



## CHAPTER II

### LITERATURE REVIEW

In order to develop self-care promotion program to improve self-care practices for patients with hypertension, three related issues are reviewed.

2.1 The nature of cardiovascular disease and hypertension

2.2 Epidemiology of hypertension in developed and developing countries

2.3 Self-care program to improve self-care practices

#### 2.1 THE NATURE OF CARDIOVASCULAR DISEASE AND HYPERTENSION

Diseases of cardiovascular and cerebrovascular are the highest risks to life for most people. The majority of circulatory diseases including hypertension, coronary heart disease, cerebrovascular diseases and diseases affecting the muscle are found in developing countries. Circulatory diseases were estimated to account for 25% of all deaths in developing countries (WHO, 1997).

##### 2.1.1 Definition of hypertension:

Hypertension is defined as a systolic blood pressure (SBP) of 140 mmHg or greater and/or diastolic blood pressure (DBP) of 90 mmHg or greater in subjects to

those who are not taking antihypertensive medication after repeated measurement (WHO, 1999).

### 2.1.2 Causes of hypertension

1. **Essential hypertension or primary hypertension:** The cause of this hypertension cannot be determined. It is a multifactorial characteristic in which there is a complex interplay between environment and genetic factors.
2. **Secondary hypertension:** The increased pressure is resulted from some of these following complications:
  - Medications, which include birth control pills, cold remedies, decongestants, over-the-counter pain relievers and some prescription drugs
  - Kidney disease
  - Adrenal disease
  - Thyroid disease
  - Abnormal blood vessels
  - Preeclampsia, a significant increase in blood pressure during the last 3 months of pregnancy
  - Use of illegal drugs such as cocaine and amphetamines

### 2.1.3 Risk factors

1) **There are four major risk factors of high blood pressure that cannot be controlled:**

- **Age:** The risks of high blood pressure rise steeply with increasing age.
- **Race:** High blood pressure is more common in black than in white.

- **Gender:** Men have high blood pressure in young adulthood and early middle age. When getting older, at the age of 65 and older, the rate for women surpasses those for men.
- **Family history:** High blood pressure tends to run in families.

## 2) The risk factors that can be controlled or managed include:

- **Obesity:** The more the body mass is, the more blood will be needed to supply oxygen and nutrients to the tissues. The volume of blood circulated through blood vessels increases, creating extra force on artery walls.
- **Inactivity:** Lack of physical activity increases the risk of high blood pressure. Inactive people also tend to have higher heart rate. Their heart muscles have to work harder with each contraction to increase the force on the arteries.
- **Tobacco use:** The chemicals in tobacco can damage the lining of artery wall that causes the arteries to accumulate plaques. Nicotine also constricts blood vessels and forces heart to work harder.
- **Sodium sensitivity:** People who are sodium sensitive retain sodium more easily, leading to fluid retention and increased blood pressure.
- **Low potassium:** Potassium is a mineral that helps balance the amount of sodium in cells. Excess in potassium can accumulate too much sodium.
- **Excessive alcohol:** The reasons of how and/or why alcohol increases blood pressure are not understood, but heavy drinking can damage the heart muscle.
- **Stress:** High level of stress can lead to a temporary increase in blood pressure.

## 2.1.4 Consequences of Hypertension

### a) Organ Damage due to Hypertension

Major targets of destructive complications of chronic hypertension are heart, cerebrovascular system, aorta and peripheral system, kidney, and retina.

1. **Heart:** The high arterial pressure (heightened after load) increases the wall tension of the ventricle, which compensates through hypertrophy. Left ventricular hypertrophy has been shown to be one of the strongest predisposing factors of cardiac morbidity in hypertension. The degree of hypertrophy correlates to the development of congestive heart failure, angina arrhythmias, myocardial infarction, and sudden cardiac death.

Chronic hypertension is a major contributor to the development of myocardial infarction. These complications reflect the combination of accelerated coronary arteriosclerosis (decrease myocardial oxygen supply) and the high systolic workload (increase oxygen demand). Not only acute myocardial infarction is common among hypertensive, but the former also has a higher incidence of post myocardial infarction complications. Post myocardial infarction complications are rupture of the ventricular aneurysm, and congestive heart failure. In fact, 60 percent of patients who died had a history of hypertension. The patients with hypertension between 40-59 years are high risk of blood pressure vessel to be constricted more than normal people 3 times and at 6 times in women (WHO, 1999).

2. **Cerebrovascular System:** Hypertension is one of major modifiable risk factors in stroke prevention (cerebrovascular accidents, or cardiovascular disease (CVAs)). Although, diastolic is important, the magnitude of systolic pressure has been the most closely linked to CVAs.

The stroke is diminished by treating hypertension and contributed to 50 percent reduction in mortality attributed to cerebrovascular event in the past two decades.

3. **Kidney:** Hypertension-induced nephropathy (nephrosclerosis) is a leading cause of renal failure from damage to the renal vasculature. Mild hypertension rarely leads to renal insufficiency in the absence of other insults to the kidney. However, malignant levels of hypertension can inflict permanent damage to the point that dialysis becomes necessary. One of the consequences of hypertension renal failure is perpetuation of the elevated blood pressure. For example, progressive renal failure compromises the ability of kidney to regulate blood volume that further contributes to chronic blood pressure elevation.

4. **Retina:** High blood pressure induces abnormalities that are collectively termed "hypertensive retinopathy." Severe hypertension that is acute in onset (e.g. uncontrolled and/or malignant hypertension) may burst small retinal vessels, causing hemorrhages, exudation of plasma liquid, and areas of local infarction. Retinal ischemia caused by hemorrhage leads to more patchy loss of vision. With more severe chronic hypertension, arterial sclerosis is evident as an in crazed, reflection of light through the ophthalmoscope. Even though these changes are not major functional

impacts, they indicate that the patient has had long-standing poorly controlled hypertension.

### **b) Social and Economic Consequences**

Clinical care of Cardiovascular Disease (CVD) is costly and prolonged. The direct costs divert the scarce family and societal resources to medical care. CVD affects individuals in their peak mid life years--disrupting the future of who was affected with CVD and undermining the development of nations by depriving valuable human resources in their most productive years. In developed countries lower socioeconomic groups have greater prevalence of risk factors, higher incidence of disease and higher mortality. In developing countries as the CVD epidemic matures, the burden will shift to lower socioeconomic groups.

#### **2.1.5 Treatment of Hypertension**

The goal of hypertension treatment and management is to prevent complications and help the patient live their life happily with the disease. This may be accomplished by achieving and maintaining SBP 140 mmHg and DBP below 90 mmHg, and lower if tolerated, and controlling other modifiable risk factors of cardiovascular disease. Treatment to lower levels may be useful, particularly to prevent stroke, and to prevent heart failure progression. That can be achieved by lifestyle modification, alone or with medication.

Having assessed the patient and determined the overall risk profile, including the level of blood pressure evaluation, the physician will determine whether the

at low, medium, high or very high risk of cardiovascular disease. This will help the physician to determine the proper treatment.

**a) Pharmacologic Treatment.** The decision to initiate pharmacologic treatment requires consideration of several factors: the degree of blood pressure elevation, the presence of target organ damage, and the presence of clinical cardiovascular disease or other risk factors. From the study of Heager and team in 1998 it was found that after having the medicine for 1 year, the patients with essential hypertension had lower blood pressure and blood vessel would be thicker. (Heagerty, et al, 1998)

The six main drug groups used world wide for blood pressure lowering treatment are diuretics,  $\beta$  blocker, calcium antagonists, ACE inhibitors, angiotensin II antagonists and  $\alpha$ -adrenergic blockers.

1. *Diuretics* one of the most valuable groups of antihypertensive drugs.
2.  *$\beta$  blocker:*  $\beta$ -adrenoceptor-blocking drugs are safe, cheap and effective when used as monotherapy or in combination with other drugs.
3. *Calcium antagonists:* All sub-groups of antagonists are effective and well tolerated in lowering blood pressure.
4. *Angiotensin II antagonist:* Antagotensin II receptor antagonist is the last major group of antihypertensive drugs to become generally available.

5.  *$\alpha$ -Blocker*:  $\alpha$ -Blockers are also effective to lower blood pressure. Their main side effect is postural hypotension, which might be a particular problem in the elderly patients.
6. *ACE-inhibitors*. ACE inhibitors are safe and effective in lowering blood pressure.

### **b) Lifestyle Modification**

The best strategy for controlling and preventing high blood pressure is to begin with lifestyle changes. Lifestyle changes can be weight reduction, reduction of excessive alcohol consumption, reduction of high salt intake and increase in physical activity.

Lifestyle modifications are required for preventing hypertension. The study by Gonzalez-Fernandez, R. et al. (1990) had shown that lifestyle changes were effective in lowering blood pressure, and reducing other cardiovascular risk factors with little cost and at minimal risk. Even if lifestyle modifications alone are not adequate to control hypertension, they may reduce the number and dosage of hypertensive medications. (Gonzalez-Fernandez, R. et al. ,1990)

Seven lifestyle changes/ modifications that may be applied are:

**1) Smoking cessation:** It is the single most powerful lifestyle measure for the prevention of both cardiovascular and non-cardiovascular diseases in patients with hypertension. Using tobacco can lead to more cholesterol and other fatty deposits in arteries and promote the constriction of blood vessels.



**2) Weight reduction:** Excess of body fat contributes to blood pressure level.

Weight reduction, as little as 5 kg, reduces blood pressure in a large proportion of hypertension, and has a beneficial effect on associated risk factors such as insulin resistance, diabetes, hyperlipidemia and ventricular hypertrophy medication. Body Mass Index (BMI) is a helpful indicator of obesity and underweight. It is calculated from body weight in kilograms divided by the height in meters squared.

**3) Limit alcohol:** Reduction of alcohol consumption can reduce blood pressure. There is a linear relationship between alcohol consumption, blood pressure levels, and the prevalence of hypertension in population. Therefore, patients with hypertension should be advised to limit their consumption, not more than 1 drink (1 ounce of pure alcohol a day). Women and lighter-weight persons should drink no more than an ounce of pure alcohol a day.

**4) Reduction in salt intake:** Epidemiology studies suggest that dietary salt intake contributes to blood pressure elevation and to the prevalence of hypertension (Law, M.R., 1997). The effect appears to be enhanced by a low dietary intake of potassium containing food. Patients should avoid adding salt such as salted foods and processed foods, but eat cooked food that has natural ingredients.

**5) Dietary changes.** Vegetarians have lower blood pressure than meat eaters. Vegetarian dietary patterns can lower blood pressure in patients with hypertension (Margetts, B.M., et al, 1986). A series of controlled dietary trials will be effective

when combined with fruit, vegetable, fiber and low saturated fat intake.. Patients with hypertension should eat more fruits, vegetables, and fish, and reduce fat intake.

**6) Increase physical activity:** Patients with hypertension should keep up with aerobic exercise or regular exercise, for example brisk walk or swim for 30 to 40 minutes, 3 or 4 times a week. Some form of exercises such as running or jogging may lower the systolic pressure by 4-8 mmHg (Arakawa. K., 1993). Isometric exercise like heavy weight lifting can have a pressure effect; therefore, the patients should avoid.

**7) Stress Management:** The effects of stress are usually only temporary. On the other hand, it can increase blood pressure if the patients experience stress regularly. The stress has impact on arteries, heart, brain, kidneys and eyes. The patients should learn how to make daily routine less stressful by getting organized, simplifying schedule, maintaining good social relationship, and practicing positive thinking. Furthermore, relaxation techniques such as meditation, deep breathing exercises, and muscle relaxation exercises should be introduced for stress management.

## **2.2 EPIDEMIOLOGY OF HYPERTENSION IN DEVELOPED AND DEVELOPING COUTRIES**

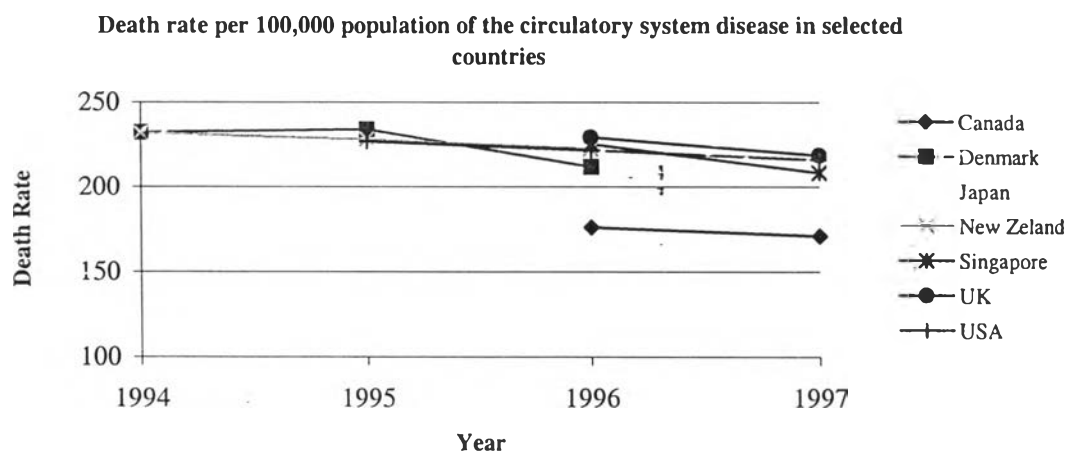
There is an evidence that the death and disability from CVD and cerebrovascular disease are increasing so rapidly in parts of the world and ranked the first and fourth respectively as causes of global burden by the year 2020 (Murray, C. & Lopz, A, 1996). It is clear that one of the biggest challenges facing public health

authorities and medical practitioners is the control of hypertension worldwide. In this part, the death rate of circulatory system will be presented.

### 2.2.1. Hypertension in developed countries

Heart disease is a leading cause of death; however, the death rates have decreased significantly for all ages in the past few decades. There are many possible reasons for this dramatic decrease. For instance, rates of smoking among adults have decreased, thereby reducing a major risk factor for heart disease and stroke. Decreases in cholesterol and blood pressure, and other risk factors for heart disease may also attribute to the decline. Finally, advances in medicine have helped prevent many deaths to major killers of population (CDC Fact Book 2000/2001). The figure 2.1 shows the fact of circulatory disease in selected countries as follows:

**Figure 2.1** The death rate of circulatory system disease in developed countries, 1994-1997



Source: WHO, 1999

In South East Asia, with an average life expectancy of about 60 years, CVDs and cancer are now the two leading causes of mortality. Hypertension has been found in India, Indonesia, and Thailand and affects 15% of the population. (WHO, 1999)

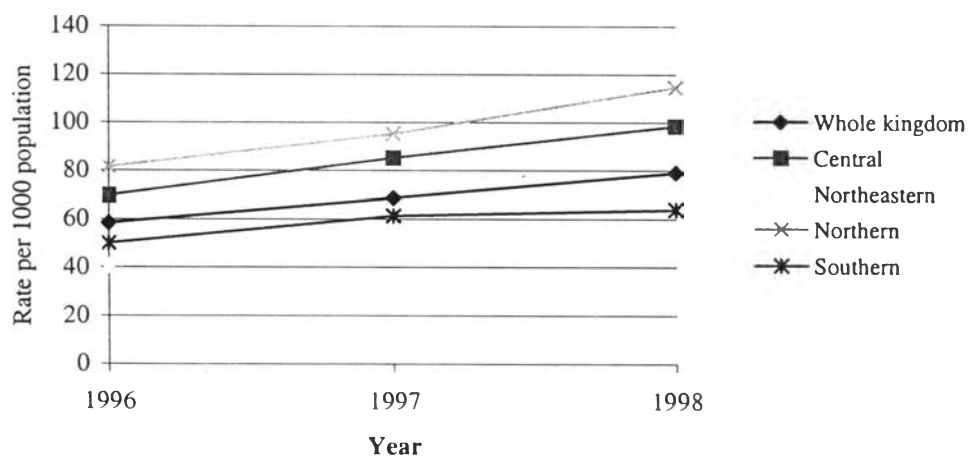
### **2.2.2. Hypertension problem in Thailand**

Hypertension is one of critical health problems since there is no warning sign apparent at the initial stage. It is often detected at later stage when the hypertension condition is already established. Therefore, treatment helps patients to live longer, and less chance in developing other related diseases. However, neglect of hypertension treatment could result in developing other co-related diseases and possibly death.

In Thailand, the prevalence in age group of 13-59 was found to be 17.6%, and 32.4% in the group of 60 years old and above. The prevalence rate increases proportionally with age and body weight. The survey showed that 10.2% of population was aware of the hypertension condition, and 71.3 % of this group received medical treatment (Pradabmuk, P., 1999).

According to Public Health Statistics during 1996-1998, there was significantly increasing trend in number of out-patients visiting with diseases of circulatory system as shown in figure 2.2; and the increase number of in-patients with hypertension shown in figure 2.3.

**Figure 2.2** Rate per 1,000 population of out - patient visiting with diseases of the circulatory system at government hospitals, 1996-1998.

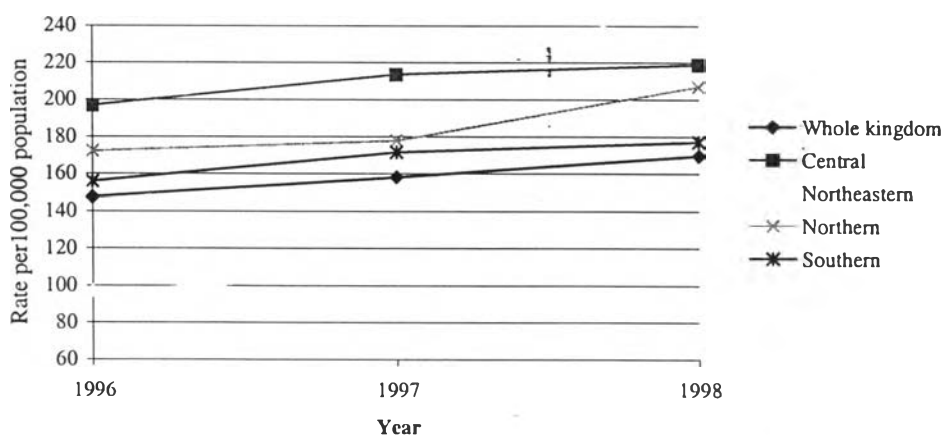


*Source: Public Health Statistics A.D.1998*

*Division of Health Statistics, Bureau of Health Policy and Plan*

*Office of the Permanent Secretary, Ministry of Public Health*

**Figure 2.3** Rate per 100,000 population of in-patients with Hypertension at hospitals, 1996-1998



*Source: Public Health Statistics A.D.1998*

*Division of Health Statistics, Bureau of Health Policy and Plan*

*Office of the Permanent Secretary, Ministry of Public Health*

## 2.3 SELF-CARE PROGRAM TO IMPROVE SELF-CARE PRACTICE

### 2.3.1 Levels of Intervention

O' Donnell (1995) has identified these following three levels of interventions:

**Level I: Awareness.** Programs that gain clients' knowledge or interest in health related areas are considered to be awareness-level program. Most often, these types of efforts should be accompanied by additional strategies in order to have impact on individuals' lifestyle. Examples of awareness programs include newsletters, E-mail, Posters, fliers, games, and classes or seminars.

**Level II: Lifestyle Change** Programs that provide lifestyle changes and personal behaviors are considered as intervention programs. The programs are promoted through a combination of health education, behavior modification, personalizing of experiences, and feedback opportunities. Examples of lifestyle change programs include smoking cessation, time management, exercise and nutrition education, weight loss, and communication enhancement skills.

**Level III: Supportive Environment.** Supportive environment programs are to create a worksite culture that encourages individuals to adopt or continue a healthy lifestyle. A critical aspect to long-term behavioral change is a good support system. Support can take the form of corporate policy, self-help group, one to one counseling, and fostering a sense of employee ownership. Smoke-free environment is one of the examples of supportive environment. The formation of in-house support group for

weight control, alcohol, drugs, and parent support also indicates supportive environment.

### **2.3.2. Lifestyle modification**

As the goal of treatment of the patient with high blood pressure is to achieve the reduction in mortality and morbidity, all the risk factors such as smoking, raised cholesterol or diabetes should be identified. Even though there is no direct evidence demonstrating that reducing blood pressure through lifestyle can reduce the risk of cardiovascular disease, changing lifestyle with antihypertensive drug can benefit the treatment of hypertension. Therefore, lifestyle modification should be instituted wherever it is appropriate to all patients including those who require drug treatment.

According to the recommendations for management of high blood pressure from WHO 1999, all patients with hypertension should modify their lifestyle. The suggestions on hypertension treatment are life style intervention (diet, weight loss, moderate intense exercise, low-to moderate alcohol use, and avoidance of cigarette) and the use of antihypertensive medications. Lower blood pressure and reduction in the risk of stroke, heart attack, and of all diabetes-related complications of the eyes, kidneys and nerves are consequences of the treatment. In addition, to change in the diet, sodium should be restricted moderately to markedly to 1000 to 2000 milligrams (one to two grams per day). Therefore, diet was even more effective in having lower blood pressure. In order to encourage patients with hypertension to change their lifestyle, the strategies to facilitate must be considered.

### 2.3.3 Strategies for facilitating change

Strategies must be planned to provide opportunities in order to facilitate the behavior change. Some of strategies that might be selected are shown in table 2.1.

Table 2.1: A Summary of Characteristics of Commonly Used Health

#### Education Methods

Methods	Characteristics
<p><b>Behavior Modification</b>  <i>(The modification of specific behavior according to the principles of classical and operant conditioning)</i></p>	<p>High interaction, potential for clinical settings, based on the concepts of stimulus control and management of rewards and punishments, development of psychomotor skills</p>
<p><b>Community Development</b>  <i>(a process-oriented method of community organizing that emphasizes the development of skills, abilities, and understanding in an entire community for the purpose of social improvement)</i></p>	<p>Used with reconcilable interests and compatible social groups (most often used in rural areas), commonly used as a health education method, based on self help principles, to deal with environmental and economic problems, high interaction</p>
<p><b>Individual Instruction</b>  <i>(Counseling, patient education)</i></p>	<p>Personalized, efficient for learner, accommodates individual diagnosis of learning needs, very adaptable for hospital and home use, high interaction between health educators and participants</p>



Table 2.1 A summary of Characteristics of Commonly Used Health Education

Methods (cont.)

Methods	Characteristics
<b>Inquiry Learning</b> (Approach in which students formulate and to test their own hypotheses)	the focus of process of learning, great motivation, able to deal with complex health information, appropriate to all age groups, high amount of time and involvement of the staff and participants are required
<b>Lecture-discussion</b>	Easy to use, essential for critical thinking, economical, adaptable, participants as passive learners
<b>Peer Group Discussion</b> (Use of small groups for educational purpose)	Effective on behavioral change, high interaction among all involved, motivation increase, high amount of time and involvement of the staff and participants are required
<b>Skill Development</b> (Development of specific psychomotor competencies)	the need on procedure, entire group involvement, skill practice , high amount of time and involvement of the staff and participants are required

Source: Dignan, M.B. & Carr, A. P. (1992). *Program Planning for Health Education and Promotion*. 2<sup>nd</sup> edition. p.110.

### Characteristics of Self-Care Promotion

Self-care promotion aims to focus on intervention level II or lifestyle change. The activities of self-care program seek to promote change through a combination of health education as follows:

- a) **Audiovisual aids:** VDO presentation will be used to help the patients with hypertension to be aware of hypertension and complications.
- b) **Peer group discussion:** This strategy will be used in order to encourage members sharing their experiences and to motivate the members to know about complications through group discussion.
- c) **Lecture-discussion:** The passive learning attempt to provide and emphasize the information on severity and vulnerability of the complications.
- d) **Role model:** This strategy tries to support and gain confidence of the patients with hypertension to modify their lifestyle.
- e) **Social support:** As the social and environment are factors that can affect human lifestyle; therefore, this study has integrated activities to support lifestyle modification.
  - *Supporting letter:* The letter will be distributed to remind patients with hypertension about lifestyle modification and to encourage them to participate in activities
  - *Family support:* the family members will be asked to participate in the program so they can understand and support the patients
  - *Follow up by group members:* This method is to encourage the group monitoring. For instance, the members can share some information and experiences on home visits.
  - *Supporting information:* The research team will provide some information and answer the patients' questions.

## **Effective program for blood pressure control:**

Gonzalez-Fernandez and team conducted the study on the patients with hypertension for hospital education program in 1990. Forty-seven hospitalized patients with hypertension had been involved in this study. The study was to examine the study group and control group. As the result, there was a significant reduction in both systolic and diastolic blood pressure and improvement of compliance. (Gonzalez-Fernandez, A.R., et al., 1990).

The intervention program is to focus on three behavioral objectives; pill taking, appointment keeping, and dietary sodium reduction. In 1987, Zisner introduced the educational program to test the efficacy of a patient whether or not it could reduce blood pressure. The results showed that blood pressure decreased in the study group but rose slightly in the control group (Zisner, D.K. et al, 1987). Regarding to Armstrong, Barrark, and Gordon's study in 1995, they found the similar result. (Armstrong, R., Barrark, D., & Gordon, R., 1995).

## **Conclusions**

Hypertension is a chronic disease and a major cause of cardiovascular disease. Uncontrolled hypertension can affect cerebrovascular disease, coronary heart disease, kidney disease and retina disease. Therefore, many studies are focused on health education and lifestyle modification in order to control blood pressure. The patients with hypertension who are able to change their lifestyle such as smoking cessation, weight reduction, limited alcohol consumption, reduction in salt intake, dietary

changes, increase in physical activity and stress management can succeed in controlling blood pressure.

In order to facilitate the lifestyle change, many strategies are needed to be integrated. In this study, self-care program will be studied from literature review and the existing intervention programs at community level, especially the information from the baseline data. Self-care program will enhance the patients to be aware of severity and vulnerability of complications, and help to develop the self-efficacy and response efficacy. In addition, social support will be integral part of the program in lifestyle modification.

Several studies have been done to identify effectiveness of health education and health promotion. The studies were mainly to measure only some items of lifestyle modification, and most of them did the intervention in the hospital. Unlike previous studies, the setting of this study will be in the community. The patients will be encouraged to change their lifestyle through activities. In addition, the involvement of key persons in the community, as one of the strategies, will play important part to assist the program in success. The next chapter will present the concept, research method, and the intervention activities, which will be applied in this study.



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