่มารับบริการที่คลินิกความดันโลหิตสูงโรงพยาบาลสมเด็จพระยุพราชบ้านดุง จำนวน 30 กลุ่มทดลองได้รับโปรแกรมฝึกจิตควบคุมกายด้วยโยคะเป็นระยะเวลา 11 สัปดาห์ และกลุ่มควบคุมได้รับการพยาบาลตามปกติ กลุ่มตัวอย่างทั้งหมดได้รับการประเมินระดับความเครียดและความดันโลหิตในสัปดาห์ที่ 1 และ 12

ผลการศึกษา พบว่า กลุ่มทดลองมีคะแนนเฉลี่ยการรับรู้ความสามารถแห่งตนหลังการทดลองเพิ่มขึ้นมากกว่าก่อนการทดลองอย่างมีนัยสำคัญทางสถิติ ($P < .001$) และเพิ่มขึ้นมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ($P < .05$) กลุ่มทดลองมีคะแนนเฉลี่ยความเครียดหลังการทดลองลดลงกว่าก่อนการทดลองและลดลงมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ($P < .001$) กลุ่มทดลองมีค่าเฉลี่ยความดันโลหิต systolic และ diastolic หลังการทดลองลดลงกว่าก่อนและลดลงมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ($P < .05$)

ผลการวิจัยแสดงให้เห็นประโยชน์ของการออกกำลังกายแบบโยคะในการจัดการกับโรคความดันโลหิตสูง บุคลากรทางการแพทย์ควรประยุกต์ใช้เทคนิคการออกกำลังกายแบบจิตควบคุมกายในการดูแลผู้ป่วยโรคความดันโลหิตสูง เพื่อป้องกันและชะลอภาวะแทรกซ้อนที่อาจเกิดตามมา

109 หน้า

# CONTENTS



Copyright by Mahidol University

# CONTENTS (cont.)



Copyright by Mahidol University

# LIST OF TABLES



Copyright by Mahidol University

# LIST OF FIGURES



Copyright by Mahidol University

# CHAPTER I
# INTRODUCTION

## 1.1 Background and Significance of the Problem

Hypertension is a chronic disease considered to be a significant public health problem in numerous developed and developing countries. It is a disease that cannot be completely cured and causes premature disabilities and fatalities (Sue & Collin, 1999). The World Health Organization has set hypertension as the third highest cause of mortality among patients all over the world (WHO, 2002). Cobanian et al. (2003) have stated that there are approximately one billion patients with high blood pressure at present, and approximately 50 million of these are in the United States.

In Thailand, the incidence rates of hypertension have increased from 477.35 to 659.57 per hundred thousand of population during 2004 – 2006 (Ministry of Public Health, 2006). Although the mortality rates from cardiovascular disease, which is another significant complication of hypertension, tend to be less, hypertension remains a significant health problem as can be seen from the statistics of mortality rates due to cardiovascular disease in 2005-2007 accounted for 59.12, 54.50 and 55.20 per hundred thousand of the population, respectively (Ministry of Public Health, 2007). Patients who cannot control blood pressure will develop complications to target organs such as cardiovascular disease, cerebrovascular disease, renal failure, and peripheral arterial disease (Kaufmann, 2005; Mansfield & Daley, 2000). Cardiovascular disease will have a special direct relationship with rising blood pressure (Cobanian et al., 2003).The Ministry of Public Health (2006) reported that the mortality of myocardial infarction was increased from 17.7% in 2004 to 19.4% in 2006.

Hypertension is classified into two types according to the etiology of the disease: primary or essential hypertension and secondary hypertension. Primary hypertension is encountered to approximately 95% of all hypertension cases (Battegay, Lip, & Bakris, 2005). The risk factors of primary hypertension are strongly

associated with age, gender, ethnicity, smoking, alcohol consumption, obesity, high sodium diets, and stress (Christensen & Kockrow, 1995; Phlipps, Sands, & Marek, 1999). Secondary hypertension is caused by some underlying medical condition such as heart failure, kidney failure, and metabolic syndrome.

Nowadays, Thailand is developing into an industrial country, a condition prompt both economical and social changes and requiring people to change their lifestyle in order to support these changes. Consequently, most Thai people are confronted with the problem of stress in daily living, especially stress from economical/financial problems which is the number one problem faced by the majority of Thai people (Kongsuk et al, 2003). If long-term accumulated stress is left without proper management, physical illness, particularly hypertension, will encounter. It has been found that the prevalence of hypertension in developing countries tends to be higher than in developed countries (Kaufmann, 2005). Therefore, stress is both a causal and supporting factor in increasing the high incidence of hypertension (Hanujareunkul & Panpakdee, 1999)

Pankam, Malaroj, Jitpleecheep, and Noikom (2000) studied the relationships between health behaviors, stress, and hypertension severity, which found that most hypertensive patients have high stress levels. Stress levels are directly related to disease severity and have a negative relationship with blood pressure control (Leejutipoom, 2001). Hypertensive patients will also have to confront the stress associated with an incurable chronic illness in addition to dealing with the stress of their daily lives. Patients require to take both medications and adjust their daily lifestyles by losing weight, limiting sodium intake, exercising, eliminating or reducing alcohol consumption, quitting smoking, and practicing proper stress management (Cobanian et al., 2003; Vasan et al., 2001). These behaviors are difficult for patients to adjust and it results in further stress (Hanujareunkul & Panpakdee, 1999). Moreover, patients who require medication to reduce blood pressure usually suffer from medication side effects such as trembling, dizziness, weakness, and fatigue (Cobanian et al., 2003). These symptoms may reduce patients' capacities in performing daily activities or decrease working efficiency, thus creating more stress for this group of patients. For these reasons, mental stress is a factor related to essential hypertension (Leeyatikul, 2000).

The body responds to stressful situations by triggering the performance of the sympathetic nervous system and the Renin Angiotensin Aldosterone System (RAAS), causing blood pressure to rise. Patients with chronic stress will have arterial changes that make the arteries fragile. Hypertensive patients confronted with stress over a long period of time will experience stimulation of the sympathetic nervous system which secretes catecholamine and causes lipolysis while raising cholesterol levels and thickening the blood. These two changes will cause for fat to accumulate in the rough areas of the arteries as arterial diameter decreases. The heart will have to work harder to pump blood from the heart and supply other parts of the body, potentially leading to myocardial infarction and heart attack (Rimsritong, Tanjira & Taechatsahong, 2002).

In contrast, when the body is in a relaxed state, it will respond to rest by reducing the performance of the sympathetic nervous system and promoting the performance of the parasympathetic nervous system. The immediate changes are reductions in heartbeat rates, blood pressure, respiratory rate, and muscle tension (Federman et al., 1995; Rice, 1999). While the body is relaxing, opioid, a substance with properties resembling opium, will be secreted to resist the body's response to stress. The result is that the arterial muscles in the body will relax and reduce the resistance of the peripheral while also reducing heart compression and blood pressure levels (Sadock & Sadock, 2000).

When hypertensive patients are continually confronted with stress over a long period of time, proper relaxation techniques should be practiced. These techniques do not require any instruments and have no hazardous effects to the body. They can help to reduce unnecessary treatment expenses and further reducing the potential complication. Relaxation techniques for hypertensive patients are breathing techniques, muscle relaxation, and non-competitive exercise (Tupairao, 1999).

In addition, other relaxation techniques using the concept of mind over body (such as yoga or Qigong) yield similar outcomes to moderate intensity of aerobic exercise (Luskin, et al., 1998; Virginia & Troy, 2006). The effects of continual aerobic exercise for 30 minutes a day at least 3 days/week will help build cardiovascular fitness and reduce blood pressure levels. Yoga exercise or Qigong will increase muscle flexibility and effectively increase lubrication of joints, ligaments, and

tendons. It also increases the circulation of blood flowing back to the heart and promoting balance between mind and body (http://www.cancer.gov).

Continued long-term practice of yoga will increase skills in confronting stress and relaxing the body (La Forge & Ralph, 1997). McCaffrey, Ruknui, Hatthakit, and Kasetsomboon (2005) studied the effects of yoga on stress and blood pressure in hypertensive patients and found that the experimental group had lower average blood pressure, heart and respiratory rates than before the intervention and lower than the control group. Furthermore, Pirasorn (1998) studied the effect of Quigong to reduce stress and blood pressure in essential hypertensive patients. The results showed that the experimental group had lower scores on stress and had lower blood pressure levels than before the intervention and lower than the control group with statistical significance.

People who have stressful life events may affect some behavior changes such as separation, not eating well, unable to sleep, drinking alcohol, and smoking cigarettes (Kanjanawong, 2002). Stress can interfere with an individual level of perceived self-efficacy and limits the individual's ability to handle stressful situations (Bandura, 1997; Lazarus & Folkman, 1984). Self-efficacy is described as people's internal beliefs about their abilities to manage their lives (Bandura, 1997). Therefore, the promotion of self-efficacy is a strategy for helping hypertensive patients relax from stress by using mind-body training. Kitjachanchaiyakul (1999) studied the implementation of the Self-Efficacy Theory with social support in the self care of essential hypertensive patients. According to research findings, perceived self-efficacy and expected outcomes were positively related to self-care behaviors. Jareunkitjakarn (2000) studied perceived self-efficacy and its influence on exercising behaviors of essential hypertensive senior adult patients. It found that perceived self-efficacy in exercise can be a predicting factor in exercising behaviors in essential hypertensive senior adult patients.

Nonghan Hospital, Udornthani Province, is a community hospital with 90 beds. In 2006, there were 746 patients who came to receive services at the hypertension clinic. Among these, 211 patients (28.28%) were essential hypertensive patients, while 73 patients (34.59%) of the total number of essential hypertensive patients were unable to control their blood pressure and have some risk factors for

disease complications (Nonghan Hospital, 2006). Nonghan hospital has a policy in promoting well-being in agreement with the government policy that emphasizes on health promotion more than disease treatment. Promoting exercise is one of its six strategies aimed at promoting health (Ministry of Public Health, 2002). The hospital has organized an exercise program as part of the care for patients coming to use services at the outpatient clinic of hypertension. The exercise activity was set up during the time patients waiting to see a physician. It had no formal pattern of exercise depending on a person who took in charge the program. Based on this traditional approach, it is not enough to give patients advice or to build patients awareness in performing physical activity. Therefore, the researcher has interested in examining the effects of a mind-body training program to reduce stress and blood pressure in essential hypertensive patients. Previous experiment research strongly suggests that self-efficacy can be enhanced and is related to subsequent health behavior change (Kitjachanchaiyakul, 1999; Jareunkitjakarn, 2000). However, there is limited research that focuses on the enhancement of self-efficacy in mind and body exercise program. This study used the concept of self-efficacy to guide the development of yoga mind-body training program in order to enhance self-confidence of hypertensive patients. This type of exercise will help to reduce physical and mental stresses and to maintain blood pressure at a normal level.

## 1.2 Conceptual Framework for the Study

In this study, the researcher used Bandura's Social Cognitive Theory as the conceptual framework for guiding this study. Human behavior is a process of action in which it is associated with 3 factors: personal, environmental, and behavioral factors. These three factors determine one another (Bandura, 1989) and the expression of an individual's behavior must employ the intellectual process and decision-making from self-observation by comparing with others (Bandura, 1986). Bandura stated that perceived self-efficacy and outcome expectation is intrinsic factors which impact on an individual's decisions toward a certain action or behavior. Perceived self-efficacy is a judgment of a person's capacity in terms of self-efficacy, while outcome expectation occurs as a belief regarding the benefits following that action or behavior. Perceived

self-efficacy and outcome expectation are interrelated and have impact on decisions to perform behavior. Individuals with high perceived self-efficacy and outcome expectation will lean toward definite behavioral expressions. However, if any single area is high or low, that individual will lean toward not expressing the behaviors.

For the present study, not all of the variables in Bandura's theory were studied, but the concepts in the theory were employed in the formation of a Mind-Body training program for hypertensive patients. By improving self-efficacy, patients would have greater confidence in their capacities to perform yoga exercise. It is evident that perceived self-efficacy is an intrinsic stimulant affecting individuals to have a motivation to perform behavior if the results are viewed as expected (Bandura, 1986). Based on self-efficacy theory, this study used four major sources of information to promote self-efficacy in yoga mind-body training as follows:

1. Performance accomplishments/mastery experience: In order to help the experimental group becoming successful in yoga mind-body training for reducing stress and blood pressure, the subjects had to be trained with sufficient skills to make accomplishment through personal experience. Yoga is a method of exercise with simple postures. Every member of the sample group was able to train by themselves. Furthermore, the training could be performed both indoors and outdoors. The experimental group had to jointly practice yoga with the researcher once a week for approximately 45-60 minutes at a time then return to practice on their own.

2. Modeling involved the demonstration of yoga mind-body training by using training leaders to support perceived self-efficacy in a group setting. Modeling made the participants evaluate self-efficacy and make comparisons with other persons in the group. The training leaders showed the possibilities in training and also helped each one to perform the correct posture according to guidelines and to avoid pain or accidents during the practice.

3. Verbal persuasion involved the use of persuasive words from the training leader and the participants in the group to build confidence with positive reinforcement that work best to enhance self-efficacy during performing the specific task.

Copyright by Mahidol University

4. Physiological and affective state was an evaluation of physical and emotional readiness before the training by measuring blood pressure prior to the

training and management of stimulants in various conditions. The arrangement of environment during performing the yoga mind-body training was set up in a peaceful place and well-ventilated location.

According to Bandura's Social Cognitive Theory, the researcher developed the yoga mind-body training program for essential hypertensive patients by integrating four sources to enhance perceived self-efficacy. Patients would develop a cognitive process and decide to practice yoga to successfully reduce stress and blood pressure levels. The conceptual framework of this study is shown in Figure1.

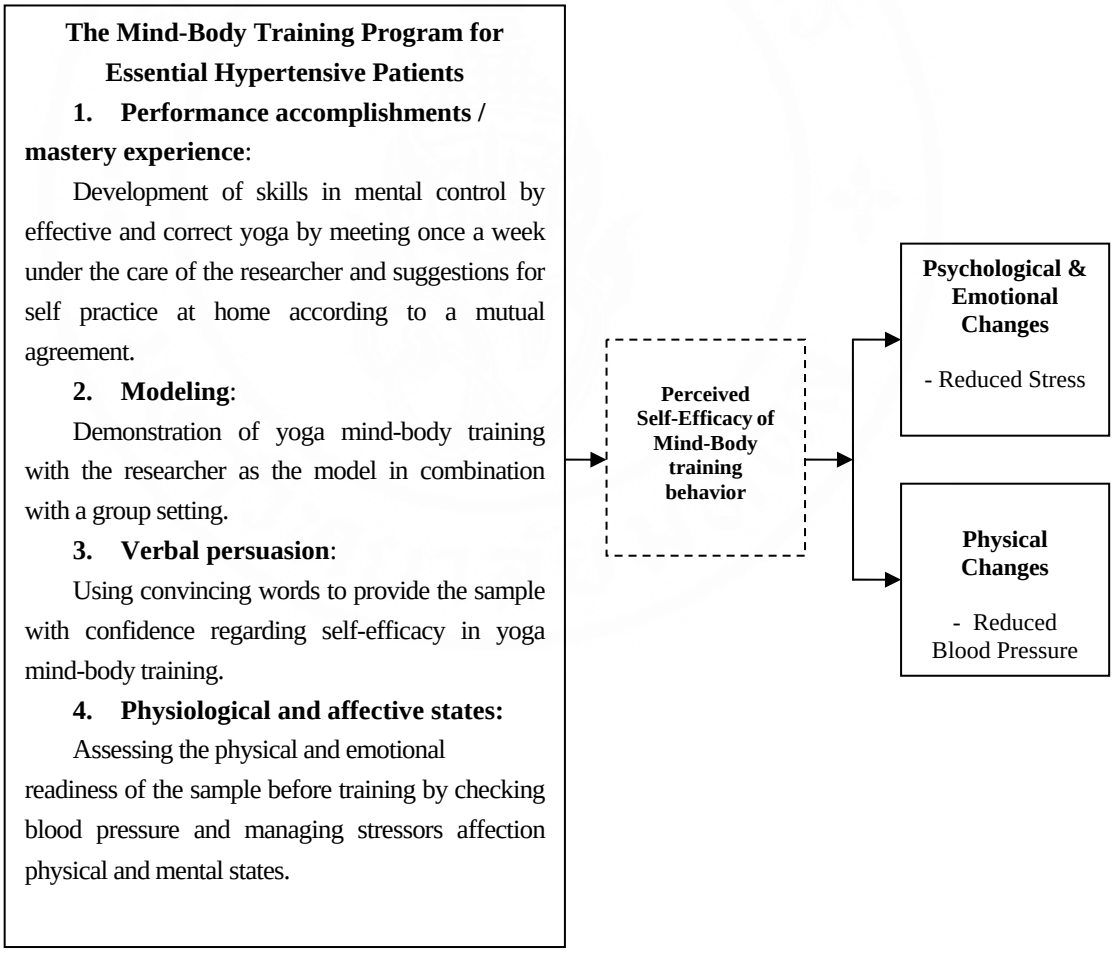



**Figure 1.** The Conceptual Framework of the Mind-Body Training Program for Essential Hypertensive Patients

Copyright by Mahidol University

## 1.3 Research Objectives

To examine the effect of Mind-Body Training program on stress and blood pressure in hypertensive patients be the experimental group and the control group.

## 1.4 Research Hypotheses

1. The mean posttest stress scores of hypertensive patients in the experimental group will be lower than their mean scores at pretest and lower than the mean scores of those in the control group.
2. The mean posttest blood pressure scores of hypertensive patients in the experimental group will be lower than their mean scores at pretest and lower than the mean scores of those in the control group.

## 1.5 Scope of the Research

This research was determine the effects of the Mind-Body Training Program on stress and blood pressure in essential hypertensive patients aged between 40-70 years, who came to receive treatment at the hypertension clinic of Nonghan Hospital, Nonghan District and Ban Dung Crown Prince Hospital, Bandung District, Udonthani Province. The subjects were divided into an experimental group and a control group of 30 patients in each group. The experimental group received the yoga mind-body training program for a time period of 12 weeks. The control group received routine care from doctors and nurses in the hypertension clinic.

## 1.6 Expected Benefits

1. The results will provide knowledge for developing nursing interventions in the following:

- To design the Mind-Body training program with yoga along with a consultation approach for hypertensive patients in relating to their conditions and environments.

- To create other forms of relaxation techniques according to the concept of mind-body control; for example, tai chi for greater diversity and to prevent boredom, so patients can choose to practice as suitable to their contexts.
- To extend the results of yoga exercise to other groups of chronic disease patients such as patients with diabetes, cerebrovascular disease and cardiovascular diseases.

2. The results will assist to design further research in yoga training by combining with other alternative therapies for hypertensive patients who cannot control their blood pressure. Other outcome measures such as Body Mass Index, cholesterol levels, and other physical changes need to be considered.

## 1.7 Definition of Variables

**Hypertensive patients** is defined as individuals diagnosed by doctors with systolic/ diastolic blood pressure levels at 140 - 159 / 90 - 99 and 160 - 179 / 100 - 109 mmHg. according to the specifications of the Joint National Committee (Cobanian et al., 2003).

**Blood pressure level** means the level of pressure in the arteries of the people who were diagnosed with hypertension measured by a digital blood pressure measuring device. Blood pressure was measured in a sitting position by using measuring techniques in compliance with the blood pressure measurement handbook modified by the researcher from the measurement of blood pressure of the Thai Hypertension Society. In this research, the sample group had to control blood pressure at lower than 140/90 mmHg. which was the target blood pressure level in the treatment of hypertensive patients without complications.

**Stress** is defined as the body response to stressors causing individuals to lose balance. Individuals respond to stressors by physical expressions such as headaches, aches in various parts of the body, accelerated heart rates, rising blood pressure, frequent constipation or diarrhea, insomnia, etc. Psychological expressions include anxiety, depression, irrational fears, unstable emotions, and changing behavioral expressions causing deterioration of relationships with families, individuals, and the environment. The stress levels was measured by the Stress questionnaire of the Department of Mental Health, Ministry of Public Health

(Department of Mental Health, 2002) by categorizing stress into 3 levels according to average scores: high, moderate, and low stress levels.

**Perceived self-efficacy** is defined as the confidence of the hypertensive sample in terms of capacity to perform yoga mind-body training program in order to relax from stress and reduce blood pressure levels to normal levels. It was assessed by the mind-body control of perceived self-efficacy questionnaire which modified from the self-efficacy questionnaire of Chareonkitkan (2000). It categorized perceived self-efficacy into 3 levels of the average scores as high, moderate, and low levels of perceived self-efficacy.

**Mind-Body Training Program** is a form of yoga exercise and relaxation techniques for the hypertensive patient aimed at reducing stress and blood pressure levels. The intervention group received basic knowledge regarding to hypertension and viewed the video on “Yoga for Human Development”. The intervention group developed their capabilities in yoga mind-body training from 4 sources: 1) Performance Accomplishments; 2) Modeling; 3) Verbal persuasion by advising, stimulating, praising, and encouraging; and 4) Physiological and Affective States for evaluation of physical and psychological preparedness (Bandura, 1997). The yoga mind-body handbook created by the researcher was given to participants in the intervention group

**Routine nursing care** is defined as a usual treatment and nursing care activities that hypertensive patients received from doctors and nurses at Ban Dung Crown Prince Hospital.

Copyright by Mahidol University

# CHAPTER II
# LITERATURE REVIEW

This chapter presented a literature review of related concepts, theory, and previous research on the following topics.

## 2.1 Hypertension

Hypertension is a condition that systolic blood pressure is equal to or higher than 140 mmHg or diastolic blood pressure is equal to or higher than 90 mmHg (Chobanian et al., 2003; ESH/ESC, 2003).

2.1.1 Categorization of hypertension: According to the World Health Organization and the Joint National Committee Guideline (Chobanian et al., 2003; WHO, 2002), hypertension is classified as shown in Table 1.

**Table 1** Classification of Hypertension in Adults Aged 18 Years and Higher

| Blood pressure classification | Systolic blood pressure (mmHg) | Diastolic blood pressure (mmHg) |
|---|---|---|
| Normal | < 120 | < 80 |
| Pre-hypertension | 120-139 | 80-89 |
| Stage 1 Hypertension | 140-159 | 90-99 |
| Stage 2 Hypertension | ≥ 160 | ≥ 100 |

2.1.2 Hypertension type is categorized by the following two causes:

- Primary or essential hypertension is found in approximately 95% of all hypertensive patients. It is usually found in the age period of 20-55 years (Kasem Wattanachai, 1989). Most patients may have hypertension without the conditions or presenting symptoms of the disease, such as occipital headaches which generally disappear

within a few hours. Other symptoms encountered include dizziness, heart palpitations, blurred vision, nausea, and vomiting (Lojaya and colleagues, 1996; Siripanit, 1998). Although the etiology of the hypertension is unknown, it is believed to be related to the factors promoting the occurrence of the diseases such as genetics, obesity, smoking, high salt or fat intake, alcohol consumption, and stress (Hansen, 1998).

- Secondary hypertension is less frequently encountered (less than 10%) and the etiology may be connected to pathology of kidneys, the thyroid gland, or abnormalities of the nervous system (Groer, 2001) and hormonal disorders, endocrine glands, toxemia, head trauma, etc. (Wood, 2002).

The etiology of essential hypertension is also unclear, but it is believed to be related to various factors such as genetics, high salt and fat intake, alcoholic consumption, obesity, stress, and lack of exercise, etc. Hypertensive patients who do not receive treatment, due to a lack of presenting symptoms, will be at risk for having disease, cerebrovascular complications, and kidney failure. Therefore, the treatment of hypertension is not only reduces blood pressure levels, but also has the objective of preventing and delaying complications of the disease. The aforementioned method involves adjusted lifestyles with pharmacological treatment (Chobanian et al., 2003).

### 2.1.3 Conditions and Presenting Symptoms of Hypertension

Most hypertensive patients have no specific symptoms indicating rising blood pressure and most diagnoses were from patients who came to see doctors due to symptoms other than hypertension (Hansen, 1998). When the disease progressed, occipital headaches may be found, especially in the morning after waking, blurry vision, nosebleeds, dizziness, heart palpitations, and weakness (Hanujareunkul, 2001; Phipps & Marek, 1999). Long-term hypertension leads to destruction of target organs, and possible symptoms of excessive urination, heart palpitations, and chest pains (Ngamukot, 1998).

### 2.1.4 Hypertension Complications

Hypertensive patients who are unable to control blood pressure at a normal level will be at high risks for various complications of the disease because target

organs are destroyed (Mansfield & Daley, 2000). The effects of hypertension on significant organs of the body are as follows:

- Heart: Hypertension will overwork the lower left ventricle of the heart due to increased arterial resistance. At first, the heart will adjust and resist the increased force by expanding the lower left ventricle. If this condition continues, the heart muscles will relax and be unable to expand in resistance, thus causing hemorrhaging in the left half of the heart and preventing the heart from receiving blood from the lungs so the blood returns to the lungs and causes pulmonary heamorrhage. The lower right ventricle will have to work harder until the heart muscles finally lose blood or the heart fails (Swales, 1995; Woods, 2002).

- Brain: Increased hypertension will thicken the arterial walls supplying the brain and cause roughness and narrowing within arteries, until the arteries become occluded and there is a lack of blood supplying the brain. Therefore, it has been found that hypertensive patients are at greater risk for stroke than ordinary people (Peunkjai Ngamukot, 1998) and stroke has become the cause of death of 50% of hypertensive patients in the United States (Groer, 2001). Furthermore, arterial pressure levels of higher than 150 mercury millimeters will increase circulation so that it is hazardous to brain tissues. If blood pressure increases immediately and rapidly, patients will have hypertensive encephalopathy (Boonchuang, 1996).

- Kidneys: Patients with chronic hypertension will have thicker and harder renal arterial walls, causing occluded arteries and capillary changes which inhibits blood supply to the kidneys, reduces renal filtration rates and causes the kidneys to deteriorate. Protein or even blood may be found in the urine and approximately 10% of hypertensive patients die from kidney failure (Hanujareunkul and Malatam, 2001).

- Arteries: Long term hypertension will thicken and harden arterial walls which lose flexibility and inhibit blood circulation, causing peripheral organs to receive insufficient blood supply or blocking the arteries until an aneurysm occurs (Jongjareun, 2000).

- Eyes: Patients with severe hypertension usually experience retinal changes such as rapid occlusion of the capillaries and constrictions at specific sites, retinal bleeding, and papilledema, which will cause scotomata, blurred vision, and possible blindness (Woods, 2002).

It is evident that the dangers of hypertension are complications to vital organs of the body such as the heart, brain, kidneys and, eyes. Therefore, treatment and blood pressure control are significant factors in the reduction of potential disability and fatality rates associated with hypertension-related complications (Battegay et al., 2005).

2.1.5 Hypertension Treatment

The goal of hypertension treatment is to control blood pressure at a normal level. Hypertensive patients with no complications should control blood pressure to be lower than 140/90 mmHg and hypertensive patients with co-morbidities, such as diabetes or renal disease should control blood pressure to be lower than 130/80 mmHg in order to prevent complications to the heart and arteries including protect other target organs. Pharmacological therapy is used in the treatment of essential hypertensive patients along with lifestyle modification (Battegay et al., 2005; Chobanian et al., 2003; WHO, 2002).

- Pharmacological Therapy. Medications are used to reduce blood pressure with the objective of reducing the resistance of peripheral arteries and increase the amount of blood flowing out from the heart and can be categorized into 8 groups as follows:

Group 1: Diuretics will reduce hypertension by reducing absorption of water and sodium by the kidneys, causing less water to be in the circulatory system. The medications in this group include Furosemide, Spinolactone, Metolazone, Amiloride, Hydrochlorothiazide, etc.

Group 2: Beta adrenergic blockers will take effect with beta adrenergic receptors in the heart and arteries to stop response of parasympathetic nervous systems, reducing heart rates and the amount of blood leaving the heart in one minute. The medications in this group include Atenolol, Carvedilol, Propranolol, Labetalol, etc.

Group 3: Vasodilators will take direct effect by smoothing muscles surrounding the arteries, causing muscles to relax and reduce resistance in the peripheral arterial walls. The medications in this group include Hydralazine, Hydrochloride, Minoxidil, etc.

Group 4: Calcium Chanal Blockers (CCB) take effect by blocking calcium from entering the muscle cells surrounding the arteries, resulting in muscle relaxation and arterial dilation in the body, reduction of arterial wall resistance and reduced blood pressure. The medications in this group include Verapamil, Nifedipine, etc.

Group 5: Angiotensin Convertingenzyme (ACE) Inhibitors will take effect by stopping ACE in the exchange from Angiotensin I to Angiotensin II, which are enzymes that constrict the arteries. Furthermore, the reduction of Angiotensin II also reduces creation of Aldosterone, reducing absorption of sodium and the amount of water in the circulation system. The medications in this group include Captopril, Enalapril, Lisinopril, etc.

Group 6: Angiotensin II receptor blockers: ARBs have the effect of expanding the arteries without raising Bradykinin levels. Therefore, doctors of patients with symptoms of coughing from the use of ACE Inhibitors usually change to this group of medication including Candesartan, Losartan, etc.

Group 7: Alpha 1adrenergic blockers have the effect of expanding peripheral arteries by blocking the effects of norepinephrin on alpha receptors. This group of medication is general used in combination with other groups of medications, because use of this medication alone, may increase risks for cerebrovascular disease, chest pain and heart failure. The medications in this group include Prazosin, etc.

Group 8: Alpha 2 – agonists have the effect of stimulating alpha 2 receptors and expanding the arteries. This group is popularly used in pregnant women, senior adults and persons with migraine symptoms. The medications in this group include Clonidine.

2.1.6 Lifestyle modification (As shown in Table 2) is used in pre-hypertension patients. As for cases with higher blood pressure, the method of lifestyle modification in used in a combination with pharmacological therapy to prevent complications and reduce expenses incurred by the long-term care of patients (Lojaya, 1996). The main concerns for lifestyle modification are as follows:

- Weight reduction. Patients with Body Mass Indexes of more than 27 $kg/m^2$ should reduce weight by at least 4.5 kilograms (Piyayothai and colleagues, 2000) and try to control weight by maintaining BMI at 18.5-24.9 $kg/m^2$. It is indicated that every 10

kilograms reduce systolic blood pressure by approximately 5-20 mmHg. Weight reduction methods can be performed by eating 3 meals a day, trying to eat vegetables and fruits with calcium, potassium and magnesium, low-fat dairy products, food high in fiber and low in cholesterol and saturated fats. The dietary control method is known as a Dietary Approach to Stop Hypertension (DASH), which will help reduce systolic hypertension by approximately 8-14 mmHg (Chobanian et al., 2003). However, dietary control should be done with exercise, which will help the body consume excess energy and reduce weight more effectively.

- Dietary sodium reduction. Regular hypertensive patients should limit consumption of high sodium foods such as fish sauce, shrimp paste, and soy sauce, also avoiding foods with salt such as pickled foods, salted foods, and sun-dried foods, etc. Patients should consume sodium at no more than 2.4 gm. per day, which will help reduce systolic hypertension by approximately 2-8 mmHg (Chobanian et al., 2003).

- Aerobic exercises such as aerobic dancing, swimming, walking, and jogging are a continual movement of large muscle groups in the body over a period of time. Exercising by the aforementioned methods every day for at least 30 minutes a day will help reduce blood pressure and reduce systolic blood pressure by approximately 4-9 mmHg. Furthermore, hypertensive patients who exercise continually will live longer or have lower rates of fatality than hypertensive patients who do not exercise (Rakpanichh, 1999).

- Moderation of alcohol consumption. Consumption of more than 1-2 ounces of alcohol (30-60 milliliters) is a risk factor that causes hypertension and also reduces the effectiveness of hypertension medication, which can lead to stroke. Therefore, persons who drink alcoholic beverages should reduce the amount by drinking a set amount each day e.g. no more than 30 milliliters of ethanol, no more than 720 milliliters of beer, no more than 300 milliliters of wine or no more than 90 milliliters of whiskey. The aforementioned moderation of alcohol consumption will help reduce the level of systolic blood pressure by approximately 2-4 mmHg (Chobanian et al., 2003). Females or people with less weight should consume no more than 15 milliliters of ethanol each day, because the aforementioned amount has no effect on blood pressure increase and also helps reduce risk factors of cardiovascular disease (JNC 6, 1997).

- Quitting Smoking. The effects of cigarettes in increasing blood pressure remain unclear. Nevertheless, it has been found that hypertensive patients who smoke have increased risk factors for heart and arterial diseases, because cigarettes have the components of nicotine, tar, carbon monoxide, hydrogen cyanide, ammonia and other substances that are hazardous to the body. Nicotine, in particular, has a direct impact on the parasympathetic nervous system by stimulating adrenaline secretion. The effects of adrenaline will cause arteries to constrict and increase blood pressure within 15-30 minutes after smoking (Rakpanich, 1999). Furthermore, the bodies of patients who smoke are resistant to treatment with medications that reduce blood pressure, thus causing the amount of medication to be increased (Kaplan, 1998). Therefore, hypertensive patients should avoid smoking.

- Stress management. Emotional stress may cause blood pressure to rise. Daily life can be stressfull and put people at risk from work or work-related stress, interpersonal conflicts, sudden changes in life, loss of loved persons, economical problems, etc. (Taylor, 1999). If persons are continually faced with confronting these types of incidents without the ability to adjust or find an outlet, the body will respond to the resulting stress by increasing hypertension ,because stress will have a direct impact on the performance of the parasympathetic nervous system, triggering secretion of epinephrine and norepinephrine from the adrenal medulla, causing the heart to compress harder and faster as most arteries become occluded and increasing the amount of blood going to and from the heart per minute and thus resulting in increased blood pressure.

Therefore, hypertensive patients will also have to confront the stress of lifestyle modification during illness (Hanujareunkul & Panpakdee, 1999; Kaplan, 1998). Learning relaxation techniques is important to hypertensive patients. Relaxing from stress will reduce the physical responses of the sympathetic nervous system and stimulate the performance of parasympathetic nervous system, which will reduce blood pressure levels. Appropriate relaxation techniques for hypertensive patients include meditation, breathing control techniques, yoga exercise, or Qi Gong to relax each muscle without stiffening, etc (Toopairao, 1999).

**Table 2** Lifestlyes Modification in Hypertensive Patients (Chobanian et al., 2003)

| Modification | Recommendation | Approximate systolic BP Ruduction, Range |
|---|---|---|
| Weight reduction | Maintain normal body weight (BMI 18.5-24.9) | 5-20 mmHg./10 Kg. weight loss |
| Adopt DASH eating plan | Consume a diet rich in fruits, vetgetables and low fat dairy products with a reduced content of saturated and total fat | 8-14 mmHg |
| Dietary sodium reduction | Reduce dietary sodium intake to no more than 100 mEq/L(2.4 gm, sodium or 6 gm sodium chloride) | 2-8 mmHg |
| Physical activity | Engage in regular aerobic physical activity such as brisk, walking(at least 30 minutes per day, most days of the week) | 4-9 mmHg |
| Moderation of alcohol consumption | Limit consumption to no more than 2 drinks per day (1 oz wine, or 3 oz 80 proof whiskey) in most men and no more than 1 drink per day in woman and lighter-weight persons | 2-4 mmHg |

## 2.2 Stress and Hypertension

Stress is a natural occurrence encountered in daily life. Stress varies according to situations and academic persons in various branches have provided different definitions for the basic knowledge of each profession. Sociologists and health personnel hold the opionion that stress is a matter of emotions and feelings toward incidents (Ignatavicius, 1999). Other persons have defined stress as follows:

Selye (1976) defined stress as a symptom to which the body has an unspecific response to the demands or threats to the person which changes the physiological balance. When the body is threatened, responses are exhibited in the form of physiological, biochemical, and other behavioral changes. This reactive response is called the General Adaptation Syndrome (GAS).

Lazarus & Folkman (1984) defined stress as an interaction between an person and the environment where the person will evaluate with intelligence whether or not the relationship will be bad or have negative effects on the health of the person. And this evaluation will depend upon the characteristics of the person e.g. thoughts, memories and experience. When the person discerns an impact on the person's well-being, the person will utilize all sources of benefits in full adaptation or beyond the capabilities of benefit sources and this condition is called "stress".

Joyce (1994) defined stress as a process of adaptation to situations or environmental conditions that disturb the balance of a person. The process of adaptation consists of physical, psychological and behavioral changes and the aforementioned changes will be expressed immediately when triggered by stress.

The Department of Mental Health, Ministry of Public Health (2002) defines stress as changed psychological and physical conditions resulting from a person's adaptation to various stimulants or triggers in a pressuring or threatening environment to cause suffering or uneasiness.

## 2.3 Factors Related to Stress

The factors related to stress can be categorized into 2 causes consisting of stress factors encountered in daily life and stress due to illness.

2.3.1 Stress encountered in daily life:

- Environmental factors e.g. hypertensive patients who live or work in with noise pollution, air pollution, crowded living conditions, living with high crime rates or changes of weather conditions e.g. extremely hot, cold or flooded, etc. can be confronted with constant stress (Brannon & Feist, 1997).

- Interpersonal relationships such as relationships with family members, colleagues, or relatives when there were changes in relationships e.g. divorces, marriages, conflicts with colleagues, relatives or family members can cause stress (Beare & Myers, 1990).

- Occupation: High risk occupations and high-responsibility jobs such as firefighters, air traffic controllers, supervisors, etc., or overwork can result in work-related stress (Pickering, et al., 1996).

- Loss of close persons, spouses, children, family members, divorce of married persons (Brannon & Feist, 1997).

- Changes in life such as losing a job, changing jobs, bankrupted businesses, menopause, retirement, loss of vital organs, etc. may require adaptation which may also cause stress (Taylor, 1999).

- Financial situations: Living in a poor family with debts or insufficient income for expenses can cause persons to work more and result in stress.

2.3.2 Illness-related stress as follows:

- Disease-related conditions: The fact that patients perceive their hypertension may cause patients to have stress and anxiety regarding their health conditions, because hypertension is a chronic disease that cannot be completely cured and blood pressure must be controlled for life while the patients may also have complications leading to disabilities or fatality (Hanujareunkul & Panpakdee, 1999). Furthermore, the symptoms of diseases that can be found in patients e.g. occipital headaches, dizziness, blurry eyes, weakness, etc. (Phipps, Sand & Marek, 1999) cause patients discomfort and reduce capacity for performing various activities.

- Treatment: Hypertensive patients need to control blood pressure within a normal range at all times, which require that they practice continual medication adherence to control blood pressure and this may cause anxiety regarding treatment, especially in patients who receive multiple types of medications to control blood pressure, which means more anxiety than in persons who do not take medication or persons who take only one type of medication as these patients believe their medications to be more severe. Medication adherence is also another cause of patient's suffering due to the side-effects of medications e.g. heart palpitations, dizziness,

weakness and fatigue (JNC 6, 1997). The aforementioned symptoms will reduce capacity for practicing daily activities or reduce work efficiency, thus casuing the patients to experience stress.

- Adjusted lifestyles: Hypertension forces patients to adjust lifestyles to control blood pressure levels by exercising regularly, weight control, avoiding high-sodium foods and limiting foods high in cholesterol, quitting smoking, abstaining from consumption of alcoholic or caffeine beverages, etc. The aforementioned changes are difficult and will increase stress levels if patients are unable to adhere (Hanujareunkul & Panpakdee, 1999).

- Changes in societal roles: Illness with hypertension affects societal roles, especially in patients with complications such as heart disease, cardiovascular disease, paralysis, etc, which will reduce capacity in the performance of former roles and make patients dependent upon other people as they become burdens on their families in terms of care. Furthermore, chronic illness will also reduce interpersonal relationships among friends (Hwu, 1995). And from the study of Dingmai (1998) who studied adjustments in the family roles of male hypertensive patients, it was found that hypertensive patients threatened by rising blood pressure had decreasing spousal roles in term of supporting the family and relieving of family burdens while also suffering from sexual impotence.

- Financial status: The fact that patients are required to receive continual treatment and take blood pressure control medication will result in financial loss due to the high costs of treatment (Kaplan, 1998) and illness has direct impacts on work, reduced income and affecting the overall financial status of the family (Chuprapawan, 1996).

It is evident that stress in hypertensive patients can occur as a result of numerous stress factors in daily life and illness. The fact that a person is continually faced with stress over a long period without stress management will cause hypertension to rise and may result in complications.

### 2.3.3 Stress Mechanisms and the Occurrence of Hypertension

When faced with stressful conditions, the body will respond to stress through the stimulation of the sympathetic nervous system, causing secretion of

epinephrine and norepinephrine from the adrenal medulla, as the heart compresses harder and faster and most arteries are constricted, as the cardiac input, and cardiac output per minute increase and blood pressure rises. In the mean time, stress will also have an impact on the Renin Angiotensin Aldosterone System, which has the role of maintaining the body's water and mineral balance. Stress will stimulate guxtaglomerular cells in the kidneys to secrete rennin enzymes to transform antiotensininogen from the liver into angiotensin I and angiotensin II whereas the Angiotensin Converting Enzymes from the lungs will cause arteries to become severely constricted and increase arterial resistance while further increasing the amount of blood to and from the heart, thus resulting in rising blood pressure and hypertension. Furthermore, angiotensin II stimulates the adrenal cortex to secrete aldosterone, causing water and sodium retention in the blood, so blood pressure also rises (Carven & Hirnle, 2003; Freeman & Lawlis, 2001). Patients with chronic stress will be affected by arterial changes as the arterial walls become more fragile and easily broken. Hypertensive patients who are unable to manage stress will trigger the sympathetic nervous system to secrete catecholamine to produce lipolysis, thus causing cholesterol levels to rise and the blood to be darker. These changes will cause fat to occlude the rough areas of the arterial walls as vascular diameter is reduced and the heart has to work harder to pump blood to supply various parts of the body, so the heart lacks blood suppy and eventually fails (Rimsritong, Tanjira, & Taechathong, 2002).

2.3.4 Stress is an unobservable condition of pressure. However, when people feel stress, there is a reactive response to stress in terms of thoughts, emotions, behaviors and physiology. Therefore, stress evaluations can be performed by a number of methods (Derogatis & Coons, 1993) such as the following:

- Self reports, such as interviewing, observations, and answering questionnaires, etc.

- Observation requires monitoring behaviors expressed when a person is in a stressful condition such as angry speech, loss of appetite, insomnia, lack of concentration, reduced work efficiency, or observation from language and gestures, such as sighs, vocal tones, or facial expressions, etc.

- Measurements of physiological changes are measurements of physical changes such as heart rates, respiratory rates, hypertension, muscle tenseness, body temperature, etc. This method of measurement requires effective instruments.

## 2.4 Self-Efficacy Theory

The Perceived Self-Efficacy Theory was developed from the Social Learning Theory of Bandura (Bandura, 1986) which was later changed to the Social Cognitive Theory. The basic concept of Bandura's Social Learning Theory had the belief that behaviors do not occur or change only as a result of environmental factors, but also require personal factors (intellectual, biological and other intrinsic). The combination of personal factors must be joined with reciprocal determinism, behavioral and environmental factors as shown in Figure 2.

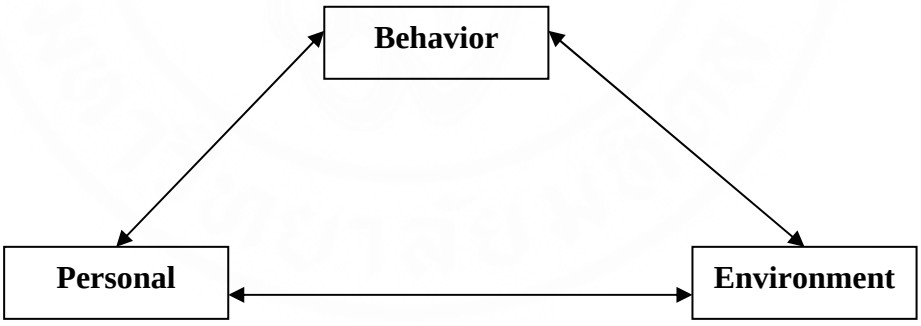



**Figure 2.** Mutaual Determinism of Behavioral, Environmental And Personal Factors (Bandura, 1997).

Bandura believed that perceived self-efficacy had impacts on behavioral changes and choosing to act in various activities by trying to perform those activities on a continual basis. If a person decides he/she is capable, the person will perform a particular activity. However, if a person believes he/she is not capable, the person will avoid performing the activity. People with differing levels of perceived self-efficacy in different situations may also exhibit diverse behaviors. A person's perceived self-efficacy can be flexible, depending upon situations and influenced from experience or

past successful skills (Bandura, 1977). Therefore, the determining factor for behaviors relies upon perceived self-efficacy in a particular situation, i.e. if a person is confident and believes he/she is capable, the person will show that capability with patience and determination rather than giving up easily as they eventually become successful. At the same time, people with no confidence in their capabilities to practice behaviors will try to avoid practices believed to be beyond their limitations (Evans, 1989 cite in Iamsupasit, 1993). A person's practice of behaviors will depend upon the relationship between two factors, namely perceived self-efficacy and outcome expectation as in the relationship shown in Figure 3.

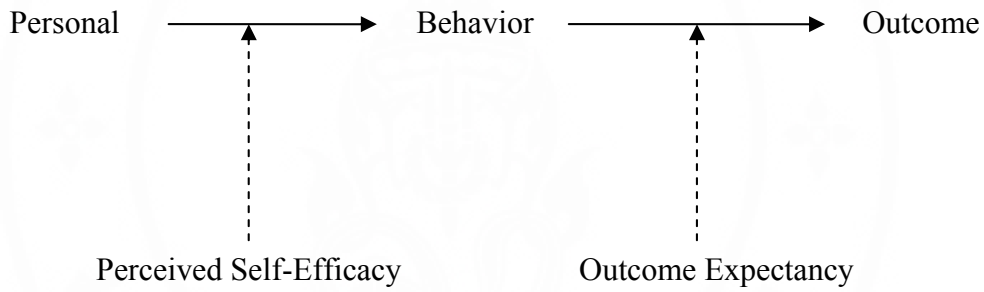



**Figure 3** The relationship between perceived self-efficacy, outcome expectancy and behavior (Bandura, 1997).

Perceived self-efficacy refers to the belief or confidence of a person that he/she is capable of exhibiting desired behaviors successfully according to goals i.e. hopes preceding the behavior. Perceived self-efficacy can be evaluated in terms of the following 3 dimensions:

Magnitude of behaviors: People with high perceived self-efficacy will evaluate the magnitude of activities to be performed at a low level and tend to practice that behavior successfully in contrast to people with low perceived self-efficacy who will evaluate the difficulty of the activity at a high level.

Generality refers to confidence in past success and the capacity to utilize skills from that experience in practicing similar activities in each situation.

Strength refers to the belief of a person in evaluating self-efficacy or possibility in practicing that activity. People with high levels of strength will have the belief that they are capable of practicing that behavior or certainty that the situation is

not beyond their limits of performance, causing a person to try to practice and maintain the aforementioned behavior.

Outcome expectation refers to the belief in subsequent good results following the performance of an activity. Outcome expectation has a significant role in motivating and deciding to change behavior, especially when the behavior is not difficult to follow. A person may not perform behaviors successfully without incentives. Outcome expectation can be divided into 3 forms. First, physical outcome expectation is a satisfaction resulting from improved health after practicing the behavior. Second, social reaction outcome is a result caused by the receipt of compliments or rewards which may be items or money from other people after practicing behavior. Lastly, mental outcome expectation is a feeling of satisfaction or pride in successfully practicing behaviors according to set goals.

According to the concept of Bandura, development of perceived self-efficacy can be derived from 4 sources: performance accomplishments, modeling, verbal persuasion and physiological and affective states (Bandura, 1986). For the present study, the researcher implemented the theory of perceived self-efficacy in developing the Mind-Body Program to reduce stress and blood pressure in essential hypertensive patients. From the concept of perceived self-efficacy, it is evident that perceived self-efficacy directs people to have effort and enthusiasm in performing a particular activity. If a person received outcomes as expected, the success will promote the person toward greater capacity (Bandura, 1986), thus indicating a relationship between perceived self-efficacy and outcome expectancy according to Figure 4.

| | Outcome Expectancy: High | Outcome Expectancy: Low |
|---|---|---|
| High Perceived Self-Efficacy | Definite tendency to perform | Tendency to not perform |
| Low Perceived Self-Efficacy | Tendency to not perform | Definite tendency to not perform |

Copyright by Mahidol Univ.

**Figure 4.** The relationship between perceived self-efficacy and outcome expectancy with impact on decisions on practicing behaviors (Bandura, 1997).

It is evident that the relationship between perceived self-efficacy and outcome expectancy has different effects on decision making. People with perceived self-efficacy and high outcome expectancy in actions will perform those actions effectively and with satisfaction. Although the expected outcome may not be as desired, the individual will continue with efforts and tendencies toward performing the behavior. If a person has high perceived self-efficacy but low outcome expectancy, the person will insist upon not performing and if a person has low perceived self-efficacy with high or low outcome expectancy, the person will tend toward not performing that behavior and will not take interest in continuing to perform the activity. Therefore, perceived self-efficacy is important in leading to behaviors of people.

## 2.5 The Concept of Yoga Mind-Body Training.

Mind-body training refers to a form of relaxation techniques combining physical movement and breathing control in order to build physical strength and flexibility with balance between body and mind, including promotion of good health in all aspects. This form of exercise methods includes yoga, Qi Gong, etc. (www.cancer.gov).

Mind-body training/ mindfulness relaxation is a form of mind training to create awareness by using the method of breathing control and the use of postures in practicing to reduce stress and create physical and mental relaxation (www.cancer.gov).

According to La Forge (1997), mind-body training is an ancient eastern science involving exercise that consists of 5 elements: 1) mind training practice; 2) determining stability while in motion; 3) practicing body movement with breathing control; 4) maintaining appropriate balance; and 5) having a belief in life energy.

In conclusion, mind-body training is a form of exercise based on belief in life energy focusing on physical movements in various postures and breathing in order to promote balance of body and mind. The outcome of the practice will make the body flexible and increase self awareness. This type of exercise will be useful for hypertensive patients. Their bodies will respond to relaxation by stopping the

performance of the sympathetic nervous system and promoting the performance of the parasympathetic nervous system, thereby reducing blood pressure (Unkule, 2005).

2.5.1 Yoga

The word “yoga” is a Sanskrit term that originated in India approximately 6,000 years ago. It is a combination of science and art, including various techniques to promote natural balance of the body, mind and soul (Sakunsak, 2002). Yoga was invented by an Indian philosopher named Patanjali who gathered the science of yoga, a science in physical movement to peace of the soul gathered together under a topic called “yoga sutra” that Swami Vivekananda introduced to the United States as early as 1890 until it became widely known as it is today (Fontaine, 2000).

Patanjali (Cite in Garfinkel & Schumacher, 2000) defined yoga as a technique used to control or stop cognitive processes and create peace of mind.

Yogendra (2002) asserted that yoga is a method for developing consciousness, so a person will live in harmony of body, mind, and soul. Yoga will complete a person with good health and ability to manage illness due to a belief that illnesses are caused by loss of harmony in body, mind and soul.

Unkule (2002) defined yoga as the adjustment of body, mind and soul to remain in natural harmony. When the body loses balance, yoga will help stimulate utilization of collected energies so the body, mind and soul can function with maximum effectiveness. Yoga can be practiced by a number of methods. Each method has the same objective of creating pure blissful consciousness. The original forms of yoga practice (Fontaine, 2000; Prakash, 2002) comprise the following:

Yoga for yogis has the primarly objective of emphasizing mental serenity and can be practiced easily with the use of scientific practice methods. People who practice seriously will gain mental serenity and the enlightenment of wisdom as a reward. However, before reaching that level of serenity, the yogi may discover that the yogi has already left society.

Karma-Yoga is the type of yoga most firmly based upon religious beliefs and comprises heightened, rituals, food offerings and praying to gods such as “Pra Wisanu”.

Bhakti-Yoga: This type of yoga is very appropriate for people with serious goals to live in jungles and forests. It is another type of yoga emphasizing cognition to learn giving and sacrifice.

Jnana-Yoga believes in reality that knowledge acquired from practicing yoga with meditation including isolation will help yogis differentiate between reality and maya.

Tantra-Yoga is yoga that indicates to yogis the differences of the dark and bright sides of light and is the only type of yoga employing the good points of various types of yoga. Tantra-Yoga includes food offerings that emphasize meditation to the level of enlightenment to awake the energies in the body and the energies of the mind to work while doing the asana posture.

Hatha-Yoga modifies the asana posture of ancient yoga by using the art of exercise under mind control to create negative and positive energies. The result of the training will have physical and mental benefit.

Muntra-Yoga is a contemporary yoga that modifies the ancient asana posture which emphasizes chanting the word “Ohhm” and can be practiced with simple asana postures.

### 2.5.2 Basic Elements for Yoga Practice

In general, yoga consists of 8 processes that benefit one another. People, who seeking to benefit from yoga, need to learn, understand, and practice all eight elements together. The eight elements of yoga (Cirone, 2002) comprise the following:

- Yama or moral discipline is morals and ethics that help people to live peacefully.
- Niyama, or self-restraint, or self methods, consists of the following:
- Cleansing the body by bathing, keeping the mind pure with yoga practice and breathing practice.
- Training yourself to be satisfied with what you have.
- Trying to have physical, verbal, and mental control to perform good health
- Having a desire to learn.

by Mahidol University

2.5.3 An “asana” or posture refers to postures in yoga practice. Asanas are postures for exercising, stretching various muscles and joints to be strong and have better movement, and stimulating the performances of various nervous systems and glands.

2.5.4 Pranayama, or breath control, is practice to control breathing.

2.5.5 Pratyahara or sensory inhibition refers to control of various feelings such as desire and anger. When the mind is not attached to objects or emotions, the person will be pure and have energy for thinking or doing good.

2.5.6 Dharana or concentration is having concentration for things being done and focusing the mind on only breathing while doing a yoga posture.

2.5.7 Dhyana or meditation is a state of mind that focuses continually until a person has concentration, even when the posture has changed. If a person is able to practice to this level, the body will feel light, comfortable, stable and cheerful.

2.5.8 Samadhi or contemplation is the ultimate goal of yoga practice. The body and mind will be in a relaxed state with serenity and harmony, while the yogi will be conscious and aware at all times.

## 2.6 Effects of Yoga Practice

Yoga is unique and different patterns of exercise in its practice of controlling respiratory rhythms with breathing practice to create concentration and a peaceful state of mind along with practice of various asana postures. If a yogi learns and practices yoga in concurrence with correct principles and methods continually, the yogi will have strong health and a clear mind. Yoga practice will have effects on physical, mental, and emotional changes (Nagaranthna, Nagendra & Monro, 1995) as follows:

Copyright by Mahidol University

2.6.1 Effects of Yoga practice on Physical Changes

The relationship between basic structures and the function of various organs in the body enables humans to live. Yoga practice will cause changes in the structures and function of the body organs in order to promote systematic physical function.

- The musculoskeletal system: Yoga exercise, especially asana yoga, will cause muscles and joints to have more effective movement, because yoga is control over the use of muscles with active postures so muscles will be tense and strengthened, while promoting the coordination of various muscle groups. Furthermore, it will also help prevent muscle atrophy and restore muscles never used before (Anandamitra, 2002). Various joints with slow movement during the practice will also gain flexibility and be able to move better within the range of the joint, thus preventing joints from locing, while further prevnting infections and joint deterioration (Teerasiri & Chunhasawatdikul, 1998).

- The cardiovascular system: Asana yoga practice will not only affect bone and muscle changes; it will also prevent arterial complications in hypertensive patients because yoga practice will cause the heart and arteries to be massaged from various asana postures which will lead to good circulation. When compressed, the blood will be forced out of that area and when relaxed or dilated, the blood will return to that area quickly. When the heart and arteries are massaged, both organs will become stronger as arterial occlusion is reduced. Therefore, the entire circulatory system will function more effectively (Pannachet, 2001). Moreover, in with high levels of stress, asana yoga will help inhibit the performance of the sympathetic nervous system and stimulate the performance of parasympathetic nervous system in order to reduce heart rates, respiratory rates and blood pressure levels (Anandamitra, 2002; Unkule, 2006).

- The endocrine system: The human nervous system is categorized into two major systems i.e. the central nervous system and the peripheral nervous system. The central nervous system consists of the brain which contains billions of cells. These cells have synapses for receiving nerve signals. Many branches of these neurons together with a layer of tissue covering them are called nerves. Nerves descend from the hypothalamus to the spaces within the spine and branch off into two sides of the spinal cord to become the peripheral nervous system. The dendrites and axons that

leave the spinal cord cells are found in various organs throughout the body and perform the function of receiving signals and send them to the brain and send orders from the brain to various organs. Furthermore, the dendrites and axons coming from the nerves in the spinal cord make up the autonomic nervous system with branches feeding various inner organs to function in areas other than mental power such as controlling heart rates, compression of digestive tract and secretion of various hormones (Worapongchet, 1999).

- The autonomic nervous system has the important duty of preserving life by preparing the body for “fight” or “flight” when life is threatened. The performance of the autonomic nervous system is related to various hormones. Hormones are like a type of “news” within the body made by the endocrine glands located in various parts of the body e.g. the pineal gland and the pituitary gland in the brain, the thyroid gland at the neck, the adrenal gland above the kidneys. The pancreas is the source of insulin production, which is an important hormone in controlling blood-glucose levels in the body, and the reproductive organs which produce gender hormones (Worapongchet, 1999). Yoga practice is controlled performance of the pineal gland to reduce emotional stress and enable better sleeping (Singh, 1998). The pineal gland will perform the function of producing two hormones i.e. ceratonin and melatonin.

Both hormones have impact on the performance of several other glands in the body, including effects on peace of mind. The pineal gland is sensitive to light. During the night, the pineal gland will produce more melatonin and less ceratonin, so we sleep well. And during the day when there is daylight, the pineal gland produces less melatonin, but more ceratonin to prepare the body for work. Whenever the pineal gland produces ceratonin in an amount that is balanced and not in excess, the body will relax and the mind will be at peace. However, whenever the pineal gland produces too much ceratonin, we will be uneasy, restless, severely stressed and unhappy (Teerasiri & Chuhasawatdikul, 1998). The adrenal gland will also produce various substances such as adrenaline and miniralocorticoids, which are significant in the response of the body to stress and blood pressure levels (Worapongchet, 1999). Practicing breathing in asana yoga will enable yogis control adrenaline better, as they become calmer and are not easily stressed (Teerasiri & Chunhasawatdikul, 1998).

The performance of the autonomic nervous system, which has both sympathetic and parasympathetic nervous systems with similar hormones must maintain balance so the body can maintain regular conditions. Yoga practice will promote performance of the nervous and gland systems to act regularly with one another and maintain balance (Pannachet, 2001).

- The digestive system: Practicing yoga asana will have the effect of massaging internal organs that are smooth muscles, so those internal organs will have appropriate sizes and shapes to prevent them from becoming flaccid as they become stronger and the digestive system will perform effectively. Furthermore, there will be effects in increasing function of internal organs, especially movements of the stomach and intestines, leading to convenient expellation of gas and solid wastes to prevent and solve problems of indigestion and constipation while improving digestive function (Worapongpichet, 1999; Pannachet, 2001).

- Psycho Neuro Immunology: Practicing asana yoga will not only help massage internal organs in the abdomen but it will also help various glands in functioning as significant components of the immune system, especially the thymus gland which will help produce lymphocytes so tuberculosis patients have improved symptoms after only two months of yoga practice. Furthermore, the feelings of serentiy and relaxation occurring after yoga practice will help stimulate endorphin secretions i.e. neuropeptides with qualities similar to morphine from glands spreading to various cells in the body, causing happiness and feelings of comfort similar to an opium or morphine high while also helping ease feelings of discomfort in cancer patients undergoing chemotherapy

2.6.2 Mental Effects of Yoga Practice

Yoga practice will cause the mind to be peaceful, promote self-awareness, help relieve chronic stress, clear the mind and create cognitive intelligence for solving problems (Trefny, 2000).

- Self-awareness: Yoga practice will help promote self awareness on a physical and mental level. People who practice yoga continually will not only create a state of relaxation but also create positive control of emotional expressions to stress or various feelings of pressure (Trefny, 2000).

- Mental performance: Practicing yoga with breathing control techniques will help the left and right cerebral hemispheres have effective coordination performance. Therefore, yoga practice will help develop the process of cognitive performance (Worapongpichet, 1999).

- Emotional changes. Physical action by stretching and contracting the muscles and joints slowly with breathing control comprise exercise that refreshes both body and mind with appropriate emotional expressions (Anandamitra, 2000), which is a result of melatonin secretion from the pineal gland. The effects of melatonin will bring feelings of happiness, serenity and mental stability (Singh, 1998: Unkule, 2005).

- Spiritual effects: Yoga practice will enable perception of mental serenity because yoga practice enables yogis to have wisdom and thorough understanding of the nature of life (Nagarathna, Nagendra & Monro, 1995).

## 2.7 Yoga and Stress in Hypertension

In addition to helping prevent and treat hypertension, yoga practice can help patients to relax from stress and reduce blood pressure. Yoga practice will bring natural balance for body, mind and soul on the basis of well being. There were many types of yoga e.g. asana yoga or pranayama yoga, used in preventing and treating emotional stress, which is another cause in hypertensive patients who are unable to control blood pressure within normal levels (Nagarathna, Nagendra, & Monro, 1995; Malathi, Demodaran, Shah, Patil, & Maratha, 2000). In hypertensive patients, yoga practice is dynamic exercise (Tanomsap, 2005; Unkule, 2006), especially asana yoga, which will not only help reduce weight but also cause arterial and capillarial changes in the body, thus resulting in flexibility, increased dilation and more blood flowing to supplyl various bodily tissues. In patients with high stress levels, practicing asana yoga will stop the function of the sympathetic nervous systems, causing reduced blood pressure. Moreover, yoga practice will also have impact on synapse function when stimulate toward awareness and work in the opposite direction by renewing the flexibility of nervous systems and response to stimulations at a suitable level (Unkule, 2006).

2.7.1 Asana is a posture of the body or holding a single position that is a search of the move appropriate bodily movements in meditation. Asana can be a sitting, standing or lying-down posture. At present there have been numerous developments in asana postures by emphasizing the principles of various asana to practice having a strong and flexible spine by practicing movement of the spine in four directions: bending forward, backward, sideways, and twisting in a wide direction. Yoga can be practiced in various asana, but must be correct according to basic principles which were to be "still" and "serene" which refers to a body and a mind related with balance in a still and serene state (comfortable) that yogis may practice as long as they remain comfortable. In order to receive maximal benefits from asana, yogis should practice with the correct attitude and suitable methods. Movements during asana should be peaceful, not erratic, or sudden as the body slowly enters the final position of the posture by remaining in a comfortable state. In practicing asana, yogis should use as little strength or effort as possible (Kongpakdee, 2002).

Forms of yoga asana will cause different effects on the body and mind. Each yogi must choose to practice a posture as appropriate for their own condition, which cannot specify which asana is most appropriate. Therefore, yoga asana practice must remain under the care of teachers who are to educate and teach correct practice methods to prevent potential danger in practicing, especially in hypertensive patients. Patients must avoid asana that will increase blood pressure and heart rates.

Yoga practice for hypertensive patients is performed with the goal of relaxing the body and mind, while stimulating blood circulation with effects on organs in the abdomen and important glands such as the pituitary and adrenal glands, which have trigger the secretion of hormones controlling blood pressure. The researcher chose asana postures as appropriate for hypertensive patients through research and real practices as follows:

- Samadhi Pose

Benefit: This is an extremely good pose for meditation and concentration. It has a calming effect on the mind and the nerves by improving faulty posture and circulation in the legs, and helping the joints in flexible condition (Kongpakdeepong, 2002).

- Turned neck Pose (Pornhommuttra Pose)

Benefit: Reduces neck stiffness and stress while promoting relaxation (Kongpakdeepong, 2002).

- Shoulder Joint Fitness Pose

Benefits: Helps relieve tension and weakness in the neck and shoulder muscles; solves problems with pain in the elbows, shoulder joints and back muscles in the shoulder area (Yuwajitti, 2001).

- Twisting Pose (Watra-asana)

Benefits: Creates flexibility for the spine; promotes liver, pancreas, spleen, intestines and kidney function (Anchaleesangkat, 2004).

- Head to knee pose

Benefits: This posure calms the mind and emotions, stimulates the nervous, reproductive, endocrine and urinary system. It keeps the liver healthy and ensures that it functions normally. It cures stomach disorder and, help the secretion of digesive juices. (Yuwajitti, 2001).

- Mountain Pose

Benefits: Stretches the spine, prevents pain from incorrect weight distributiom, focuses and creates feelings of relaxation (Teerasiri & Chunhasawatdikul, 1998).

- Wheel Pose (Jakra-asana)

Benefits: Stretches muscles to the side of the body, increases flexibility of the spine, reduces tenseness in the waist area (Kongpakdeepong, 2002).

- Bent Knee Position

Benefits: Helps massage organs in the abdomen, expel gas, relieves constipation, helps exercise knee and hip joints, strengthens back joints, reduces fat in the abdomen, hips and thighs (Anchaleesangkat, 2004).

- Snake Pose (Phuchong Asana)

Benefits: Supplies blood to the spine and nerves, which is of great benefit to muscles and organs in the abdomen, especially the kidneys, because blood will be wrung from the kidneys during the position, and when the body returns to its original position, the blood will flow back to supply the kidneys more so the kidneys will be better able to filter wastes (Yuwjitti, 2001).

- Corpse Pose (Chawasana)

Benefits: This position relaxes muscles all over the body, helps the body return to energy balance, relaxes the mind and brings better sleep (Ikata, Ikata, Pongpreuk, & Kongpakdeepong, 2004).

In addition to the aforementioned asana postures, the researcher arranged for meditation before and after the practice with the objective of calming and relaxing the mind during the practice so attention would be focused only on one thing at a time e.g. inhalation, exhalation, compressing the stomach, so concentration on perception according of the current bodily movements and changes in mind or emotions. Practices in this characteristic will help the body rest completely, while reducing pressure and stress. Furthermore, if patients practice regularly, it will help them reduce levels of physiological awareness. Practicing to calm the mind with relaxation will develop transcendental meditation. People have defined meditation as firmness of the mind in focusing on one thing without fantasizing or wavering in order to have clear intelligence of that thing (The Royal Institute-Thailand, 1987). Any method of practicing meditation affects the body and the mind while inducing relaxation. Therefore, the researcher arranged to practice meditation before and after the practice so patients would be in a state of relaxation with concentration on various practices of asana according to the program and have peace of the mind following the practice.

2.7.2 Pranayama is an important element of yoga practice in terms of stress management and blood pressure reduction. The word “pranayama” comes from the word “pran” and “ayama”. “Pran” refers to energy. In in yoga, however, “pran” refers to the force of life and “ayama” refers to breathing control (Unkule, 2004). Therefore, pranayama refers to life force acquired from the control of breathing. This technique of breathing control is called the “pranayamic breathing technique” (Unkule, 2004) and consists of 3 basic elements i.e. inhalation, suspension, and exhalation. The process of inhalation will cause changes in refilling pure air for lungs. The diaphragm will move lower and the lungs will expand in order to allow the entry of as much air as possible, while suspension will cause temperatures within the body to rise and have the significant role of increasing as much oxygen saturation as possible into the body as possible. Exhalation will return the diaphragm to its regular level while driving

toxins and wastes by exhaling. Therefore, training to control breathing in yoga practice is extremely necessary and will cause the lungs to expand fully during inhalation and exhalation, as life force is replenished with every breath (Anandamitra, 2000; Unkule, 2005).

Significance of Pranayama

In yoga, breathing control involves complex breathing similar to respiration at the cellular level which causes various cells in the body to receive sufficient oxygenated blood for cell function and disposal of carbon dioxide from the lungs. The life force created by yoga breathing will circulate within the body. Whenever life force is blocked, people become ill with disease. “Pran” yoga will move in a circle and the “pran” cyle is called “chakra”. There are 7 chakra centers in the body which are at the head, forehead, neck, chest, navel, lower abdomen and at the small of the back. Each chakra will control the performance of various organs in the body. The upper chakra is the chakra at the forehead. According to yoga beliefs, it is the position of the third eye, which is actually the position of the center of the nervous system. The chakra in this position controls the pituitary gland, hypothalamus and mind. The chakra at the head is the chakra that specifically controls the performance of the pineal gland.

The lower chakra consists of the chakra at the tailbone which performs the duty of controlling the solid parts of the body such as muscles, bones, testicles, ovaries and control of excretion. The chakra at the lower abdomen performs the duty of controlling the liquid parts of the body and the reproductive system. The chakra at the navel performs the duty of controlling body temperature, energies in the body and performance of the digestive system along with pancreatic and adrenal function. The chakra at the chest performs the duty of controlling breathing and blood circulation. The chakra at the neck controls thyroid, parathyroid and speech. Whenever the seven cyles are flowing, the energies of the body will be balanced people will have good health. Therefore, illnesses mean that the “pran” cycle has been disturbed. The “pran” cycle can be corrected by using various asana (Teerasiri & Chunhasawatdikul, 1998) because practicing asana along with diet control and yoga breathing will promote coordination between the nervous systems and various organs for recovery and full capacity performance (Unkule, 2004).

**Breathing Exercises**

Natural breathing does not fully benefit our bodies. Therefore, yoga experts have discovered breathing methods and recommend of daily breathing exercises several times a day as follows (Yuwajitti, 2001):

1. Breathing in the Abdomen (The lower part of the body)

Method

- Sit in a meditation posture and base the feeling at the navel and inhale-exhale by the nose slowly and softly.

- Start to exhale as the abdominal wall compresses. When you have reached then end of the exhalation rhythm, inhale slowly and your abdominal wall will expand as the lower part of the body is filled with air. Then exhale again by so the abdomen compresses as much as possible to force all air out from the lungs.

- In abdominal breathing, the air will fill only the lower lungs and this method will cause the abdomen to move up and down with characteristics of waves but the chest will not move.

Benefits

- The heart will rest completely and blood pressure will be reduced.

- The digestive system will be stimulated, thus causing intestines to move regularly.

- All internal organs within the abdomen will be massaged well.

2. Breathing at the Center of the Body

Method

Sit in a meditation position and base feelings at the rib area on both sides. Use the right hand to feel the right ribs and use the left hand to feel the left ribs. Put the thumbs under the armpits and point the other four fingers upward along the line of ribs and exhale slowly so that the ribs will compress inward on both sides. Then inhale slowly as both sides of the ribs expand and the center of the lungs is filled with air. Then exhale so that both sides of the ribs compress inward. The hands at the ribs will feel the ribs expanding during inhalation and the ribs will compress inward during exhalation.

Benefits

- This is an exercise for the lungs that will strengthen the lungs and cause the heart to rest and work more slowly as the blood circulates to internal organs such as the liver, gall bladder, stomach, spleen and kidneys.

3. Breathing in the Upper Part of the Body

Method

- Sit in a meditation posture. Focus feelings on the upper parts of the lungs and exhale first so as to have a feeling of a shrunken neck. Then inhale by lifting the neck and shoulders up slowly; let the air pass through the nostrils to fill the upper lungs and then raise the neck until taught, bend the neck toward the back until taught, then exhale by slowly bowing the chin lower, sitting straight and breathing slowly with lowered shoulders. Then gradually compress the neck. The abdomen and center of the chest must remain straight and still.

Benefits

- Allows inhaled air to reach the end of the upper lungs, strengthening the lungs and preventing lung-related diseases.

4. Combination of Breathing Methods in the Abdominal, Central and Upper Parts of the Body

Method

- Sit in a meditating position, exhale slowly through the nostrils and allow the abdomen to compress as much as possible; then start inhaling so the abdomen expands as much as possible and then push up to the chest. Expand the ribs as much as possible and slowly raise the shoulders and neck. Inhale to maximum capacity, bend the neck toward the back until taught, lift the waist and small of the back until taught and straight, bend the chin down a little, sit straight and slowly exhale. The abdomen will begin to compress as the ribs, shoulders and neck shrink or “subside” as in a wave.

Benefits

- Lung fitness for good pulmonary health.
- Increases oxygen in blood.

Copyright by Mahidol University

- Causes the heart to perform continually with lower heart rates.
- Reduces blood pressure.
- Stimulates the digestive system.
- Causes the heart to be calm and focused.

In this research, the researcher chose to exercise breathing by the method of abdominal breathing (lower part of the body) which is a basic pranayama practice combined with the practice of various asana to yield maximal benefits from the practice. Effective breathing can cause the body to relax and reduce blood pressure, even though the yogis in the present study did not practice various asana. (Teerasiri & Chunhasawatdikul, 1998; Unkule, 2004).

It is evident affects physiological changes. The mind-body link is an invisible connection and changes that occur in the body are a result of "pran" which can be compared with baseball pitchers who inhale deeply when in position to throw the ball, so they throw the ball as far as possible. Another example can be found in opera singers who must control breathing so they can sing as well, thus indicating that the body and mind are connected through breathing. Therefore, breathing is as a bridge between the sympathetic and parasympathetic nervous systems. When faced with emotional stress, the sympathetic nervous system will be stimulated and cause muscles throughout the body to become tenses heart rate increases and blood pressure rises. When a person faces chronic stress, the sympathetic nervous system will be stimulated to over-perform which results in loss of balance. The control of sympathetic nervous system performance can be done by practicing breathing control techniques continually and regularly, which will stop sympathetic nervous system function and promote the function of the parasympathetic nervous system, thus causing the body and mind to become calm so that stress will be controlled by practicing breathing techniques (Unkule, 2004).

## 2.8 Related Studies

Hongwachin (1999) conducted a quasi-experimental study by employing the theory of perceived self-efficacy and setting goals to control blood pressure in hypertensive patients in two groups to compare within groups and between groups.

According to the research findings, it was indicated that the experimental group had increased perceived self-efficacy, higher outcome expectancy, dietary intake health behavior adjustment, positive exercise and ability to relax from stress than the control group.

Pantong (2002) studied the effects of increasing perceived self-efficacy in muscle relaxation on blood pressure in hypertensive patients in a quasi-experimental research by arranging the experimental group to obtain increased of perceived self-efficacy in muscle relaxation whereas the control group received routine consultation only. According to the research findings, it was found that the experimental group had higher levels of perceived self-efficacy than during the pre-experimental period.

Tankitjanon (2007) studied the effectiveness of a stress relaxation program by implementing the self-efficacy theory with Thai massage and physical postures to relieve stress in middle-aged women in Prayeun Sub-district, Prayeun District, Khonkaen Province. A quasi-experimental study conducted in an experimental group and a comparison group. The experimental group received the stress relaxation program. It was found that the experimental group had higher average scores of perceived self-efficacy, outcome expectancy, more practice of stress management techniques than during the pre-experimental period, and higher than in the control group, with statistical significance ($p < .001$).

Krajangdan (1997) studied the effects of relaxed Annabansati meditation in reducing stress and blood pressure in 20 essential hypertensive patients. The sample group practiced relaxed Annabansati meditation twice per day every day for more than ten minutes per time for duration of 8 consecutive weeks. It was indicated that the post-experimental stress levels of the sample group were lower than the pre-experimental period with statistical significance ($p = .001$) and the levels of systolic and diastolic blood pressure were lower than during the pre-experimental period with statistical signiticance.

Pirasorn (1998) studied the effects of Qi Gong relaxation exercise on stress and blood pressure in essential hypertensive patients and categorized the sample group into an experimental group and a control group with 20 members in each group and evaluated scores for the pre-experimental period and the post-experimental period. The sample group practiced Qi Gong relaxation exercise techniques for 12 weeks. In

the post-experimental period, it was found that the experimental group had lower scores on stress than during the pre-experimental period with statistical significance ($p < .05$) and lower scores than the comparison group with statistical significance ($p < .05$). It was also found that the pre-experimental and post-experimental systolic and diastolic blood pressure in the experimental group were different with statistical significance ($p < .05$). And when compared between groups, it was found that the post-experimental values of systolic and diastolic blood pressure between groups were different with statistical significance ($p < .05$) and began to differ with statistical significance from the $4^{th}$-$12^{th}$ week of the practice. Furthermore, it was also found that the experimental group had fewer symptoms of headaches and dizziness and better stomach and intestinal function, ability to sleep well with enhanced concentration and invigorated feelings.

Pochanapan, Seriwiwattana, Kaikaew, and Panyut (2003) studied the effects of yoga practice on physical capacity and stress in 37 yogis by having the yogis who volunteered for the program receive yoga training 3 days a week for 2 hours and 30 minutes a day continually for 3 months. According to the research findings, it was found that physical capacity in terms of muscle strength, hand squeezing strenght in both right and left sides, leg muscle strength and flexibility of the sample group before and after the practice differed with statistical significance. As for stress, it was found, the yogis had reduced stress with statistical significance ($p < .01$) following the practice.

McCaffrey et al., (2005) studied the effects of a program on practicing yoga in the reduction of stress and blood pressure in 54 essential hypertensive patients in the Songkla Province, dividing the sample group into an experimental group and a comparison group with 27 members each. The experimental group participated in the yoga practice program at least 3 days a week for 8 weeks consecutively. The comparison group received routine instruction on health behaviors from the staff of the Songkla Hospital and compared differences in terms of stress, blood pressure, heart rates and Body Mass Index within the same group and between the groups. According to the research findings, it was indicated that the experimental group had lower pre-experimental average scores on stress with statistical significance ($p < .01$) and lower scores than in the comparison group with statistical significance ($p < .01$).

Furthermore, the experimental group contined to have lower post-experimental average scores on blood pressure, heart rates and breathing rates than the pre-experimental period with statistical significance ($p < .01$) and lower than the comparison group with statistical significance ($p < .01$). As for post-experimental Body Mass Index, it was found that BMI was reduced with statistical significance ($p < .05$). However, when compared with the comparison group, no changes were discovered ($p < .05$).

Wongsrila (2008) studied the effects of promotion of Qi Gong fitness in essential hypertensive patients at Koksuwan Hospital in a single group comparative study between the pre-experimental period and the post-experimental period. The sample group exercised with Qi Gong for 30-60 minutes per session, 3-5 times/week over a period of 8 weeks. According to the research findings, it was indicated that the levels of stress and hypertension during the post-experimental period were less than the pre-experimental period with statistical significance ($p < .05$).

Lee et al (2003) studied the effects of Qi Gong on changes of blood pressure levels, specific factors of hypertension and gas exchange capacity of the lungs in 58 middle-aged essential hypertensive patients divided into an experimental group and a control group with 29 members each. The experimental group received the Qi Gong practice program twice per week for 30 minutes per session over a period of ten weeks. According to the research findings, it was indicated that the experimental group had reduced systolic and diastolic blood pressure with statistical significance when compared with the control group. As for specific factors regarding hypertension such as urinary catecholamine, epinephrine, nor-epinephrine in the experimental group, these was found to be reduced with statistical significance when compared with the control group. With regard to gas exchange capacity of the lungs in the experimental group following the program, it was found that the lungs were capable of exchanging more gas with statistical significance when compared with the control group.

Meles et al., (2004) studied the effects of breathing practice on blood pressure levels at work and at home in the non-pharmacological treatment of hypertension in 79 patients divided into two groups. The first group received breathing practice according to the Daily Device Guided Breathing Exercise (DGBE) by

practicing at home every evening for 15 minutes a day over a period of 8 weeks. The second group received instruction regarding measurements and recording hypertension at work and at home without receiving the DGBE. According to the research findings, it was found that the first group had lower average blood pressure levels at work and at home than the pre-experimental period with statistical significance when compared with the second group.

Joseph, et al., (2005) studied the effects of practicing to breath slowly to reduce blood pressure and promote sensitivity of the aroreflex in essential hypertensive patients in a sample group of 46 patients divided into two groups. The first group consisted of 20 essential hypertensive patients who did not receive pharmacological treatment or had discontinued medication for two weeks. The second group consisted of 26 healthy members of the sample group. Both sample groups received the program for practicing to breath slowly after breakfast or dinner for ten minutes a day. According to the research findings, it was found that breathing slowly can reduce levels of systolic and diastolic blood pressure with statistical significance and increased sensitivity of the baroreflex of the hypertensive patients with statistical significance.

Schnei et al., (2005) studied and compared the effects of a meditation program with muscle relaxation and health education on the control of blood pressure in hypertensive patients wherein 150 African-Americans were studied and divided into three groups. The first group received the transcendental meditation program. The second group received the progressive muscle relaxation program. The third group received only health education. According to the research findings, it was found that the group that received transcendental meditation program had reduced blood pressure with statistical significance when compared with the two remaining groups.

Smith, Hancock, Blake-Mortimer, and Eckert, (2006) studied and compared the effects of practicing hatha yoga and progressive muscle relaxation in the sample group with stress at minimal to moderate levels and living in communities in the south of Australia. A sample group of 131 patients was studied and divided into two groups. The first group consisted of 68 patients. This group received hatha yoga practice while the second group, which consisted of 63 patients, received progressive muscle relaxation. Each group must practice according to the program for one hour a

week and continually every week for a period of ten weeks to measure changes in stress and anxiety levels at the tenth and sixteenth weeks. According to the research findings, it was found that the group receiving hatha yoga had better results on the reduction of stress and anxiety than the group that received progressive muscle relaxation at ten weeks. At the sixteenth week, however, it was found that the levels of stress and anxiety of both groups were reduced without statistical difference.

Taylor-Piliae, Haskell, Water, and Froelicher (2006) conducted an experimental study regarding the perception of social conditions to mind-body exercise by practicing Tai Chi in Chinese people who were at risk for cardiovascular disease and lived in the United States. In this study, the researchers conducted their researher without a control group and had 39 participants in the experiment receive the Tai-Chi exercise program three times a week for approximately 60 minutes per session over a period of twelve weeks. According to the research findings, it was found that the sample group experienced psychosocial changes, such as reduced perceived stress and mode state with statistical significance. It was also found that the sample group had greater perceived self-efficacy toward obstacles and perceived self-efficacy in practicing Tai-Chi exercise behaviors than during the pre-experimental period and with statistical significance.

## 2.9 Summary

According to the review of literature, it is evident that the body and mind are interrelated and inseparable. Mind-body connection exercises such as hatha yoga has been proved that it can be used as an effective nonpharmacological therapy to manage stress and to help in keeping blood pressure under control. Yoga exercise has both physiological and psychological benefits in harmonizing the body and mind, which in turn helps in dealing with psychosomatic diseases like hypertension. Recent studies have shown that mind-body exercise intervention plays an important role in stress reduction and the reduction of blood pressure in essential hypertension. Although experimental studies of self-efficacy suggest that efficacy can be enhanced personal thoughts and feelings to perform physical activity or exercise, there are few published studies that incorporate the enhancement of self-efficacy into yaga exercise program. Four sources to improve self-efficacy were applied to the yoga training

program. This study was conducted to determine the effect of yoga exercise on stress and blood pressure reduction in paients with essential hypertension.

Copyright by Mahidol University

# CHAPTER III
# METHODOLOGY

This study was based on quasi experimental research examining two groups consisting of an experimental and a control group with a pretest-posttest control group design to evaluate the effects of the Mind-Body Program on stress and blood pressure in essential hypertensive patients with the following research methodology:

## 3.1 Population and Sample

3.1.1 The research population comprised hypertensive patients seeking services at the Hypertension Clinic of Nonghan Hospital, Nonghan District, Udonthani Province and the Bandung Crown Prince Hospital, Bandung District, Udonthani Province.

3.1.2 The sample group comprised 60 essential hypertensive patients seeking services at the Hypertension Clinic of Nonghan Hospital, Nonghan District, Udonthani Province and the Bandung Crown Prince Hospital, Bandung District, Udonthani Province by employing the method of simple random sampling, dividing the samples into experimental and control groups with 30 members each by setting the following inclusion criteria for the sample group:

Inclusion criteria

1. Males and females aged 40-70 years.
2. Being a diagnosed with essential hypertension and received treatment at the Hypertension Clinic no less than 2 months.
3. Blood pressure levels between 140/90-179/109 mmHg.
4. No history of hypertension complications, such as paralysis, arterial disease, kidney failure or diabetes and no history of psychological illnesses.

5. Ability to understand, read, and write in Thai.
6. Can be accessed by telephone
7. Willingness to participate in the research throughout duration of 12 weeks.

Exclusion criteria

1. Orthopedic problems that are limitations to yoga practice, such as osteoarthritis and carpal tunnel syndrome (Pain, numbness of the hand from pressure on the median nerve).
2. Patients with orthostatic hypotension.

3.1.3 Sampling selection

Step 1: Selected two purposive hospitals. One was Nonghan Hospital , Nonghan District, as the experimental group and the other was Bandung Crown Prince Hospital, Bandung District, as the control group.

Step 2: Conducted simple random sampling by drawing names from the list of patients in the Hypertension Clinic of Nonghan Hospital and the Bandung Crown Prince Hospital until the sample groups contained 30 members in each group.

3.1.4 Sample Size

The sample size was calculated by designating a level of significance (∞) = .05, power = 0.80 and effect size = 0.80 (McCaffrey et al., 2005). It required a sample size of 20 participants in each group (Cohen, 1988). In this study, the researcher increased the size of the sample by considering potential attrition rate of 48% (Li Shen et al., 2007) in order to prevent the drop out participants during the experiment. Therefore, 30 participants were required in each sample group.

## 3.2 Setting.

The control of non-communicated diseases by the Udonthani Provincial Public Health Office has the project plan for hypertension control and prevention by stipulating that all community hospitals in the province organize Hypertension Clinics to provide services specifically for hypertensive patients. The services comprised of health education regarding to knowledge on hypertensive disease, treatment,

adherence to medication, and self-care. Besides, the criteria for treatments are based on hypertension clinical practice guidelines of the Thai Hypertension Society (www.thaihypertension.org). The hospital policies of both hospitals have similar characteristics in terms of population, culture, living, lifestyles and location of the hospitals which were conveniently accessed.

## 3.3 Research Instrumentation

The instrumentation for this research comprised experimental and data collection instruments with the following details:

3.3.1 Intervention Instruments

3.3.1.1 The Mind-Body training program was designed by the researcher based on self-efficacy concept of Bandura (1997) and literature review of relevant research. This program was thought to foster self-efficacy of hypertensive patients, who were unable to control blood pressure at a normal level through the following sources:

- Successful experiences on their own by having the experiment group practice yoga mind-body control with the researcher once a week for 11 weeks. The practice gradually progressed so the experiment group would have sufficient skills to be successful in practice and have proper mind-body control with maximal efficiency so the experiment group would be able to continue to practice on their own at home.

- Viewing models or the experiences of others by having the experiment group watch demonstrations of yoga mind-body control from the researcher in compliance with the yoga mind-body control handbook and slow practice over the first week of participation in the program wherein the researcher was the model in all joint sessions until the completion of the program.

- Motivational speaking: The researcher and research assistant developed perceived self-efficacy by using motivational speaking with their own successful experiences by praising and encouraging the sample group in the practice and providing recommendations and support when confronted with problems or obstacles

during the experiment group practice for increasing perceived self-efficacy and successful practice.

- Physical and emotional conditions: The researcher prepared facilities for practicing yoga mind-body control by practicing in the meeting room of the hospital outside working hours and quiet room, making physical preparations for the sample group by measuring blood pressure to evaluate hypotension due to changes in posture before all training.

The duration of this Mind-Body training program was 12 weeks. One week was for preparation and the other 11 weeks comprised the experimental period. The main activities of the program comprised instruction according to the educational handbook "Let's Get to Know Hypertension" and then viewed the video "Yoga Science for Human Development" and practiced according to the yoga mind-body control handbook devised by the researcher with the following media and instrumentation:

3.3.1.2 The educational handbook "Let's Get to Know Hypertension" of the Thai Hypertension Society covers the definition of hypertension, causes, symptoms, complications, and treatments so that the experiment group could utilize the knowledge as information accompanying self-care decisions by practicing yoga mind-body control.

3.3.1.3 The video "Yoga Science for Human Development" was a media presentation permitted for dissemination by the yoga dissemination program for health of Folk Doctor Foundation with contents regarding current living conditions of people in facing problems, changed social and environmental conditions which have affected physical and mental health.

3.3.1.4 The yoga mind-body control handbook is a yoga practice handbook for hypertensive patients created by researcher based upon the review of relevant literature consisting of 10 yoga postures i.e. the samadhi pose, the turned neck pose (pornhommuttra pose), the shoulder joint fitness pose, twisting pose (watra-asana), the head to knee pose, the mountain pose, the wheel pose (jakra-asana),

the bent knee pose, the snake pose (phuchong asana), the corpse pose and breathing exercises with the abdomen (lower part of the body). Every time the practice was over, the experiment group had to record their practice in the practice schedule records at the end of the handbook.

3.3.1.5The practice schedule records is a form for recording dates, times, and number of practiced postures in order to prevent absentmindedness and remind the experiment group to practice yoga mind-body control according to the program continually for no less than 3 days per week wherein the members of the experiment group recorded themselves. During the training, any subjects in the experiment group who had abnormal symptoms or other obstacles to training were to record them in the space for remarks.

3.3.1.6 The Blood Pressure Measurement Handbook (for staff) was a blood pressure measurement handbook the researcher modified from the measurement of blood pressure of the Thai Hypertension Society to implement as a guideline for measuring hypertension, including evaluating preparedness of the sample group in the experimental group before the training and the blood pressure of the sample groups in the experimental group and the control group before and after participating in the Mind-Body training program by recording in the vital signs record.

3.3.1.7 The vital signs record (for staff) was a form the researcher used to record dates, times, blood pressure levels, pulse rates and respiratory rates of the experiment group before and after participating in the Mind-Body training program.

3.3.1.8 The researcher and research assistants had to gain basic knowledge of yoga practice and received training from experts. They had capability to practice Asana Yoga and Pranayama and recommend correct practice methods for the participants to get maximal benefits in practice and to prevent harm or injuries due to incorrect yoga practice. This research was conducted by the researcher and two research assistants. The researcher and the first research assistant had passed practical

yoga training in the subject of Pranayama for Quality of Life and Yoga for Therapy by Dr. Nitin Unkule, who was a yoga therapist from the Kaivalaya Yoga Institude, Pune, India. Following the training, the researcher and research assistant practiced continually and gained expertise on the subject. The second research assistants were professional nurses who had passed yoga training from a yoga expert and practiced continually and gained expertise on the subject over a period of 3 years.

3.3.1.9 The Blood Pressure Measurement instruments comprised two digital machines for measuring blood pressure digitally that were used with patients seeking services at the Hypertension Clinic, Nonghan Hospital and with regular instrument quality inspections from the manufacturing company according to the hospital's medical instruments and equipment maintenance plans before measuring the blood pressure of the sample group every time. The researcher determined the validity of the instruments by comparison with mercury sphygmomanometers that met hospital standards before measuring the sample group every time.

3.3.2 Measurements

Research measurements were consisted of the following:

3.3.2.1 Personal data questionnaire. It consisted of 11 questions covering gender, age, marital status, level of education, occupation, income, history of alcohol consumption, smoking, symptoms of illnesses or diseases that are obstacles to exercise, weight, height, Body Mass Index, duration of illness, treatment received and blood pressure level.

3.3.2.2 Yoga mind-body control of perceived self-efficacy questionnaire**.** The researcher employed the perceived self-efficacy measurement that was modified from the perceived self-efficacy questionnaires of Chareonkitkan (2000) with an instrument reliability value of 0.82. The researcher modified this instrument with questions appropriate for the subject of the present study by asking about the level of confidence of the sample group in practicing mind-body control when facing different situations covering the topics of places, times, practice continuity, and confidence in solving problems when facing physical and mental conditions that were obstacles to yoga exercise. All questions were close-ended and positive questions. The answers were assessed on a rating scale divided into 5 levels

| | | |
|---|---|---|
| 5 | Means | Most Confident |
| 4 | Means | Very Confident |
| 3 | Means | Moderately Confident |
| 2 | Means | Not Very Confident |
| 1 | Means | Not Confident |

Explanation of Scoring

Most Confident means a statement that the patient was most confident that he/she would be able to practice yoga mind-body control.

Very Confident means a statement that the patient was very confident that he/she would be able to practice yoga mind-body control.

Moderately Confident means a statement that the patient was moderately confident that he/she would be able to practice yoga mind-body control.

Not Very Confident means a statement that the patient was not very confident that he/she would be able to practice yoga mind-body control.

Not Confident means a statement that the patient was not confident at all that he/she would be able to practice yoga mind-body control.

Interpretation of Scores

For the present study, the researcher interpreted the mean score results by Best's criteria (Best, 1970). The total possible scores for each question were five points and there were 11 questions, making the total scores equal to 44 points wherein the class interval was calculated as follows:

$$\text{Class Interval} = \frac{\text{Maximum-Minimum Scores}}{\text{Number of Class Intervals}}$$

The following score levels will be obtained:

| Mean Score Range | Interpretation |
|---|---|
| 11.00 – 25.66 | Low perceived self-efficacy |
| 25.67 – 40.33 | Moderate perceived self-efficacy |
| 40.34 – 55.00 | High perceived self-efficacy |

3.3.2.3 Stress questionnaire. The researcher implemented the Suanprung Stress Test, which had been used in a similar study by Pochanapan and colleagues (2003) on the effects of yoga practice on physical capabilities and stress in yoga instructors and a study by Poplap (2001), which studied and tested models of

relationships between work-related stress and hypertension. This stress test consisted of 20 close-ended questions regarding physical, psychological, emotional, and behavioral changes that occurred within the past two months, which had already been checked for content validity, which equaled 0.91. The researcher saw that the aforementioned physical, psychological, emotional, and behavioral changes were related to stress; therefore, it was appropriate to implement and evaluate stress in the sample group of essential hypertensive patients in this study. The test had a rating scale with answers divided into 4 levels and scoring as follows:

1 Means No Presenting Symptoms of Stress in 2 Months

2 Means Infrequent Presenting Symptoms of Stress (1-2 Times/Week).

3 Means Occasional Presenting Symptoms of Stress (3Times/Week).

4 Means Daily Presenting Symptoms of Stress.

Interpretation of Scores

In this research, the researchers translated mean score results according to the scoring criteria (Best, 1970). The full scores for each question were four points with a total of 20 questions, thus making the total scores equal to 80 points. The class interval was calculated as follows:

$$\text{Class Interval} = \frac{\text{Maximum-Minimum Scores}}{\text{Number of Class Intervals}}$$

The following score levels will be obtained:

| Mean Score Range | Interpretation |
|---|---|
| 20.00 – 40.00 | Low Stress |
| 41.00 – 60.00 | Moderate Stress |
| 61.00 – 80 00 | High Stress |

3.3.3 Instrument Quality Examination

- Content validity**:** The research instruments requiring examination for content validity consisted of the yoga mind-body control handbook, the yoga mind-body control of perceived self-efficacy questionnaire, practice schedules records and vital signs records (for staff). The researcher submitted the instruments to a panel of 5 qualified experts who examined for content validity and suitable language usage. This panel included the following experts:

- Physician from Faculty of Medicine Siriraj Hospital.
- Yoga expert from Thai Yoga Institute of the Folk Doctor Foundation.
- Nurse instructor from Faculty of Nursing, Mahidol University.
- Nurse instructor from Department of nursing, Faculty of Medicine Ramatipbodee Hospital.
- Professional Nurse from Songkla Hospital.

The researcher submitted the yoga mind-body control handbook, practice schedule records, vital sign records **(**for staff), and the yoga mind-body control of perceived self-efficacy questionnaire to five qualified experts to evaluate for content validity, accuracy and suitability of language usage, models, and suitability of activities. Then, the instruments that had passed this examination were reviewed and revised according to recommendations of the qualified experts. The yoga mind-body control of perceived self-efficacy questionnaire was calculated according to the Content Validity Index which was 0.80.

3.3.4. Instrument Reliability

- The yoga mind-body control of perceived self-efficacy questionnaire was test for reliability in 30 hypertensive patients with similar characteristics to the sample group at the Hypertension Clinic, Nonghan Hospital. Cronbach's alpha coefficient as the internal consistency was 0.86.

- The Suanprung stress questionnaire was a standardized tool developed by the Department of Mental Health, Ministry of Public Health. Cronbach's alpha coefficient reliability was 0.92.

- The digital instrument for measuring blood pressure had already passed reliability tests from the company. The researcher compared the two digital instruments for measuring blood pressure used in the study with the mercury sphygmomanometers which provided more accurate measurements and had passed instrument reliability tests according to the medical instruments and equipment maintenance plans of the hospital by following the procedures in the blood pressure measurement handbook (for staff) and acquired no different values.

## 3.4 Research Procedures and Data Collection

**Pre-Experiment**

- After approval from Mahidol University Institutional Review Board (MU-IRB) for Human Subjects, the researcher delivered a introduction letter from Faculty of Graduate Studies, Mahidol University, to the Administrator of Nonghan Hospital in order to request cooperation in studying the effects of the Mind-Body Program to Reduce Stress and Blood Pressure in Essential Hypertensive Patients. After approval from the Hospital Administrator, the researcher met with the head nurse of the Nursing Department and the head nurse of the Hypertension Clinic to explain the objectives and request cooperation with the research.

- The researcher used a simple random sampling to recruit the subjects into the experimental and control groups. When the sample group arrived according to schedule at the Hypertension Clinic on Wednesdays and Fridays, the researcher introduced herself and explained the objectives of the research and the process of data collection. Then, the researcher explained the rights to either accept or refuse participation in this research, which would have no impact on treatment received. The researcher ensured that all data of the sample group will be kept secret and used only in this research. When the sample group answered that they were willing participate in the research, they signed informed consent forms to participate in the research.

- Two weeks before the experiment, the researcher gathered the 30 members of the experimental group and appointed dates/times for participating in the program for the first time.

**During the Experiment**

Control Group

Weeks 1-11

- The 30 participants were randomly selected to the control group. The control group received routine nursing care at the Hypertension Clinic of the Bandung Crown Prince Hospital, Bandung District, Udonthani Province. The questionnaires on demographic data, the yoga mind-body control of perceived self-efficacy questionnaire, and the stress questionnaire were collected at 1 and 12 week.

Experimental Group

Week 1

- The experimental group was introduced to the research team to build a relationship leading to participation in the program by advising them of activities that would be performed during this time from measuring vital signs and demonstration of yoga practicing postures.

- The experimental group was measured vital signs such as pulse, respiratory rates and blood pressure and record in the vital signs records form (for staff).

- The researcher had the experiment group answer questionnaires or interviewed the sample group according to the interview form for demographic data, the form for evaluating perceived self-efficacy in practicing mind-body control and the Stress questionnaire for approximately 15 minutes.

- Instructed according to the handbook "Let's Get to Know Hypertension" and provide opportunities for the experiment group to ask questions for approximately 15 minutes.

- When the presentation was complete, the researcher provided opportunities for experiment group to ask questions about yoga, which required approximately 25 minutes.

- Demonstrated yoga practice according to the yoga mind-body control handbook and have experiment group practice slowly for approximately 30 minutes.

- Following the demonstration, the researcher had the experiment group ask questions and scheduled the experiment group to practice yoga together during the next week for approximately 15 minutes.

Weeks 2-11

- Build relationships and make physical preparations before practicing yoga by measuring blood pressure which took approximately 30 minutes.

- Before commencing practice according to the yoga mind-body control handbook, the researcher and the experiment group made a joint agreement regarding the practice by emphasizing that the experiment group practice according to their physical capacity and not push themselves too hard, practicing movements slowly in relation with inhaling-exhaling and discontinuing the practice if any abnormal symptoms appeared during the practice, when they would notify the researcher

immediately to prevent injuries during the practice. This required approximately 5 minutes.

- After the agreements were complete, the researcher and the experiment group practiced according to the yoga mind-body control handbook with the researcher as a model and the other two research assistants helping and providing consultation during the practice to prevent injuries, encourage the sample group so they would have increased perceived self-efficacy and drive the sample group to practice successfully on their own, all of which required approximately 45-60 minutes.

- At the end of the practice, the researcher asked about feelings, problems and obstacles while providing consultation to solve problems appropriately and distribute the yoga mind-body control handbooks to the experiment group to record the dates, times and number of postures practiced in the practice record and having the experiment group return to practice on their own at home, requiring approximately 10 minutes.

- In practicing on their own at home, the researcher recommended the experiment group to practice according to the distributed handbooks with stipulations to practice continually for a duration of no less than 30 minutes per time and no less than three days per week.

- Every Monday from 2:00 p.m. to 3:00 p.m., the researcher called the experiment group to follow-up on the continuity of the practice and ask about problems and obstacles occurring during the course of home practice, provide recommendations for solving problems according as suitable and offering words of encouragement to the experiment group, so they would have confidence in their yoga practice capabilities and record in the practice schedule records every time. Before ending each conversation, the researcher would report the dates, times and schedules for joint practices during subsequent weeks in a process that required approximately 10 minutes per person.

- In cases the experimental group was ill such as having fever or abnormal symptoms preventing them from practicing yoga, the yoga practice was cancelled and recorded in the practice schedule records for “Remarks” on the cause of illness. The yoga practice could be continued after the patients had not been ill for 1-2 days by

practicing according to the specifications i.e. practicing yoga continually for period of 30 minutes per session and for no less than 3 days a week.

**Post Experiment**

Week 12

Control Group

- Evaluate results following participation in the project according to the yoga mind-body control of perceived self efficacy questionnaire for measuring perceived self-efficacy in mind-body practice and the Stress questionnaire.

- When the post-experimental data collection was complete, the researcher distribute the yoga mind-body control handbooks to the control group and practice scheduled records to the control group for practicing yoga mind-body control at the hospital together, so the samples in the control group would receive correct and effective practice from the researcher.

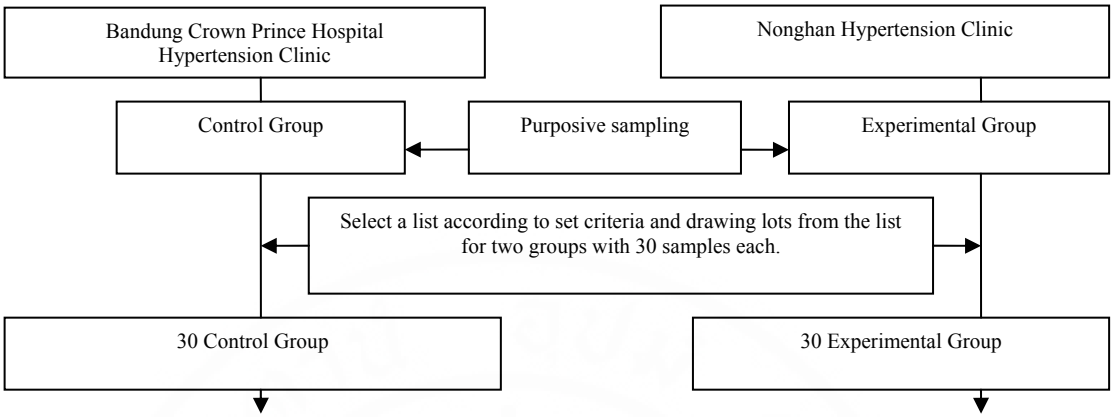
- The control groups were thanked for participating in the study.

Experimental Group

- The researcher followed the procedures during the experimental period in preparing the experiment group by measuring blood pressure and evaluating the experiment group before practicing yoga together according to the yoga mind-body control handbook which required approximately 1 hour and 30 minutes.

- After completed the training, the researcher evaluated the results of program participation by having the sample group answer questionnaires or make interviews according to the yoga mind-body control of perceived self-efficacy questionnaire and the Stress questionnaire, which required approximately 30 minutes.

Copyright by Mahidol University




| Week No. | Routine Nursing Care | Week No. | Mind-Body Program |
|---|---|---|---|
| | | 2 weeks before experiment | - Gather 30 members of the sample group in the experimental group and appoint a time and date for the first program participation. |
| 1-4 | - Introduce, build relationships, measure weight, height and evaluate control group by vital signs measurements.<br>- Have the control group answer questionnaires or interviews of the Peronal data questionnaire, the mind-body control of perceived self-efficacy questionnaire , and the Stress questionnaire.<br>- Schedule the control group for another 12 weeks. | 1 | - Build relationships and evaluate the sample group by measuring vital signs.<br>- Interviews in the interview form for personal data questionnaire, the yoga mind-body control of perceived self-efficacy questionnaire,, and the Stress questionnaire.<br>- Provide instruction regarding hypertension and have the experiment group view the video presentation,<br>"Yoga Science for Human Development".<br>- Provide instruction according to the yoga mind-body control handbook with accompanying demonstrations of yoga practice and let the experiment group follow slowly.<br>- Schedule joint practices for the next week. |
| | | 2-11 | - Evaluate physical readiness before practicing yoga.<br>- Practice yoga together with the researcher as a model.<br>- Call the experiment group every two weeks to follow up on the practice and make schedules for practicing yoga together. |
| 12 | - Evaluate the control group after participating in the program by measuring vital signs, answering questionnaires or interviews according to the yoga mind-body control of perceived self-efficacy questionnaire and the Stress questionnaire.<br>- Thank the control group | | - Evaluate physical preparedness prior to practicing yoga by measuring vital signs.<br>- Practice yoga with the researcher by using the researcher as a model.<br>- Evaluate the effects of participation in the program according to the yoga mind-body control of perceived self-efficacy questionnaire and the Stress questionnaire.<br>- Thank the sample group. |

**Figure. 5** Experiment and Data Collection Procedures

## 3.5 Human Subject Protections

In this study, the researcher protected the rights of the sample group by requesting approval to proceed with the research from the Mahidol University Instituitional Review Board (MU-IRB). After approval, the researcher proceeded with the research by introducing herself, explaining the research objectives, the benefits to be received and the process of data collection, advising the sample of patients' rights, requesting cooperation from the sample group in writing for their willing participation in the study on the sample group without any coercing and explaining that the sample group had the right to withdraw from the research at any time, with no negative impact on treatment received. All the data on the sample group was kept confidential. All data acquired from this data collection will be destroyed once the research is complete. The researcher has presented the data only in general terms with no impact or damage to the sample group or related individuals.

## 3.6 Data Analysis

The researcher analyzed the data obtained by using the SPSS program with the following analytical processes:

1. Descriptive statistics, frequency, percentage, mean, and standard deviation, were calculated for demographic data and all study variables.

2. Pair t-test was used to analyze the differences of mean stress scores and blood pressure between baseline and after 12 weeks of intervention.

3. Independent t-test was used to analyze the differences of mean stress scores and blood pressure scores between the experimental and the control group.

Copyright by Mahidol University

# CHAPTER IV
# RESULTS

The quasi experimental research aimed at exploring the effects of the Mind-Body program on stress and blood pressure in essential hypertensive patients. The sample group comprised of essential hypertensive patients seeking services at the hypertension clinic of Nonghan Hospital, Nonghan District, Udonthani Province and the Bandung Crown Prince Hospital, Bandung District, Udonthani Province and was devided into experimental and control groups with 30 members in each group. During the experiment, 9 samples withdrew from the study because their doctors had increased medication dosages to control blood pressure (2 members), discovered complications, diabetes and heart palpitations (2 members) and loss of practice continuity (5 members). This chapter presents the results of the study into three parts. The first part illustrates demographic characteristics and health conditions of the sample. The second is the description of study variables. The last part is the findings of hypothesis testing.

## 4.1 Demographic characteristics and health conditions of the sample.

### 4.1.1 Demographic data

Most of the subjects in the experimental group were females (63.3%). The control group had equal numbers of females and males. The experimental and control groups were mostly in the age group of 60 years old and over. The mean age was 55.7 years in the experimental group and 57 years in the control group. Most of the subjects were married and the highest level of education was the primary level. Most of the subjects in both group held occupations as housewives and agriculture. When demographic variables were analyzed and compared by using $\chi 2$ test statistics, they

were no differences between the experimental and control groups. Table 3 shows description of demographic data of the study samples.

**Table 3** Numbers and percentages of demographic data of participants

| Characteristics | Experimental Group (N = 30) | | Control Group (N = 30) | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Gender | | | | |
| Male | 11 | 36.7 | 15 | 50.0 |
| Female | 19 | 63.3 | 15 | 50.0 |
| Age | | | | |
| 40-44 Years | 1 | 3.3 | 3 | 10.0 |
| 45-49 Years | 5 | 16.7 | 4 | 13.3 |
| 50-54 Years | 9 | 30.0 | 4 | 13.3 |
| 55-59 Years | 5 | 16.7 | 5 | 16.7 |
| More Than or Equal to 60 Years | 10 | 33.3 | 14 | 46.7 |
| $\bar{x}$ ± SD | 55.7 ± 7.3 | | 57.0 ± 7.9 | |
| Range | 42 - 69 | | 41 - 70 | |
| Marital Status | | | | |
| Married | 23 | 76.7 | 27 | 90.0 |
| Widowed/Divorced/Separated | 7 | 23.3 | 3 | 10.0 |
| Level of Education | | | | |
| Uneducated | 1 | 3.3 | 4 | 13.3 |
| Primary Education | 22 | 73.3 | 24 | 80.0 |
| Secondary Education (high school) | 6 | 20.0 | - | - |
| Certificate/ Vocational Certificate./ Associate Degree | - | - | 1 | 3.3 |
| Bachelor's Degree | 1 | 3.3 | 1 | 3.3 |
| Occupation | | | | |
| Housewife/Unemployed | 11 | 36.7 | 12 | 40.0 |

Copyright by Mahidol University

**Table 3** Numbers and percentages of demographic data of participants (cont.)

| Characteristics | Experimental Group (N = 30) | | Control Group (N = 30) | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Agriculture | 13 | 43.3 | 11 | 36.7 |
| Company Employee/Ordinary Worker | 3 | 10.0 | 3 | 10.0 |
| Privately-Owned Business | 1 | 3.3 | 3 | 10.0 |
| Civil service/ Government enterprise | 1 | 3.3 | - | - |
| Civil Service Pension | 1 | 3.3 | 1 | 1 |
| Income Per Month (Baht) | | | | |
| Less Than or Equal 2,500 | 14 | 46.7 | 21 | 70.0 |
| 2,501-5,000 | 13 | 43.3 | 6 | 20.0 |
| 5,000-10,000 | 2 | 6.7 | 2 | 6.7 |
| More Than 10,000 | 1 | 3.3 | 1 | 3.3 |
| $\bar{x}$ ± SD | 3,604.3 ± 5223.6 | | 3,206.7± 4650.0 | |
| Range | 500 - 29,860 | | 500 - 25,000 | |

4.1.2 Health condition**.**

Most of subjects in both groups reported that they had never drunk alcohol and smoked cigarette with the higher percentage in the control group (70% and 76.70%, respectively). The body weights of subjects were mostly in the overweight range. The Body Mass Index was 24.28 (SD = 4.08) in the experimental group and 25.67 (SD = 3.94) in the control group. The experimental group had durations of illness with hypertension 2.13 (SD = 1.25) less than the control group 3.55 (SD = 3.59). Most of the subjects reported the symptoms/diseases that were obstacles to exercise as being muscle and joint pain (66.7%) in the experimental group and 53.3% in the control group. Both groups received treatment with combined medication such as Diuretic and Calcium Channel Blocker (CCB), 63.3% in the experimental group

and 56.7% in the control group. When the data on health conditions was analyzed by $\chi 2$ test, no differences were found between the experimental and control groups, as shown in Table 4.

**Table 4** Numbers and percentages of health conditions

| Variables | Experimental Group (N = 30) | | Control Group (N = 30) | |
|---|---|---|---|---|
| | **Numbers** | **Percentage** | **Numbers** | **Percentage** |
| Alcohol Consumption | | | | |
| Never | 14 | 46.7 | 21 | 70.0 |
| Occasionally | 7 | 23.3 | 4 | 13.3 |
| Regularly | 1 | 3.3 | - | - |
| Stop drinking | 8 | 26.7 | 5 | 16.7 |
| Smoking | | | | |
| Never | 19 | 63.3 | 23 | 76.7 |
| Occasionally | 1 | 3.3 | 4 | 13.3 |
| Regularly | - | - | - | - |
| Stop smoking | 10 | 33.3 | 3 | 10.0 |
| Body Mass Index (BMI) | | | | |
| < 18.5 | 2 | 6.7 | 2 | 6.7 |
| 18.5 – 22.9 | 9 | 30.0 | 5 | 16.7 |
| 23.0 – 24.9 | 6 | 20.0 | 7 | 23.3 |
| 25.0 – 29.9 | 10 | 33.3 | 11 | 36.7 |
| ≥ 30.0 | 3 | 10.0 | 5 | 16.7 |
| $\bar{x}$ ± SD | 24.28 ± 4.08 | | 25.67± 3.94 | |
| Range | 16.40 -32.10 | | 17.90 -34.13 | |
| Duration of illness | | | | |
| 1-2 Years | 21 | 70.0 | 15 | 50.0 |
| 3-4 Years | 7 | 23.3 | 9 | 30.0 |
| > 5 Years | 2 | 6.7 | 6 | 20.0 |
| $\bar{x}$ ± SD | 2.13 ± 1.25 | | 3.55 ± 3.59 | |
| Range | 1 - 21 | | 1 - 15 | |

Copyright by Mahidol University

**Table 4** Numbers and percentages of health conditions (Cont.)

| Variables | Experimental Group (N = 30) | | Control Group (N = 30) | |
|---|---|---|---|---|
| | **Numbers** | **Percentage** | **Numbers** | **Percentage** |
| Symptom/Disease Obstacles to Exercise | | | | |
| Muscle and Joint Pain | 20 | 66.7 | 16 | 53.3 |
| None | 10 | 33.3 | 14 | 46.7 |
| Current Medications | | | | |
| Single Group | | | | |
| Diuretics | 3 | 10.0 | 3 | 10.0 |
| Beta blockers | 1 | 3.3 | 1 | 3.3 |
| ACE Inhibitor | 1 | 3.3 | 2 | 6.7 |
| Combine Group | | | | |
| Diuretic / CCB | 19 | 63.3 | 17 | 56.7 |
| Diuretic / ACE Inhibitor | 4 | 13.3 | 3 | 10.0 |
| CCB / ACE Inhibitor | 1 | 3.3 | 2 | 6.7 |
| Beta Blocker / CCB | 1 | 3.3 | 2 | 6.7 |

## 4.2 The description of study variables

According to the illness histories of the sample group, systolic and diastolic blood pressure was collected in previous two months before the intervention. It was found that the experimental group had the mean minimum systolic/ diastolic blood pressure of 132.70/ 77.63 mmHg and the mean maximum systolic/ diastolic blood pressure of 156.20/ 86.00 mmHg. Whereas, the control group had the mean minimum systolic/diastolic blood pressures of 126.33/75.03 mmHg and the mean maximum systolic/ diastolic blood pressures of 158.20/ 96.47 mmHg. It showed that the control group had slightly higher mean maximum of systolic and diastolic blood pressure than the experimental group.

Descriptive statistics of perceived self-efficacy were analyzed at pretest and posttest (Table 5). At pretest, it showed that the experimental group had slightly higher mean scores of perceived self-efficacy (35.71 ± 7.79) than the control group (33.13 ± 10.28), indicating a moderate level of perceived self-efficacy. After 12 weeks of intervention, the experimental group highly increased the mean score of perceived self-efficacy (42.71 ± 4.59) more than the mean score of pretest with statistical significance (t -4.523, df 20, $p < .001$). In addition, there were statistically significant differences in mean scores of perceived self-efficacy at posttest between the experimental and control groups (t -3.611, df 49, $p < .01$).

**Table 5** Descriptive statistics of perceived self-efficacy at pretest and posttest

| variables | Experimental group (N = 30) | | | | | Control group (N = 30) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Min | Max | $\bar{x}$ | SD | N | Min | Max | $\bar{x}$ | SD |
| **Pretest** | | | | | | | | | | |
| Perceived self-efficacy | 30 | 24.00 | 50.00 | 35.03 | 7.00 | 30 | 13.00 | 55.00 | 33.13 | 10.28 |
| **Posttest** | | | | | | | | | | |
| Perceived self-efficacy | 21 | 33.00 | 52.00 | 42.71 | 4.59 | 30 | 22.00 | 55.00 | 35.73 | 7.96 |

## 4.3 Testing hypotheses

4.3.1 Comparison of differences in mean stress scores between the experimental and control groups at pretest and posttest

The mean stress scores at pretest of both the experimental and control groups were in the moderate level (47.43± 7.22 and 50.27± 6.82, respectively) which it was slightly higher than the experimental group. No participants in both groups had a high level of stress score. After the 12 weeks of yoga mind-body training program,

the mean stress scores of the experimental group was decreased to 35.67 (SD = 6.70), indicating a low level of stress. When the mean scores of stress were analyzed by using paired t-test statistics, it was found that the experimental group had statistically significant difference mean stress scores of pretest and posttest ($p$ <.001). The mean stress score at posttest (35.67±6.70) was lower than the mean stress score at pretest (47.43± 7.22). There was no significant difference of mean stress scores of the control group between pretest and posttest. The difference in mean stress scores at posttest was statistically significance between the experimental and control group ($p$ <.001) (Table 6 and Table 7).

**Table 6** Comparison of differences in mean stress scores between pretest and posttest of the experimental and control groups

| Groups | n | Min-Max | $\bar{x}$ | SD | t | df | p-value |
|---|---|---|---|---|---|---|---|
| Experimental | | | | | | | |
| Pretest | 21 | 33.00-57.00 | 47.43 | 7.22 | | | |
| | | | | | 6.305 | 20 | .000 |
| Posttest | 21 | 24.00-48.00 | 35.67 | 6.70 | | | |
| Control | | | | | | | |
| Pretest | 30 | 40.00-61.00 | 50.27 | 6.82 | | | |
| | | | | | -1.300 | 29 | .204 |
| Posttest | 30 | 45.00-60.00 | 52.00 | 3.99 | | | |

P < .001

Copyright by Mahidol University

**Table 7** Comparison of differences in mean scores for stress between the experimental and control groups at pretest and posttest

| Group | n | Min-Max | $\bar{X}$ | SD | t | df | p-value |
|---|---|---|---|---|---|---|---|
| **Pretest** | | | | | | | |
| Experimental | 30 | 33.00-57.00 | 49.10 | 6.83 | | | |
| | | | | | .662 | 58 | .511 |
| Control | 30 | 40.00-61.00 | 50.27 | 6.82 | | | |
| **Posttest** | | | | | | | |
| Experimental | 21 | 24.00-48.00 | 35.67 | 6.70 | | | |
| | | | | | 10.902 | 49 | .000 |
| Control | 30 | 45.00-60.00 | 52.00 | 3.99 | | | |

P < .001

4.3.2 Comparison of differences in mean scores for blood pressure between the experimental and control groups at pretest and posttest

Both experimental and control group had similar mean levels of systolic and diastolic blood pressure at pretest (153.07/93.10 and 152.90/93.53, respectively). As the posttest, it was found that the experimental group had lower mean scores of systolic and diastolic blood pressure than the control group (142.10/79.33 and 153.03/89.60, respectively). The levels of systolic and diastolic blood pressure at posttest in the experimental group were statistically significant difference as compared to the levels at pretest (SBP, p <.01; DBP, p <.001). They were significantly decreased from the pretest (Table 8). When the group differences were compared, there were significant differences in the levels of systolic blood pressure and diastolic blood pressure at posttest between the experimental and control groups ((SBP, p <.05; DBP, p <.05) (Table 9).

Copyright by Mahidol University

**Table 8** Comparison of differences in mean scores of blood pressure in the experimental and control groups at pretest and posttest

| Group | n | Min-Max | $\bar{x}$ | SD | t | df | p-value |
|---|---|---|---|---|---|---|---|
| **Experimental** | | | | | | | |
| Systolic | | | | | | | |
| Pretest | 21 | 140.00-170.00 | 154.14 | 8.91 | | | |
| | | | | | 3.400 | 20 | .003* |
| Posttest | 21 | 110.00-179.00 | 142.10 | 17.63 | | | |
| Diastolic | | | | | | | |
| Pretest | 21 | 80.00-101.00 | 93.67 | 5.08 | | | |
| | | | | | 5.149 | 20 | .000** |
| Posttest | 21 | 58.00-100.00 | 79.33 | 12.62 | | | |
| **Control** | | | | | | | |
| Systolic | | | | | | | |
| Pretest | 30 | 140.00-177.00 | 152.90 | 9.60 | | | |
| | | | | | - .052 | 29 | .959 |
| Posttest | 30 | 122.00-188.00 | 153.03 | 15.91 | | | |
| Diastolic | | | | | | | |
| Pretest | 30 | 77.00-112.00 | 93.53 | 6.68 | | | |
| | | | | | 1.454 | 29 | .157 |
| Posttest | 30 | 70.00-122.00 | 89.60 | 12.92 | | | |

*p < .01,

**p <.001

Copyright by Mahidol University

**Table 9** Comparison of differences in mean scores of blood pressure between the experimental and control groups at pretest and posttest

| Group | n | Min-Max | $\bar{x}$ | SD | t | df | p-value |
|---|---|---|---|---|---|---|---|
| **Pretest** | | | | | | | |
| Systolic | | | | | | | |
| Experimental | 30 | 140.00-170.00 | 153.07 | 8.32 | | | |
| | | | | | - .072 | 58 | .943 |
| Control | 30 | 140.00-177.00 | 152.90 | 9.60 | | | |
| Diastolic | | | | | | | |
| Experimental | 30 | 80.00-101.00 | 93.10 | 5.40 | | | |
| | | | | | .276 | 58 | .783 |
| Control | 30 | 77.00-112.00 | 93.53 | 6.68 | | | |
| **Posttest** | | | | | | | |
| Systolic | | | | | | | |
| Experimental | 21 | 110.00-179.00 | 142.10 | 17.63 | | | |
| | | | | | 2.311 | 49 | .025 |
| Control | 30 | 122.00-188.00 | 153.03 | 15.91 | | | |
| Diastolic | | | | | | | |
| Experimental | 21 | 58.00-100.00 | 79.33 | 12.62 | | | |
| | | | | | 2.820 | 49 | .007 |
| Control | 30 | 70.00-122.00 | 89.60 | 12.92 | | | |

P< .05

Copyright by Mahidol University

# CHAPTER V
# DISCUSSION

This chapter presents the discussion of research findings based on characteristics of participants and research hypotheses in testing the effects of the Mind-Body training program on stress and blood pressure in essential hypertension.

## 5.1 Characteristics of participants

In the present study, majority of subjects in both groups had similarity in demographics except gender. Most participants in the experimental group were females (63.3%). Female subjects were more voluntary to participate in yoga exercise than males. Two previous studies that examined the effects of yoga intervention and Qi Gong fitness on Blood pressure reduction also reported more numbers of female subjects than males (McCaffrey & Hatthakit, 2005; Wongsrila, 2008). This may be due to the fact that females pay more attention to health practice than males (Kantisuwan, 1986). Females generally do better health care practice than males in reducing risk behaviors (Reungtip, 2000). In addition, men may be more interested in other forms of exercise, such as running or weight lifting. The majority of subjects in both experimental group and control group had body mass index with in the overweight range, which the means of BMI were 24.28 (SD = 4.08) in the experimental group and 25.67 (SD = 3.94) in the control group. Wongsrila (2008) examined the effect of Qi Gong fitness in essential hypertensive patients and found that the subjects were mostly overweight with the mean BMI of 23.50. In adults with hypertension, increasing body weight may rise blood pressure, and in turn increasing the risk of cardiovascular complications. Lifestyle intervention studies have reported weight loss in overweight subjects associated with blood pressure reduction (Neter et al., 2008; Cakir & Pinar, 2009). Lifestyle changes, including proper exercise and diet control, may help alone or in conjunction with antihypertensive treatment.

In this study, the mean scores of perceived self-efficacy were observed between the experimental and control groups before and after 12 weeks of yoga exercise. Improvement in exercise self-efficacy scores were greater in the experimental group ($\bar{x}$ = 42.71; SD = 4.60) as compared to the pretest score ($\bar{x}$ = 35.71, SD = 7.79) with statistically significance. The use of self-efficacy theory was to encourage participants to maintain regular yoga exercise. Four major sources of self-efficacy were used in this study to promote subjects' confidence of ability to perform yoga exercise in class and at home through skill building in actual practice and using various educational media. The researcher arranged for the intervention group to gain experiences from group yoga training at the hospital as well as to increase awareness through the educational manual "Let's Get to Know Hypertension", the video "Yoga Science for Human Development", and yoga demonstration "Yoga Mind-Body Handbook". The finding from this study suggests that self-efficacy can be enhanced with group settings, which demonstrates the importance of social influence.

Bandura (1997) stated that verbal persuasion alone may have short-term limitations with regard to the power of creating perceived self-efficacy, but it will be able to support self-changes because people will feel they have received support and built confidence on their success. Previous studies have found that the use of self-efficacy theory in the intervention program was more effective in improving relaxation from stress and adherence to exercise behavior (Hongwachin, 1999; Sripochang, 2000; Pantong, 2002; Tankitianon, 2007). The increase of perceived self-efficacy was considered to be an essential element in the intervention program for modifying health practices. However, changes in mean scores of perceived self-efficacy were also observed in the control group ($\bar{x}$ =33.13 at pretest; $\bar{x}$ =35.3 at posttest) with no statistical significance. This may be due to heightened awareness of health-promoting hospital policy to motivate chronically ill people in performing healthy lifestyle and preventing severity of diseases.

Copyright by Mahidol University

## 5.2 Effects of The Mind-Body training program on stress and blood pressure

**Hypothesis 1:** The mean posttest stress scores of hypertensive patients in the experimental group will be lower than their mean scores at pretest and lower than the mean scores of those in the control group.

There were statistically significant differences in the mean posttest stress scores between the experimental and control groups ($p < .001$). The difference of mean stress scores was also found between the pretest and posttest in the experimental groups with statistical significance ($p < .001$). The experimental group had lower mean stress scores after 12 weeks of yoga exercise and had lower mean stress scores than the control group. The findings indicated that the 12 weeks yoga mind-body training program reduced the stress levels of patients with essential hypertension. Practicing yoga affects the nervous and endocrine systems. The feelings of relaxation were the results of melatonin secretions from the pineal gland, while the effects of melatonin caused feelings of serenity and mental stability (Singh, 1998; Unkule, 2005). The state of relaxation stimulated the body to secrete endorphins: a neuropeptide from the endocrine gland and spread to various cells in the body. Thus, it stimulates feelings of happiness and comfort in similar to the high opium or morphine intake. Moreover, the state of relaxation stops the performance of the pituitary gland in secreting adrenaline, a substance created by the fight or flight reactions of the body in a stressful situation to maintain balance and patience, preventing the patients from becoming easily stressed (Teerasiri & Chunhasawatdikul, 1998). McCaffrey et al. (2005) studied the effects of a yoga program to reduce stress and blood pressure in hypertensive patients. It was found that the experimental group had lower mean scores of stress than before starting yoga program and lower than the control group with statistical significance ($p < .01$). Smith et al. (2006) examined the effects of practicing yoga and progressive relaxation of muscles to reduce stress and anxiety. The findings showed that practicing yoga was more effective in relaxing from mental stress than progressive muscle relaxation. Wongsrila (2008) and Pirasorn (1998) examined the effect of Qi Gong physical fitness in essential hypertensive patients using the concept of the mind-body technique. The results indicated that after practicing Qi Gong physical fitness, the experimental group had greater reduction in stress levels than the control group. In addition, Krajangdan

(1997) studied the effect of meditation on reducing stress and blood pressure in essential hypertensive patients and found that the experimental group had lower stress levels than during the pretest and lower than the control group.

**Hypothesis 2:** The mean posttest blood pressure scores of hypertensive patients in the experimental group will be lower than their mean scores at pretest and lower than the mean scores of those in the control group.

This study found that in the experimental group, mean scores of systolic and diastolic blood pressure decreased significantly after 12 weeks of yoga mind-body training program and were significantly lower than the mean scores of those in the control group. These findings suggest that yoga exercise can reduce both systolic and diastolic blood pressure. When the body is in a relaxed state from each posture of yoga practice, the state of relaxation that occurs will trigger the performance of the parasympathetic system, which will have the effect of reducing heart contractions and muscles relaxation and final results are reduced blood pressure levels (Jacob & Pelham, 2000; Rice, 1999).

The mind-body yoga training program emphasized on physical and mental relaxation techniques, such as meditation postures and practicing abdominal breathing. Deep breathing with practicing various asana positions was introduced to subjects in the intervention group to move their bodies slowly as they inhale and exhale. When a person has an illness, imbalanced life energy is indicated. Therefore, yoga practice along with deep breathing will promote physical balance in restoring the function of nervous systems and organs for perfect function (Unkule, 2004). The effect of the yoga practice will induce calmness of body and mind relaxation that leads to blood pressure reduction (Yuwajitti, 2001).

The findings of this study are similar to other reports of mind and body exercise studies. Joseph et al. (2005) examined the effects of slow breathing exercise to reduce blood pressure and promote baroreflex speed in essential hypertension. It was found that slow breathing exercise reduced systolic and diastolic blood pressure levels. Male et al. (2004) studied the effects of breathing exercise in the non-pharmacological treatment of hypertension and they reported that the experimental group had greater reduction in mean blood pressure at work and at home than the

control group. Schnei et al. (2005) conducted a study to compare the effects of muscle relaxation and health education program on blood pressure control in 150 hypertensive patients divided into 3 groups. It was found that the group that received transcendental meditation had lower blood pressure than the other two groups. McCaffrey, et al. (2005) reported that yoga practice, asana and pranayama effectively reduced blood pressure. These findings suggest that in hypertensive patients, exercise using mind-body techniques, such as yoga, Qi Gong or meditation, can help to generate self-awareness and create concentration in practice resulting in synergy of body and mind.

Copyright by Mahidol University

# CHAPTER 6
# CONCLUSION AND RECOMMENDATIONS

## 6.1Summary of the study

This quasi-experimental research aimed to examine the effects of a Mind-Body Training Program on stress and blood pressure in essential hypertensive patients. The experimental group consisted of hypertensive patients seeking services at the hypertension clinic, Nonghan Hospital, Nonghan District, Udonthani Province, while the control group consisted of hypertensive patients who came to receive services at the hypertension clinic, Ban Dung Crown Prince Hospital, Bandung District, Udonthani Province. The data was collected from August to October of 2008. During the experiment, the experimental group received the yoga Mind-Body Program developed by the researcher over a period of 12 weeks whereas the control group received routine nursing care only. The data was analyzed with descriptive and t-test statistics. The research findings were presented as follows:

6.1.1 Demographic data and characteristics of the sample

Of the entire sample group, 63.3% of samples in the experimental group were females, while the control group had equal numbers of females and males (50%). Most of the samples were senior adults at rates of 33.33% in the experimental group and 46.7% in the control group. The average age was 55.7 years for the experimental group and 57.0 years for the control group. Most of the samples were married and the highest level of education was at the elementary level. The average income was 3,604.3 baht/month for the experimental group and 3,206.7 baht/month for the control group. Most of the samples in the experimental group had occupations in agriculture (43.3%) and most of the samples in the control group were either housewives or unemployed (40.0%).

Copyright by Mahidol University

According to the data associated with health condition, it was found that most of both sample group did not drink alcoholic beverages (46.7% in the

experimental group and 70.0% in the control group), while 63.3% of the experimental group and 76.7% of the control group did not smoke and 66.7% of the experimental group and 53.3% of the control group had symptoms or diseases that were obstacles to exercise. The sample group specified symptoms that the obstacles to exercise consisted of muscle and joint pain encountered in 66.7% for the experimental group and 53.3% for the control group. Most of the sample group had Body Mass Index values between 25.0 – 29.9, 33.3% in the experimental group and 36.7% in the control group. The average Body Mass Index values were 24.28 (SD = 4.08) in the experimental group and 25.67 (SD = 3.94) in the control group.

The duration for having hypertension was mostly in a period of 1-2 years. The average year of illness in the experimental group was 2.13 (SD = 1.25) and 3.55 (SD = 3.59) in the control group. Both groups used two types of medications in treatment hypertension. The medication most frequently used was diuretic and ACEI groups at rates of 63.33% in the experimental group and 56.66% in the control group. During 2 months before the intervention, the maximum means of systolic and diastolic blood pressure scores were 156.20/86.0 mmHg in the experimental group and 158.20/96.47 mmHg in the control group. The mean scores of self-efficacy in the experimental group enhanced after the yoga mind-body program ($\bar{x}$ =35.03 at pretest and $\bar{x}$ =42.71 at posttest).

6.1.2 Effects of The Mind-body training program

The experimental group had significantly lower mean scores of stress at the posttest than the pretest ($p < .001$) and had significantly lower mean scores than the control group ($p < .001$).

The experimental group had greater reduction in mean scores of systolic and diastolic blood pressure at the posttest than the pretest with statistical significance ($p < .01$, $p < .001$). The experimental group also had significantly lower mean scores of systolic and diastolic blood pressure than the control group ($p < .05$).

Copyright by Mahidol University

## 6.2 Implication and Recommendations

6.2.1 Nursing Practice

It became evident that the yoga mind-body program with the application of Bandura's self-efficacy theory resulted in enhanced self-efficacy and yielded successful reduction in stress and blood pressure in hypertensive patients. Patients who possess high levels of self-efficacy have ability to handle stressful situations in their lives. To manage hypertension, yoga practice should be integrated in the health care service in order to promote exercise and helps to relax from stress through mind and body activities. This technique is less hazardous and can help to reduce unnecessary expenses incurred in the course of treatment. Regular practice of yoga also reduces blood pressure and is less likely to suffer from target organ damage. Nurses should be able to give advice and encourage both well patients and hypertensive patients to practice yoga and increase their skills in performing yoga exercise.

6.2.2 Further Research

According to the literature review, it was found that previous studies had different durations of yoga practice from 8 to 12 weeks. Future study should be repeated periodically to measure both physiological and psychological outcomes and to determine the most appropriate duration for comparing changes in stress and blood pressure. It should be designed to include patients' records to indicate any symptoms that disturb daily living before and after participating in yoga exercise.

## 6.3 Limitation of the study

6.3.1 The findings of this study may not be representative of the general population because it is recruited only the participants who are interested in yoga exercise.

Copyright by Mahidol University

6.3.2 The participants reported risk factors for the occurrence of CVD due to a history of smoking and BMI values in the obese range. Therefore, other

interventions should be used in order to reduce risk factors and the complications of the disease.

6.3.3 This study did not follow-up to assess problems or pains during the first week of the yoga exercise program. Participants who do not receive advice or encouragement may discontinue practice as scheduled and drop out from the study.

6.3.4 This study is limited only participants who receive treatment in the hospital and can contact by telephone.

6.3.5 Yoga exercise may be more preference in female than male. This could explain why mostly male participants were dropout from this study.

Copyright by Mahidol University

# BIBLIOGRAPHY

Anandamitra, A. (2000). *Yoga for health (2nd ed.)*. Calcutta India: Ananda Marga.

Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioral change. *Physiological review, 84*(2), 191-215.

_____ (1986). *Social Foundations of thought and Action.* Englewood Cliffs, New Jersy: Prentice-Hall.

_____ (1989). Human agency in social cognitive theory. *AmericanPsychologist, 44*(9), 1175-1184.

_____.(1997). *Self efficacy: The exercise of control*. New York: Freeman.

Barnes et al. (2004). Impact of transcendental meditation on ambulatory blood pressure in African-Americans aldolescents. *American Journal of hypertension, (17)*4, 366-369.

Battegay, E. J., Lip, G. Y. H., & Bakris, G. L., (2005). *Hypertension: Principle and practice.* United States of America: Taylor & Francis Group.

Beare, J. M., & Myers, J. L. (1990). *Principles and practice of adult health nursing.* St. Louis: Mosby.

Best, J. W. (1977). Research in Science Education (3 rd ed.). New Jersy: Englewood Cliff.

Brannon, L., & Feist, J. (1997)**.** *Health psychology: An introduction to behavior and health.* Pacific Grove, CA: Books/Cole.

Cakir, H., & Pinar, R. (2006). Randomized controlled trail on lifestyle modification in hypertensive patients. *Western Journal of Nursing Research, 28*(2), 190-209.

Carven, R.F., & Hirnle, C.J. (2003). *Fundamental of nursing* (2 nd ed.). St. Louis: Mosby

Chobanian, A. V. (2003). The seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *JAMA, 289*, 2560-2572.

Christensen, B., & Kockrow, E. (1995). *Foundation of nursing* (2 nd ed.). St. Louis: Mosby.

Cirone, M.U. (2002). *Yoga philosophy. (Online).* Available: http://www . Yoga_for_health_and_fitness.com/yoga_philosophy.com

Cohen, J., (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

European Society of Hypertension/ European Society of Cardiology guideline for the management of arterial hypertension. (2003). Guideline committee. *Journal of hypertension, 21*: 1011-1053.

Federman, C.L., Stuart, E.M., Deckro, J.P., Mandle, C.L., Baim, M., & Medich, C. (1995). The mind-body connection: the psychophysiology of many traditional nursing interventions. *Clinical Nurse Specialist, 9*(1), 59-66.

Fotaine, K. L. (2000). *Healing Practice: Alternative Therapies for Nursing.* New Jersey: prentice-Hall.

Frain, M., & Valiga, T. M. (1981). The multiple dimensions of stress, In D. C. Suttley & G. F Donnelly (Eds.), *Coping with stress: a nursing perspective* (pp. 59-68). London: Aspen Systems Corporation.

Frederikson, M., Robson, A., & Ljungdell, T. (1991). Ambulatory and laboratory blood pressure in individuals with negative and positive family history of hypertension. *Health psychology, (10),* 371-377.

Freeman, L.W., & Lawlis, G. F. (2001). *Mosby's complementary & Alternative medicine: A research based approach.* St. Louis: Mosby.

Garfinkel, M., & Schumacher, H. R. (2000). Yoga therapies. *Rhumatic Disease Clinics of North America, 26*(1), February, 125-132.

Groer, M. W. (2001). *Advanced pathophysioloy: Application to clinical practice.* Philadelphia: Lippincott.

Hansen, M. (1998). *Pathophysiology: Foundations of disease and clinical intervension.* Philadelphia: W.B. Saunders.

Herick, C. M., & Ainsworth, A.D. (2000). Yoga as a self care strategy. *Nursing Forum, 35*(2), April-June, 32-36.

Hollar, M. (2003). *Guiding philosophy of Arlington yoga center.* (Online). Available: http://www.arlingtonyogacenter.com/aboutyoga.html

Hwu, Y. J. (1995). The impact of chronic illness on patients. *Rehabilitation Nursing, (20),* 221-225.

Ignatavicius, D. D. (1999). Stress, coping and adaptation. In D. D. Ignatavicius, M. L. Warkman & M.A. Mishler. (Eds), *Medical Surgical Nursing across the health Care continuum* (3rd ed.). (pp 93-107). Philadelphia: W. B. Saunders Company.

Joint National Committee. (1997). The sixth report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *Archive Internal Medicine, 157,* 2513-2445.

Jacob, R. G., & Pelham, W. H. (2000). Behavior therapy. In B. J. Sadock & W. A. Sandock (Eds.), Comprehensive textbook of psychiatry: Volume II (7th ed.) (pp.2080-2128). Philadelphia: Lippincott Williams & Wilkins.

Joseph, N. C., Porta, C., Casucci, G., Casiraghi, N., Maffeis, M., & Rossi, M. et al. (2005). Slow breathing improve arterial baroreflex sensitivity and decreased blood pressure in essential hypertension. *Hypertension, (46)*4, 714-718.

Joyce, E.V. (1994). Stress and adaptation. In V. B. Bolander (Ed.). *Soresen and Luckman's basic nursing: a psychophysiology approach* (3rd ed.). (pp 267-298). Philadelphia: W.B. Saunder Company.

Kaplan, N. M. (1998*). Clinical hypertension.* (7 th ed.). Baltimore: Williams & Wilkins.

Kaplan, N. M., & Lieberman, E. (2002). *Kaplan's clinical hypertension* (8th ed.). United States of America: Lippincott Williams & Wilkins.

Kaufamann,G. R. (2005). Epidimiology of Hypertension. In E. J. Battegay.,G. Y. H. Lip., & G. L., Bakris (Eds.), *Hypertension: Principle and practice.* United States of America: Taylor & Francis Group.

Kochar & Daniels. (1978). *Hypertension control for nurse and other health professionals*. St. Louis: The C. V. Mosby Company.

La forge, & Ralph (1997). Mind-Body fitness: Encouraging Prospects for Primary and secondary Prevention. *Journal of Cardiovascular Nursing, 11*(3): 53-65.

Lan, C., Chen, S.Y., Lai, J.S. and Wong, M.K. 2001. Heart rate responses and oxygen consumption during Tai Chi Chuan practice. Am. *J. Chin. Med., 29*(3-4): 403-10.

Lazarus, R. S., & Folkman, S. (1984). Stress. Appraisal, and coping. New York: Springer Publishing Company. Inc.

Lee et al. (2003). Effets of qigong on blood pressure, Blood pressure determinants and Ventilatory Function in Middle-Aged patients with essential hypertension. *The American journal of Chinese medicine, (31)*3, 489-497.

Lenz, E. R., & Shertridge Baggett, L. M. (2002). *Self efficacy in nursing Research and Measurement Perspective.* New York: Springer Publishing Company. Inc.

Li Shen, C., Du feng., Christina, M., Esperat, R., Irons, B. K., Chyu, M., et al. (2007). Effect of tai chi Exercise on Type 2 Diabetes: A feasibility Study. *Integrative Medicine insights, 2,* 15-23.

Luskin, F. M., Newell, K.A., Griffith, M., Holmes, M., Telles, S., Marvasti, F.F., Pelletier, K., & Haskell, W.L. (1998). A review of mind-body therapies in the treatment of cardiovascular disease. Part 1: implication for the elderly. *Alternative Therapies, 4*(3), 46-61.

Maibach, E., & Murphy, D. A. (1995). Self efficacy in health promotion research and practice: conceptualization and measurement. *Health education research, 10*(1), 37-50.

Malathi, A., Demodaran, A., Shah, N., Patil, N., & Maratha, S. (2000). Effect of yogic practice on subjective well being. *Indian Journal Physiology Pharmacology, 44*(2), 202-206.

Mansfield, J., & Daley, K. (2000). Hypertensive emergencies. *American Journal of Nursing, Sep,* 20-23.

McCaffrey, R., Ruknui, P., Hatthakit, U. & Kasetsomboon, P. (2005). The effect of yoga on hypertensive persons in Thailand. *Holistic Nursing Practice, 19*(4), 173-180.

Meles et al. (2004). Non-pharmacologic treatment of hypertension by respiratory exercise in the home setting. *American Journal of hypertension, (17)*4, 370-374.

Monahan, F.D., & Neighbors, M. (1998). *Medical Surgical Nursing foundations for clinical practice* (2 nd ed.). Philadelphia: W.B. Saunders.

Nagarathna, R., Nagendra, H. R., & Monro, R. (1995). Effect of selected yogic practices on management of hypertension. *Indian Journal Physiological and pharmacology, 44*(2), 207-210.

National Cancer Institute. (n.d.). Retrieved December 18, 2006, from http://www.cancer.gov

Neter, Stam B.E., Kck F.J., Grobbee D.E., Geleijnse J.M. (2008). Influence of weight reduction on blood pressure: a meta analysis of randomized controlled trials. *Hypertension, 42,* 878 - 884.

Oparil, S. & Weber, M.A. (2005). *Hypertension.* (2nd ed.). China: Elsevier.

Phipps, W. J., Sands, J. K., & Marek, J. F. (1999 .(*Medical-surgical nursing: Concept & clinical practice* (6 th ed.). St. Louis: Mosby.

Pickering, T. G., Devereux, R. B., James, G. D., Gerin, W., Landsbergis, P., Schnall,P. L., & Schwartz, J. E. (1996). Environmental influences on blood pressure and the role of job strain. *Journal of hypertension., 14*, 179-185.

Potter, P. A., & Perry, A. G. (1997). *Fondamentals of Nursing.* (5th ed.). St. Louis: Mosby.

Prakash, P. (2002). *The branches of yoga* (Online). Available: http:// www.yrec.org/branches.html.

Raub, J. A., (2002). Psychophysiologic effects of hatha yoga on musculoskeletal and cardiopulmonary function: A literature review. *The journal of alternative and complementary medicine, 8*(6), 797-812.

Rice, P.L. (1999). *Stress and health* (3 rd ed.). Practice Grove, CA: Book/Cole.

Rice, V. H., (2000). *Handbook of stress, Coping, and Health: Implication For nursing research, theory, and practice*. United States of America: Sage Publication.

Rowell, L.B. (1993). *Human Cardiovascular Control.* New York: Oxford University.

Sadock, B. J., & Sadock, V. J. (2000). *Kaplan & Sadock's comprehensive textbook of psychiatry Volume II* (7th ed.). Philadelphia: Lippincott Williams & Wilkins.

Schnei, Alexandra, Stragger, Orme-Johnson, Rainforth, & Salerno et al. (2005). A randomized controlled trial of stress reduction in African-Americans treated for hypertension for over one year. *American Journal of hypertension, (18)*1, 88-89.

Singh, J. (1998). *Biopsychology: a new science of body, mind and soul.* West Bengal India: Anada Mudaranalaya.

Selye, H. (1976). *The stress of life* (Rev. ed.). New Boston: Mc. Graw-Hill.

Smith, C., Hancock, H., Blake-Mortimer, J., & Eckert, K. (2006). A randomized comparative trial of yoga and relaxation to reduce stress and anxiety. (Electronic version). *Complementary Therapies in Medicine*, from http://elsevierhealth.com/journals/ctim.

Sue, J., & Collin, T. (1999). System and disease. *Nursing times, 94*(3), 50-54.

Swales, J. D. (1995). *Manual of hypertension.* Oxford: Blackwell Science.

Copyright by Chiang Mai University

Taylor-Piliae. R. E., & Froelicher, E. S., (2004). The Effectiveness of Tai Chi exercise in improving aerobic capacity: a meta-analysis. *Journal of Cardiovascular Nursing, 19*(1), 48-57.

Trefny, B. (2000). Alance unity stretching: Yogic application. *Journal of Arkansas Nursing News, 17*(1), 23-26.

Unkule, N., (2004). *The law of rhythmic breath*. India: Kaivalya Yoga Institute.

Unkule, N., (2006). *Attack the attack: Cardiovascular diseases, Yoga and You.* India: Kaivalya Yoga Institute.

Virginia, S.C & Troy, B. A. (2006). Heart rate in yoga asana practice: A comparison of styles. *Journal of bodywork and Movement Therapies,* 11, 91-95.

Wood, A. D. (2002). Improving the odds against hypertension. *Nursing Management, (33)*4, 27-34.

World Health Organization. (2002). The World Health Report. *Reducing Risks, Promoting Health Life***.** : 58. Geneva, Switzerland.

Yogendra, H.J. (2002**).** *Growing with yoga* (3rd ed.). Mumbai: The Yoga Institute.

กระทรวงสาธารณสุข. (2545). *แผนพัฒนาสุขภาพแห่งชาติฉบับที่ 9.* นนทบุรี: กระทรวงสาธารณสุข

กระทรวงสาธารณสุข.(2549). *สถิติสาธารณสุข พ.ศ.254*5. นนทบุรี : สำนักนโยบายและยุทธศาสตร์ กระทรวงสาธารณสุข.

กระทรวงสาธารณสุข.(2550). *สถิติสาธารณสุข พ.ศ.2546.* นนทบุรี : สำนักนโยบายและยุทธศาสตร์ กระทรวงสาธารณสุข.

กระทรวงสาธารณสุข.(2551). *สถิติสาธารณสุข พ.ศ.2547.* นนทบุรี : สำนักนโยบายและยุทธศาสตร์ กระทรวงสาธารณสุข.

กวี คงภักดีพงษ์ .(2545). *คู่มือการฝึกโยคะ 1, 2, 3.* เอกสารประกอบการอบรมโครงการอบรมผู้ฝึกสอนอาสนะ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล (เอกสารอัดสำเนา)

เกษม วัฒนชัย. (2542). การดูแลรักษาความดันโลหิตสูง. กรุงเทพฯ: สำนักพัฒนศึกษา.

งานสถิติโรงพยาบาลหนองหาน. (2549). *สถิติโรคความดันโลหิตสูง.* อุดรธานี: โรงพยาบาลหนองหาน

จันทณา วังคะออม. (2543). *ผลของโปรแกรมส่งเสริมการออกกำลังกายโดยประยุกต์ทฤษฎีการรับรู้ความสามารถแห่งตนต่อพฤติกรรมการออกกำลังกายของผู้สูงอายุ.* วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

จันทร์เพ็ญ ชูประภาวรรณ. (2539). *รายงานการสำรวจสถานะสุขภาพอนามัยของประชาชนไทยด้วยการสอบถามและการตรวจร่างกายทั่วประเทศ ครั้งที่ พ.ศ .2534-2535.* กรุงเทพฯ: ดีไซร์.

จารุวรรณ ขันติสุวรรณ. (2528). *ความสัมพันธ์ระหว่างปัจจัยบางประการกับความร่วมมือในการรักษาของผู้ป่วยวัณโรคปอด*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

ดิลก ภิยโยทัย และคณะ. (2543). *เคล็ดลับในการดูแลรักษาโรคความดันโลหิตสูง*. กรุงเทพฯ: จุฬาลงกรณ์มหาวิทยาลัย.

ทองออน ศรีสุข. (2551). *ประสิทธิผลของการประยุกต์ใช้ทฤษฎีความสามารถตนเองร่วมกับแรงสนับสนุนทางสังคมเพื่อส่งเสริมการออกกำลังกายเพื่อสุขภาพของชายวัยทอง อำเภอคลอดหาด จังหวัดสระแก้ว*. วิทยานิพนธ์ปริญญาสาธารณสุขศาสตรมหาบัณฑิต,มหาวิทยาลัยขอนแก่น.

ทัศนีย์ แดขุนทด. (2549). *ผลของโปรแกรมการฟื้นฟูสมรรถภาพหัวใจในการออกกำลังกายและการทำกิจกรรมในผู้ป่วยโรคหลอดเลือดหัวใจโคโรนารี่*.วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

ธรณินทร์ กองสุข และคณะ. (2546). *รายงานการวิจัยความเครียดของ คนไทย: การศึกษาระดับชาติ ปี 2546*. กรมสุขภาพจิต กระทรวงสาธารณสุข.

ธิดา กิจจาชาญชัยกุล. (2542). *การประยุกต์ทฤษฎีความสามารถแห่งตนร่วมกับแรงสนับสนุนทางสังคมในการดูแลสุขภาพตนเองของผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ* . วิทยานิพนธ์ปริญญาวิทยาศาสตร์, มหาวิทยาลัยมหิดล.

เนตรนภา ติ่งหมาย. (2541). *การปรับตัวด้านบทบาทในครอบครัวของผู้ป่วยความดันโลหิตสูงเพศชาย* .วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

บรรลุ ศิริพาณิชย์. (2541).*ปัญหาสุขภาพของผู้สูงอายุ*. พิมพ์ครั้งที่ 2. กรุงเทพฯ: โครงการจัดพิมพ์คบไฟ.

บุญใจ ศรีสถิตย์นรากุล. (2541). *ระเบียบวิธีการวิจัยทางการพยาบาลศาสตร์*. พิมพ์ครั้งที่ 2. กรุงเทพมหานคร: จุฬาลงกรณ์มหาวิทยาลัย.

เบ็ญจมาภรณ์ รักษ์มณี. (2549). *ผลของการฝึกโยคะต่อความรุนแรงของโรคในผู้ป่วยโรคหืด*. วิทยานิพนธ์ปริญญาพยาบาลศาสตร์มหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

ปราณี ทู้ไพเราะ. (2543). *การพยาบาลทางอายุรศาสตร์* .กรุงเทพฯ: บริษัทลิฟวิ่งทรานส์มีเดีย.

ปิยะนุช รักพาณิชย์. (2542). *โรคความดันโลหิตสูง โรคเบาหวาน โรคหัวใจขาดเลือด กับการปฏิบัติตัว*. กรุงเทพฯ: ชุมนุมการเกษตรแห่งประเทศไทย.

พวงผกา ตันกิจจานนท์. (2550). *ประสิทธิผลของโปรแกรมคลายเครียดโดยการประยุกต์ทฤษฎีความสามารถตนเองร่วมกับการนวดไทยและการดัดตน เพื่อการคลายเครียดในสตรีวัยกลางคน ตำบลพระยืน อำเภอพระยืน จังหวัดขอนแก่น*. วิทยานิพนธ์ปริญญาสาธารณสุขศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

พิกุล บุญช่วง. (2530). *ความดันโลหิตสูงในภาวะวิกฤติ: ปัญหาและการพยาบาล*. เชียงใหม่: โครงการตำราคณะพยาบาลศาสตร์ มหาวิทยาลัยเชียงใหม่.

พีระ บูรณะกิจเจริญ . (2546). *ความดันโลหิตสูงทันยุค*. สมาคมความดันโลหิตสูงแห่งประเทศไทย คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล . กรุงเทพฯ: แซด .อี .เอ็น .กราฟฟิคเพรส.

พึงใจ งามอุโฆษ. (2541). ความดันโลหิตสูง. ใน วิทยา ศรีมาดา บรรณาธิการ. *ตำราอายุรศาสตร์ 2* (พิมพ์ครั้งที่ 3) (หน้า 133-145). กรุงเทพฯ: ยูนิตี้ พลับลิเคชั่น.

พูลรัตน์ ลียะติกุล. (2543). *ปัจจัยที่มีความสัมพันธ์กับภาวะความดันโลหิตสูงชนิดไม่ทราบสาเหตุในผู้สูงอายุ*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

เพ็ญศรี วงศรีลา. (2551). *การส่งเสริมการบริหารแนวชี่กงในผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โรงพยาบาลโคกศรีสุพรรณ*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

แพทย์พงษ์ วรพงศ์พิเชษฐ์. (2542). *โยคะเพื่อการพัฒนาร่างกายและจิตใจ*. กรุงเทพฯ: เอช ที พี เพรส.

มานพ ประภายานนท์. (2545). *โยคะสำหรับผู้เริ่มต้น*.กรุงเทพฯ: สำนักพิมพ์น้ำฝน.

ยุพิน หงษ์วชิน. (2542). *การประยุกต์ทฤษฎีการับรู้ความสามารถแห่งตนและการตั้งเป้าหมายเพื่อควบคุมความดันโลหิตในผู้ป่วยความดันโลหิตสูง*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

ยุวเรศ ใสสีสูบ. (2543). *การรับรู้ความสามารถแห่งตนและอิทธิพลด้านสถานการณ์ต่อพฤติกรรมด้านการออกกำลังกายของผู้ป่วยโรคหลอดเลือดหัวใจ*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

รัตนาภรณ์ เรืองทิพย์. (2543). *การศึกษาความเชื่อด้านสุขภาพและพฤติกรรมสุขภาพในการป้องกันความดันโลหิตสูงในเจ้าหน้าที่ธนาคาร*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

โรงพยาบาลหนองหาน. (2549). *สถิติผู้ป่วยโรคความดันโลหิตสูง*. สำนักงานสาธารณสุขอำเภอหนองหาน จังหวัดอุดรธานี.

ลิลิตา ธีระสิริ และวัลลี ชุณหสวัสดิกุล. (2541). *โยคะรักษาโรค*. กรุงเทพฯ: บริษัทรวมทรรน์

วิชุดา เจริญกิจการ. (2543). *การรับรู้ความสามารถแห่งตนระหว่างบุคคลต่อพฤติกรรมการออกกำลังกายในผู้สูงอายุความดันโลหิตสูงชนิดไม่ทราบสาเหตุ*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

วิมลรัตน์ จงเจริญ. (2543). โภชนบำบัดสำหรับพยาบาลในการดูแลผู้ป่วยเรื้อรัง. สงขลา: ชานเมืองการพิมพ์.

วิภาวรรณ ลีลาสำราญ และวุฒิชัย เพิ่มศิริวาณิชย์. (2547). *การออกกำลังกายเพื่อสุขภาพในโรคต่างๆ*. สงขลา: ชานเมืองการพิมพ์.

วิมลทิพย์ แก้วถา. (2546). *ผลของการฝึกการผ่อนคลายร่วมกับการใช้ไบโอฟีดแบคต่อความเครียดและความดันโลหิตในผู้ที่มีความดันโลหิตสูง*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลผู้ใหญ่ , มหาวิทยาลัยเชียงใหม่.

ศิราณี ปันคำ และคณะ. (2543).*รายงานการวิจัยความสัมพันธ์ระหว่างพฤติกรรมสุขภาพความเครียดกับระดับความรุนแรงของโรคความดันโลหิตสูง* .กรมสุขภาพจิต กระทรวงสาธารณสุข.

ศุภชัย ถนอมทรัพย์ .(2548). *New Horizontals in Management of hypertension.* สมาคมความดันโลหิตสูงแห่งประเทศไทย ร่วมกับหน่วยโรคหัวใจภาควิชาอายุรศาสตร์ โรงพยาบาลรามาธิบดี (โครงการอบรมระยะสั้นสมาคมความดันโลหิตสูงแห่งประเทศไทย ครั้งที่ 4 วันที่ 14-16 กันยายน พ.ศ .2548).

สมคิด โพธิ์ชนะพันธุ์ เพ็ญจันทร์ เสรีวิวัฒนา สุคนธ์ ไข่แก้ว และดวงจันทร์ พันธ์ยุทธ์. (2546).*ผลของการฝึกโยคะต่อสมรรถภาพทางกายและความเครียดในผู้ฝึกสอนโยคะ* . คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล.

สมจิต หนุเจริญกุล และพรทิพย์ มาลาธรรม. (2544). *การพยาบาลผู้ป่วยความดันโลหิตสูง*. ใน สมจิต หนุเจริญกุล (บรรณาธิการ). *การพยาบาลอายุรศาสตร์ เล่ม 2*. (พิมพ์ครั้งที่ 14). กรุงเทพฯ: โครงการตำราภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล.

สมจิต หนุเจริญกุล และอรสา พันธ์ภักดี. (2542). *การพยาบาลโรคความดันโลหิตสูง: การทบทวนองค์ความรู้ สถานการณ์และปัจจัยการสนับสนุนใน การดูแลตนเอง,* กรุงเทพฯ: โรงพิมพ์ชุมนุมสหกรณ์การเกษตรแห่งประเทศไทย.

สมชาติ โลจายะ และคณะ. (2539). *มาตรฐานการบำบัดรักษาโรคความดันเลือดสูง* .กรุงเทพฯ: หมอชาวบ้าน.

สมาคมความดันโลหิตสูงแห่งประเทศไทย. *แนวทางการรักษาภาวะความดันโลหิตสูงในเวชปฏิบัติทั่วไป* .ค้นเมื่อวันที่ 8 ธันวาคม 2549, จาก http://www.thaihypertension.org

สมโภชน์ เอี่ยมสุภาษิต. (2543). *ทฤษฎีและเทคนิคการปรับพฤติกรรม* (พิมพ์ครั้งที่ 4). กรุงเพทฯ: จุฬาลงกรณ์มหาวิทยาลัย.

สร้อยจันทร์ พานทอง. (2545). ผลของการเพิ่มการรับรู้สมรรถนะแห่งตนในการผ่อนคลายกล้ามเนื้อต่อความดันโลหิตในผู้ที่มีความดันโลหิตสูง. วิทยานิพนธ์ปริญญาพยาบาลศาสตมหาบัณฑิต. มหาวิทยาลัยเชียงใหม่.

สิริพิมล อัญชลีสังกาศ. (2547). *คู่มือโยคะวัยรุ่นสำหรับฝึกปฏิบัติด้วยตนเอง*. กรุงเทพฯ: โรงพิมพ์องค์การรับส่งสินค้าและพัสดุภัณฑ์.

สุจินดา ริมศรีทอง สุดาพรรณ ธัญจิรา และอรุณศรี เตชัสหงศ์. (2545). พยาธิสรีรวิทยาทางการพยาบาล. กรุงเทพฯ: บริษัทสามเจริญพาณิชย์.

สุดารัตนา ลีจุติภูมิ. (2544). *ปัจจัยที่มีความสัมพันธ์กับการควบคุมความดันโลหิตในในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โรงพยาบาลท่าวัง จังหวัดลพบุรี*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

สุนันทา กระจ่างแดน .(2540). *ผลการทำสมาธิชนิดอานาปานสติแบบผ่อนคลาย ในการลดความเครียดและความดันโลหิต ในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ*, วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาสาธารณสุขศาสตร์, มหาวิทยาลัยมหิดล.

สุนีย์ ยุวจิตติ. (2544). *โยคะเพื่อพลังกายและพลังจิต*. กรุงเทพฯ: สายส่งสุขภาพใจ.

สุมน พวงแก้ว และมนตรา ใจดี. (2540). *ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการออกกำลังกายของประชาชน กรณีศึกษา: เขตสุขาภิบาลท่าม่วง อำเภอท่าม่วง จังหวัดกาญจนบุรี*. สำนักงานสาธารณสุขอำเภอท่าม่วง จังหวัดกาญจนบุรี.

สุรีย์ กาญจนวงศ์. (2545). *รายงานวิจัยเรื่องความเครียด สุขภาพ และความเจ็บป่วย: แนวคิดการศึกษาในประเทศไทย*. นครปฐม: คณะสังคมศาสตร์และมนุษย์ศาสตร์ มหาวิทยาลัยมหิดล.

เสาวนีย์ ศรีติระกุล และคณะ. (2542). *ปัจจัยที่เกี่ยวข้องกับความล้มเหลวของการควบคุมความดันโลหิตสูง*. *วารสารธารณสุขศาสตร์ ,29*(1), 48-58.

อมรรัตน์ ภิราษร. (2541). *ผลของการบริหารผ่อนคลายแนวชี่กงต่อความเครียดและความดันโลหิต ในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ*. วิทยานิพนธ์ปริญญาวิทยาศาสตร์มหาบัณฑิต, มหาวิทยาลัยมหิดล.

อัจฉรา นุตะโร. (2546). การผ่อนคลาย :แนวคิดและปฏิบัติ. *วารสารการพยาบาลจิตเวชและสุขภาพจิต, (17)*1, 1-10.

อิโรชิ ไอคะตะ ฮิเดโกะ โอคะตะ สุภาพร พงศ์พฤกษ์ และกวี คงภักดีพงษ์. (2547). *โยคะในชีวิตประจำวัน*. กรุงเทพฯ: สำนักพิมพ์หมอชาวบ้าน.

อุทัยวรรณ์ แจ่มถาวร. (2547). *ผลของโปรแกรมส่งเสริมสุขภาพกาย-จิต ต่อการเปลี่ยนแปลงพฤติกรรมสุขภาพละคุณภาพชีวิตในสตรีวัยทอง* .วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต, มหาวิทยาลัยมหิดล.

เอกไชย พรรณเชษฐ์. (2540). *โยคะ: คู่มือการปฏิบัติด้วยตนเอง*. กรุงเทพฯ: มูลนิธิโกมลคีมทอง.

เอมอร แสงศิริ. (2546). *ผลของโปรแกรมส่งเสริมการดูแลตนเองต่อคุณภาพชีวิตและลดปัจจัยเสี่ยงในผู้ป่วยโรคหลอดเลือดหัวใจ*. วิทยานิพนธ์ปริญญาพยาบาลศาสตร์มหาบัณฑิต, มหาวิทยาลัยขอนแก่น.

# APPENDICES

Copyright by Mahidol University

# APPENDIX A

## รายนามผู้ทรงคุณวุฒิ

| อาจารย์ผู้ทรงคุณวุฒิ | สังกัด |
|---|---|
| ผศ. พญ. อรุณ วงศ์จิราษฎร์ | ภาควิชากุมารเวชศาสตร์<br>คณะแพทย์ศาสตร์ ศิริราชพยาบาล |
| อาจารย์กวี คงภักดีพงษ์ | สถาบันโยคะวิชาการ<br>มูลนิธิหมอชาวบ้าน |
| รศ. สมคิด โพธิ์ชนะพันธ์ | ภาควิชาการพยาบาลศัลย์ศาสตร์<br>คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล |
| ผศ. ดร. นพวรรณ เปียซื่อ | ภาควิชาพยาบาลศาสตร์<br>(งานการพยาบาลเวชศาสตร์ทั่วไปและ<br>เวชศาสตร์ฉุกเฉิน) คณะแพทย์ศาสตร์<br>โรงพยาบาลรามาธิบดี |
| คุณฐปรัตน์ รักษาภาณุสิทธิ์ | พยาบาลวิชาชีพระดับ 7<br>สังกัดโรงพยาบาลสงขลา |

Copyright by Mahidol University

# APPENDIX B

## คำชี้แจงผู้ยินยอมตนทำการวิจัย (กลุ่มทดลอง)

**เรียน ผู้เข้าร่วมโครงการทุกท่าน**

ดิฉันชื่อ นางสาววลัยพร รุ่งเรือง นักศึกษาระดับปริญญาโทหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลเวชปฏิบัติครอบครัว มหาวิทยาลัยมหิดล กำลังทำการศึกษาเรื่อง ผลของโปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โดยมีวัตถุประสงค์ของการวิจัยเพื่อประเมินระดับการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย ระดับความเครียดและความดันโลหิต ในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

ท่านเป็นผู้ป่วยความดันโลหิตสูงคนหนึ่งที่ได้รับการสุ่มเลือกเข้ารับการศึกษาโปรแกรมดังกล่าว ถ้าท่านยินดีเข้าร่วมการวิจัยครั้งนี้ ท่านจะได้รับคำอธิบายจากผู้วิจัยพร้อมกับเอกสารชี้แจงโครงการวิจัยก่อนการตัดสินใจเข้าร่วมโครงการดังกล่าว ซึ่งกิจกรรมในโครงการวิจัยนี้ไม่มีผลต่อการรักษาพยาบาลหรือการร่วมกิจกรรมกับโรงพยาบาลที่ให้การดูแลท่านแต่อย่างใด ดังนั้นการตัดสินใจนี้จึงเป็นสิทธิของท่านโดยเฉพาะ

เมื่อท่านตัดสินใจเข้าร่วมโครงการวิจัย ในสัปดาห์แรกท่านจะได้รับการวัดความดันโลหิต ได้ตอบแบบสอบถามหรือสัมภาษณ์เกี่ยวกับข้อมูลส่วนบุคคล แบบวัดการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย และแบบวัดความเครียด ใช้เวลาประมาณ 15 นาที หลังจากตอบแบบสอบถามหรือสัมภาษณ์เสร็จท่านจะได้รับความรู้เกี่ยวกับโรคความดันโลหิตสูง รับชมวิดีทัศน์เรื่องโยคะศาสตร์แห่งการพัฒนามนุษย์ การสอนสาธิตการฝึกโยคะที่ถูกต้อง ก่อนที่ผู้วิจัยจะนัดท่านให้มาฝึกโยคะร่วมกันที่โรงพยาบาลสัปดาห์ละ 1 ครั้ง ภายหลังการฝึกร่วมกัน ท่านที่เข้าร่วมโครงการวิจัยจะต้องฝึกโยคะด้วยตนเองที่บ้านตามคู่มือฝึกจิตควบคุมกายด้วยโยคะที่ผู้วิจัยแจกให้ โดยฝึกต่อเนื่องกันเป็นระยะเวลาไม่น้อยกว่า 30 นาที อย่างน้อย 3 วันต่อสัปดาห์ ผู้วิจัยจะโทรศัพท์ถึงท่านทุก 2 สัปดาห์ เพื่อสอบถามปัญหา อุปสรรคที่เกิดขึ้นจากการฝึก ตลอดจนให้คำแนะนำเพื่อช่วยเหลือท่านในการแก้ไขปัญหาตามความเหมาะสม จนสิ้นสุดโครงการเป็นระยะเวลาทั้งสิ้น 12 สัปดาห์

การเข้าร่วมโครงการวิจัยครั้งนี้ท่านสามารถที่จะตอบตกลงหรือปฏิเสธที่จะเข้าร่วมโครงการวิจัยได้ตลอดเวลา การปฏิเสธของท่านจะไม่มีผลต่อการรักษาที่ท่านจะได้รับตามปกติ ข้อมูลที่ได้จากท่านทั้งหมดจะเป็นความลับ และจะไม่เปิดเผยชื่อ นามสกุล ใดๆ ทั้งสิ้น ข้อมูลจะถูกวิเคราะห์และนำเสนอในภาพรวม หากขณะตอบแบบสอบถามท่านมีอาการผิดปกติ เช่น หน้ามืด วิงเวียน คล้ายจะเป็นลม เป็นต้น ท่าสามารถหยุดการตอบแบบสอบถามได้และจะได้รับการช่วยเหลือโดยนำส่งห้องฉุกเฉินทันที เนื่องจากเป็นการเก็บข้อมูลในคลินิกโรคความดันโลหิตสูงของโรงพยาบาล

หากท่านเห็นว่าโครงการวิจัยดังกล่าวเป็นประโยชน์ และสนใจเข้าร่วมกิจกรรมของโครงการโปรดลงนามในแบบฟอร์มยินยอมร่วมการวิจัยที่แนบมาพร้อมกันนี้ และหากท่านมีข้อสงสัยประการใดเกี่ยวกับการทำ

วิจัยหรือต้องการข้อมูลเพิ่มเติม สามารถติดต่อผู้วิจัยโดยตรงได้ที่ โรงพยาบาลหนองหาน อำเภอหนองหาน จังหวัดอุดรธานี หมายเลขโทรศัพท์ 081-3800109

ขอแสดงความนับถือ
นางสาววลัยพร รุ่งเรือง
ผู้วิจัย

Copyright by Mahidol University

## คำชี้แจงผู้ยินยอมตนทำการวิจัย (กลุ่มควบคุม)

**เรียน ผู้เข้าร่วมโครงการทุกท่าน**

ดิฉันชื่อ นางสาววลัยพร รุ่งเรือง นักศึกษาระดับปริญญาโทหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลเวชปฏิบัติครอบครัว มหาวิทยาลัยมหิดล กำลังทำการศึกษาเรื่อง ผลของโปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ โดยมีวัตถุประสงค์ของการวิจัยเพื่อประเมินระดับความเครียด การรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกายและระดับความดันโลหิต ในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

ท่านเป็นผู้ป่วยความดันโลหิตสูงคนหนึ่งที่ได้รับการสุ่มเลือกเข้ารับการศึกษาโปรแกรมดังกล่าว ถ้าท่านยินดีเข้าร่วมการวิจัยครั้งนี้ ท่านจะได้รับคำอธิบายจากผู้วิจัยพร้อมกับเอกสารชี้แจงโครงการวิจัย ก่อนการตัดสินใจเข้าร่วมโครงการดังกล่าว ซึ่งกิจกรรมในโครงการวิจัยนี้ไม่มีผลต่อการรักษาพยาบาลหรือการร่วมกิจกรรมกับโรงพยาบาลที่ให้การดูแลท่านแต่อย่างใด ดังนั้นการตัดสินใจนี้จึงเป็นสิทธิของท่านโดยเฉพาะ

เมื่อท่านตัดสินใจเข้าร่วมโครงการวิจัย ท่านจะได้รับการวัดความดันโลหิต ได้รับแบบสอบถามหรือสัมภาษณ์เกี่ยวกับข้อมูลส่วนบุคคล แบบวัดการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย และแบบวัดความเครียด ใช้เวลาประมาณ 30 นาที หลังจากนั้นท่านจะได้รับบริการปกติจากโรงพยาบาล ผู้วิจัยจะนัดท่านอีก 12 สัปดาห์ เพื่อเชิญท่านมาวัดความดันโลหิต และตอบแบบสอบถามหรือสัมภาษณ์เกี่ยวกับการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย และความเครียด

การเข้าร่วมโครงการวิจัยครั้งนี้ท่านสามารถที่จะตอบตกลงหรือปฏิเสธที่จะเข้าร่วมโครงการวิจัยได้ตลอดเวลา การปฏิเสธของท่านจะไม่มีผลต่อการรักษาที่ท่านจะได้รับตามปกติ ข้อมูลที่ได้จากท่านทั้งหมดจะเป็นความลับ และจะไม่เปิดเผยชื่อ นามสกุล ใดๆ ทั้งสิ้น ข้อมูลจะถูกวิเคราะห์และนำเสนอในภาพรวม หากขณะตอบแบบสอบถามท่านมีอาการผิดปกติ เช่น หน้ามืดวิงเวียน คล้ายจะเป็นลม เป็นต้น ท่าสามารถหยุดการตอบแบบสอบถามได้และจะได้รับการช่วยเหลือโดยนำส่งห้องฉุกเฉินทันที เนื่องจากเป็นการเก็บข้อมูลในคลินิกโรคความดันโลหิตสูงของโรงพยาบาล

หากท่านเห็นว่าโครงการวิจัยดังกล่าวเป็นประโยชน์ และสนใจเข้าร่วมกิจกรรมของโครงการโปรดลงนามในแบบฟอร์มยินยอมร่วมการวิจัยที่แนบมาพร้อมกันนี้ และหากท่านมีข้อสงสัยประการใดเกี่ยวกับการทำวิจัยหรือต้องการข้อมูลเพิ่มเติม สามารถติดต่อผู้วิจัยโดยตรงได้ที่ โรงพยาบาลหนองหาน อำเภอหนองหาน จังหวัดอุดรธานี หมายเลขโทรศัพท์ 081-3800109

Copyright by Mahidol University

ขอแสดงความนับถือ
นางสาววลัยพร รุ่งเรือง
ผู้วิจัย

# APPENDIX C

**แบบฟอร์มใบยินยอมให้ทำการวิจัย**

**โดยได้รับการบอกกล่าวและเต็มใจ (**Informed Consent Form)

การวิจัยเรื่อง ผลของโปรแกรมออกกำลังกายฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ

วันที่ให้คำยินยอม วันที่.....เดือน.....พ.ศ. .....

ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการทำวิจัย วิธีวิจัย อันตราย หรืออาการที่อาจเกิดขึ้นจากการวิจัยหรือจากยาที่ใช้ รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียด และมีความเข้าใจดีแล้ว ผู้วิจัยรับรองว่าจะตอบคำถามต่างๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจ ไม่ปิดบังซ่อนเร้น จนข้าพเจ้าพอใจ

ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ และเข้าร่วมโครงการวิจัยนี้โดยสมัครใจ และการบอกเลิกการเข้าร่วมการวิจัยนี้จะไม่มีผลต่อการรักษาโรคที่ข้าพเจ้าจะพึงได้รับต่อไป

ผู้วิจัยรับรองว่าจะเก็บข้อมูลที่เกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยไว้เฉพาะในรูปที่สรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆ ที่เกี่ยวข้องจะกระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ผู้วิจัยรับรองว่าหากมีข้อมูลเพิ่มเติมที่ส่งผลกระทบต่อการวิจัย ข้าพเจ้าจะได้รับการแจ้งให้ทราบโดยไม่ปิดบังซ่อนเร้น

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว และมีความเข้าใจดีทุกประการ และได้ลงนามยินยอมในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม.....ผู้ยินยอม

ลงนาม.....พยาน

ลงนาม.....พยาน

ข้าพเจ้าไม่สามารถอ่านหนังสือได้แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้ว ข้าพเจ้าจึงลงนามหรือประทับลายนิ้วหัวแม่มือขวาของข้าพเจ้าในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม.....ผู้ยินยอม

ลงนาม.....พยาน

ลงนาม.....พยาน

# APPENDIX D

## เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูล

**<u>แบบสัมภาษณ์เรื่อง</u> ผลของโปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูง ชนิดไม่ทราบสาเหตุ**

แบบสัมภาษณ์ชุดนี้แบ่งเป็น 3 ส่วน ดังนี้

**ส่วนที่ 1** แบบสัมภาษณ์ข้อมูลส่วนบุคคลของผู้ป่วยโรคความดันโลหิตสูงชนิดไม่ทราบสาเหตุ จำนวน 13 ข้อ

**ส่วนที่ 2** แบบวัดการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย จำนวน 11 ข้อ

**ส่วนที่ 3** แบบวัดความเครียดในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ จำนวน 20 ข้อ

Copyright by Mahidol University

**ส่วนที่ 1 แบบสัมภาษณ์ข้อมูลส่วนบุคคลของผู้ป่วยโรคความดันโลหิตสูง ชนิดไม่ทราบสาเหตุ**

**<u>คำชี้แจง</u>** โปรดทำเครื่องหมาย ✓ ลงใน ( ) หน้าข้อความเพียงข้อเดียว

1. เพศ ( ) 1 ชาย ( ) 2 หญิง
2. อายุ..... ปี
3. สถานภาพสมรสของท่าน
   ( ) 1 โสด
   ( ) 2 คู่
   ( ) 3 หม้าย/ หย่าร้าง/แยกกันอยู่
   ( ) 4 อื่นๆ ระบุ.....
4. ท่านสำเร็จการศึกษาสูงสุดระดับใด
   ( ) 1 ไม่ได้รับการศึกษา
   ( ) 2 ประถมศึกษา ระบุ.....
   ( ) 3 มัธยมศึกษา ระบุ.....
   ( ) 4 ปวส. / ปวช. / อนุปริญญา
   ( ) 5 ปริญญาตรีหรือเทียบเท่า
   ( ) 6 อื่นๆ ระบุ.....
5. ขณะนี้ท่านมีอาชีพ
   ( ) 1 แม่บ้าน/ ว่างงาน
   ( ) 2 เกษตรกรรม
   ( ) 3 พนักงานบริษัท หรือลูกจ้างทั่วไป
   ( ) 4 ธุรกิจส่วนตัว
   ( ) 5 รับราชการ/ รัฐวิสาหกิจ
   ( ) 6 ข้าราชการบำนาญ
   ( ) 7 อื่นๆ ระบุ.....
6. รายได้ของท่านเฉลี่ยต่อเดือน
   ( ) 1 เฉลี่ยต่อเดือน.....บาท
   ( ) 2 กรณีไม่มีรายได้ ได้รับจาก.....เฉลี่ยต่อเดือน.....บาท

Copyright by Mahidol University

**ข้อมูลเกี่ยวกับภาวะสุขภาพ**

7. ท่านดื่มเครื่องดื่มประเภทแอลกอฮอล์หรือไม่

( ) 1 ไม่ดื่ม

( ) 2 ดื่ม เป็นบางครั้ง

( ) 3 ดื่ม เป็นประจำ.....แก้ว/วัน

( ) 4 เคยดื่ม ปัจจุบันหยุดดื่มแล้ว

8. ท่านสูบบุหรี่หรือไม่

( ) 1 ไม่สูบ

( ) 2 สูบ เป็นบางครั้ง

( ) 3 สูบ เป็นประจำ.....มวน/วัน

( ) 4 เคยสูบ ปัจจุบันหยุดสูบแล้ว

9. ปัจจุบันท่านมีอาการเจ็บป่วยอื่นๆ หรือป่วยเป็นโรคที่เป็นปัญหาต่อการออกกำลังกายหรือไม่ (เช่น ปวดศีรษะ ปวดข้อ ขาบวม ป่วยด้วยโรคหัวใจ หอบหืด เป็นต้น)

( ) 1 ไม่มี

( ) 2 มี ระบุ.....

10. น้ำหนัก.....กิโลกรัม

ส่วนสูง.....เซนติเมตร

BMI =.....$Kg/m^2$

11. ท่านได้รับการวินิจฉัยจากแพทย์ว่าเป็นความดันโลหิตสูงประมาณ.....ปี.....เดือน

12. การรักษาที่ได้รับในปัจจุบัน.....

.....

.....

.....

13. ระดับความดันโลหิต

ระดับความดันโลหิตต่ำสุดก่อนเข้าร่วมโครงการ 2 เดือน

วันที่.....เดือน.....พ.ศ. ..... ความดันโลหิต =.....มิลลิเมตรปรอท

ระดับความดันโลหิตสูงสุดก่อนเข้าร่วมโครงการ 2 เดือน

วันที่.....เดือน.....พ.ศ. ..... ความดันโลหิต =.....มิลลิเมตรปรอท

ความดันโลหิตครั้งปัจจุบัน

วันที่.....เดือน.....พ.ศ. ..... ความดันโลหิต =.....มิลลิเมตรปรอท

Copyright by Mahidol University

**ส่วนที่ 2 แบบวัดการรับรู้ความสามารถแห่งตนในการฝึกจิตควบคุมกาย**

**<u>คำชี้แจง</u>**

แบบสอบถามชุดนี้มีวัตถุประสงค์ เพื่อต้องการทราบถึงความมั่นใจในความสามารถของท่านที่จะฝึกบริหารร่างกายด้วยโยคะเพื่อผ่อนคลายความเครียดและลดระดับความดันโลหิต

โปรดอ่านข้อความทางซ้ายมือ และทำเครื่องหมาย ✓ ลงในช่องคำตอบทางขวามือตามความรู้สึกของท่านซึ่งคำตอบของท่านไม่มีการตัดสินว่าถูกหรือผิด โดยมีเกณฑ์การตอบคำถาม ดังต่อไปนี้

| | |
|---|---|
| มั่นใจมากที่สุด | หมายถึง ข้อความนั้นท่านมีความมั่นใจมากที่สุด ว่าจะสามารถฝึกโยคะได้ |
| มั่นใจมาก | หมายถึง ข้อความนั้นท่านมีความมั่นใจ มากว่าจะสามารถฝึกจิตโยคะได้ |
| มั่นใจปานกลาง | หมายถึง ข้อความนั้นท่านมีความมั่นใจปานกลาง ว่าจะสามารถฝึกโยคะได้ |
| มั่นใจน้อย | หมายถึง ข้อความนั้นท่านมีความมั่นใจน้อยว่าจะสามารถด้วยฝึกโยคะได้ |
| ไม่มั่นใจเลย | หมายถึง ข้อความนั้นท่านไม่มีความมั่นใจเลย ว่าจะสามารถฝึกจิตโยคะได้ |

Copyright by Mahidol University

| ข้อความ | ความมั่นใจ | | | | | สำหรับผู้วิจัย |
|---|---|---|---|---|---|---|
| | มากที่สุด | มาก | ปานกลาง | น้อย | ไม่มั่นใจ | |
| 1. ท่านมีความมั่นใจว่าจะสามารถ..... ..... | | | | | | |
| 2. ถึงแม้ท่านมีภาระ..... ..... | | | | | | |
| 3. ท่านมั่นใจว่าท่านสามารถ..... ..... | | | | | | |
| 4. ท่านมั่นใจว่าท่านสามารถ..... ..... | | | | | | |
| 5. ท่านมั่นใจว่าสามารถฝึกโยคะโดย..... ..... | | | | | | |
| 6. ท่านมั่นใจว่าท่านสามารถ..... ..... | | | | | | |
| 7. ท่านสามารถตัดสินใจที่จะ..... ..... | | | | | | |
| 8. ถึงแม้ท่านจะรู้สึกเหนื่อย ..... ..... | | | | | | |
| 9. ถึงแม้ท่านรู้สึก..... ..... | | | | | | |
| 10. ท่านมั่นใจว่าท่านสามารถ..... ..... | | | | | | |
| 11. ท่านมั่นใจว่าสามารถ..... ..... | | | | | | |

**ส่วนที่ 3** แบบวัดความเครียดในผู้ป่วยความดันโลหิตสูง

**<u>คำชี้แจง</u>** โปรดทำเครื่องหมาย ✓ ลงในช่องแสดงระดับอาการที่เกิดขึ้นกับตัวท่านตามความเป็นจริงมากที่สุดในระยะเวลา 2 เดือนที่ผ่านมานี้ ท่านมีอาการ ความรู้สึก หรือพฤติกรรมต่อไปนี้มากน้อยเพียงใด

| อาการ พฤติกรรมหรือความรู้สึก | ระดับอาการ | | | | สำหรับ |
|---|---|---|---|---|---|
| | ไม่เคยเลย | นานๆ ครั้ง | บางครั้ง | ทุกวัน | ผู้วิจัย |
| 1. นอนไม่หลับเพราะ..... | | | | | |
| 2. รู้สึก..... | | | | | |
| 3. ทำอะไรไม่ได้..... | | | | | |
| 4. มีความ..... | | | | | |
| 5. ไม่อยากพบ..... | | | | | |
| 6. ปวดหัวข้างเดียว..... | | | | | |
| 7. รู้สึก..... | | | | | |
| 8. รู้สึก..... | | | | | |
| 9. รู้สึก..... | | | | | |
| 10. กระวนกระวาย..... | | | | | |
| 11. รู้สึกว่า..... | | | | | |
| 12. รู้สึก..... | | | | | |
| 13. รู้สึก..... | | | | | |
| 14. มีอาการ..... | | | | | |
| 15. เสียงสั่น ..... | | | | | |
| 16. รู้สึก..... | | | | | |
| 17. ปวดหรือ..... | | | | | |
| 18. ตื่นเต้น..... | | | | | |
| 19. มึนงง ..... | | | | | |
| 20. ความสุข..... | | | | | |

# APPENDIX E

**เครื่องมือที่ใช้ในการทดลอง**

a. โปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิตในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ
b. คู่มือให้ความรู้เรื่อง มารู้จักโรคความดันโลหิตสูงกันเถอะ
c. คู่มือฝึกจิตควบคุมกายด้วยโยคะ
d. ปฏิทินบันทึกการฝึก
e. คู่มือวัดความดันโลหิตสำหรับเจ้าหน้าที่

Copyright by Mahidol University

**a. โปรแกรมฝึกจิตควบคุมกายต่อความเครียดและความดันโลหิต ในผู้ป่วยความดันโลหิตสูงชนิดไม่ทราบสาเหตุ**

**(CD ท้ายเล่ม)**

Copyright by Mahidol University

**b. คู่มือให้ความรู้เรื่อง มารู้จักโรคความดันโลหิตสูงกันเถอะ**
**(CD ท้ายเล่ม)**

Copyright by Mahidol University

**c. คู่มือฝึกจิตควบคุมกายด้วยโยคะ**

**(CD ท้ายเล่ม)**

Copyright by Mahidol University

**d. ปฏิทินบันทึกการฝึก**

**(CD ท้ายเล่ม)**

Copyright by Mahidol University

**e. คู่มือวัดความดันโลหิตสำหรับเจ้าหน้าที่**

**(CD ท้ายเล่ม)**

Copyright by Mahidol University

# BIOGRAPHY


| | |
|---|---|
| **NAME** | Walaiporn Rungrueang |
| **NAME OF BIRTH** | 23 September 1975 |
| **PLACE OF BIRTH** | Udonthani Province, Thailand |
| **INSTITUTIONS ATTENDED** | Udonthani Nursing Collage, 1997 |
| **POSITION & OFFICE** | Nonghan Hospital, Udonthani.<br>Thailand 41130<br>Position: Nurse<br>TEL. 0-42-261-136<br>Email: walai_er@hotmail.com |
| **HOME ADDRESS** | 333 Moo 10 TambonNonghan<br>Nonghan, Udonthani Province,<br>Thailand 41130 |


Copyright by Mahidol University