CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Literature review

In this study, four fields and related studies have been reviewed as follows:

1. Myocardial infarction
2. Health behaviors among myocardial infarction patients
3. Self-efficacy among myocardial infarction patients
4. Relationships between self-efficacy and health behaviors among myocardial infarction patients

Myocardial infarction (MI)

Pathophysiology

Myocardial infarction (MI) is the result of prolonged myocardial ischemia, which causes irreversible cellular damage (Abraham, 1995). It is caused by a sudden blockage, most often secondary to thrombosis, of one or more branches of a coronary artery that interfere with the blood supply to a portion of the myocardium, producing ischemic death of tissue over a period of hours (Hudak, Gallo, & Morton, 1998).

Risk factors for myocardial infarction

The risk factors for MI are classified into three groups: physical, psychological, and social risk factors. Major physical risk factors that cannot be modified include age, heredity and gender. Although 50% of all MI occurs in people under the age of 65, 80% of people who die of MI are 65 years or older (American Heart Association, 1994 cited in Hudak, Gallo, & Morton, 1998). The mortality rate of MI patients aged 70 or younger was 3% to 6%; however in MI patients of 85 years or older the mortality rate was about 35% or higher (Topol, 1988 cited in Roberts, 1995). People with a parent or sibling who developed cardiovascular disease before 55 years of age generally have two to six times the risk of developing cardiovascular disease as those without a family history (Hudak, Gallo, & Morton, 1998). About gender, men have a greater risk for developing coronary artery disease than women at earlier ages (American Heart Association, 1994 cited in Hudak, Gallo, & Morton, 1998). This obvious difference diminishes after menopause. However, even after age 65 years, women continue to be less likely than men to develop coronary artery disease (Stokes, 1990 cited in Black & Matassarin-Jacobs, 1993). In addition, after menopause, women's death rates from coronary artery disease also increase because of the declined estrogen level (American Heart Association, 1994 cited in Hudak, Gallo, & Morton, 1998). Estrogen also has been shown to reduce LDL cholesterol levels and increase HDL cholesterol levels by 10% to 15% (Nabulsi, Follsom, & White, 1993 cited in Ulstad,

1997). Estrogen also has directly beneficial effects on the vasculature particularly through endothelial function (Ulstad, 1997). These vasodilatory effects mediated by the formation and release of endothelium-derived relaxing factor, reduction of endothelial decrepit level, and the promotion of prostacyclin production. It has been evidenced that the lower levels of estrogen, the higher risk of impaired coronary artery endothelial function. Damaged endothelial function lead to thrombosis and occurring MI (Reis, Gloty, & Blumenthal, 1994 cited in Ulstad, 1997).

Major physical risk factors that can be modified include cigarette smoking and high blood cholesterol. Cigarette smoking is the biggest risk factor for MI and sudden death (Hudak, Gallo, & Morton, 1998). According to the American Heart Association, there was a relationship between high cholesterol and the incidence of coronary heart disease throughout the cholesterol levels. A blood cholesterol level in the range of 200 to 239 mg/dl represents a moderate risk but can increase the risk of MI. When the level rises above 240 mg/dl, the risk for coronary artery disease is about double (Hudak, Gallo, & Morton, 1998).

A contributing physical risk factor is diabetes mellitus. Hyperglycemia and diabetes can lead to coronary artery endothelial injury, platelet adhesion and aggregation, arterial smooth muscle cell proliferation, and lipid deposition. All of these effects can impair blood flow, and lead to MI. Data from the Framingham Study stated

that men and women with diabetes had a double and a triple incidence of cardiovascular disease (Allard, 1991). Five percent of diabetic patients have "silent myocardial infarction", with 39% to 42% having no history of chest pain (Allard, 1991). The American Heart Association stated that more than 80% of diabetic patients died from heart or blood vessel disease (American Heart Association, 1994 cited in Hudak, Gallo, & Morton, 1998). The Framingham Study indicated that sudden death and death due to myocardial infarction are 1.5 to 4 times higher in diabetic patients than in non diabetic persons (Allard, 1991).

Regarding psychological factors, Robert (1997) found that there was a relationship between cardiovascular disease and stress, anxiety, and depression (cited in Hudak, Gallo, & Morton, 1998). Byrne's study reported that a type A behavior pattern was associated with the frequency of life-events such as the onset of MI (Byrne, 1981). A study of Channer and colleagues (1988) showed that depressed patients developed earlier ST depression, which is an electrophysiological marker for ischemia (cited in Broome & Llewelyn, 1995).

Regarding social risk factors, unemployment with financial difficulties and family disruption are significant in increasing the incidence of coronary artery disease because these factors are considered as stressors (Broome & Llewlyn, 1995). The responses to stress are the feelings of anxiety, depression and hopelessness, resulting in symptomatic improvement in myocardial ischemia, and the

increase of the risk of life-threatening dysrhythmias and sudden cardiac death for a person who has experienced an acute myocardial infarction (Broome & Llewelyn, 1995).

Consequences of myocardial infarction

Myocardial infarction is a frightening experience that disrupts patients' lives in many ways. Myocardial infarction reduces an individual's physical stamina. Many patients are surprised by the extent of their disability, and have feelings of shame, helplessness, and low self-esteem (Taylor, 1986). Croog (1977) found that after diagnosis of MI, 70% of American patients reported being less active for 12 months (cited in Broome & Llewelyn, 1995).

MI patients also suffer from psychological and social disabilities. Myocardial infarction may lead to a collapse of patients' self-image, nightmares, chronic anxiety, depression, low expectations of regaining health and vigor, and neurotic symptoms. By the late 1970s, it had become apparent that psychological or behavioral reactions to MI were greater barriers to recovery than was the myocardial damage resulting from infarction (Broome & Llewelyn, 1995). Poor adjustment may be related to misperceptions about heart disease. Wynn (1967) analyzed the reasons for unwarranted distress of illness behavior, and judged that 38% of MI patients were primarily upset due to an inadequate understanding of what had happened (cited in Broom & Llewelyn, 1995). Behavioral responses of MI patients include anxiety, denial, depression, anger, guilt,

and sexual aggressiveness. Stressful interactions over the need to modify daily activities can aggravate the patient's perceptions of dependence and exacerbate already existing depression. In MI patients, denial or excessive fear may impair the ability to envision coping alternatives, think flexibly, and evaluate potential solutions against appropriate criteria.

Garrity, Kerr, and Bay (1981) stated that MI patients had intense anxiety and depression, and often experienced unexpected difficulties when they tried to resume normal physical activities, perform family roles, or return to their jobs (cited in Broome & Llewelyn, 1995). Social deprivation is a powerful predictor of both morbidity and mortality in coronary artery disease. Many MI patients in the early months after MI were unable to perform when faced with social pressures and conflicts at home and at work. Failure to return to work and physical restriction can greatly reduce the efficacy and capability to perform social activities (Broome & Llewelyn, 1995). Finlayson and McEwen (1977) found that at 1 year 30% and at 4 years 50% of their sample of post-MI patients reported a reduction in social and leisure activities (cited in Broome & Llewelyn, 1995).

In addition, sexual activity can increase the heart rate, respiratory rate and blood pressure, and cause dysrhythmias and heart attack. The cardiac workload during coitus is similar to that for climbing stairs or walking and the energy expenditure during coitus is similar to that of

climbing two flights of stairs at a brisk rate, or climbing 20 steps in 10 seconds. Thus, sexual activity by people with heart disease is dangerous (Seidl, Bullough, Haughey, Scherer, Rhodes, & Brown, 1991). Changes in the MI patient's frequency of intercourse may be related to the occurrence of symptoms during coitus. Symptoms include angina, hypertension, suffocation, tachycardia, and hyperventilation. Gupta and Singh (1982) studied 150 MI males, and revealed that 26 % experienced symptoms when they returned to sexual activity. Scalzi (1982) studied 100 post-MI patients, 65% of men reported a marked and lasting reduction in the frequency of intercourse, and 10% stated that they had become permanently impotent. The patient's reasons for not resuming sexual relations included a decrease in desire, depression, anxiety, a spouse's decision, and fear of relapse, fatigue, angina, and impotence. Walbroehl (1984) found that fear of death or re-infarction was the most frequently cited reason for not resuming sexual activity. Horgan and Craig (1978) interviewed 100 MI patients and reported that 46% suffered anxiety, 65% of patients felt at risk of re-infarction, 57% of patients reported a reduction in sexual desire (cited in Seidl, Bullougy, Haughey, Scherer, Rhodes, & Brown, 1991). In the study regarding sexual activity in 100 male MI patients, Singh and Malhotra (1970) reported 34% of patients had psychological symptoms, 18% of patients experienced reactive depression, and 16% of patients reported anxiety

neuroses (cited in Seidl, Bullough, Haughey, Scherer, Rhodes, & Brown, 1991).

Health behaviors among myocardial infarction patients

According to Kasl and Cobb (1966), health behaviors refer to those actions as undertaken by persons to enhance or maintain their health. Health behaviors include promoting health behaviors, such as getting enough sleep or eating a balanced diet, and risk-reduction behaviors, such as stopping smoking, reducing alcohol intake (cited in Taylor, 1986). Health behaviors are important not only because they are implicated in illness but also because they may easily become health habits. Health habits are health-related behaviors that are firmly established and often performed automatically, without awareness (Taylor, 1986). Health behavior is considered as preventive and protective behavior. Sarafino (1998) stated that health behaviors include healthy people's exercising, eating healthy diets, having regular dental checkups, and getting vaccinations against diseases. In this study, health behaviors can be considered as the promoting behaviors. They refer to the actions performed by myocardial infarction patients including follow-up visiting, taking medication as prescribed, checking their pulse, abnormal signs and symptoms to control disease, and exercising, modifying nutrition, limiting smoking, and managing stress to prevent recurrent MI.

Miller and colleagues (1990) found that performance of health behaviors usually declined dramatically during the first year after MI, with a smaller decline in performance after one year. Andrew and colleagues (1981) mentioned that tangible spouse support has been found to predict personal psychological and social adjustments after myocardial infarction. Lack of spouse support was the most frequent reason given for dropping out of an exercise program after infarction (cited in Miller, McMahon, Ringel, Siniscalchi, & Welsh, 1989). Additionally, Miller and colleagues (1982) followed 27 ischemic heart disease patients over a 6 month period in order to investigate their attitude, intentions and adherence behaviors toward the actions prescribed by the medical regimen. They found that the individual would possess certain information about his heart condition and medical regimen. In addition, the attitude of the individual would lead him to develop a set of intentions about his performance. Intentions to take medication, stop smoking, modify stress response, and follow activity and diet prescriptions would be directly related to specific behavior or performance of the actions. The results also showed that patients had strong intentions and adherence behaviors for all actions of the medical regimen across all situations. Therefore, the MI patients should perform health behaviors to control disease and prevent recurrent MI. The following paragraphs are details of the health behaviors.

Behaviors to control disease

Follow-up visiting and taking medication as prescribed are beneficial for MI patients to limit infarct size and the progression of ischemic to the damaged myocardium effectively. Goals for MI treatment include prevention of further tissue injury and limitation of infarct size. In the first 6 hour period, it is possible to achieve reperfusion of infarcting myocardium with intravenous and intracoronary thrombolysis. Oxygen is used for a minimum of 24 to 48 hours postinfarction to treat tissue hypoxia, which may be caused by left-ventricular failure. Intravenous nitrates and beta-blocking agents may be instituted to reduce myocardial oxygen demand by decreasing both preload and afterload. Nitrates are potent vasodilators that act primarily on the capacitance circulation. Nitrates can enhance myocardial perfusion, facilitate cardiac output, limit infarct size, decrease ischemia, and reduce chest pain. Beta-blocking agents may reduce infarct size by decreasing sympathetic tone, thus decreasing afterload. Aspirin can reduce coronary reocclusion and ischemia following thrombolytic therapy (Urden, Davie, & Thelan, 1992). Additionally, patients should periodically return follow-up visiting in order to maintain the treatment. At the revisit, patients should be checked for physical and label changes. Patients should also be asked to report any new problems they had experienced and state whether they believed that the problems were caused by the medication. Follow-up visiting

and taking medication as prescribed are very important for MI patients to control disease.

Checking their pulse, abnormal signs and symptoms can enable MI patients to find warning signs and symptoms and ask for medical professional help as soon as possible. MI patients may have severe chest pain or tightness or heaviness lasting at least 30 minutes or more. Patients had the experienced signs of nausea, vomiting, diaphoresis, sudden dysrhythmias, increased pulse rate, decreased blood pressure and symptoms of dyspnea, nausea, diaphoresis, pallor, palpitations, dizziness, weakness, sleep disturbances, and a sense of impending doom. Approximate 20% to 60% of infarctions are unrecognized because there are no symptoms ("silent") or because the symptoms are not recognized as infarction. On the ECG in the leads facing damaged tissue, the inverted T wave is relatively narrow in shape, S-T segment elevations are of 1 to 2 mm or more, and the Q wave is 0.04 per second or longer in duration and 25% or more of the R wave in height (Ehrat, 1983). Creatine Kinase (CK) is an enzyme found mainly in the heart and skeletal muscles. When the heart muscle is damaged, CK is released into the blood. The level of CK becomes abnormal within 6 to 8 hours after the onset of infarction and peaks within about 24 hours, and returns to normal with 4 days. Elevation of CK-MB offers a more definitive indication of myocardial cell damage than total CK alone. AST (serum aspartate aminotransferase) elevates within 6 hours after cardiac damage, peaks in 12 to 14 hours, and returns to

normal in 4 days. The CK-MB appears in the serum in 6 to 12 hours, peaks between 12 and 28 hours, and returns to normal levels in about 72 to 96 hours. Lactase dehydrogenase (LDH) is an enzyme found in many organs, such as the heart, liver, kidneys, and lung. LDH levels are not as useful as CK levels in diagnosing an acute MI because it is not specific for the cardiac muscle. It is detected in the blood about 12 to 24 hours after AMI, peaks between 2 to 3 days and levels remain elevated for 7 to 10 days (Hudak, Gallo, Morton, 1998). The major complications of MI include dysrhythmias, congestive heart failure, cardiogenic shock, post-myocardial infarction syndrome, pericarditis, ventricular aneurysm, and embolism. The mortality rate of cardiogenic shock is about 80% - 90% because of inadequate pumping. In the post-infarction period, 15% - 30% of MI patients expercriced complicated infarction extension, and 50% - 60% of MI patients experienced complicated infarction expansion. Infarction extension may result in continuous chest pain unrelieved by medication or recurrent chest pain within 12 hours to 6 days. Infarction expansion is associated with progressive worsening of heart function, failure, aneurysm formation, ventricular septal defect (VSD), and ventricular free-wall rupture (Cochrane, 1995). The location of myocardial infarction can include the anterior wall, inferior wall, lateral wall, and posterior wall. Anterior wall myocardial infarction is more likely to lead to serious complications, such as ventricular premature beat, tachycardia and fibrillation, cardiogenic shock and

congestive heart failure (Hudak, Gallo, & Morton, 1998). So checking the pulse, abnormal signs and symptoms are necessary for MI patients to control their disease.

Behaviors to prevent recurrent MI

Exercise: Since the 1950s it has been recognized that there is a positive relationship between increased physical activity and reduction in coronary artery disease (Noy, 1998). Exercise at moderate intensity to target heart rate for 15 to 30 minutes at least three times per week is beneficial for cardiovascular fitness (Herrmann, Carter, & Lowther, 1991). Exercising among MI patients may reverse the physical restrictive process, improve cardiovascular functioning, and reduce the burden on the damaged myocardium. Patients should not only adhere to exercising but also regulate exercise intensity and duration by monitoring their heart rate, signs and symptoms. MI patients who took part in formal exercise programs achieved their optimum functional status more rapidly than patients who did not. Physically active patients tend to have a more rapid recovery and a greater survival rate after MI (Broome & Llewelyn, 1995). In the first few months after MI, appropriate physical exercise reassured patients that they were recovering and could safely resume normal activities (Shumaker, Sckron, & Ockene, 1990). Horgan, Bethell and Carson (1992) tested exercise-based rehabilitation after MI in 4554 patients, and found that overall mortality rate was reduced by 20%. Additionally, regular exercise has a beneficial effect on psychological adjustment, and can

increase sexual relations for MI patients (Broome & Llewelyn, 1995). Exercise can raise serum HDL levels and lower the heart rate and blood pressure (Herrmann, Carter, & Lowther, 1991).

Nutritional modifications: Cardiac diet refers to a diet limiting cholesterol and saturated fat intake and increasing polyunsaturated fat intake (Ruppert, Kernicki, & Dolan, 1996). Cholesterol is both consumed through dietary intake and produced by the liver. Cholesterol is transported in the blood by very low-density lipoproteins (LDL), low-density lipoproteins, and high-density lipoproteins (HDL) (Ruppert, Kernicki, & Zdolan, 1996). HDL is referred to as the good lipoprotein because it becomes an aid in the transport of cholesterol from the peripheral tissues to the liver for excretion. An HDL cholesterol level below 35 mg/dl is a major risk factor of coronary heart disease (Herrmann, Carter, & Lowther, 1991). The low-density lipoproteins are formed primarily from the breakdown of very low-density lipoproteins. They are the major carriers of cholesterol and the primary atherogenic lipoproteins. The higher the plasma cholesterol level, especially the low-density lipoproteins level, the greater the progression of atherosclerosis and risk of recurrent MI (Peckenpaugh & Poleman, 1999). Atherosclerotic coronary arteries have impaired endothelial function. This impaired function may contribute to the pathogenesis of coronary vasospasm, which may promote plaque rupture, thrombosis and MI (Ulstad, 1997).

The National Cholesterol Education Program (1985) reported that there was a clear association between cholesterol and the risk of coronary heart disease. A 19% reduction in the risk of coronary heart disease was associated with a decrease by 8% of total cholesterol and a decrease of 11% in low-density lipoprotein cholesterol (Shumaker, Schron, & Ockene, 1990). A study showed that there was a low incidence of coronary disease in populations who habitually subsist on a low-fat and low cholesterol diet or on a diet that was low in saturated fats and cholesterol (Peckenpaugh & Poleman, 1999). Serum cholesterol levels influence prognosis after MI. The risk for re-infarction is 3.7 (men) to 9.2 (women) times as great when serum cholesterol levels are 275 mg/dl, or greater, compared with levels of less than 200 mg/dl (Wong, Wilson, & Kannel, 1988 cited in Newton & Froelicher, 1995). The Cipid Research Clinics Program (1984) reported that by reducing the blood cholesterol level by 8%, coronary heart disease mortality will decrease by 19% (cited in Herrmann, Carter, & Lowther, 1991). The Helsinki Heart Study (1987) demonstrated that lowering the level of LDL by 8% and raising the level of HDL by 10% through diet and medication reduced coronary heart disease mortality by 34 % (cited in Herrmann, Carter, & Lowther, 1991). The Coronary Drug Project research group (1975) also showed that drug treatment of cholesterol levels declined the mortality of myocardial infarction (cited in Herrmann, Carter, & Lowther, 1991).

Limiting Smoking: Cigarette smoking in MI patients is the biggest risk for sudden death. A smoker's risk of sudden death and recurrent of MI is two to four times greater than the nonsmoker's risk (Rosenberg, Kaufman, Helmrich, & Shapiro, 1985). Nicotine causes the blood pressure to increase by 7% to 10% (Lowther & Dunn, 1991). Nicotine acutely increases catecholamine levels and the heart rate, and leads to vasoconstriction of the coronary arteries. Additionally, nicotine also limits the amount of oxygen available to the body tissues (Ruppert, Kernicki, & Zdolan, 1996). Smokers have lower HDL than do nonsmokers, usually 5 gm/dl or less (Lowther & Dunn, 1991). Cessation of smoking became the most important predictor of the declining mortality rate among MI patients (Conn, Taylor, & Casey, 1992). Salonen (1980) and Willhemsen (1983) found evidence that cessation of smoking after MI can result in a 50% reduction in sudden death and fatal re-infarctions (cited in Conn, Taylor, & Casey, 1992). The Oslo Trial (1981) reported that cessation of smoking and a decrease in dietary cholesterol over 5 years decreased the incidenced of myocardial infarction and sudden death by 47% (cited in Lowther & Dunn, 1991).

Stress management: The heart is one target of stress response. Catecholamines will be released in the early stages of response which greatly increase the risk of life-threatening dysrhythmias and sudden cardiac death for myocardial infarction patients (Dunn & Lowther, 1991). Stress may increase levels of serum cholesterol, damage the

vessel intimate via increased blood pressure, and increase the aggregation of blood platelets that is incorporated into arterial plaque (Dunn & Lowther, 1991). Prolonged stress may affect the cardiovascular system's ability to use fat as a source of energy. Therefore, stress can lead to myocardial infarction via several mechanisms (Dunn & Lowther, 1991).

In a prospective study of 2300 male MI patients, Ruberman and colleagues (1984) researched the relationship between stress and coronary artery disease, and showed the following results: (1) A person with type A behavior patterns tended to be in potentially stressful situations, and type A behavior is an independent predictor of sudden cardiac death. (2) MI patients with type A behavior patterns have a higher long-term risk of both cardiac mortality and re-infarction. (3) Patients suffering social isolation and high levels of stress have four times the risk of death during the 3 years following MI. Van Dixhoorn and colleagues (1989) randomly allocated 156 post-MI patients to 5 weeks of exercise only (group B) or exercise plus relaxation and breathing retraining (group A). Group A patients showed a more pronounced training bradycardia, greater improvement in S-T abnormalities and less angina (cited in Broome & Llewelyn, 1995).

According to Bandura (1977), persons' behaviors are influenced by their self-efficacy. Self-efficacy can influence all aspects of behaviors, such as the acquisition of new behavior (e.g. walking as an exercise), inhibition of

existing behavior (e.g. cessation of smoking), and disinhibition of behaviors (e.g. resumption of sexual activity after myocardial infarction) (Reigle, 1991).

Self-efficacy among myocardial infarction patients

Bandura's self-efficacy theory is derived from social learning theory. According to Bandura (1977), efficacy expectations vary in magnitude, strength and generality. Magnitude refers to the complexity of the tasks people believe they can accomplish, strength determines individuals' levels of confidence to perform the behaviors, and generality reflects the extent that self-efficacy expectations for one situation may extend to another situation. In addition, self-efficacy expectations are derived from four sources: performance accomplishments, vicarious experience, verbal persuasion, and emotional and physical arousal. The greatest influence on self-efficacy derives from actual successful performance of a behavior. Successful mastery of a task tends to increase perceived self-efficacy. As people master simple behaviors, they are encouraged to pursue more complex ones and, as further success results, their perceptions of self-efficacy for accomplishing more difficult behaviors are increased. Vicarious experience involve seeing another person's performing behaviors. Observations of others' successful performance enhance individuals' expectations about their own mastery. Vicarious experience include participation in peer groups, the use of videos, peer groups, tapes, books,

and pamphlets. Verbal persuasion occurs when people are given information verbally about their capability to perform a specific behavior. Verbal persuasion is readily provided through praise and encouragement. Emotional and physical arousal can also influence expectations about self-efficacy. Individuals rely on physical feedback to judge their capabilities. Interpreting symptoms using stress management techniques to reduce anxiety can improve expectations about efficacy and performance (Bandura, 1977).

Bandura (1977) maintained that there are two types of expectations that influence behavior: efficacy expectations and outcome expectations. The distinction between outcome and efficacy expectations is important because both are required for behavior. Persons can believe that a certain action will result in a desired outcome, but if they do not think that they can perform the activity then their behavior will not be influenced (Robertson, & Keller, 1992). Therefore, it should be emphasized that both efficacy and outcome expectations reflect a person's belief about capabilities and outcomes of behavioral change.

Outcome expectations

Outcome expectations refer to the individual's belief that these specific behaviors will produce specific outcomes, such as reducing symptoms or decreasing the frequency of exacerbation (Bandura, 1977). Outcome expectations depend largely on persons' judgments of how well they will perform in given situations. It has been found that outcome expectations are important in health

promotion (Grembowski, Patrick, Diehr, Durham, Beresford, Kay, & Hecht, 1993). Outcome expectations can be considered as beliefs of susceptibility to a particular illness, and of the benefits of taking recommended preventive actions. Outcome expectations may influence initial motivation and decisions to change a persons' behavior. Health behavioral performance may depend on outcome expectations (Strecher, Devellis, Becker, & Rosenstock, 1986). Pechacek and Danaher (1979) studied cessation of smoking. Their conclusions include (1) Outcome and efficacy expectations are predictors in the initiation and maintenance of the cessation of smoking. (2) Outcome expectations mediate the initial motivation to quit smoking, while efficacy expectations influence both cessation and the maintenance process (cited in Strecher, Devellis, Becker, & Rosenstock, 1986). In this study, outcome expectations refer to myocardial infarction patients' beliefs that health behaviors will produce the outcomes regarding controlling the disease and preventing recurrent MI.

Efficacy expectations

An efficacy expectation, or "perceived self-efficacy", is defined as an individual's conviction that an individual can successfully perform the behavior required to produce the outcome (Bandura, 1977). When people believe that they are capable of dealing effectively with a situation, they possess a sense of self-efficacy about it. The belief in performing ability is an important link between knowing what to do and actually doing it.

Individuals may have different levels of self-efficacy for different types of behaviors (Bandura, 1977). Bandura (1982) stated that perceived self-efficacy will determine which behavior (s) will be chosen and how much effort will be expended, and how long it will persist (cited in Grembowski, Patrick, Diehr, Durham, Beresford, Kay, & Hecht, 1993). In this study, self-efficacy refers to the conviction that myocardial infarction patients can successfully perform health behaviors to control their disease and prevent recurrent MI. MI patients often suffer from serious depression, feelings of physical helplessness and great fear of recurrence of MI. When fear causes patients to become excessively cautious, patients should modify unhealthy psychological states and related behaviors. Thus, it is necessary to increase patients' conviction of performing health behaviors in order to enhance recovery following acute MI.

Ewart, Taylor, Reese, and DeBusk (1983) studied the effects of exercise, testing 40 men with a mean age of 52 $\pm$ 9 years after uncomplicated myocardial infarction patients. Both physical activities and patients' confidence in their ability to perform various physical activities were enhanced after a symptom-limited treadmill exercise test. They found that after performing treadmill exercises, patients increased their confidence (self-efficacy) for activities similar to treadmill exercise (walking, stair climbing, and running). The higher the patient's perceived physical efficacy, the greater the self-reported intensity

and duration of exercise and peak heart rate during physical activity at home. Patients' self-efficacy is a good predictor of their activity levels after they returned to their natural environment. Thus, MI patients' perception of their capacity for physical activity can be increased by early treadmill exercise. Self-efficacy has been found to be a significant determinant of exercise endurance in recovering heart attack victims. Self-efficacy theory has also been applied to different domains of psycho-social function, such as anxiety disorder, depression, achievement behavior, career choice and development and athletic attainments. All results of these different researches found that people's perceptions of their efficacy significantly affected their level of motivation and psycho-social functioning (O'Leary, 1985).

Relationship between self-efficacy and health behaviors among myocardial infarction patients

According to self-efficacy theory, perceived self-efficacy can affect health behaviors. If the patients believe their abilities to affect their health strongly, they would adhere to medical long term regimens , and would recover from serious illnesses rapidly (O'Leary, 1985). Efficacy expectations are related to behaviors in three ways: The confidence that one has the ability to (1) initiate the activity, (2) maintain the activity, and (3) persist in performing the activity in the face of obstacles (Bandura, 1986 cited in Horan, Katherine, Gendler, Froman, &

Patel, 1998). As a motivating factor, self-efficacy has a powerful and significant impact on behavioral changes. The theoretical proposition is that self-efficacy has a positive influence on the enactment of health related behaviors (Bandura, 1982 cited in Strecher, Devellis, Becker, & Rosenstock, 1986). Studies investigating individual health behaviors using self-efficacy theory found that self-efficacy became an important factor in the individual decision to initiate a change in lifestyle (Fleury, 1992). One research also provided evidence that perception of the physical and efficacy was a reliable predictor of post-infarction activity, and this self-efficacy could be enhanced (O'Leary, 1985). Additionally, Conn (1997) found that there was a positive correlation between self-efficacy and health behaviors (exercise, $r = .56$; diet, $r = .54$; stress, $r = .39$; $p \leq .0001$) among older women.

Lawrence's (1986) review of self-efficacy studies also supported that the value of self-efficacy was as a behavioral predictor (cited in Salazar, 1991). Previous investigators have studied several chronic physical conditions in relation to self-efficacy including chronic obstructive pulmonary disease (COPD), cardiac rehabilitation, pain tolerance, asthma, bulimia and hypertension. Increased self-efficacy has been linked with adherence to an exercise regimen with COPD, activity following cardiac rehabilitation, and ability to tolerate painful stimuli (Wassem, 1992).

In studying 51 individuals with coronary artery disease, Robertson and Keller (1992) assessed four variables related to compliance: severity, self-efficacy, perceived benefits, and barriers. Positive correlation was found between activity and benefits and between activity and self-efficacy. Perkins and Jenkins (1998) studied self-efficacy expectation and performance of selected cardiac recovery behaviors and mood states in the patients recovering from percutaneous transluminal coronary angioplasty (PTCA). The results reported that self-efficacy expectations were significantly and positively related to behavior performance for all study behaviors with the correlation value ranging from 0.26 to 0.85. Charoenwongwiwat (1995) studied self-efficacy and self-care behaviors, which included taking medication, checking pulse and abnormal symptoms, exercising, consuming an appropriate diet, giving up smoking, and managing stress, among 60 myocardial infarction patients; and found that positive relationships existed between self-efficacy and self-care behaviors with a correlation value of .76 ($p < .01$) in total score, and a correlation value ranging from .33 to .79 ($p < .01$, $p < .001$) in each corresponding area.

Self-efficacy has been evaluated in relation to a number of health-related behaviors. Kaplan and colleagues (1984) found that self-efficacy was positively correlated with exercise tolerance and walking compliance 3 months after a treatment program for individuals with COPD (cited in Wassem, 1992), and smoking relapse in chronic smokers

(Godding & Glasgow, 1985). Hickey, Owen, and Froman (1992) found that there were positive relationships among participants' diet and exercise self-efficacy and their subsequent diet and exercise goal attainment. Individuals with high confidence in their ability to adhere to diet and exercise behaviors achieved more goals than did those who had less self-efficacy. In studying adherence to walking programs by 60 patients with COPD, Kaplan, Atkins, and Reinsch (1984) found that those groups demonstrating efficacy judgments corresponded more closely with exercise tolerance. In studying addictive behaviors such as smoking, eating disorders and adherence to prescribed regimens, self-efficacy was used to explain behavioral change, predict the effects of different treatment modes and to improve treatment performance. Strecher, DeVellis, Becker, and Rosenstock (1986) found that self-efficacy was positively related to behavioral change and maintainance in areas such as of cessation of cigarette smoking, weight control, contraception, alcohol abuse, and exercise. DiClemente (1981) found that the higher the smokers' self-efficacy ratings, the longer and less difficulty that smokers had maintaining abstinence (cited in O'leary, 1985). Therefore, self-efficacy can facilitate MI patients to perform good health behaviors.

Summary

According to all of the studies cited in the review of the literature, the researcher may make the following conclusion: Myocardial infarction is a life-threatening disease. MI patients are faced with physical, psychological and social disabilities. Health behaviors can be considered as promoting behaviors. They refer to the actions performed as reported by myocardial infarction patients with regard to follow-up visiting, taking medication as prescribed, and checking their pulse, abnormal signs and symptoms to control the disease, and exercising, modifying nutrition, limiting smoking, and managing stress to prevent the recurrence of MI. According to Bandura (1977), a person's outcome expectations and efficacy expectations influence their behaviors. Outcome expectations refer to the MI patients' belief that good health behaviors will produce specific outcomes with regard to controlling their disease and preventing the recurrence of MI. Self-efficacy refers to the conviction that MI patient can successfully perform good health behaviors to control disease and prevent the recurrence of MI. The literature also supported the importance of self-efficacy in influencing and predicting health behaviors. It was evidenced that as a motivating factor, self-efficacy had a positive influence on the performance of health behaviors in MI patients.

Conceptual framework

According to social learning theory, there is a triadic reciprocal relationship among person, behavior, and environment. Environmental facts partly determine which behaviors are developed and activated. Behavior partly determines which potential environmental factors will come into play, and what forms they will take. People interpret behavior and environmental factors through their cognitive thought processes. People behave in ways that change the environment and meet with more favorable behavioral outcomes. A person's expectations influence their performance, and their behavioral outcomes change their expectations (Bandura, 1977).

Self-efficacy theory is derived from social learning theory. According to Bandura's self-efficacy theory, behavioral change is viewed as a function of efficacy expectations and outcome expectations. Outcome expectations refer to the individual's belief that specific behaviors will produce specific outcomes, such as reducing symptoms or decreasing the frequency of exacerbation (Bandura, 1977). An efficacy expectation, or "perceived self-efficacy", is defined as an individual's conviction that an individual can successfully perform the behavior required to produce the outcome (Bandura, 1977). Outcome expectations and efficacy expectations are differentiated, because a person can believe that a certain action will result in desired outcome, but if they do not think that they can perform the activity then their behaviors will not be influenced (

Bandura, 1977). Therefore, self-efficacy is considered as an important factor in individual decision-making behavior. Efficacy expectation is the component of self-efficacy theory explored in this descriptive study. The literature also supports the importance of self-efficacy in influencing and predicting health behaviors.

In this study, MI patients needed to have the conviction that they could successfully perform the health behaviors that they believed would result in controlling their disease and preventing the recurrence of MI. Those with high self-efficacy were more likely to initiate, maintain and persist in performing good health behaviors. The health behaviors included follow-up visiting, taking medication as prescribed, checking their pulse, abnormal signs and symptoms in order to control disease, and exercising, modifying nutrition, limiting smoking, and managing stress in order to prevent the recurrence of MI.

The conceptual framework of this study was shown in Figure 1:

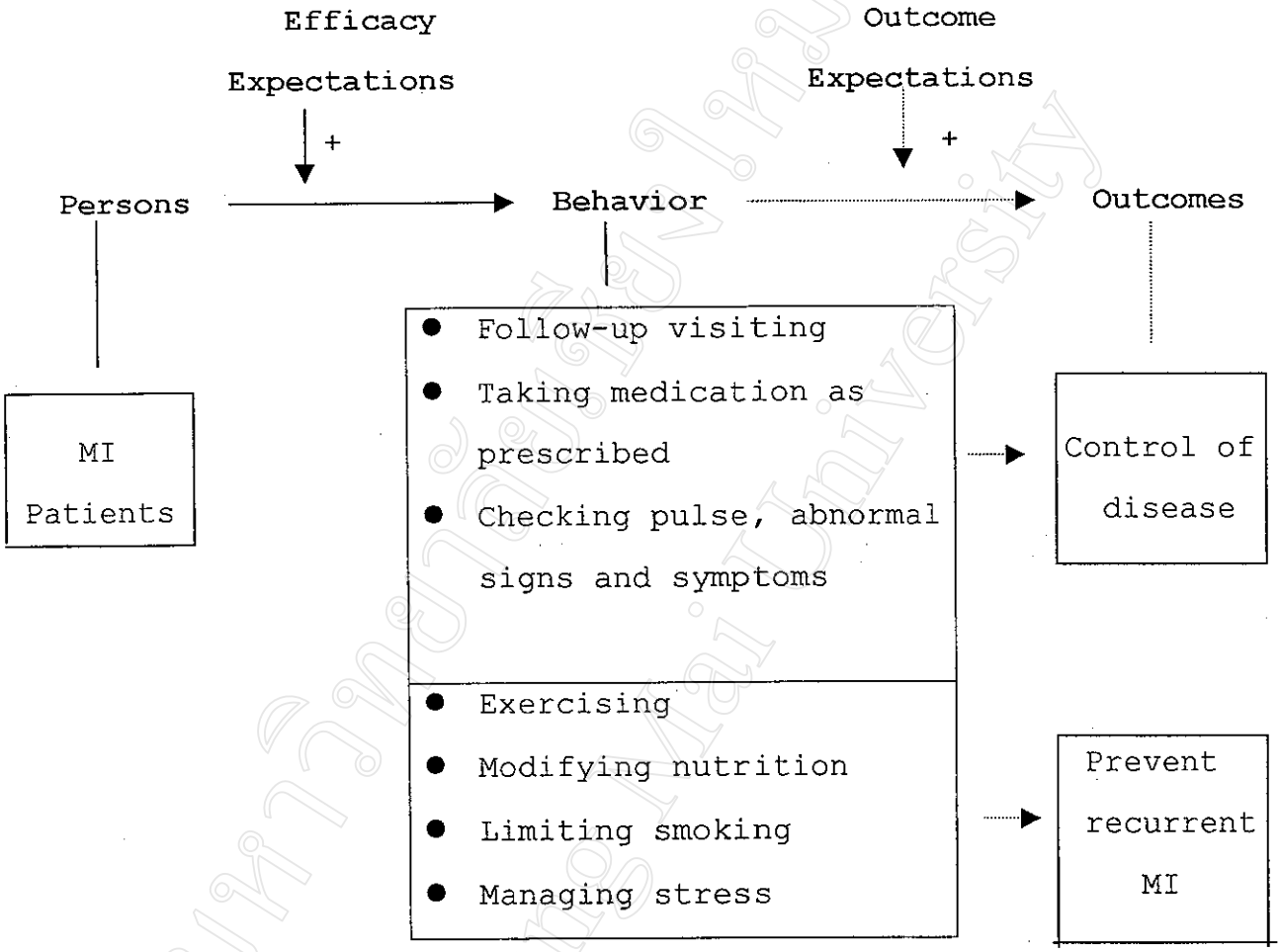

Figure 1: A conceptual framework of self-efficacy and health behaviors among myocardial infarction patients