

CHAPTER 1

INTRODUCTION

Background and significance of study

Although medical science has been developing rapidly in recent times, hypertension is still an important public health problem. It is the most common risk factor for cardiovascular and cerebrovascular disease in both developed and developing countries (Cunningham, 2000; Kaplan, 1998). It has become a significant public health problem all over the world. The morbidity of hypertension in Thailand has increased due to changes in the environment and life style of Thai people because of changes in society, economy, technology, marketing, communication, and transportation in the country (Rakpau & Duangkumsawas, 1997).

In Thailand, the Ministry of Public Health reported that for every 100,000 people the morbidity rate of hypertension increased from 147 in 1996 to 158 in 1997, and to 169 in 1998 (National Library of Thailand, 2001). The report also indicated that hypertension was one of the five most common diseases causing death in 1990-1995 (Ministry of Public Health, 1996; National Library of Thailand, 2001). It has become a major health problem because it is one of the leading causes of coronary artery disease, cerebrovascular accident, and renal failure, a result of which can be disability leading to a chronic non- curable illness (Beyea, 1999; Christensen & Kockrow, 1999). From 1997-1998 cardiovascular disease was the leading cause of death in Thailand (National Library of Thailand, 2001).

Persons with hypertension often have no symptoms and may be unaware of the problem until their blood pressure increases to such a level that damage has already occurred to organs such as the heart, brain, kidney, and aortic artery (World Health Organization Expert Committee, 1996). Often high blood pressure or hypertension is found accidentally after patients consult their doctors for unrelated problems. Many patients refuse to believe it when they are told that they have hypertension or high blood pressure because they have previously felt perfectly well (Reeves, 1995). That is why, hypertension is known as the silent killer. The asymptomatic condition can continue until organ damage occurs as a result of vascular changes in blood vessels, particularly in the eyes, kidney, heart, and brain (Roach, 2001). These changes contribute to congestive heart failure, renal failure, cerebrovascular accident, paralysis, and possible death (Beyea, 1999; Joint National Committee, 1997; Kaplan, 1998). Hypertension is a chronic disease that cannot be completely cured but controlled with pharmacologic and/or non-pharmacologic therapies. Therefore, those who take medication for long time need a lot of money to pay for medical services. If they have little or no income, they may have economic problems (World Hypertension League, 1995). Therefore, hypertension can have many consequences; physiological, psychological, and economical problems (Hwu, 1995; Power & Jallowice, 1987; World Health Organization Expert Committee, 1996).

Although, the cause of essential hypertension is unknown, there are multiple risk factors associated with high blood pressure, both nonmodifiable and modifiable risk factors. Stress is a modifiable risk factor that is a hallmark for developing hypertension due to its effect on arterial blood pressure and neuroendocrine reactions (Lam, 2002). Stress increases sympathetic nervous system activity resulting in increased heart rate and

vasoconstriction, which leads to an increase in blood pressure (Izzo, 1999). Unfortunately, stresses cause hypertension and hypertension produces more stress (Pollock, Christain, & Sands, 1990). In addition, the study of Sritirakul, Nuntawan, Thrakul, Bullangpo, and Paonibol (1999) demonstrated that stress is a factor related to the failure of controlling hypertension.

There are two methods for controlling blood pressure: pharmacologic and nonpharmacologic approaches (Joint National Committee, 1997). Management of hypertension requires not only antihypertensive medications (pharmacologic) but also needs compliance from patients to avoid unnecessary risk factors and make lifestyle modifications (nonpharmacologic). The goal of management is to reduce morbidity, mortality and control blood pressure to below 140 / 90 mmHg, which may be achieved by life style modification or with a pharmacological approach. Some lifestyle modifications are weight reduction, salt restriction, reduction of alcohol intake, smoking cessation, increased physical activity, and stress management (Joint National Committee, 1997; LeMonc & Burke, 2000; Smeltzer & Bare, 2000; Spence, Barnett, Linda, Ramsden, & Taenzer, 1999). Effective stress management techniques can reduce stress and also blood pressure. Examples of these techniques are relaxation, biofeedback, Qi-gong, and yoga (LeMonc & Burke, 2000; Malathi & Damodaran, 1999; Pirasorn, 1998).

Yoga is known to help in the reduction of stress as well as blood pressure. It breaks the vicious circle of stress by calming the mind and diffusing stress whereas other nonyogic relaxation methods fail to do this due to a lack of awareness in which the mind becomes active and prevents further relaxation (Nagarathna, Nagendra, & Monro, 1995). Yoga originated in eight limbs; yama, niyama, asana, praniyama, pratyahara, dharana,

dhyana, and samadhi. Together these cover the basic guidelines regarding how to live a meaningful and purposeful life. Additionally, relaxation after asana is necessary of yoga practice (Nagarathna, Nagendra, & Monro, 1995). Therefore, this study focuses on yoga asana, pranayama, and deep relaxation. Practising yoga asanas helps to elongate and strengthen muscles. The stretching and range of joint motions also helps decrease muscle tension and joint stiffness as well as improving body mechanism. The regular practice of yoga asanas relaxes muscles, massages internal organs, and promotes circulation, which balances the hormonal secretions from various glands (Anandamitra, 2000) and maintains an equilibrium in the functioning of endocrine glands (Nagarathna, Nagendra, & Monro, 1995). Particularly, the balanced functioning of the pineal gland leads to the secretion of melatonin, which reduces the effects of stress and improves the functioning of the immune system. Improving adrenal cortex function leads to the secretion of aldosterone, which is responsible for salt and water balance, and the maintenance of a normal blood pressure.

The breathing technique (pranayama) another component of yoga, helps harmonize and balance the flow of prana, which is the life energy that flows through the body resulting in calmness and relaxation of the body and mind (Nagarathna, Nagendra, & Monro, 1995). Disease can arise from prana obstruction (Anandamitra, 2000). The slow controlled deep breathing practiced during yoga also brings a profound sense of relaxation (Anandamitra, 2000). Additionally, pranayama practice leads to reduced blood pressure by ensuring the flow of prana through the higher chakras to regulate the working of glands together with nerve cells thereby improving their performance and balancing the secretion of hormones which directly relates to stress and blood pressure reduction.

Deep relaxation brings about physiological responses that oppose the flight or fight stress response resulting in decreased sympathetic activities and the dominance of parasympathetic activities (Malathi & Damodaran, 1999). Heartbeat and blood pressure are decreased by parasympathetic activities (Bullock, 1999). Therefore, practicing asanas, pranayama, and deep relaxation can lead to an increase in physical strength, flexibility, stamina, regular hormone secretion, fostering self-awareness, emotional stability, and peace of mind with the result being a decrease in stress and blood pressure (Anandamitra, 2000; Collins 1998; Nagarathna, Nagendra, & Monro, 1995; Schumacher, 2000; Trefny, 2000).

Research on the therapeutic effects of yoga on the reduction of stress (Bera, Gore, & Oak, 1998; Malathi & Damodaran, 1999; Telles & Naveen, 1997) or blood pressure (Murugesan, Govindarajulu, & Bera, 2000; Selvamurthy, et al., 1998) have been conducted in many countries. However, in Thailand, there have been no specific studies that focused on a yoga program to reduce both stress and blood pressure among persons with hypertension. The relationship between stress and hypertension has been well documented (Frizzell, 1999; Joint National Committee, 1997). The physiological effects of stress, – the adrenergic responses of the vascular system increasing the pumping force of the heart to get blood through the constricted vessels, result in increased blood pressures (Izzo, 1999). Yoga as a type of complementary therapy is becoming more popular in Thailand. Hence, it would be beneficial to develop a yoga program that is congruent to Thai people's way of life, particularly one aimed at reducing both stress and blood pressure in hypertensive Thai people. Importantly, the Ninth National Economic and Social Development Plan in Thailand promotes the integration of complementary

therapies and local wisdoms into the mainstream health service in order to provide Thai people with more choices for health care and to strengthen their self reliance (Ministry of Public Health, 2002). Studying the effects of a tailored yoga program on the stress and blood pressure of persons with hypertension is critical to realizing the value of non-pharmacological therapies on a disease state that demands utilization in practice.

Objective of the Study

To identify the effect of the Yoga program on the reduction of stress and blood pressure among Thai people with hypertension

Research Questions

1. Is there a difference in the mean stress scores of persons with hypertension before and after practising the Yoga program?
2. Is there a difference in the mean stress scores of persons with hypertension practising the Yoga program (the experimental group) and those who do not (the control group)?
3. Is there a difference in mean systolic and diastolic blood pressure of persons with hypertension before and after practising the Yoga program?
4. Is there a difference in mean systolic and diastolic blood pressure of persons with hypertension practising the Yoga program (the experimental group) and those who do not (the control group)?
5. Is there a difference in the mean heart rate and respiratory rate of persons with hypertension before and after practising the Yoga program?

6. Is there a difference in mean heart rate and respiratory rate of persons with hypertension practising the Yoga program (the experimental group) and those who do not (the control group)?

7. Is there a difference in the mean body mass index of persons with hypertension before and after practising the Yoga program?

8. Is there a difference in mean body mass index of persons with hypertension practising Yoga program (the experimental group) and those who do not (the control group)?

Hypotheses

There would be a difference in stress mean scores and blood pressure levels before and after practising the Yoga program.

1. The posttest mean stress scores of persons with hypertension (experimental group) would be lower than that of pretest and of the control group.

2. The posttest mean systolic and diastolic blood pressure of persons with hypertension (experimental group) after practising the Yoga program would be lower than that of pretest and of the control group.

3. The posttest mean heart rate and respiratory rate of persons with hypertension (experimental group) after practising the Yoga program would be lower than that of pretest and of the control group.

4. The posttest mean body mass index of persons with hypertension (experimental group) after practising the Yoga program would be lower than that of pretest and of the control group.

Conceptual Framework of the Study

Concepts of stress based on Selye (1976), the principle of practice based on Nagarathna, Nagendra, and Monro (1995), and social cognitive theory of Bandura (1997) were used. Stress is defined as the nonspecific response of the body to any demand that is an endogenous or exogenous stressor. Increased demand, to which the body responds both physiologically and psychologically, results in physiological, psychological, and behavioral changes. People's response to stress is the activation of the sympathetic nervous system to release epinephrine and nor-epinephrine into the blood stream causing an increased heart rate, vasoconstriction, and increased systemic vascular resistance, which elevate the blood pressure (Ignatavicius, 1999; Izzo, 2000). While under stress, the hypothalamus also stimulates the posterior pituitary gland resulting in the secretion of antidiuretic hormone (ADH), which promotes water retention, leading to increased stroke volume. ADH also acts as a powerful peripheral vasoconstrictor, resulting in decreased vessel size, and increased blood pressure (Frizzell, 1999). Emotional stress can raise blood pressure acutely (JNC, 1997; Kaplan, 1998). Each day, individuals may encounter stressful situations, as there are so many different types of stressors, such as exposure to heat, cold, noise, and other environmental conditions. Additionally, all the lifestyle modifications recommended to hypertensive patients can cause stress; diet, such as salt restriction diet, regular exercise, and avoidance of smoking and alcohol consumption.

According to Nagarathna, Nagendra, and Monro (1995), yoga practice helped to break the vicious circle of stress by working on the mind and body to reduce stress. Yoga can control the fluctuations of the mind by strengthening one's attention resulting in

calmness. Stress reduction through practising yoga asanas, pranayama, and relaxation help to relax body and mind and further lower the blood pressure level in persons with hypertension. A regular yoga asanas practice can result in increased strength, endurance, flexibility, and balance of the glandular secretions (Anandamitra, 2000). In addition, yoga practice massages internal organs, such as the pineal and adrenal glands, improving the function and resulting in more balanced functioning. As the balance, in the pineal gland improves the secretion of melatonin increases leading to stress reduction and improvements in the body's immune function (Anandamitra, 2000). Improved adrenal cortex function leads to the secretion of aldosterone that is responsible for salt and water balance, which directly influences blood pressure.

Practicing pranayama with controlled, deep and long breathing leads to increased oxygen uptake and improved carbon dioxide release resulting in chemical changes in the blood that affect chemoreceptors located in the carotid bodies (Bullock, 1999) The response is sympathetic inhibition, which affects the release of adrenaline from the adrenal medulla and as a result, blood pressure and heartbeat are decrease, and the mind calms. Moreover, pranayama acts directly to balance prana inwardly through the chakra system and upward to the crown chakra (sahasara) (Singh, 1998). Balancing of prana through the chakras regulates the glands along with the nerve cells to work better together resulting in a balanced body and mind and hence blood pressure reduction. Deep relaxation works opposite to the fight or flight response by activating the parasympathetic nervous system and stabilizing the disruptive effects of the fight or flight stress response, resulting in reduced respiratory and heart rate and blood pressure (Ignatavicius, 1999).

According to Bandura (1997), human learning cognitive is a complicated process as people have efficacy expectations influencing their own behaviors through outcome expectation. People who have high self- efficacy are more likely to maintain protective health behaviors than those with low self- efficacy (Grembowski, et, al., 1993 cited in Bandura, 1997). Vicarious experience, live model and symbolic model, are modalities influencing self- efficacy (Rankin & Stallings, 2001). The live model is directly observed from reality and personal capacity, while the symbolic model is indirectly observed through media, such as handbooks and cassette sound tape used as positive guides for performance (cited in Mulmeang, 1998). Therefore, in this study health informational support about hypertension and stress management was given through booklets and cassette tapes. They were used to induce self–efficacy among persons with hypertension for enhancing their behaviors in reduction of stress and blood pressure.

Definition of Terms

1. Blood pressure is the brachial arterial pressure that is the force applied against the walls of arteries as the heart pumps blood through the body and can be indirectly measured by a digital blood pressure manometer. Blood pressure has two readings to reflect the working of the heart and the arterial walls.

1.1 Systolic blood pressure (SBP) is the pressure ejected on the arterial walls as the heart muscle pumps and forces the volume of blood through the vessels.

1.2 Diastolic blood pressure (DBP) is the pressure in the arterial walls when the heart has completed the pumping stroke and is relaxing.

2. A person with hypertension is someone who has a systolic blood pressure of 140 mmHg or greater and/ or a diastolic blood pressure of 90 mmHg or greater after repeating the measurement at least three times over a period of five minutes. This includes the classification of mild or moderate hypertension as made by the Joint National Committee (1997).

2.1 Mild hypertension: was a systolic blood pressure of 140-159 mmHg or diastolic blood pressure 90-99 mmHg.

2.2 Moderate hypertension: a systolic blood pressure 160-179 mmHg or diastolic blood pressure 100-109 mmHg.

2.3 Severe hypertension: a systolic blood pressure greater than 180 mmHg or diastolic blood pressure greater than 110mmHg.

3. The Yoga program consisted of two parts; informational support through a booklet, and yoga practice.

3.1 Informational support refers to the health information that the researcher provided to the experimental group of person with hypertension and included information on stress management based on the yogic principles of Nagarathna, Nagendra, and Monro (1995) and the Central Council for Research in Yoga and Naturopathy (1999). The information was collated by the researcher.

3.2 Yoga practice refers to the yoga asanas, pranayama, and deep relaxation to balance body and mind based on Nagarathna, Nagendra, and Monro's framework (1995).

3.2.1 The Asanas comprised 14 postures. These postures were Lotus pose, Symbol of yoga, Joint exercise, Corpse pose, Bow pose, Fish pose, Crocodile pose,

Cobra pose, Vajrasana pose, Head-to-knee pose, Twisting pose, Mountain pose, Wheel pose, and Yoni mudra pose.

3.2.2 Pranayama is the controlled breath of Nadi-shodhana and yogic complete breath.

3.2.3 Deep relaxation was practiced through the Corpse pose to receive complete benefit at the end of the asana practice.

4. Stress is defined as the body response to any stressor placed on it that disrupts the person's equilibrium resulting in physical, psychological, and behavioral changes. Individuals respond differently in their physiological processes of stress as well as their emotional coping or adaptation. In this study Stress Assessment Questionnaire (SAQ) was used to measure a person's perceived stress. The Questionnaire was modified from the Symptom of Stress Inventory proposed by Thammakoon (1989) with permission. The stress level was classified into five levels by using the range of mean scores of stress. The higher mean score reflects high stress whereas a low mean score indicates low stress (Thummakoon, 1989).

Scope of the Study

This research was conducted with persons with hypertension who had been diagnosed by a doctor as having hypertension or a person who had a systolic blood pressure of 140 mmHg or greater and/or a diastolic blood pressure of 90 mmHg or greater after repeating the measurement at least three times, and had a stress mean score greater than 1 as measured by the Stress Assessment Questionnaire. Any person with hypertension who met the inclusion criteria and agreed to practise Yoga according to the

program was invited to participate in the study. The program was implemented in Songkhla Province, Thailand

Expected Outcomes of the Study

1. The results of this study will provide knowledge for nurses to educate hypertensive patients and their families about yoga practice in order to reduce stress and blood pressure.

2. The results may help promote self-confidence regarding yoga practice and stress management among hypertensive patients.

3. The Yoga program developed in this study could be used or further modified for stress measurement in persons with other diseases especially chronic diseases that often induce stress in the course of the illness.

4. To encourage the practice of yoga in daily life and help maintain body-mind-spirit balance resulting in health promotion.