



**The Effect of Illness Representation-Based Intervention on Anxiety in Patients  
With Myocardial Infarction**

**Pantipa Nilwilai**

**A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of  
Master of Nursing Science (International Program)**

**Prince of Songkla University**

**2015**

**Copyright of Prince of Songkla University**



This is to certify that the work here submitted is the result of the candidate's own investigations. Due acknowledgement has been made of any assistance received.

.....Signature

(Dr. Charuwan Kritpracha)

Major Advisor

.....Signature

(Asst. Prof. Dr. Tippamas Chinnawong)

Co-advisor

.....Signature

(Pantipa Nilwilai)

Candidate

I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

.....Signature

(Pantipa Nilwilai)

Candidate

|                      |   |
|----------------------|---|
| <b>Thesis Title</b>  | The Effect of the Illness Representation-Based Intervention on Anxiety in Patients With Myocardial Infarction |
| <b>Author</b>        | Miss Pantipa Nilwilai   |
| <b>Major Program</b> | Nursing Science (International Program)   |
| <b>Academic Year</b> | 2014  |

### ABSTRACT

Anxiety is a major psychological consequence in patients with myocardial infarction (MI). This randomized control trial examined the effects of an Illness Representation-Based Intervention (IRBI) on anxiety among the patients with MI in Hatyai, Thailand. The study was conducted at Songklanagarind Hospital and Hatyai Hospital from June 2014 – January, 2015.

Sixty patients with MI completed the study, with 30 patients in the experimental group and 30 patients in the control group. The participants in the experimental group received the 1-month IRBI and usual care, whereas the subjects in the control group received only usual care. The Representational Approach to Patient Education was used to guide the intervention. The IRBI included process of (1) representational assessment of the cognitive illness representation along the five components (identity, timeline, consequences, cause, cure/control), (2) identifying and exploring gaps, misconceptions, and confusion related to MI, (3) creating conditions for conceptual change, (4) introducing replacement information, (5) summarizing, (6) goal setting and planning regarding lifestyle modification, and (7) follow-up of the goal and the strategies. Techniques used in this study included face-

to-face interview, individual counseling, and telephone follow-ups. Anxiety was measured at baseline, discharge, and one month after discharge in both groups using the Thai version of the State-Trait Anxiety Inventory (STAI). The internal consistency reliability of the STAI obtained Chronbach's alpha coefficient of .91 for the State Anxiety Inventory (SAI) and .85 for the Trait Anxiety Inventory (TAI).

The differences of the state anxiety scores between two groups were analyzed by using an independent t-test, and a repeated measures ANOVA was used to analyze the state anxiety scores within group over time. The results indicated that anxiety was improved after the program implementation. The findings showed significant differences of anxiety at discharge ( $p < .001$ ), and one month after discharge ( $p < .001$ ) between the experimental group and the control group. There were also statistical differences of anxiety within the experimental group over time ( $p < .001$ ). These findings indicated that the IRBI effectively reduced anxiety in patients with MI. This study provides empirical evidence of the effect of the illness representation-based intervention on anxiety reduction in patients with MI. This study, therefore, recommends that such program should be implemented in nursing practice.

**CONTENTS**

|  | Page |
|--|------|
| ABSTRACT.....  | v    |
| ACKNOWLEDGEMENTS.....  | vii  |
| CONTENTS.....  | ix   |
| LIST OF TABLES.....  | xii  |
| LIST OF FIGURES.....   | xiii |
| CHAPTER  |      |
| 1. INTRODUCTION.....   | 1    |
| Background and Significance of the Problem.....                            | 1    |
| Objectives of the Study.....   | 7    |
| Research Questions.....  | 7    |
| Conceptual Framework of the Study.....                                     | 7    |
| Hypothesis of the Study.....   | 13   |
| Definition of Terms.....   | 13   |
| Scope of the Study.....  | 16   |
| Significance of the Study.....   | 16   |
| 2. LITERATURE REVIEW.....  | 17   |
| Overview of Myocardial Infarction.....                                     | 18   |
| Theoretical Concepts.....  | 36   |
| Anxiety in Patients with Myocardial Infarction.....                        | 50   |
| Factors Contributing to Anxiety in Patient With Myocardial Infarction..... | 51   |

**CONTENTS (Continued)**

|   | Page       |
|---|------------|
| Intervention for Anxiety Reduction in Patients with<br>Myocardial Infarction..... | 55         |
| Measurement Instruments.....  | 69         |
| Summary of Literature Review.....   | 74         |
| <b>3. RESEARCH METHODOLOGY.....</b>   | <b>75</b>  |
| Research Design.....  | 75         |
| Variables.....  | 76         |
| Setting.....  | 76         |
| Population and Sample.....  | 78         |
| Instrumentation.....  | 81         |
| Pilot Study.....  | 87         |
| Ethical Consideration.....  | 87         |
| Data Collection Procedures.....   | 88         |
| Data Analysis.....  | 92         |
| <b>4. RESULTS AND DISCUSSION.....</b>   | <b>94</b>  |
| Results.....  | 94         |
| Discussion.....   | 103        |
| <b>5. CONCLUSION AND RECOMMENDATIONS.....</b>                                     | <b>109</b> |
| Conclusion.....   | 109        |
| Strengths and Limitations.....  | 110        |
| Implications and Recommendations.....   | 111        |
| <b>REFERENCES.....</b>  | <b>113</b> |

**CONTENTS (Continued)**

|  | Page |
|--|------|
| APPENDICES.....  | 125  |
| A. Effect Size Calculation.....  | 126  |
| B. Informed Consent.....   | 127  |
| C. Demographic Data and Health History Questionnaire (DDHHQ).....                | 134  |
| D. The Brief Illness Perception Questionnaire (BIPQ).....                        | 136  |
| E. The State Anxiety Inventory.....  | 139  |
| F. Trait Anxiety Inventory.....  | 140  |
| G. Illness Representation-Based Intervention Guidelines.....                     | 141  |
| H. Illness Representation Booklet.....   | 149  |
| I. Normal Distribution.....  | 152  |
| J. Permission of Using State-Trait Anxiety Inventory (STAI).....                 | 154  |
| K. Permission of Using the Brief Illness Perception Questionnaire<br>(BIPQ)..... | 155  |
| L. Permission of Using the Brief Illness Perception Questionnaire<br>(BIPQ)..... | 156  |
| M. List of Experts.....  | 157  |
| N. Additional Analysis.....  | 158  |
| VITAE.....   | 166  |

**LIST OF TABLES**

| TABLE   | Page |
|---|------|
| 1. Randomization Block Design.....  | 81   |
| 2. Frequencies and Percentages of Subjects' Characteristics of the<br>Experimental Group and the Control Group.....               | 95   |
| 3. Frequencies and Percentages of Subjects' Clinical Characteristics<br>of the Experimental Group and the Control Group.....      | 97   |
| 4. Comparison of Mean Scores of the State Anxiety and the Trait<br>Anxiety at Baseline between Two Groups.....                    | 99   |
| 5. Comparison of Mean Scores of the State Anxiety at Baseline,<br>Discharge, and One Month After Discharge between Two Groups.... | 100  |
| 6. Comparison of the State Anxiety Scores over Time within the<br>Experimental Group and the Control Group.....                   | 102  |

**LIST OF FIGURES**

| FIGURE   | Page |
|--|------|
| 1. Conceptual Framework of the Study.....  | 12   |
| 2. The Implementation Phase of the Data Collection Procedures.....   | 91   |
| 3. Comparison of the State Anxiety Scores Within the Experimental Group and the<br>Control Group over Time ..... | 102  |

## **CHAPTER 1**

### **INTRODUCTION**

#### **Background and Significance of the Problem**

Globally, myocardial infarction (MI) becomes a leading cause of death and disability worldwide. Since 1990, more people have died from MI than from any other cause (World Health Organization [WHO], 2004). In 2005, the total number of deaths from cardiovascular diseases (CVDs) had increased to 17.5 million from 14.4 million in 1990. Of these deaths, 7.6 million were attributed to coronary heart disease (Institute of Medicine (US) Committee on Preventing the Global Epidemic of Cardiovascular Disease, 2010). The WHO estimates that more than 7 million people all over the world die each year from MI. Representing 30% of global death from CVD in 2008, 7.3 million people with MI died, and the WHO predicted that the estimated number of the deaths will increase to reach 23.3 million by 2030 (WHO, 2013). According to the American Heart Association (AHA) (2013), MI has threatened Americans' lives annually. In 2010, the prevalence of MI in American adults  $\geq 20$  years of age was 76 million (2.9%). The AHA predicted that Americans being newly diagnosed MI increasingly in 2013 and it will increase 18% by 2030 (The American Heart Association, 2013). Furthermore, nearly 80% of deaths from MI take place in low- and middle-income countries.

The greatest increases are in Africa, the Eastern Mediterranean, and South-East Asia, where they will increase by over 20% by 2030 (WHO, 2011). In Thailand, the incidence of MI continuously tends to increase. Respectively, there were

276.83, 359.34, and 397.24 by 100,000 people in the year 2008, 2009, and 2010 having diagnosed of MI (Bureau of Non Communicable Disease Thailand, 2010). In 2013, MI became the second cause of death in Thailand (12%), following cancer (19%) (Centers for Disease Control and Prevention [CDC], 2014).

MI affects both physical and psychological aspects of patients. Regarding physical aspect, according to Brink, Brändström, Cliffordsson, Herlitz, and Karlson (2008), patients with MI reported fatigue, breathlessness, and decreased physical health leading to role limitation, vitality problems, and decreased social functioning. Another previous study on physical activity six months after MI also indicated that patients with MI reported fatigue and breathlessness, which were associated with less physical activity and low physical functioning leading to delayed returning to work (Brändström, Brink, Grankvist, Alsén, Herlitz, & Karlson, 2009). Regarding psychological aspect, anxiety is one of the most common psychological impacts in patients with MI (Moser, 2007). According to Hanssen, Nordrehaug, Eide, Bjelland, and Rokne (2009), 19.7% of the patients with MI reported high level of anxiety. Furthermore, anxiety in those patients influenced poorer outcomes after MI.

According to Zafar et al. (2010), anxiety is associated with elevated serotonin-mediated platelet reactivity in patients with MI, leading to re-stenosis and further cardiac events. Huffman, Smith, Blais, Januzzi, and Fricchione (2008) found that among 110 patients within 72 hours after MI, 27% of MI patients with anxiety indicated recurrent chest pain, 22% had ventricular arrhythmia, 13% had congestive heart failure, 7% reported recurrent ischemia, and 6% reported ventricular arrhythmia requiring intervention. Furthermore, anxiety in patients with MI also affects their social outcomes and quality of life. According to Mayou et al. (2000), MI patients

who reported anxiety in the hospital had a significantly longer hospital stay, less daily routine and leisure activities, less social activity, and exercise. Moreover, 15% of those distress patients reported more than 4 emergency visits in 1 year after MI. Consequently, anxiety creates both physical and psychological consequences in patients with MI. To prevent those effects of anxiety, health care provider should figure out factors contributing patients with MI to develop anxiety.

Several factors contributing to anxiety in patients with MI were found including gender, first experience of MI, and patients' illness representation. Gender difference affects different level of anxiety. Norris, Ljubska, and Hegadoren (2009) found that women reported higher anxiety scores than men among MI patients. Kim et al. (2000) found that among 424 patients with 72 hours after admission with MI, women had significantly higher scores than men.

The first time of experience affects an individual to be more anxious. Especially in patients with first time diagnosed of MI, feeling of uncertain future usually occurs in patients with MI because it is perceived as a life-threatening disease. Moreover, experience of unfamiliar treatment such as cardiac catheterization can be a source of anxiety (Chair, Chau, Sit, Wong, & Chan, 2012). In a previous study, the findings indicated that absence of any information about what will happen after cardiac catheterization of first hospitalization for MI were associated with higher state anxiety among 100 patients with MI without previous experience with cardiac catheterization before undergoing coronary angiography (Uzun, Vural, Uzun, & Yokusoglu, 2008). Consequently, this information emphasizes health care team that patients with the first experience of MI should be concerned in anxiety reduction.

Illness representation significantly influences anxiety in patients with MI. Patients with MI usually perceive that MI threatens their life because of the high mortality rate, serious health consequences, and it creates many changes in their daily life (Mierzyńska, Kowalska, Stepnowska, & Piotrowiz, 2010). According to Alsén, Brink, Persson, Brändström, and Karlson (2010), the more MI patients perceived their illness to be chronic, and the more consequences they would have, the higher anxiety was found. In a recent study, Yan et al. (2011) surveyed the illness representation among Chinese patients with MI. The findings indicated that patients who perceived that MI would last longer and could have serious consequences in their lives, reported poor emotional status. Broadbent, Petrie, Ellis, Ying, and Gamble (2004) found that perceptions of greater damaged area of the heart by drawing picture of patient's heart predict greater anxiety 3 months later. Broadbent et al. (2006) found higher anxiety in patients who overestimated their risk of MI. Furze, Lewin, Murberg, Bull, and Thompson (2005) found that the higher misconception of MI the patients perceived was associated with higher anxiety. Accordingly, patients' representation on their MI in different views can encourage anxiety as well.

Several aspects about how patients view their MI were determined. Recently, Yan et al. (2011) found that Chinese patients with the first diagnosis of MI reported that they recognized only the experienced symptoms; they did not know other common symptoms. Furthermore, the researchers found that the patients perceived chance or bad luck as the most common causes, followed by altered immunity, aging, own behavior, and overwork. Ultimately, the patients reported that they were uncertain that their illness could be controlled by themselves and their

psychological status was not well adjusted. Therefore, illness representation can influence negative outcomes in patients with MI.

Alsén, Brink, and Persson (2008) interviewed patients 4 month after MI. The patients reported fear of death and concern about performing daily activities. Some patients did not participate in the rehabilitation groups because they thought that performing activities would damage their hearts so that they lacked of confidence and motivation to do the exercise and make lifestyle changes. Several patients viewed that MI was impossible to control because they perceived that MI was unpredictable. These beliefs reflect that the patients still had inaccurate illness representation about their illness and its consequences, which lead to failure to participate in the rehabilitation program and return to work.

There were some inaccurate illness representation about causes of MI in a recent study. Reges, Vilchinsky, Leibowitz, Manor, Mosseri, and Kark (2011) found that most of the patients with MI in the study reported that general stress was the most common cause of MI, followed by smoking, and genetic factor. Only few patients reported that dyslipidemia, overweight, lack of exercise and hypertension, respectively, were the causes for cardiac event. These findings represent that the patients lacked of awareness on risk factors contributing to MI. In Thailand, few studies examine the illness representation in patients with MI such as perceived symptoms (Orksuk & Ruisungnoen, 2012; Thepphawan, Watthanakitkriart, Pongthavornkamol, and Dumavibhat, 2011), and delayed seeking treatment (Orksuk and Ruisungnoen, 2012). Nursing intervention about changing illness representation on anxiety reduction in patients with MI is still unexamined in Thailand.

Previously, several researchers developed programs to change patients' illness representation after MI. Petrie, Cameron, Ellis, Buick, and Weinman (2002) developed a randomized controlled trial (RCT) in order to change patients' illness perceptions. The program consisted of 3 sessions to explore patients' beliefs about the cause of MI, develop a plan of reducing future risk, correct the inaccurate beliefs about performing activities after discharge, and discuss about symptoms of recovery and medication. This successful intervention could significantly change patients' perceptions of MI. Furthermore, the findings also showed that patients reported higher understanding of their MI and their preparedness to leave hospital, significantly increasing patients' intentions to go to the cardiac rehabilitation program, and higher speed of return to work in the patients in the intervention group.

In 2009, a randomized controlled trial of an illness perception intervention was further developed (Broadbent, Ellis, Thomas, Gamble, & Petrie, 2009). This study was conducted based on Petrie et al. (2002) in larger sample size. The intervention was divided into 4 sessions including one spouse session in order to encourage the patient's recovery.

Both of previous studies focused on the rate of return to work. However, the researchers did not emphasize on anxiety. Furthermore, the illness perception interventions were conducted in New Zealand, which has some different contexts with Thailand in the aspects of ethnicity, religions, lifestyle, culture, economics, education, and health care system that would affect to patients' beliefs on MI. The intervention aimed to change patients' perception on MI is still undefined in Thailand. Illness representation intervention has been proved that it is very efficacious in changing patients' misconceptions about MI and their health behaviors. Therefore,

this study is proposed to examine the effect of illness representation-based intervention on anxiety in patients with MI.

### **Objectives of the Study**

1. To compare anxiety level of patients with MI after receiving the Illness Representation-Based Intervention (IRBI) with patients with MI receiving usual care
2. To compare anxiety level among patients with MI before and after receiving the Illness Representation-Based Intervention (IRBI)

### **Research Questions of the Study**

1. Is the anxiety level of patients with MI after receiving the Illness Representation-Based Intervention (IRBI) lower than the patients receiving usual care?
2. Is the anxiety level of patients with MI receiving illness representation-based intervention (IRBI) lower than after receiving intervention?

### **Conceptual Framework of the Study**

Representational Approach to Patient Education proposed by Donovan et al. (2007) was used as a conceptual framework of the study. The representational Approach to Patient Education derived from the Common Sense Model (CSM) of

illness representation proposed by Leventhal, Meyer, and Nerenz (1980), and the Conceptual Change Model (CCM) proposed by Posner, Strike, Hewson, and Gertzog (1982).

The CSM is focused on how individuals interpret new information and forms their representation when they face with a health threat and overcome the illness. The CSM assumes that individuals create representation of their illness, namely illness representation, based on the available concrete and abstract sources of information in order to make the common sense of the illness and manage the problem. The information either from health care providers, social communication, trustable others, current experience, culture, or contemplating their illness themselves contributes to forming a representation of their condition. Illness representation is an organized set of beliefs regarding how the illness affects on an individual, its impact on life activities and experiences. A number of other terms are often used in the literature: illness cognitions, illness perceptions, illness beliefs, and illness schemata (Cameron & Moss-Morris, 2004).

Illness representation consists of 5 components including identity, cause, timeline, consequences, and control/cure. *Identity* refers to individual's belief about the illness label or diagnosis and associated symptoms. *Cause* refers to the individual's beliefs about the factors or conditions believed to have caused the illness. *Timeline* refers to the individual concerns about the expected duration of the illness whether the illness can be acute or limited duration; to cyclic, with episodes over time; and chronic, or long term condition. *Consequences* refer to individual's beliefs about the expected effects of an illness on physical, social and psychological well-being. *Control/cure* refers to individual's concerns about how the illness is controlled

and how it is cured by treatment (Leventhal et al., 1980). Illness representation comprising these five components guides an individual's responses, either physically or emotionally. An individual might hold appropriate illness representation, which in turn influences desirable outcomes, or inappropriate illness representation, which health care providers need to facilitate the individual to change or replace with the appropriate one.

The CCM developed by Posner et al. (1982) describes that conceptual change is to replace misconceptions with correct conceptions (Hewson, 1992). This model describes that learning involves an interaction between new and existing conceptions with the outcome being dependent on the nature of the interaction. The model describes that learning involves an interaction between new and existing conceptions with the outcome being dependent on the nature of the interaction.

According to Posner and colleagues (1982), the conceptual change occurs when three conceptions are met including: (1) an individual is dissatisfied with the existing knowledge, (2) when the new conceptions can be understood easily (intelligible) and reliable (plausible), and (3) when the individual see that the new conceptions will be fruitful.

In 2001, Donovan and Ward developed a representational approach to patient education in order to apply the steps of the representational intervention to decrease pain (RIDPAIN). The concept of this approach was based on the CSM and the CCM. Five steps were proposed including: (1) representational assessment; (2) exploring misconceptions; (3) creating conditions for conceptual change; (4) introducing replacement information; and (5) summary. In 2007, Donovan et al. further developed an update of representational approach to patient education and

change the word “step” to “key element” since each component can be alternating back and forth. The update approach consists of 7 components including: (1) representational assessment; (2) exploring misconception; (3) creating conditions for conceptual change; (4) introducing replacement information; (5) summary; (6) goal setting and planning; and (7) follow-up contact. The component 6 and 7 were developed in order to translate the abstract information to concrete strategies in changing behaviors.

As individuals are active, they indeed try to understand their symptoms and illness and this understanding drives the individuals’ coping and emotional responses to the health threat (Petrie, Broadbent, & Kydd, 2008). Therefore, only giving education or motivation may not be effective in attempt to change their beliefs. In this study, the Illness Representation-Based Intervention (IRBI) based on an update on the representational approach to patient education (Donovan et al., 2007) was applied in order to shape the patients’ illness representation, including 5 components of identity, timeline, causes, consequences, and cure/control, and to reduce anxiety. The researcher developed the IRBI which included activities under 7 components of representational approach to patient education as the followings: (1) representational assessment; (2) exploring misconception; (3) creating condition for conceptual change; (4) introducing replacement information; (5) summary; (6) goal setting and planning; and (7) follow-up contact. The conceptual framework of this study was summarized in Figure 1. The IRBI was specifically individualized direct at enhancing patients’ beliefs about their MI by approaching their existing knowledge and beliefs and reorganizing their representations. The researcher provided individual sessions in

order to reduce patients' anxiety and change their illness representation to overcome their illness.

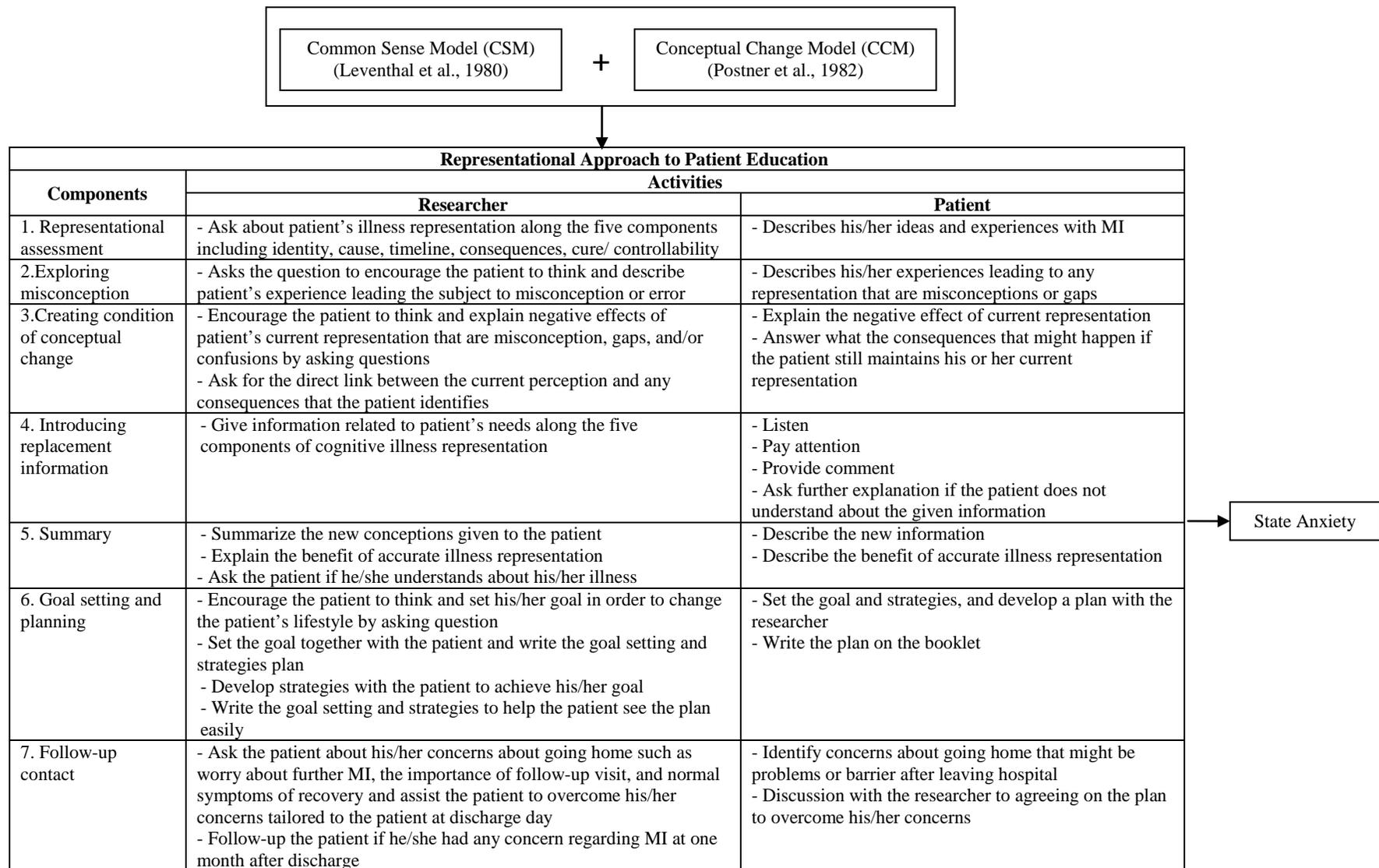


Figure 1. *Conceptual Framework of the Study*

## **Hypotheses of the Study**

The hypotheses of the Study are as the followings:

1. Anxiety of patients with MI after receiving the Illness Representation-Based Intervention is lower than before receiving the Illness Representation-Based Intervention.

2. Anxiety of patients with MI who receive the Illness Representation-Based Intervention is lower than those who do not receive the Illness Representation-Based Intervention.

## **Definition of Terms**

The Illness Representation-Based Intervention refers to the intervention in order to change patients' misconceptions about their MI and enhance their emotional outcome based on Representational Approach to Patient Education proposed by Donovan et al. (2007), which was used to guide this study. The intervention comprised of 2 sessions. The first session consisted of 4 steps: (1) representational assessment, participant was encouraged to describe his/her ideas about MI along the 5 dimensions of representations: identity, cause, timeline consequences, and cure or control; (2) exploring misconception, the participant was encouraged to think and describe about the misconceptions or experiences led to the development of any misconceptions or confusions; (3) creating condition of conceptual change, the participant and the researcher discussed any problems associated with the patient's current representations and the consequences of those

representations for his/her coping behavior, and the researcher made direct links between previous gaps, confusions, or misconceptions and undesirable consequences; (4) introducing replacement information, the researcher presented new information to fill gaps in knowledge, clarified confusions, and replaced misconceptions; (5) summary, the researcher summarized the new information and discussed the benefits to expect from acting on the new information. The second session consisted of 2 steps including: (1) goal setting and planning, the researcher asked the participant to identify personally important goals associated to behavior change and strategies to reach the goals; and (2) follow-up contact, the researcher asked the participant to evaluate the strategies that his/her attempted to implement, whether the plan encouraged the participant to change his/her behaviors or not, and made revisions of the plan if necessary at discharge day. One month later, the researcher followed-up each participant by telephone to ask if the participant had any concern regarding MI.

This intervention focused on individual's representation on MI. For each participant, this intervention was begun during hospitalization, and ended at 1 month after discharge. Patients' illness representations were assessed by using the Brief Illness Perception Questionnaire (BIPQ) developed by Broadbent, Petrie, Main, and Weinman (2006) to guide the intervention. The BIPQ consists of 9-item scale designed to rapidly assess the cognitive and emotional representations of illness. The questionnaire assessed each dimension using a single-item scale from 0-10 with 3 open-ended questions to measure casual beliefs. The open-ended questions were added following each item in order to further assess each patient's illness representation.

Usual care refers to care provided by nurses, nursing students, and physicians at the MICU and the medical ward of Songklanagarind Hospital and the medical wards of Hatyai Hospital, which had some differences in detail according to the context. Usual care for patients with MI in the medical wards and the medical intensive care unit (MICU) in Songklanagarind Hospital consisted of daily physical assessment, brief information about MI, treatment, and lifestyle changes after discharge, and giving a leaflet. Usual care for patients with MI in the medical wards of Hatyai Hospital consisted of routine physical assessment including blood pressure and heart rate checking, and medication administration.

Anxiety refers to a feeling of uneasiness, unpleasant emotion that a person responds to an uncertain future situation. In this study, there were 2 types of anxiety; state anxiety and trait anxiety. State anxiety refers to an emotional response involving unpleasant feelings of tension and apprehensive thoughts to a stressful situation. Trait anxiety refers to individual differences in the likelihood that a person would respond to state anxiety differently. Anxiety was measured by the State-Trait Anxiety Inventory developed by Spielberger, Gorsuch, and Lushene (1970), which consists of State Anxiety Inventory (SAI) and Trait Anxiety Inventory (TAI). In this study, state anxiety was used as the outcome of the study and was measured by the SAI. The higher scores indicate the higher state anxiety. Trait anxiety was used as the characteristics of the participants, which was measured by the TAI.

### **Scope of the Study**

This study was conducted to measure the effect of Illness Representation-Based Intervention (IRBI) on anxiety among patients with MI in the tertiary hospitals in the south of Thailand. The participants were recruited in this study including patients with first diagnosis of MI and hospitalized in the hospital during June 2014 – January 2015.

### **Significance of the Study**

Illness Representation-Based Intervention was a program to shape patients' conceptual thinking on their MI regarding the 5 components including identity, cause, timeline, consequences, and control/cure. This program provided the illness representation assessment and replaced the accurate illness representation, which promoted positive emotional outcome, anxiety reduction, appropriate health behaviors, and reduce mortality in patients with MI.

## **CHAPTER 2**

### **LITERATURE REVIEW**

This part illustrates theories and evidences that have associations with illness representation and anxiety in patients with MI, and effects of illness representation-based intervention on anxiety and illness perception. The review covers the following topics:

1. Overview of Myocardial Infarction
2. Theoretical concepts
  - 2.1 Illness Representation in Patients with Myocardial Infarction
  - 2.2 Conceptual Change Model
  - 2.3 A Representational Approach to Patient Education
3. Anxiety in Patients with Myocardial Infarction
4. Factors Contributing to Anxiety in Patients with Myocardial Infarction
5. Interventions for Anxiety Reduction in Myocardial Infarction Patients
6. Measurement Instruments
  - 6.1 Anxiety Assessment Tools
  - 6.2 Illness Representation Assessment Tools
7. Summary of Literature Review

## **Overview of Myocardial Infarction**

Myocardial infarction (MI) causes a large number of deaths worldwide and creates several negative outcomes to the patients. This section provided the details of pathophysiology of MI, risk factors, signs and symptoms, and treatments.

### **Pathophysiology of Myocardial Infarction.**

MI results from myocardial cell death due to prolonged ischemia when a coronary artery is blocked. It primarily starts with atherosclerosis, the thickening of arterial wall which affects from the accumulation of lipids consisting of cholesterol in the vessel wall. Vascular smooth muscle cells multiply and scar tissue forms. These form a lesion that swells into the artery, causing them to become narrowed or blocked, ultimately affecting blood flow to the area of the heart supplied by that artery. The surface of the plaque may become roughened or eroded. When this happens, platelets accumulate and a blood clot forms. This clot (or thrombus) may completely occlude the vessels. The reduction of blood flow due to rupture of an atherosclerotic plaque causing partial occlusion results unstable angina. In an MI, an area of the myocardium is permanently destroyed because of complete obstruction, interrupting blood supply to the heart muscle, affected tissue becomes ischemia and eventually dies (infarcts) (Bentzon & Falk, 2003; Burke, Mohn-Brown, & Eby, 2011; Cunningham, Bene, & Vaughan, 2000; Dressler, 2010; Keresztes & Wcisel, 2009).

The disease tends to be symptom free until about 75% of the lumen of affected vessels is occluded. If circulation to the affected cardiac muscle is not rapidly

restored, functional muscle is lost and the heart may be unable to maintain an effective cardiac output. This can lead to cardiogenic shock and death. Most deaths of acute MI occur within the first hour after the onset of manifestations, often before the patient reaches the hospital (Burke, Mohn-Brown, & Eby, 2011).

MI usually affects the left ventricle because it is the major “workhorse” of the heart; its muscle mass is greater, as are its oxygen demands (Burke, Mohn-Brown, & Eby, 2011). MIs are described according to the area of the heart that is damaged. Occlusion of the left anterior descending (LAD) artery damages the anterior portion of the left ventricle; occlusion of the left circumflex artery (LCA) causes lateral damage. Right ventricular, inferior, and posterior MIs involve occlusions of the right coronary artery (RCA) and posterior descending artery (PDA) (Burke, 2013; Burke, Mohn-Brown, & Eby, 2011).

MI is divided into ST-elevated MI (STEMI), non ST-elevated MI (NSTEMI), and unstable angina (UA). STEMI is caused by sudden formation of thrombus from the rupture of plaque in the blood vessel and the platelet aggregation at the rupture site, which completely blocks an artery in the heart, resulting interruption of blood flow, and leading to damaged area of the heart muscle. STEMI can be detected by the elevation of ST segment appeared on electrocardiography (ECG) (American College of Cardiology, 2013). The ST segment is a portion of ECG, which indicates the severity of damage area of the heart muscle. Therefore, STEME requires early invasive intervention to unblock the coronary artery to save as much area of the heart as possible.

NSTEMI is defined as a development of heart muscle necrosis without change of ST segment in ECG (NSTEMI.org, 2014). NSTEMI results from developing partial occlusion of a major coronary artery or total occlusion of a minor coronary artery previously affected by atherosclerosis (NSTEMI.org, 2014). The result of this process leads to acute interruption of blood supply to the heart muscle. The absence of ST segment elevation indicates less thickness of damaged area of the heart muscle. The blockage is from different type of blood clots than STEMI such as clotting proteins and platelet blood cells. Therefore, early open the artery is not a priority, but anticoagulants such as heparin is required to prevent formation of blood clots (American College of Cardiology, 2013).

Unstable angina (UA) is characterized by clinical condition including ischemic chest pain occurring at rest with minimal exertion, rapid deterioration of previous stable angina, caused by the imbalance of myocardial oxygen supply and demand resulting from a rupture of atherosclerotic plaque. The symptoms surprisingly occurs usually while resting, sleeping, or little physical activity. The symptoms deteriorate over time, and medicine or rest may not be helpful.

### **Risk Factors Contributing to Myocardial Infarction.**

Although several mechanisms are presented, it appears that the primary cause of coronary artery disease is inflammation and lipid deposition in the wall of the artery. Risk factors that precipitate MI can be presented in two categories: nonmodifiable and modifiable risk factors. Nonmodifiable risk factors include

heredity, age, and gender. Modifiable risk factors include smoking, hypertension, and elevated serum cholesterol levels.

### ***Minor Nonmodifiable Risk Factors.***

*Heredity (Including Race).* A family history of coronary heart disease is a risk factor for both men and women. This increased risk is related to genetic predisposition too hypertension, elevated lipid levels, diabetes, and obesity, all of which increase the risk of CHD (Keresztes & Wcisel, 2009). The risk increases if a first-degree blood relative has had coronary heart disease before the age of 55 years (for a male relative) or 65 years (for a female relative). Ethnic origin also plays a role. People with African or Asian ancestry are at higher risks of developing cardiovascular disease than other racial groups. (World Heart Federation, 2013).

*Increasing Age.* Age influences both the risk and the severity of MI. Symptomatic MI appears predominantly in people older than 40 years of age, and 4 of 5 people who die of MI are age 65 years or older (Burke, Mohn-Brown, & Eby, 2011; Keresztes & Wcisel, 2009). Risk of MI doubles every decade after age 55 (World Heart Federation, 2013).

*Gender.* Both men and women are affected by MI. In women, however, it often develops later in life because of the heart-protective effects of estrogen. After menopause, women's risk increases, but never becomes equal to that of men (Burke, Mohn-Brown, & Eby, 2011; Keresztes & Wcisel, 2009). Women who

take oral contraceptives and who smoke or have high blood pressure are at greater risk for MI. Women with an early menopause are also at higher risk than are women with a normal or late menopause (Keresztes & Wcisel, 2009).

### ***Major Modifiable Risk Factors.***

Smoking, hypertension, elevated serum cholesterol levels, physical inactivity, obesity, and diabetes mellitus are the modifiable risk factors for MI. These factors can be modified or reduced by lifestyle changes and treatment regimens.

*Smoking.* Cigarette smoking is a major risk factor, increasing the risk of heart disease by three to four times than a non-smoker (Burke, Mohn-Brown, & Eby, 2011). Both active smoking and passive smoking have been strongly implicated as a risk factor in the development of MI. Tar, nicotine and carbon monoxide contribute to the damage. Tar contains hydrocarbons and other carcinogenic substances. Nicotine increases the release of epinephrine and norepinephrine, which results in peripheral vasoconstriction, elevated blood pressure and heart rate, greater oxygen consumption, and increased likelihood of dysrhythmias. In addition, nicotine activates platelets and stimulates smooth muscle cell proliferation in the arterial walls. Carbon monoxide reduces the amount of blood available to the intima of the vessel wall and increases the permeability of the endothelium (Keresztes & Wcisel, 2009).

*Hypertension and Diabetes.* High blood pressure over 140/90 mmHg causes higher risk of MI by increasing the workload of the heart by increasing afterload, enlarging and weakening the left ventricle over time. As blood pressure increases, the risk of a serious cardiovascular event also increases (Keresztes & Wcisel, 2009). A fasting blood glucose level of more than 126 mg/ dl or a routine blood glucose level of 180 mg/ dl and glucosuria signals the presence of diabetes and represents an increased risk for MI. Patients with diabetes have a two to four times higher prevalence, incidence, and mortality from all forms of coronary heart disease (Keresztes & Wcisel, 2009; Burke, Mohn-Brown, & Eby, 2011).

*Physical Inactivity.* Physical inactivity is associated with higher risk. Regular aerobic exercise is important in preventing heart and blood vessel disease. People who maintain a regular program of physical activity are less likely to develop MI than sedentary people (Burke, Mohn-Brown, & Eby, 2011; Keresztes & Wcisel, 2009). The American Heart Association recommends that at least 30 minutes of physical activity on 5 or more days of the week can help lower blood pressure, lower cholesterol and keep your weight at a healthy level (American Heart Association, 2012).

*Obesity.* Obesity places an extra burden on the heart, requiring the muscle to work harder to pump enough blood to support added tissue mass. In addition obesity increases the risk for MI because it is often associated with elevated serum cholesterol and triglyceride levels, high blood pressure, and diabetes. Distribution of body fat is also important. A waist measurement is a way to estimate

fat. For Asian men with waist circumference  $\geq 90$  cm and women with waist circumference  $\geq 80$  cm are at higher risk for all forms of coronary heart disease (World Health Organization, 2008). Body mass index (BMI) is another measure to estimate body fat. For Asian people, a BMI from 18.5 to 23 is considered healthy. The range of BMI from 23 to 27.5 is considered increased risk, and 27.5 or higher are considered high risk of obesity (WHO expert consultation, 2004).

*Elevated Serum Cholesterol Levels.* Elevated serum total cholesterol and low-density lipoprotein (LDL) cholesterol, also known as bad cholesterol, are associated with an increase risk of MI in men and women of all ages. Lipoproteins carry cholesterol in the blood. LDL is the primary carrier of cholesterol. High levels of LDL promote atherosclerosis because LDL deposits cholesterol on the artery walls. In contrast, high-density lipoprotein (HDL) helps clear cholesterol from the arteries, transporting it to the liver for excretion. HDL levels above 35 mg/dL reduce the risk of CHD. The desirable level of total cholesterol is less than 200 mg/dL, LDL less than 130 mg/d, and triglycerides less than 150 mg/dL (Burke, Mohn-Brown, & Eby, 2011).

On the other hands, MI can be classified into major risk factors and minor risk factors. The major risk factors include: (1) high serum cholesterol level; (2) hypertension; (3) diabetes mellitus; and (4) cigarette smoking. Minor risk factors include: (1) increasing age; (2) male gender; (3) family history; (4) physical inactivity; (5) obesity; (6) excess alcohol consumption; (7) excess carbohydrate intake leading to overweight; (8) competitive and stressful lifestyle with type A personality; and (9) diet deficient in fresh vegetables, fruits, and polyunsaturated fat acid such as olive oil, soybeans, sesame seeds, etc. (NSTEMI.org, 2014).

### **Signs and Symptoms of Myocardial Infarction.**

Chest pain is often described as crushing and severe; the patient may call it a pressure, heavy, or squeezing sensation, or complain of chest tightness or burning. The pain begins in the center of the chest (in the substernal region) and may radiate to the shoulders, neck, jaw, or arms. It lasts more than 15 to 20 minutes and is not relieved by rest or nitroglycerin (Burke, Mohn-Brown, & Eby, 2011).

A feeling of weakness or numbness in the arms, wrists, and hands, as well as shortness of breath, pallor, diaphoresis, dizziness or lightheadedness, and nausea and vomiting may accompany pain. Anxiety may occur with angina. An important characteristic of angina is that it decreases with rest or administering nitroglycerin. Unstable angina is characterized by attacks that increase in frequency and severity and are not relieved by rest and administering nitroglycerin (Dressler, 2010).

The cardiologists usually use the thrombolysis in myocardial infarction (TIMI) score to define risk of MI, which are divided into TIMI score for NSTEMI or UA, and TIMI score for STEMI.

Regarding the TIMI score for NSTEMI or UA, the details of each item are presented as follows:

| 1. Age of patient:                           | Score |
|--|-------|
| Less than 65 years                           | 0     |
| 65 years or more                             | 1     |
| 2. Risk factors for coronary artery disease: |       |
| - Hypertension                               |       |

- Hypercholesterolemia
- Family history of coronary artery disease
- Diabetes
- Smoking

| Number of risk factors for coronary artery disease | Score |
|--|-------|
| Presence of less than three                        | 0     |
| Presence of three or more                          | 1     |

3. Prior coronary artery stenosis:

| Coronary angiography is done to see the stenosis | Score |
|--|-------|
| Less than 50%                                    | 0     |
| 50% or more                                      | 1     |

4. ST segment deviation on ECG:

It includes horizontal ST-segment depression or transient ST-segment elevation more than 1 mm.

| ST segment deviation on ECG | Score |
|-----------------------------|-------|
| Absent                      | 0     |
| Present                     | 1     |

5. Prior aspirin intake

|                                      | Score |
|--------------------------------------|-------|
| No aspirin intake in the last 7 days | 0     |
| Aspirin intake in the last 7 days    | 1     |

6. Severe angina chest pain

|                                       | Score |
|---------------------------------------|-------|
| No or one episode in last 24 hours    | 0     |
| Two or more episodes in last 24 hours | 1     |

|                             |       |
|-----------------------------|-------|
| 7. Elevated cardiac markers | Score |
| Absent                      | 0     |
| Present                     | 1     |

Risk identification by TIMI score in patients with NSTEMI or UA is presented as follows:

|                      |       |
|----------------------|-------|
|                      | Score |
| Low risk patients    | 0 – 2 |
| Medium risk patients | 3 – 4 |
| High risk patients   | 5 – 7 |

For the STEMI, the TIMI risk score is used to predict 30-day mortality in patients with STEMI. The details of each item are presented as follows:

|                                  |       |
|----------------------------------|-------|
| 1. Age of patient:               | Score |
| Less than 65 years               | 0     |
| 65-74 years                      | 2     |
| 75 years or more                 | 3     |
| 2. History of angina chest pain: | Score |
| Absent                           | 0     |
| Present                          | 1     |
| 3. History of hypertension:      | Score |
| Absent                           | 0     |
| Present                          | 1     |
| 4. History of diabetes:          | Score |
| Absent                           | 0     |
| Present                          | 1     |

|  |       |
|--|-------|
| 5. Systolic blood pressure:                          | Score |
| 100 mmHg or more                                     | 0     |
| Less than 100 mmHg                                   | 3     |
| 6. Heart rate:                                       | Score |
| Less than 100 beats/minute                           | 0     |
| 100 beats/minute or more                             | 2     |
| 7. Killip Class:                                     | Score |
| I – No heart failure                                 | 0     |
| II – Crackles audible in lower half<br>of lung field | 0     |
| III – Crackles audible in whole lung field           | 2     |
| IV – Cardiogenic shock                               | 2     |
| 8. Weight of patient:                                | Score |
| Less than 67 kg                                      | 0     |
| 67 kg or more  | 1     |
| 9. Anterior myocardial infarction:                   | Score |
| No   | 0     |
| Yes  | 1     |
| 10. Left bundle branch block (LBBB):                 | Score |
| Absent   | 0     |
| Present  | 1     |
| 11. Delay to treatment after attack:                 | Score |
| Less than 4 hours                                    | 0     |
| 4 hours or more                                      | 1     |

The interpretation of TIMI risk score for STEMI is presented as follows:

| Total score | Risk of death in 30 days |
|-------------|--------------------------|
| 0           | 0.8%                     |
| 1           | 1.6%                     |
| 2           | 2.2%                     |
| 3           | 4.4%                     |
| 4           | 7.3%                     |
| 5           | 12.4%                    |
| 6           | 16.1%                    |
| 7           | 23.4%                    |
| 8           | 26.8%                    |
| 9-16        | 35.9%                    |

Another scale “Framingham Risk Score” is used to assess an individual’s risk of developing cardiovascular disease over 10 years. It is gender-specific design; scoring system is different for men and women. It is practical, clinically relevant and modestly accurate but its effectiveness seems somewhat limited in certain specific populations (Wadud, 2014). Six variables are used to assess risk of cardiovascular disease development including age of person, diabetes, smoking status, total cholesterol, high density lipoprotein cholesterol (HDL), and systolic blood pressure. Regarding the Framingham Risk Score for men, the details of each item are presented as follows:

## 1. Age of person:

| Age        | Points |
|------------|--------|
| 30 – 34    | 0      |
| 35 – 39    | 2      |
| 40 – 44    | 5      |
| 45 – 49    | 6      |
| 50 – 54    | 8      |
| 55 – 59    | 10     |
| 60 – 64    | 11     |
| 65 – 69    | 12     |
| 70 – 74    | 14     |
| 75 or more | 15     |

## 2. Diabetes:

|         | Points |
|---------|--------|
| Absent  | 0      |
| Present | 3      |

## 3. Smoking status:

|            | Points |
|------------|--------|
| Non-smoker | 0      |
| Smoker     | 4      |

## 4. Serum total cholesterol (mg/dL):

|               | Points |
|---------------|--------|
| Less than 160 | 0      |
| 160 – 199     | 1      |
| 200 – 239     | 2      |
| 240 – 279     | 3      |
| 280 or more   | 4      |

|   |        |
|---|--------|
| 5. Serum HDL cholesterol (mg/dL):       | Points |
| 60 or more                              | -2     |
| 50 – 59                                 | -1     |
| 45 – 49                                 | 0      |
| 35 – 44                                 | 1      |
| Less than 35                            | 2      |
| 6. Systolic blood pressure not treated: | Points |
| Less than 120                           | -2     |
| 120 – 129                               | 0      |
| 130 – 139                               | 1      |
| 140 – 159                               | 2      |
| 160 or more                             | 3      |
| 7. Systolic blood pressure treated:     | Points |
| Less than 120                           | 0      |
| 120 – 129                               | 2      |
| 130 – 139                               | 3      |
| 140 – 159                               | 4      |
| 160 or more                             | 5      |

The total score indicates risk of developing cardiovascular disease over 10 years. The risk categorization is presented as follows:

| <b>Risk group</b>   | <b>Points</b> | <b>Cardiovascular risk over next 10 years</b> |
|---------------------|---------------|---|
| - Low risk          | Less than 11  | Less than 10%                                 |
| - Intermediate risk | 11 – 14       | 10-20%  |
| - High risk         | 15 or more    | More than 20%                                 |

For women, the Framingham Risk Score is different in the points of the categorization as follows:

| <b>Risk group</b>   | <b>Points</b> | <b>Cardiovascular risk over next 10 years</b> |
|---------------------|---------------|---|
| - Low risk          | Less than 13  | Less than 10%                                 |
| - Intermediate risk | 13 – 17       | 10-20%  |
| - High risk         | 18 or more    | More than 20%                                 |

The Framingham Risk Score indicates that men are higher risk than women. Age, diabetes, smoking status, HDL level, and systolic blood pressure are the key factors of developing cardiovascular disease. Moreover, the Framingham Risk Score is used as a guide for prevention, which can be achieved by lifestyle modification and medication therapy.

### **Investigation of Myocardial Infarction.**

Common diagnostic test to determine the extent of coronary heart disease and angina includes electrocardiography, echocardiogram, laboratory tests, and coronary angiography.

#### ***Electrocardiography.***

Myocardial injury is most often indicated by ST segment elevation  $\geq 1$  mm above the baseline in limb leads, or  $\geq 2$  mm above the baseline in chest leads . Other signs of acute injury include a straightening of the ST segment that slopes up to

the peak of the T wave without spending any time on the baseline; tall, peaked T waves; and symmetric T-wave inversion (Jacobson, 2000).

### ***Echocardiogram.***

The echocardiogram is used to evaluate ventricular function. It may be used to assist in diagnosing an MI, especially when the ECG is nondiagnostic. The echocardiogram can detect hypokinetic and akinetic wall motion and can determine the ejection fraction (Dressler, 2010).

### ***Laboratory Tests.***

Cardiac enzymes and biomarkers are used to diagnose and acute MI. Cardiac biomarkers, which include serum creatine kinase (CK)-MB and troponin-T, can be analyzed rapidly. These tests are based on the release of cellular contents into the circulation when myocardial cells die.

CK-MB is the cardiac-specific isoenzyme; it is found mainly in cardiac cells and therefore it increases only when there has been damaged to these cells. The level begins to increase within a few hours and peaks within 24 hours of an MI.

Troponin-T is specific for cardiac muscle, and this biomarker is currently recognized as reliable and critical marker of myocardial injury. An increase in the level of troponin in the serum can be detected within 3-6 hours after pain has started. It remains elevated for a long period, often as long as 3 weeks, and it therefore

can be used to detect recent myocardial damage (Burke, Mohn-Brown, & Eby, 2011; Dressler, 2010).

### **Treatments of Myocardial Infarction.**

The goals of medical management are to minimize myocardial damage, preserve myocardial function, and prevent complications. These goals may be achieved by reperfusing the area with the emergency use of thrombolytic medications or by percutaneous cardiac intervention (PCI).

#### ***Pharmacological Treatment.***

Medical management of patients with MI focuses on three goals: 1) relieve acute pain, 2) restore coronary blood flow, and 3) prevent further attacks to reduce the risk of MI (Keresztes & Wcisel, 2009). The major types of medications used to treat the acute attack in angina pectoris are as follows (Burke, Mohn-Brown, & Eby, 2011; Dressler, 2010; Keresztes & Wcisel, 2009):

*Opiate Analgesics.* Opiate analgesics are used to relieve or reduce acute pain. By reducing pain, the heart rate often lowers and the need for oxygen by the myocardium also is reduced.

*Vasodilators.* Vasodilators helps reduce acute pain and prevent further attacks by widening the diameter of coronary arteries and increasing the

supply of oxygen to the myocardium. Nitroglycerin, a short-acting nitrate, is the drug of choice against angina attacks. Administered sublingually, per tablet, or via translingual spray, nitroglycerin helps relieve or reduce anginal pain within 1 to 2 minutes. Long-acting nitrates, given orally vasodilation, thereby promoting blood flow and oxygen to the heart muscle.

*Beta-Adrenergic Blockers.* Beta-adrenergic blockers help reduce the workload of the heart, decrease myocardial oxygen demand, and may decrease the number of anginal attacks such as Metoprolol, Atenolol, and Propranolol.

*Calcium-Channel Blockers.* Calcium-channel blockers are used to dilate coronary arteries, thereby increasing oxygen supply to the myocardium such as Amlodipine, Nifedipine, and Verapamil.

*Antiplatelet Agents.* Antiplatelet agents inhibit platelet aggregation and reduce coagulability, thus preventing clot formation. The drug of choices is usually Aspirin, followed by Heparin.

*Antithrombotic Therapy.* Antithrombotic therapy continues with medications that dissolve the clot that forms the blockage of the coronary arteries. Thrombolytic therapy includes streptokinase, urokinase, and tissue-type plasminogen activator (t-PA). For the best efficacy, thrombolytic agents should be given within an hour after the onset of chest pain. However, new AHA guidelines advise that thrombolytic agents can still be given for up to 12 hours after the onset of chest pain.

## **Theoretical Concepts**

In this study, the conceptual framework derived from 3 conceptions: (1) the Common Sense Model (CSM), (2) the Conceptual Change Model (CCM), and (3) a Representational Approach to Patient Education. The details of each concept are as follows:

### **Common Sense Model (CSM).**

The CSM proposed by Leventhal et al. (1980) consists of illness representation, coping, and appraisal. The details of each component are presented as follows:

#### ***Illness Representation.***

Illness representation has been defined in several definitions. Leventhal et al. (1980) defined the illness representation as the “individual’s integrated perceptual-cognitive model of a health threat that guides the person’s coping with health events as well as evaluation of treatment effects”. Cameron and Moss-Morris (2004) defined illness representation as an organized set of beliefs regarding how the illness affects the body, its impact on life activities and experiences. Petrie and Weinman (2006) described that the illness representation is dynamic process which changes to shift in patients’ perception and ideas about their illness. According to

Petrie, Broadbent, and Kydd (2008), the illness representation is defined as a dynamic process where information about the illness or changes in symptoms may cause a re-evaluation of an individual's perceptions of their illness and consequences in a patient's coping patterns, help seeking, or emotional response whereas Maes and Karoly (2005) viewed the illness representation as a personal resource or trait and it can be more specifically defined as a goal-guidance process occurring systematically that aimed at the accomplishment and maintenance of personal goals which can be thoughts about, mental representations of, desired outcomes or states.

Therefore, the illness representation refers to the ideas about how patients view their illness and its consequences which occur by the information about the illness or symptoms guiding their behaviors, coping patterns, seeking for help, and emotional response which aimed to maintain their goals. Illness representations are often used in several terms; illness cognitions, illness perceptions, illness beliefs, and illness schemata (Cameron & Moss-Morris, 2004).

Illness representation is generated by the information originating from 3 sources (Hagger & Orbell, 2003). The first source is the general pool of lay information already assimilated by the individual from previous social communication and cultural knowledge of the illness. The second source is the information from the external social environment from perceived significant others or trustable sources such as a doctor or parent. Finally, current experience is a significant source of the information that the individual uses in order to build the representation. Current experience includes the somatic or symptomatic information based on current perceptions and previous experiences with the illness, and also involves to knowledge

of the effective use of the previous strategies to cope with the illness. The information from these sources influences individuals to make sense or representations of illness.

Therefore, the pre-existing information from any source is the stimuli of organizing illness representations. Then the illness representations guide the selection of coping behaviors. The outcomes will be evaluated in term of successfulness in controlling or eliminating the illness and its consequences.

Typically, people match their knowledge or information with the characteristics of their condition to construct the representation of their illness regarding 5 components of illness representation including identity, causes, timeline, consequences, and cure/controllability.

*Identity.* It is the label or name given to the condition and the symptoms that appear to go with it. People seek information to label or define their condition and they use symptoms, or body states to define labels.

*Causes.* It is the representation regarding the factors contributing to the illness or disease. Causal representations are important in some illnesses as they can influence the types of treatments that patients seek for their condition or the changes they make to control their illness in a logical way such as myocardial infarction patients who perceive that the disease is caused by unhealthy behaviors such as smoking and consuming fatty foods are more likely to make change on their behaviors.

*Timeline.* It is the representation about how long the condition would be last, usually ranging from acute to chronic.

*Consequences.* It is the representation involving the thoughts about the effects of their illness on patients' work, family, lifestyle, finances, and emotional states.

*Cure/control.* This representation involve whether the illness condition can be cured or controlled through medication, surgery or other types of treatment, and also personal control.

The inaccurate views of illness can create anxiety as a cognitive representation outcome. Individuals who perceive that MI is a life-threatening disease and it is difficult to prevent, moreover, if the individual has a family member died with MI, they might be anxious that it will be their turn in some day. Some people who believe that MI creates large consequences in their lives may have anxiety about how to perform activity daily livings as usual.

In parallel, the symptoms perceived by the individual also trigger emotional responses such as fear, stress, and worry. Awareness of these emotional responses induces the selection and use of strategies for controlling these emotions. These responses are then appraised for their success, and these appraisals guide further efforts in emotional regulation.

Several researchers determined illness representation in patients with MI. Alsén et al. (2008) interviewed patients 4 month after MI. The patients reported

fear of death and concern about performing daily activities. Some patients did not participate in the rehabilitation groups because they thought that performing activities would damage their hearts so that they lacked of confidence and motivation to do the exercise and make lifestyle changes. Several patients viewed that MI was impossible to control because they perceived that MI was unpredictable. One patient reported that his family members died from MI, so he did not believe that MI could not be prevented and preferred waiting for his turn. These beliefs reflect that the patients still had inaccurate perceptions about their illness and its consequences, which lead to failure to participate in the rehabilitation program and return to work.

Inaccurate illness representations provide negative effects for patients with MI. Recently, Yan et al. (2011) found that Chinese patients reported that they recognized only the experienced symptoms. They did not know other common symptoms. Furthermore, the researchers found that the patients perceived chance or bad luck as the most common causes, followed by altered immunity, aging, own behavior, and overwork. In addition, the patients reported that they were uncertain that their illness could be controlled by themselves and their psychological status was not well adjusted. These results reflect that there were several inaccurate illness representations among the patients with MI, which can lead to poor lifestyle modification later on.

There are several inaccurate causal beliefs among patients with MI. In the recent study, Reges, Vilchinsky, Leibowitz, Manor, Mosseri, and Kark (2011) found that most of the patients with MI in the study reported that general stress was the most common cause of MI, followed by cigarette smoking, and genetic factor. Only few patients reported that dyslipidemia, overweight, lack of exercise and

hypertension, respectively, were the causes for cardiac event. These findings represent that the patients lacked of awareness on risk factors contributing to MI.

In Thailand, few studies indicated patients' representation on MI and its effects. Thepphawan, Watthnakitkrileart, Pongthavornkamol, and Dumavibhat (2011) found that 46.7% of the patients devoted time to see whether or not the symptoms would disappear. Orksuk and Ruisunngnoen (2012) also found that the patients perceived that their symptoms did not relate to heart and waited to see if the symptoms disappeared itself after management according to their experience and understanding. They sought for treatment when the symptoms became intolerable. These findings indicate that the patients did not perceive that the symptoms were the signs of MI and threatened to their lives. Moreover, they still lacked of knowledge on how they timely decided for receiving treatment and understanding about the disease. Accordingly, there are various misperceptions regarding the five components of the illness representation that patients with MI perceived.

In addition to the sources of information (previous social communication and cultural knowledge, trustable sources such as healthcare providers, and current experience) as mentioned before, several determinants are also related to various illness representations. These determinants include gender, age, personality, educational level, and culture.

*Gender.* Gender difference is a factor involving different illness representation. Grace et al. (2005) studied the illness representations among 661 patients with MI and they found that woman perceived a significantly more chronic course and more cyclical episodes than men, while men perceived greater personal

control and curability than women. Women reported family history as a cause, a risk factor of MI which is nonmodifiable. In a similar way, Aalto, Heijmans, Weinman, and Aro (2005) and Yan et al. (2011) found that men reasoned their illness more often to internal and behavioral factors whereas women saw their illness caused by stress more often. These findings indicated that gender difference is an ordinary cause of different representation. Consequently, reframing women's causative risk factors to focus on modifiable or controllable behavior changes may be constructive.

*Age.* According to Meischke et al. (2000), the study was conducted in 1294 MI patients in the United States. The researchers found that the increased number of risk factors of MI declined with age. Patients with younger age perceived their physical health better than the elders and older people who feel more vulnerable to getting MI than younger people.

*Personality.* Some types of personality can affect the illness representation. According to Denolett (2005), type D or distressed personality refers to a general tendency to psychological distress. Williams, O'Connor, Grubb, and O'Carroll (2011) studied type D personality and illness perceptions in 192 patients with MI. Type D patients believed that their illness has significantly more serious consequences, will last longer, less controllable by them or through treatment compared to non-type D patients. Type D patients experienced more symptoms and there were more concerns about their illness, more emotions. Moreover, they saw their illness to be significantly less comprehensible compared to non-type D patients. Alsén, Brink, and Persson (2007) interviewed the patients with MI about how they

viewed their MI and themselves. The patients who were dependent on others viewed their conditions as uncontrollable and avoid identifying and reasoning the possible causal attributes compared to the patients who were self-confident. Accordingly, these findings reveal that patient's personality can contribute to different representations.

*Educational Level.* People with different educational level have different perception about the illness. According to Yan et al. (2011), patients with MI in China who had higher educational level reported higher identity, more personal controllability and more illness coherence whereas patients with lower educational level reported misconceptions on causal beliefs such as altered immunity and chance or bad luck. Furthermore, the participants reported only experienced symptoms and they did not know that MI also has other common symptoms. People with higher educational level might have chance to approach the information related to the illness easier. Thus, an individual's ideas about illness can be varied by educational level.

*Culture.* Illness representations are associated to culture's philosophy and spiritual aspects. People who believe that supernatural power creates their fates and gives their illness might not realize in behavioral factors that cause the disease such as MI (Cameron and Moss-Morris, 2004). Furthermore, beliefs about supernatural force can influence the inaccurate seeking treatment. For example, some patients with MI in the northeastern Thailand believe that their illness is caused by ghost, then they prefer go to the sorcerer rather than hospital (Pokathip & Chirawatkul, 2012).

Consequently, several factors were identified to contributing the differences of illness representation in patients with MI. Patients with the same conditions may have various views of their illness depending on the determinants of each individual.

### *Coping.*

In order to overcome the problem, an individual uses coping strategies based on cognitive and emotional representation. According to Leventhal et al. (1980), there are three principles in order to respond as coping. First, the situations and individual's emotion define the goals of the coping. Second, the goals are based on the cognitive illness representation and making plan about what to do. Third, information has a role to generate the illness representation and plan for behavior.

### *Appraisal.*

Appraisal is the evaluation process of the coping strategies, whether or not the coping is effective in order to deal with the situation (Leventhal et al., 1980). To evaluate the coping, the individual needs to test whether the selected action provides the effective result or not. If the action is successful, the individual can achieve the goal. In another way, if the action does not achieve the goal, the process will go backward to the illness representation whether there are any barriers that the individual faces when he or she uses coping.

To encourage patients with MI to overcome through the 5 components of the illness representation, challenging the new information about the illness can influence the individuals to reorganize their representations and guide their coping strategies for better outcomes. Therefore, the process of changing the conceptual thinking of the patients is needed.

### **The Conceptual Change Model.**

The conceptual change model (CCM) was developed by Posner, Strike, Hewson, and Gertzog (1982). The model was described that learning involves an interaction between new and existing conceptions with the outcome being dependent on the nature of the interaction. There are two phases of the conceptual change, namely assimilation and accommodation (Posner et al., 1982). In the assimilation phase occurs when an individual experiences new phenomena and he/she sees that the existing conceptions are suitable and relate to the new phenomena. The individual then uses current conceptions to define problems, setting strategies to face the problems, and identifying criteria for the solution. The accommodation phase occurs when the current conceptions are not possible for solving the problems. Then the individual needs to restructure the existing conceptions.

In order to restructure the current conceptions, the criteria need to be met including: (1) an individual is dissatisfied with the existing knowledge, (2) when the new conceptions can be understood easily (intelligible) and reliable (plausible), and (3) when the individual see that the new conceptions will be fruitful. To make the individual dissatisfied with the current concepts, he/she has to see that there has no

status of being intelligible, plausible, and fruitful, which indicated that the current concepts are not possible to overcome the problems. Therefore, the individual will likely change his/her current conceptions.

Before the current conceptions changed, there are two features of conceptual ecology to guide the change process from one conception to another including (1) anomalies and (2) fundamental assumptions. Anomalies provide the sort of cognitive conflict that prepares the individual's conceptual ecology for an accommodation phase. The more the individual considers the anomaly to be serious, the more dissatisfaction occurs with the current conceptions (Posner et al., 1982).

In order to change the current conceptions, teaching strategies are importantly involved (Posner et al., 1982). The teaching strategies include: (1) developing lectures, demonstrations, or problems to create cognitive conflict, (2) organizing instruction to identify errors in the individual's thought in order to resist accommodation, (3) developing the kinds of strategies to deal with the errors, (4) assisting the individual to make sense of the new conceptions to another representation, and (5) developing evaluation techniques to appraise the process of conceptual change.

Changing patients' illness representations also requires the concepts to guide the process in order to provide an effective education to the patients. Several researchers developed the strategies to approach the patient's illness representation and challenge the new information in practical implementation.

### **A Representational Approach to Patient Education.**

The representational approach to patient education proposed by Donovan and Ward (2001) was based on the Common Sense Model (CSM) (Leventhal et al., 1980) and the Conceptual Change Model (CCM) (Posner, Strike, Hewson, & Gertzog, 1982) in order to modify individuals' concepts or representations (Hewson, 1992; Posner et al., 1982). Individuals construct their own knowledge by using their existing knowledge appeared within a context of social interaction and agreement. In the process of constructing their knowledge, individuals develop the pattern of beliefs in the way they can see the link and usefulness. Each individual may perceive and interpret the same situations in different way, depending on their existing knowledge and beliefs and the way in which these beliefs influence and are influenced by the social interactions.

In the light of patient education, Donovan and Ward (2001) applied the CCM with the CSM to develop the representational approach to patient education. CSM can be used to guide the development of how to present the information and what information is useful to the patient, and CCM is the process of changing the misconceptions. Before giving the new information to a patient, nurses should understand the existing knowledge or representation that the patient holds in his/her cognition. Assessing patient's representation on their illness guides the nurse to give specific, highly relevant, and individualized information that will have a greater chance to be accepted by the patient.

Donovan and Ward (2001) proposed 5 steps of representational approach to patient education including (1) representational assessment: patients are

encouraged to explain their beliefs about the illness along the 5 components of illness representation, (2) exploring misconception: the patients are encouraged to identify the experiences that lead to any misconception found in the first step, (3) creating conditions for conceptual change: the nurse and patient discuss the problems associated with the misconceptions and the results of acting on those misconceptions, (4) introducing replacement information: the nurse presents information to replace the misconceptions or fill the gaps in the patient's representation, and (5) summary: the nurse summarizes the new information and discuss the benefit from acting on the new information.

In order to approach to patient education, there are 3 ways that should be considered. First, patients would have the opportunity to consider and comment on the relationship among beliefs and outcomes because the misconceptions can be lessened by discussing on their limitations. Second, the nurse can present educational information when a patient's representation has been assessed so that the patient can see the intelligibility and plausibility of the new information. Finally, discussing the benefits of the plausible information will promote the support of new information that solves the problems associated with existing misconceptions (Donovan & Ward, 2001).

In 2007, Donovan, Ward, Song, Heidrich, Gunnarsdottir, and Philips proposed an update on the representational approach to patient education in order to strengthen the representational approach as the process of conceptual change needed the translation of the new information into concrete strategies to be more practical in order to change behaviors. According to the gap, two more steps were added to the representational approach: goal setting and planning, and follow-up reinforcement.

During goal setting and planning, patients are encouraged to identify personally important goals related to their health problems. Health care providers can give the suggestion if they are unable to identify goals. Then, patients and health care providers work to identify strategies that could help them reach the goals. During the follow-up reinforcement session, patients are asked to evaluate the strategies they attempted to implement and make revisions to the plan if necessary.

Concisely, there are 7 key elements of the representational approach to patient education including (1) representational assessment, (2) identifying and exploring gaps, errors, and confusions, (3) creating conditions for conceptual change, (4) introducing replacement information, (5) summary, (6) goal setting and planning, and (7) follow-up contact: goal and strategy review. Furthermore, Donovan et al. (2007) also emphasized on involving significant others in the sessions to increase the ability of patients to identify and reflect on important health-related representations.

Consequently, the entire process of the approach is driven by the patients' responses and sociocultural context. The representational approach to patient education is adequately flexible to guide the intervention as it provides patient-centered care tailored to each individual to encourage self reflection about their illness representations associated to the health problem and guide the selection of changing behaviors to improve patients' outcomes.

### **Anxiety in Patients with Myocardial Infarction**

Anxiety can be conceptualized in many ways. In general, anxiety means a state of uneasiness and apprehension, as about future uncertainties. In

psychiatric term, anxiety means a state of apprehension, uncertainty, and fear resulting from the anticipation of a realistic or fantasized threatening event or situation, often impairing physical and psychological functioning (The American Heritage, 2009). Moreover, anxiety has been explained by several theorists in different aspects.

Regarding to Freudian theory proposed by Sigmund Freud in 1924 (as cited in Endler & Kocovski, 2001), anxiety referred to a feeling of impending danger. Freud differentiated anxiety to be objective, neurotic, and moral anxiety. Objective or reality anxiety referred to a fear of a stimulus that was objectively dangerous such as a dog or a snake. Neurotic anxiety referred to the result of conflict between id and ego, which threatens to express its irrationality in thoughts and behavior. Moral anxiety was determined as a conflict between id and superego by the fear of internal or self-punishment such as guilt when one express unconscious level behaviors.

Spielberger, Gorsuch, and Lushene (1970) differentiated components of anxiety including situation (state) and person (trait). State anxiety is defined as a transitory emotional response involving unpleasant feelings of tension and apprehensive thoughts. Trait anxiety refers to individual differences in the likelihood that a person would experience state anxiety in a stressful situation

Anxiety, therefore, is a feeling of uneasiness, unpleasant emotion that a person responds to an uncertain future situation. Level of anxiety may be different depending on various factors that affect on each individual.

## **Factors Contributing to Anxiety in Patients with Myocardial Infarction**

Several factors contribute the patients to develop anxiety. According to the reviews, the influencing factors are as follows:

### **Sociodemographic Factors.**

Several factors contributing a person to develop different level of anxiety were discussed. Kim et al. (2000) found that gender indicated differences in anxiety. Among 424 patients with 72 hours after admission with MI, woman had significantly higher scores than men ( $p = .02$ ). According to Norris, Ljubska, and Hegadoren (2009), women reported higher anxiety scores measured by HADS than men among MI patients.

Moreover, Kim et al. (2000) found the correlation among the sociodemographic factors. Marital status interacted with gender influenced anxiety by using state anxiety inventory (STAI). Married women had higher anxiety than single and widowed women, whereas married men had lower anxiety than single men. These results indicated that a significant role for social support reduced anxiety in men. In contrast, women may perceive themselves as caregivers rather than caretakers and may not expect to be supported, or when they are ill, they actually may not receive as much support as men do from spouses and others.

Furthermore, the findings from this study showed that women with lower income reported higher anxiety and had no effect of income on anxiety in men because women may be more vulnerable than men to psychological distress when the

women are poor. Low income is a predictor of anxiety in cardiac patients, and this relationship may be a consequence of the impact of lack of resources available to persons with lower incomes.

In short, gender, marital status, and financial differences are the predictors of anxiety. These findings encourage health care providers to raise higher attention to sociodemographic factors and the role of social support may reduce anxiety in patients with MI.

### **Personality.**

Personality is an internal factor enhancing to anxiety. According to Brandes & Bienvenu (2006), there are two types of personality relevant to anxiety including neuroticism and extraversion. Neuroticism refers to one's tendency to experience negative emotions and cope poorly with stress. Person who has high neuroticism personality tend to feel transiently anxious, sad, angry, self-conscious, and vulnerable more often than those who are low neuroticism. In contrast, extraversion personality refers to a person's quantity and intensity of interpersonal interactions and positive emotions. A person who has high extraversion tend to be warm, sociable, affirmative, active, excitement-seeking, and emotionally bright compared with introverted person.

Type-D or distressed personality is another type of personality that affected a person to be more anxious. Type-D personality is characterized by the tendency to experience increased negative affectivity together with the tendency not

to express these emotions in social interactions due to fears of how others may response (Denolett, 2005).

Therefore, personality is an individual factor that contributes a person to indicate different level of anxiety. Trait personality should be considered for health care team to aware that a patient with MI who has anxious personality tends to be more anxiety and to provide strategies to reduce anxiety in the patients with MI.

### **Experience.**

The first time of experience affects a person to be more anxiety. Especially in patients with first time of MI, feeling of uncertain future usually occurs in this group of patients because it is perceived as a life-threatening disease. Moreover, experience of unfamiliar treatment such as cardiac catheterization can be a source of anxiety (Chair, Chau, Sit, Wong & Chan, 2012). In a previous study, the findings indicated that absence of any information about what will happen after cardiac catheterization, first hospitalization for MI were associated with higher state anxiety among 100 patients with MI without previous experience with cardiac catheterization before undergoing coronary angiography (Uzun, Vural, Uzun & Yokusoglu, 2008). Consequently, this information emphasizes the health care team that MI patients with first experience of MI and procedure should be concerned in anxiety reduction.

**Severity of the disease.**

Anxiety has positive correlation with the severity of the disease. The greater severity of MI, the higher anxiety was found in the patients. Moreover, the severity of the disease encourages the patients to worry about ability to maintain their interpersonal relations, social role, and self-care. (Ladwig, Kieser, Konig, Briethardt & Borggreffe, 1991 as cited in Aghakhani, Sharif, Khademvatan, Rahbar, Eghtedar, & Shojaei motlagh, 2011).

**Invasive Procedure.**

Coronary angiography (CAG) is a procedure for investigation and treatment in the patients with MI. As it is an invasive procedure and causes possible complications, the patients with MI undergoing CAG usually reported anxiety (Caldwell, Arthur, Natarajan & Anand, 2007). Moreover, being in the waiting list for CAG also causes anxiety for the patients with MI. Uzun et al. (2008) reported that the level of state anxiety before CAG was highly dependent on the time on the waiting list particularly more than 7 days for elective cases.

**Illness Representation.**

Illness representation or perception of their illness also contributes patients with MI to develop higher anxiety. According to Alsén, Brink, Persson, Brändström, and Karlson (2010), the more MI patients perceived their illness to be

chronic and episodic in nature, and the more they believed that the condition would affect to their life, the higher anxiety were found. In a recent study, Yan et al. (2011) surveyed the illness representation among Chinese patients with MI. The findings indicated that patients who perceived that MI would last longer and could have serious consequences in their lives reported poor emotional status. Broadbent, Petrie, Ellis, Ying, and Gamble (2004) found that perceptions of greater damage of the heart by drawing picture of patient's heart predict greater anxiety 3 month later. Broadbent et al. (2006) found higher anxiety in patients who overestimated their risk of MI. Furze, Lewin, Murberg, Bull, and Thompson (2005) found that the higher misconception of MI the patients perceived indicated higher anxiety. Accordingly, patients' representation on their MI in different views can encourage anxiety as well.

Therefore, assessing factors contributing to anxiety in the patient with MI is the role of nurses. Nursing intervention to correct and strengthen patients' illness representation reducing anxiety should be provided.

### **Interventions for Anxiety Reduction in Patients with Myocardial Infarction**

Several interventions were conducted to reduce anxiety in patients with MI. The major aim of each intervention emphasizes on dealing with the factors and causes of anxiety.

### **Music Therapy.**

Hamel (2001) conducted music intervention in the patient waiting for cardiac catheterization. The sample consisted of 51 participants in experimental group and 50 participants in control group. The participants in experimental group received Trance-Zendance (relaxing music), which consisted of 70-80 beats per minute and no lyrics for 20 minute before undergoing cardiac catheterization whereas the control group did not receive music. The components of the intervention in this study included (1) the patient was placed in quiet environment (catheterization room) and (2) the patient was placed in comfortable position. The results indicated that state anxiety scores were statistically significant decreased between group ( $p = .002$ ) and within experimental group ( $p = .003$ ).

Bally, Campbell, Chesni, and Tranmer (2003) conducted patient-controlled music therapy during coronary angiography (CAG) on procedural pain and anxiety distress syndrome among 107 patients with MI waiting for CAG including 56 participants in experimental group and 51 participants in control group. The interesting point in this study is all participants experienced first time of CAG. Moreover, types of music were selected by the patients including classical, soft rock, relaxation, country, and other music depended on patient's preference. The participants in experimental group selected their preference music and listened to the selected music before, during, and after CAG before complete the questionnaire, average time around 45 minutes. The findings showed that before CAG, the participants in both groups reported moderate state anxiety score. After CAG, there were no statistically significant differences between group ( $p = .36$ ) and within group

( $p = .40$ ). The researchers discussed these findings that this study was conducted in the room which may have been influenced strongly by procedural events such as flat and cold table, multiple machines, large fluoroscope, and by overwhelming fear and anxiety about the procedure itself. Moreover, the researchers did not measure patients' anxiety during procedure which may be different with prior to and after CAG. Therefore, the interesting component of the intervention in this study is selected music by patients depended on their preferences and the researchers tried to deal with the factor related to experience of first time for CAG.

Nilsson, Lindel, Eriksso, and Kellerth (2009) conducted music in relation to gender during CAG. This randomized controlled trial consisted of 240 participants including male 58 males in control group, 59 females in control group, 61 males in experimental group, and 60 females in experimental group. MusicCure®, the music for relaxation, was used in this study. The components of the music included 60-80 beats per minute, soft and relax melody, and the volume was controlled during 60-70 dB. The music was begun as soon as the patient was lying on the table, continued during the procedure, and ended before the patient left the operating table. The results showed no statistically significant differences between group ( $p = .932$ ) and between gender ( $p = .187$ ). This study showed that the researchers tried to deal with the factor of gender differences on anxiety level.

Doğan and Şenturan (2012) performed music therapy in patients undergoing CAG. This study included 200 MI patients with first time of CAG including 100 participants in experimental group and 100 participants in control group. Hüseyini music (traditional Turkish music) was played, which consisted of feeling of peace and tranquility, generate self- confidence, sense of determination

because of its hidden pentatonic composition, no lyrics, and included water sound. The music was begun before the participants in the experimental group came and continued until the patients left the room. The findings reported that before and during CAG, state scores reduced both group ( $p = .000$ ) and between group, state scores were also reduced ( $p = .000$ ), but the differences of scores before and after intervention in the experimental group were higher than the control group. Therefore, this study showed that the researchers used the music based on cultural aspect and dealing with the experience of first time for CAG which the patients may be familiar with.

In summary, the similarities among 4 articles is that the researchers tried to deal with the cause of anxiety which is “experience” (first time of CAG) because any experienced situation for the first time can create anxiety for any person, and “treatment”, which is the invasive and procedure using in the critical situation that makes the patients experience anxiety. The music intervention was used with the concurrent characteristics of the music including no word, rhythm 60-80 bpm, soft melodies, creating feeling of calm, peace, and relaxation. Environment is one of the similarities which the music interventions were conducted in the catheterization room, which is usually quiet and cold. The differences include method of using music which was selected by the researchers or by the patients’ preference. One study tried to focus on gender difference, but no significant difference of the result after intervention. The results in the study were discussed that it was because of the frightful environment such as flat and cold table, multiple equipments, large fluoroscope, and by overwhelming fear and anxiety about the procedure itself. Type of music using in each study were different; general music as the patients’ preference (classical, soft

rock, etc.), relaxation music, and cultural-based music (Hüseyni) which the patients were familiar.

### **Education Sessions.**

The study conducted by Aghakhani et al. (2011) was emphasized on education and anxiety reduction. The participants were 124 patients with MI including 62 participants in control group and 62 participants in experimental group. The education included face to face training by nurses and given booklet consisted of dietary regimen, sexual relationship, exercises, administered drugs, weight changes, lab result, and relaxation method. The findings showed that no significant differences of anxiety level before intervention in both group ( $p = .71$ ). At discharge time, there was a significant difference in anxiety scores ( $p = .003$ ) and 3 months after discharge ( $p = .05$ ). Stress was significantly and positively correlated with age and gender and marriage status in two groups ( $p = .003$ ), but negatively related to income and re-hospitalization for cardiac events. According to this study, the researchers paid attention on the previous studies that the patients with MI reported anxiety in their social role, interpersonal relationship and personal health. Giving education by face to face with nurses and giving booklet were more effective than giving booklet alone in the control group. This result indicated that nurses play the important role in anxiety reduction by giving education to the patients with MI.

Chair et al. (2012) conducted education by using a videotape on cardiac catheterization patients in Hong Kong. The sample in this study consisted of 128 MI patients with first time of CAG including 64 patients in control group and 64

patients in experimental group, elective case, and non emergency. All patients were invited to attend the pre- admission assessment session 1 week before CAG by voluntary capacity at out-patient department (OPD). The patients in the experimental group received educational session 1 week before the procedure with a 12-min educational videotape including procedure, expected sensation, and coping strategies. The whole session for the experimental group lasted for approximately 20 minutes whereas the control group received usual pamphlet and brief information including fasting time before CAG, skin preparation, wound care, routine vital signs recorded, and pain management. The findings indicated that anxiety scores in both group were decreased ( $p < .05$ ), and significant differences in state anxiety between group across the time ( $p < .001$ ). Therefore, the researchers pointed out on the experience of first time for CAG and using media to give education instead of face to face that would be the benefit to reduce workload in nurses. Furthermore, the researchers paid attention to the Hong Kong population who were inability to read, so the researchers combined using pamphlet and videotape to reduce the gap for the patients to approach the education.

According to these 2 studies, the similarity is focused on the benefit of education reducing anxiety in patients with MI. Aghakhani et al. (2011) found the positive correlation between the severity of MI and anxiety and the patients worried about their social role, interpersonal relations, and personal health. Moreover, the researchers discussed that nurses should identify the patients' needs, worries and concerns, which nurses can create the effective counseling and teaching whereas Chair et al. focused on the first time experience with CAG which creates fear of the unknown, possible complication, tension resulting from awareness of the unfamiliar

equipment, and the activities of staffs during the procedure. The researchers also realized that printed pamphlet might not be useful according to many of MI patients in Hong Kong were either illiterate or only received elementary education. Therefore, using the pamphlet plus with videotape were provided to help the patients approach the information. Furthermore, the researchers reviewed that the optimal time for education session should be 1-10 days before the procedure, so they set the education session 1 week before the CAG for the elective cases which they already knew the date of procedure in advance.

The important similarity is that nurses have the important role to prepare the patients for either the unfamiliar procedure or self-care after discharge. The differences among these 2 studies are time of giving education and the aim of education because the aims are different. One study was aimed to prepare the patients for the first time of unfamiliar procedure whereas another one study focused on self management after discharge.

### **Mindfulness Meditation.**

Tacón, McComb, Caldera, and Randolph (2003) conducted mindfulness meditation in 18 women diagnosed cardiovascular disease consisting of 9 patients in control group and 9 patients in experimental group. This pilot study was aimed to reduce anxiety in MI patients by using Buddhist-based intervention. The intervention was provided to the participants in experimental group for 2 hours each week, total 8 weeks of training. Audiotapes were given to facilitate daily homework practice. The mindfulness meditation included 3 basic practices; the body scan, sitting

meditation, and Hatha yoga. The results indicated that the participants in the experimental group had lower anxiety scores ( $p < .01$ ).

Another study related to mindfulness meditation conducted by Nyklíček, Dijkstra, Lenders, Fonteijn, and Kooiken (2012). This RCT study, the researchers aimed to reduce anxiety by using Buddhist-based intervention in 55 MI patients in experimental group whereas 52 patients in control group also received meditation but they were in self-help group. All participants in both groups were undergone percutaneous coronary intervention (PCI). The patients in the experimental group received mindfulness-based stress reduction (MBSR) 90-120 min each week for 3 weeks. Moreover, the experimental group received psychoeducation regarding the role of behavior, bodily sensation, emotional, and thoughts in psychological distress, psychoeducation regarding to the role of mindfulness and non judgemental acceptance of anxiety, practice meditation, and discussion experience while doing meditation whereas the self-help group (control group) received booklet based on group training with reading and practicing meditation every day by themselves. The findings reported that the anxiety and depression were significantly reduced between groups ( $p < .01$ ).

According to the 2 studies, the similarity is the use of Buddhist-based intervention aimed to reduce anxiety. Mindfulness focuses attention to the present moment and encourages detached, non-judging observation, sensation and emotion which provides a meaning of self-monitoring of the response to anxiety. However, this intervention needs regular practice and requires skills from the educators in meditation. The difference is one pilot study conducted on only women because the researchers believed that women are traditionally socialized to be feminine and

attractive at all time, and not to express negative emotions as men do. This may be a cause of higher anxiety in women. The difference is to combined psychoeducation to provide psychological distress management for the patients with MI in the RCT study. Consequently, it is interesting that these interventions were aimed to deal with factors and causes either gender, experience, or lack of information.

All the interventions were conducted in order to reduce anxiety by using relaxation techniques and giving education to patients with MI. However, the relaxation techniques only provided temporary effect in reducing anxiety and giving education sessions might not be effective for the existing knowledge and beliefs did not be explored to understand the misconceptions that the patients hold in their cognitions. The intervention that offers the assessment of patients' existing beliefs and sessions to clarify patients' misconceptions, therefore, is needed.

### **Illness Representation-Based Intervention.**

Previously, several researchers developed programs to change patients' perception after MI. Petrie, Cameron, Ellis, Buick, and Weinman (2002) developed a randomized controlled trial (RCT) to change patients' illness perceptions. The program consisted of 3 sessions. The first session included exploring patients' beliefs and brief explanation of MI. The second session included using Illness Perception Questionnaire (IPQ) to identify the patients' beliefs on the causes, developing a plan of minimizing future risk relevant to the patients and increasing beliefs about control of the condition. The third session was reviewing and discussing the action plan and symptoms of recovery after MI. This successful intervention could significantly

change patients' perceptions on the course of the disease, the consequences of MI on their life, and the controllability of the illness. Furthermore, the findings also showed that patients reported higher understanding of their MI and their preparedness to leave hospital, significantly increasing patients' intentions to go to the cardiac rehabilitation program, and higher speed of return to work in the patients in the intervention group. The early intervention was conducted in hospital where the patients had just faced with acute heart attack, so they were more amenable to the intervention and more responsive to change behavior. Nevertheless, the researchers did not focus on emotional outcomes, but they emphasized on the intention to participate the cardiac rehabilitation and the speed of return to work.

In 2009, a randomized controlled trial of an illness perception intervention was further developed (Broadbent, Ellis, Thomas, Gamble, & Petrie, 2009). This study was conducted based on Petrie et al. (2002) in larger sample size. The intervention was divided into 4 sessions. The first session included exploration patient's idea about causes and explanation of MI symptoms. The second session consisted of making a worksheet on personal action recovery plan including how patient's risk factors related to health behaviors, clarifying about the causes of MI and recovery, discussing the benefit and problem of changing behavior, discussing how to change behavior, setting the goal, and brief explanation the role of spouse in rehabilitation. The third session involved both the patient and spouse including exploration of the spouse's causal perceptions, discussion of the link between causes and the recovery plan developed with the patient, appropriate timelines to normal functioning, discussion of the spouse's role, along with exploration and normalization of concerns about going home. The last session included discussing about going

home. This brought out patient concerns about medications and discussed the benefits of medications. The session also involved the importance of pacing activity, following the structured action plan, and setting up routines. Lastly, concerns about leaving the hospital such as worry about a further MI, the importance of visiting the general practitioner, and normal symptoms of recovery were discussed. The additions from the previous trial in this study was that the color diagrams and take-home audio recordings of the intervention sessions were given to the patients in order to enhance self education at home.

In addition, the latter study also included spouse in the session in order to help improving patient outcomes in recovery. Nevertheless, emotional response still was not underscored.

Gould (2011) conducted the discharge nursing intervention (DNI) to promote self-regulation of care for cardiology patients. The intervention consisted of written discharge materials and telephone follow-up by an expert cardiovascular nurse who having advanced education and clinical expertise in the care and management of cardiology patients. The intervention was offered at discharge and continued within 24 hours of discharge. The packet of the materials containing a medical pocket card, medication review materials, suggested internet sites, copies of the interview tools was prepared for each patient in the experimental group. Patients in the control group received standard care. The researcher found that patients who received the DIN recognized the chronic nature of the disease. No significant group differences were found on medication adherence, patient satisfaction, and use of urgent care.

The illness perception interventions were conducted in foreign countries, which have some different contexts with Thailand in the aspects of

ethnicity, religions, lifestyle, culture, economics, education, and health care system that would affect to patients' beliefs on MI. The intervention aimed to change patients' perception on MI is still undefined in Thailand. Only the program based on common problems that nurses usually found in patients with MI undergoing percutaneous coronary intervention (PCI) was developed. Somsiri and Susang (2010) conducted the planned instruction to educate MI patients receiving PCI. The session consisted of causes, symptoms, treatments, and self care after discharge including diet control, activity, exercise, medications, and symptoms management. The session involved the patient and relatives. One month after discharged, the patients reported significantly higher knowledge, perceived self care abilities, and self care behavior after receiving planned instruction. However, this study did not focus on emotional outcomes and the patients' perception on their MI remains unidentified.

### **Summary of the Illness Representation-Based Interventions.**

According to the reviews, there are some similarities and differences in details of the intervention. The summary of the studies are presented as follows:

#### ***Target Population and Setting.***

Generally, the target populations of the illness representation-based intervention in the previous studies were patients with first time of MI or any episode of MI. Patients' ages ranged from 30-80 years treated in hospital. Some of populations had undergone percutaneous coronary intervention (PCI) and discharged

from hospital setting within 72 hours of the procedure. Most of the settings conducted the interventions were in hospitals at the general ward, CCU.

### ***Purpose of the Interventions.***

Most of the interventions were aimed at changing patients' beliefs along the 5 components of the CSM. Some of the previous studies aimed at medication adherence, return to work, and attending cardiac rehabilitation. The satisfaction with the given information was also measured.

### ***The Interventions.***

Two studies (Broadbent et al., 2009; Petrie et al., 2002) were arranged the sessions into 3-4 sessions. The session usually included exploration of patients' beliefs and explanation of MI. The following sessions depended on the researchers' interests. One study (Broadbent et al., 2009) provided a recovery plan session and one study involved spouse session to encourage recovery plan.

Based Gould's study (2011), there are 3 components of the interventions in the review: first, the intervention to change beliefs was part of multifaceted intervention or it was a stand-alone intervention; second, according to method of belief change (e.g. counseling, and/or education, cognitive behavioral therapy or self-education); and finally according to method of delivery (e.g. verbal, verbal and written, self-administered auditory or self-administered written where the

self-administered refers to interventions that patients can implement alone at a time and place of their choice without assistance from other individual).

### ***Duration of the Intervention.***

The duration of the interventions usually ranged from 30 to 40 minutes for a session, 3-4 sessions. In one study (Petrie et al., 2002), the participants were contacted to complete the questionnaires at baseline, discharge, and 3 months after discharge. Another one study (Broadbent et al., 2009), the data were collected at discharge, three months, and six months after discharge whereas one study (Gould, 2011) collected data only once immediately post intervention. According to Gould (2011), the time of data collection varied from immediately post intervention to 5 years.

### ***Outcomes.***

The outcomes of the intervention consist of changing illness perception and rate of return to work (Petrie et al., 2002), speed of return to work, changes in causal attribution, intention to cardiac rehabilitation, and satisfaction of the intervention (Broadbent et al., 2009), medication adherence, use of urgent care, and patients' satisfaction (Gould, 2011).

## **Measurement Instruments**

According to the reviews, several tools were used to measure anxiety and illness representation. The details of each tool are presented as follows:

### **Anxiety Assessment Tools.**

The tools which are usually used for anxiety assessment in MI patients include Hospital Anxiety Depression Scale (HADS), State-Trait Anxiety Inventory (STAI), Geriatric Anxiety Scale (GAS), and Beck Anxiety Inventory (BAI).

The HADS developed by Zigmond and Snaith (1983; as cited in Norton, Cosco, Doyle, Done, & Sacker, 2013) is widely used to measure psychological distress for non-psychiatric patient populations. The HADS is a self-administered scale consisting of 14 items; 7 items for anxiety, and 7 items for depression subscales, with a four-point ordinal response format. The scores on each item range from 0 to 3. The total scores range from 0 and 21 for either anxiety or depression. Norton et al. (2013) suggested that the use of HADS in clinical practice is not appropriate because it cannot differentiate the symptoms of anxiety and depression. Other tools should be considered in case of anxiety assessment particularly.

State-Trait Anxiety Inventory (STAI) was proposed by Spielberger et al. (1970). It composes of two measurement of anxiety; state and trait anxiety. State anxiety is defined as a transitory emotional response involving unpleasant feelings of tension and apprehensive thoughts, while trait anxiety is defined as the personality of

individual differences in the likelihood that a person would experience state anxiety in a stressful situation. The STAI consists of state anxiety (SAI) items 1-20 and trait anxiety (TAI) items 21-40. Each item is rated on a 4-point Likert scale with higher scores indicating higher levels of anxiety.

The short-form of STAI was developed by Marteau and Bekker (1992) in order to reduce barrier to its use in studies as the STAI consists of 40 items long. The State Anxiety Inventory was shortened from 20 items to be 6 items. The acceptable reliability were obtained ( $\alpha = .82$ ) and there were no differences in the mean score obtained by using the full-form of STAI and the 6-item short-form.

Geriatric Anxiety Scale (GAS) is a self-report measure consisting of 30 items used to screen for anxiety symptoms among older adults. The higher scores indicate higher levels of anxiety. The GAS includes three subscales; somatic symptoms, cognitive symptoms, and affective symptoms (Segal, June, Payne, Coolidge & Yochim, 2010).

Beck Anxiety Inventory (BAI) is a 21-item self-report Likert scale measuring common symptoms of clinical anxiety, such as nervousness and fear of losing control. Each symptom is rated on a 4-point scale ranging from 0 (not at all) to 3 (severely, I could barely stand it). Total scores can range from 0 to 63, with higher scores indicating higher levels of anxiety (Leyfer, Ruberg & Woodruff-Borden, 2006).

### **Illness Representation Assessment Tools.**

The illness representation of MI is usually measured by using the Illness Perception Questionnaire (IPQ), the revised Illness Perception Questionnaire (IPQ-R), and the Brief Illness Perception Questionnaire (BIPQ).

The IPQ was proposed by Weinman, Petrie, Moss-Morris, and Horne (1996) in order to assess individual's illness perception regarding the 5 components including *identity* - the symptoms the patient associates with the illness, *cause* - personal ideas about factors that cause the illness, *time-line* - the perceived duration of the illness, *consequences* - expected effects and outcome and *cure control* - how an individual controls or recovers from the illness. The identity scores consist of 12 core symptoms on a 4-point Likert scale ranging from "all of the time" to "never" according to how often each symptoms experienced as part of the patient's illness. The following 4 components IPQ scales are presented in a mixed order and rated by the patient on a 5-point Likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree". The timeline subscale contains four items with scores ranging from 4 to 20 and higher scores representing a belief that the illness is going to last for a longer time. The consequences subscale consists of 9 items and scores ranged from 9 to 45 with higher scores indicating a stronger belief that the illness will have serious consequences. The cure/control subscale consists of 7 items. The scores range from 7 to 35, with higher scores representing a higher level of belief in control or potential for cure of the illness. The emotional outcomes are rated on a 2-item scale. The scores range from 2 to 10 with higher scores indicating greater distress.

The IPQ-R developed by Moss-Morris, Weinman, Petrie, Horne, Cameron, and Buik (2002) consists of 9 subscales measuring identity, timeline acute/chronic, timeline cyclical, cause, consequences, personal control, treatment control, illness coherence, and emotional representation. Identity is measured by using a list of 12 symptoms (Yan et al., 2011) including chest pain, uncomfortable feeling in chest, cold sweat, uncomfortable feeling in other parts of the body, nausea or vomiting, breathlessness, fatigue, dizziness, palpitation, syncope, irritability, and unconsciousness for which patients will be asked to rate in yes/no format whether they have experienced the symptoms during the heart attack and if they think the symptom will be related to their heart condition. Scores on this scale range from 0 to 12; yes = 1, no = 0. A higher score indicates greater symptoms associated with heart attack.

The following subscales including consequences, timeline acute/chronic, timeline cyclical, coherence, and emotional dimensions are rated on five-point Likert scale; strongly disagree = 1, disagree = 2, neither agree nor disagree = 3, agree = 4, and strongly agree = 5. Higher scores on the timeline acute/chronic, timeline cyclical, and consequences subscale indicate strongly held beliefs about the chronicity, cyclical nature, and negative consequences of the illness. Higher scores on the personal control, treatment control, and coherence subscale indicate greater positive beliefs about the controllability and a personal understanding of the illness. Items IP1 - IP5 and IP18 represent timeline (acute/ chronic), items IP6 - IP11 represent consequences, items IP12 - IP17 represent personal control, items IP19 - IP23 represent treatment control, items IP24 - IP28 represent illness coherence, items IP29 - IP32 represent timeline cyclical, and items IP33 - IP38 represent emotional

representations. The reversed score items are IP1, IP4, IP8, IP15, IP17, IP18, IP19, IP23, IP24, IP25, IP26, IP27, and IP36. The cause subscale (items C1-C18) is also an 18-item five-point Likert scale. Patients will rate how much they agree with a list of possible causes for MI from 1 (strongly disagree) to 5 (strongly agree). A higher score on an item indicates greater agreement that the item contributes to the development of MI.

The Brief Illness Perception Questionnaire (BIPQ) developed by Broadbent et al. (2006) to assess patients' illness perceptions about MI along the dimensions of consequences, timeline, identity, personal control, treatment control, emotional representation, concern, and coherence consists of 9-item scale designed to rapidly assess the cognitive and emotional representations of illness with good test-retest reliability. The questionnaire assesses each dimension using a single-item scale from 0-10 with 3 open-ended questions to measure casual beliefs. Each item represents each component of illness representation; item 1 indicates the consequences score, item 2 indicates the timeline score, item 3 indicates the personal control score, item 4 indicates the treatment control score, item 5 indicates the identity scores, item 6 indicates illness concern which reflects a combination of emotional and cognitive representations, item 7 indicates the coherence score, item 8 indicates the emotional representation, and item 9 indicates causal beliefs which allows a participant to identify 3 most important factors that cause the illness. To compute the score, reverse score items 3, 4, and 7 and add these to items 1, 2, 5, 6, and 8. A higher score reflects a more threatening view of the illness.

## **Summary of Literature Review**

MI is a global major cause of death and disability. MI worsens in both physical and psychological aspects of the patients. To deal with the health threat such MI, patients use their representations of the illness to guide their actions. Illness representations consist of five components including identity, cause, timeline, consequences, and cure/control. However, several factors influence patients with MI to have different representations including gender, age, personality, and knowledge. Misconception of MI results in poor outcomes of recovery such as delayed seeking treatment, unable to return to work, and psychological distress. Anxiety is a common emotional response in patients with MI. Several factors contribute anxiety including sociodemographic factors, personality, experience, severity of the disease, invasive procedure, and patients' illness representations. Many interventions have been conducted in order to reduce patients' anxiety such as music therapy, mindfulness meditation, and education sessions. The previous interventions, however, could not provide the long term effects for anxiety reduction because the misconception of the illness representation, which is the origin of the problem, still exist.

In this study, illness representation-based intervention was developed in order to reform and fill the gaps of the misconceptions, which results in anxiety reduction. The accurate representations will guide coping strategies in order to change behavior, adhere to the treatment, and improve emotional outcomes.

## CHAPTER 3

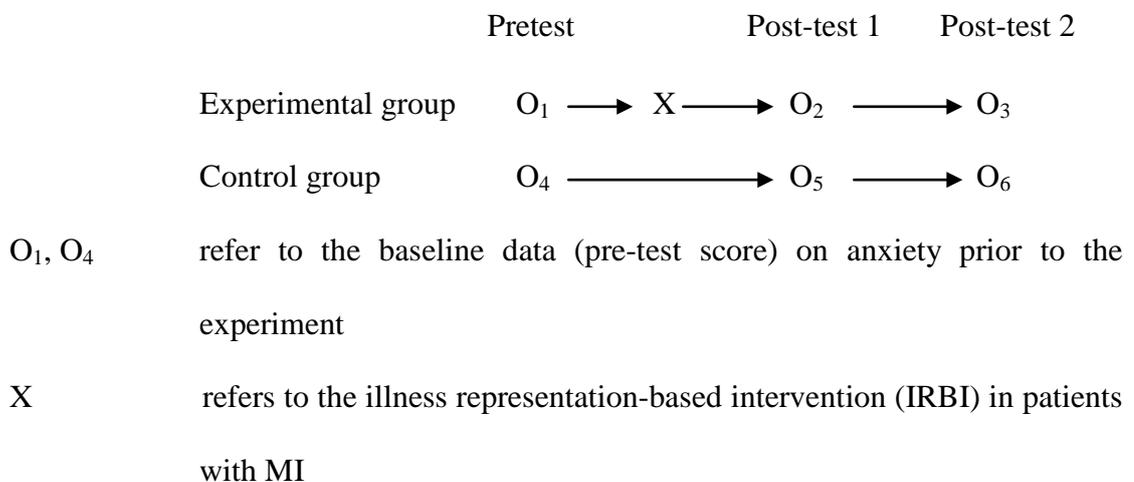
### RESEARCH METHODOLOGY

This chapter consists of the research design, variables, setting, population and sample, instrumentation, validity and reliability of the instruments, data collection procedures, ethical considerations, and data analysis of the study.

#### Research Design

A randomized control-group pretest-posttest design was used. It was conducted to test the effect of illness representation-based intervention on illness representation and anxiety in patients with MI. Anxiety and illness representation were investigated before and after conducting the intervention. The scores were compared within group and between two groups.

The research design was as follows:



O<sub>2</sub>, O<sub>5</sub> refer to the data (post-test score) on anxiety after the experiment at discharge

O<sub>3</sub>, O<sub>6</sub> refer to the data (post-test score) on anxiety after the experiment at one month after discharge

### **Variables**

The independent variable in this study was the illness representation-based intervention. There were two levels: receiving the illness representation-based intervention (the experimental group) and not receiving the intervention (the control group, receiving usual care). Anxiety was the dependent variable. The components of anxiety included state anxiety and trait anxiety. In this study, gender and trait anxiety were the confounding variables. Gender and trait anxiety was controlled by using randomization block design. In addition, some factors were restricted through the inclusion and exclusion criteria such as having unstable vital signs during the intervention and not receiving anti-anxiety agents.

### **Setting**

This study was conducted at Songklanagarind Hospital and Hatyai Hospital, which located in the southern region of Thailand. The researcher recruited samples from medical intensive care unit (MICU) and medical wards of Songklanagarind Hospital and medical wards of Hatyai Hospital. During hospitalization, patients with MI usually received standard care such as general

assessment including blood pressure monitoring, heart rate checking, and medication. General information such as taking prescribed medication, regular exercise, consuming healthy diet and low-fat food, and smoking cessation were briefly given. The cardiologist or nurses informed the patient on follow-up visits for regular check-up after discharge.

The researcher selected these tertiary hospitals for the present study because these hospitals are the excellence center in cardiology in the southern Thailand and provide advanced technology of treatments such the cardiac catheterization. These hospitals are regional referral hospitals where all patients are from all around the southern part of Thailand. The hospitals are located in Hatyai city, the center of southern economy, transportation, medical services of Thailand. Many patients with MI are referred to this hospital for proper management. Therefore, the researcher expected a large number of patients who were hospitalized to be recruited as samples for this study. However, the hospitals only serve the standard care and do not provide the individual sessions for patients with MI.

In this study, the researcher selected the MICU and the medical wards because the patients with MI are hospitalized in the MICU after critical situations such as heart attack and post cardiac catheterization. After the clinical conditions are stable, the patients are transferred to the medical wards. The patients who had passed a critical condition either in the MICU or the medical wards were included. The illness representation-based intervention (IRBI) was provided as soon as possible after their clinical conditions were stable. The consent form was given to the patients in order to take part in the intervention.

## **Population and Sample**

### **Target Population.**

The population of this study was the patients with myocardial infarction who were hospitalized in the MICU and the medical ward, Songklanagarind Hospital and the medical ward of Hatyai Hospital in Hatyai, Songkhla province, Thailand.

### **Sample Size.**

The number of sample in this study was estimated based on power analysis by using the effect size ( $d$ ) of Chair et al.'s study (2012) which examined the effect of a videotape educational intervention on anxiety in cardiac catheterization patients. The effect size calculation of that study was 0.82. In this study, the researcher used the effect size of 0.7 because of a different conceptual framework. Accordingly, this study used the effect size of 0.7 to calculate the sample size. Based on Polit and Beck (2012), the sample size for a significant level of  $\alpha = .05$ , power = .80, and  $d = 0.70$ , 25 participants per group were required. Totally, 60 participants (30 participants per group) were recruited in this study to prevent attrition.

**Inclusion Criteria.**

The 60 participants of this study were selected using the following inclusion criteria: (1) age 20 or above in order to sign an informed consent form independently; (2) being first diagnosed with myocardial infarction (MI); (3) stable vital signs and free of severe arrhythmias and heart failure at the time of data collection; (4) no mental health problems; (5) able to communicate with the researcher; (6) able to read and write Thai language; (7) consent to participate in the study either verbally or written consent; (8) being able to contact by phone after discharge; and (9) not receiving anti-anxiety agents.

**Exclusion Criteria.**

The sample would be excluded if: (1) having unstable vital signs during the intervention, and (2) receiving anti-anxiety agents. In this study, none of the patients was excluded.

**Sampling Procedure.**

The researcher informed a nurse who worked in the MICU and the medical wards and who agreed to help the researcher to identify potential participants. After the nurse contacted him or her, the researcher approached the patients who met the inclusion criteria to ascertain their willingness to participate in the study. After that, the researcher explained the purpose of the study, obtained informed consent

after providing information regarding the study, procedures, risks, benefits, and confidentiality (Appendix B). The patients were able to withdraw from the study at any time.

Before preparing the patients for the random assignment, 2 covariate factors, gender and trait anxiety, were controlled. Non-proportionate stratification was performed for gender. However, there were only 3 female patients at the time of data collection. Therefore, two females in the experimental group and one female in the control group were randomly assigned. After that, each patient completed the Trait Anxiety Inventory (TAI) to assess individual characteristics of anxiety. The total scores of trait anxiety were classified into 3 levels; low (20-39), moderate (40-59), and high (60-80). Then a block of six was done (2 blocks of gender  $\times$  3 levels). Each patient had equal chance to be in either control group or experimental group by drawing lots after the total score of trait anxiety was calculated and classified. Totally 60 participants including 30 patients with MI per group were randomized. The experimental group consisted of 2 females who reported moderate level, 21 males who reported low level, and 9 males who reported moderate level. In the control group, 1 female reported moderate level, 22 males reported low level, and 8 males reported moderate level (Table 1). In order to prevent contamination of participants, the researcher informed the participants in the experimental group not to tell to others that they were in the research experiment.

Table 1

*Randomization Block Design*

|                  | Male (n = 57)      |               | Female (n = 3)     |               |
|------------------|--------------------|---------------|--------------------|---------------|
|                  | Experimental group | Control group | Experimental group | Control group |
| Low (20-39)      | 21                 | 22            | -                  | -             |
| Moderate (40-59) | 7                  | 7             | 2                  | 1             |
| High (60-80)     | -                  | -             | -                  | -             |

**Instrumentation**

Two sets of instruments were used in this study. The measurement instruments included the demographic and health history data questionnaire (DDHHQ) and the State-Trait Anxiety Inventory (STAI). The program was the illness representation-based intervention (IRBI).

**Illness Representation-Based Intervention.**

The intervention was conducted during patients' hospitalization, as soon as possible after their clinical conditions were stable. Each session lasted 40 minutes approximately and provided at bedside. An explanation of each session was as follows:

*The introduction phase.*

Before starting the intervention, the researcher provided the introduction phase in order to create trust with the participant and to help the participant understand the intervention. This step took around 5 minutes.

*First session.*

In the first session, the researcher used the information from the BIPQ to guide the session. The researcher asked the participant to explain his or her experience or perception about MI. The goal of this step was to explore the patient's idea about MI that might have some gaps or misconceptions. The researcher broadened the patient's perception about how the patient viewed his/her illness regarding signs and symptoms of MI (identity), causal factors (causes), course of MI (timeline), effects of MI on his/her life (consequences), and how to control the illness (cure/control). The researcher made a link about how the inaccurate beliefs had a negative effect to the patient. The researcher and the patient developed a plan of recovery to alter risk factors relevant to the patient, and discussed about recovery plan, benefits and problems of changing behavior. Finally, the patient was encouraged to set the personal goals and the researcher discussed with the patient about strategies to reach the goals. This session took around 45-60 minutes.

### ***Second session.***

In the second session, the researcher discussed with the patient about going home, symptoms of recovery, symptoms of MI, the patient's concerns about their medication and benefits of medications, the importance of follow-up visit, and summarized the new information, review the plan, and revision of the plan if necessary. This session took around 30 minutes.

### **Data Collection Instruments.**

Several measurement instruments were used in this study including Demographic Data and Health History Questionnaire (DDHHQ), State-Trait Anxiety Inventory, and Brief Illness Perception Questionnaire (BIPQ). The details of the instruments are presented as follows:

#### ***Demographic Data and Health History Questionnaire (DDHHQ).***

The DDHHQ was developed for this study consisting of two sets of information. The first set was the demographic data including gender, age, marital status, religion, educational level, occupation, and monthly income. The second set was illness history including smoking status, family history of heart disease, concurrent disease, experience of receiving patient education, and days of hospital stay of this admission.

### ***The State-Trait Anxiety Inventory (STAI).***

The original State-Trait Anxiety Inventory (STAI) was proposed by Spielberger et al. (1970). It composes of two measurements of anxiety; state and trait anxiety. State anxiety is defined as a transitory emotional response involving unpleasant feelings of tension and apprehensive thoughts, while trait anxiety is defined as the personality of individual differences in the likelihood that a person would experience state anxiety in a stressful situation. Total scores range from 20-80. The score of 20-39 indicate low trait anxiety, 40-59 indicate moderate trait anxiety, and 60-80 indicate high trait anxiety. Items number 1, 6, 7, 10, 13, 16, and 19 of the trait score were reversed. In this study, the trait anxiety scores were measured at baseline, and state anxiety scores were measured at baseline, discharge, and one month after discharge as the outcomes of the intervention. The researcher had contacted the MindGarden Inc. in order to purchase the licensed original STAI (Appendix J).

### ***The Brief Illness Perception Questionnaire (BIPQ).***

The Brief Illness Perception Questionnaire (BIPQ) developed by Broadbent et al. (2006) was used to guide the intervention. The purpose of using the BIPQ was to assess patients' illness perceptions along the dimensions of identity, causes, timeline, consequences, cure/control, emotional representation, concerns, and comprehension. In this study, the BIPQ was measured at pre-test, discharge, and one month after discharge.

The BIPQ consists of 9-item scale designed to rapidly assess the cognitive and emotional representations of illness. Each item represents each component of illness representation; item 1 indicates the consequences score, item 2 indicates the timeline score, item 3 indicates the personal control score, item 4 indicates the treatment control score, item 5 indicates the identity scores, item 6 indicates illness concern which reflects a combination of emotional and cognitive representations, item 7 indicates the coherence score, item 8 indicates the emotional representation, and item 9 indicates causal beliefs which allows a participant to identify 3 most important factors that cause the illness. The higher scores indicate higher appropriate representation. The questionnaire assesses each dimension using a single-item scale from 0-10 with 3 open-ended questions to measure casual beliefs. The open-ended questions were added following each question in order to further explore the patient's perceptions in each component. The researcher contacted Broadbent et al. (2006) for permission to use the scale (Appendix K). The results of the BIPQ were reported in the Appendix N.

### **Validity and Reliability of the Instruments.**

The instruments were tested for validity and reliability. The explanation of validity and reliability testing are presented as follows:

### ***Validity.***

The content of the instruments including the program and the data collection instruments were validated by three experts. Two of three experts were the lecturers in the Faculty of Nursing, Prince of Songkla University, and one is a cardiologist from the Faculty of Medicine, Prince of Songkla University. The instruments consisted of program guidelines, the teaching plan, and the data collection instruments (the DDHHQ, the STAI, and the BIPQ). The instruments were modified and revised based on the experts' suggestions.

### ***Reliability.***

In this study, 20 participants were included for reliability testing. The STAI was tested for internal consistency. The instrument is divided into 2 parts, State Anxiety Inventory (SAI) and Trait Anxiety Inventory (TAI). The internal consistency reliability of the STAI obtained Chronbach's alpha coefficient of .91 for the State Anxiety Inventory (SAI) and .85 for the Trait Anxiety Inventory (TAI).

### ***Translation of the Instruments.***

The State-Trait Anxiety Inventory (STAI) and the Brief Illness Perception Questionnaire (BIPQ) were originally developed in English. Thai version of the STAI was translated by the MindGarden Inc., and Thai version of the BIPQ was translated by Napaporn Sowattanagoon with a permission letter to use the Thai

version (Appendix L), which has been widely used to measure patients with medical conditions (Ng, 2012).

### **Pilot study**

A pilot study is a small-scale version or trial conducted before the major study to see the plausibility of the study (Polit & Beck, 2012). The researcher conducted a pilot study in order to examine the feasibility of the planned intervention procedure. The researcher recruited three patients with MI who met the inclusion criteria of the present study from those 20 participants involving in reliability testing to receive the illness representation-based intervention. The open-ended questions were added after each item of the BIPQ in order to further explore the patients' perceptions in each component. The results of the pilot study showed that the illness representation-based intervention was feasible to be applied in the target population. The planned intervention was proposed to conduct the intervention in a quiet room. However, the intervention had been conducted bedside due to limited area.

### **Ethical Considerations**

The researcher asked the participants who met the inclusion criteria to participate in this study. The patients who agreed to participate voluntarily in this program were asked to join the meeting that conducted by the researcher. At the meeting, the participants were informed about their right to withdraw at any time without negative consequences. The researcher explained the purpose of the study and

other important information related to the intervention. Patients who agreed to participate in this study received a written informed consent form. After that, the researcher explained to the participants how to complete the questionnaires. The researcher maintained the confidentiality of the patients by using a code on the questionnaires and all of the information was kept secretly.

Afterwards, the researcher's contact information such as telephone number and address were provided for the patients. They could inform the researcher if they had any problem related to the intervention or any adverse effect from the intervention, they were asked to inform the researcher in order to find the solution for the problem. For participants in the control group, the researcher provided a brief session and a booklet after the intervention in the experimental group was done and post-test data was collected.

### **Data Collection Procedures**

Data collection was conducted in the Songklanagarind Hospital and Hatyai Hospital, Hatyai, Songkhla, Thailand. The steps of the data collection were as follows:

#### **Preparation phase.**

This phase consisted of: (1) obtaining official approval from the Faculty of Nursing, Prince of Songkla University; (2) obtaining official permission for data collection from the director of Songklanagarind Hospital and Hatyai Hospital; (3)

Obtaining official permission from head nurses in the MICU and the medical wards of Songklanagarind Hospital and Hatyai Hospital; (4) Informed nurses in the MICU and the medical wards about the objectives of the study; (5) preparing the questionnaires and informed consent; (6) testing the validity and reliability of the instruments; (7) recruiting a research assistant (RA); and (8) conducting the pilot study.

In order to prepare the RA, the researcher provided an explanation to the RA related to her responsibility in collecting data from the patients. The RA was a nurse who did not know whether the patient was in the control or experimental group. The RA was trained to understand the concept of this study and how to assist the patients to complete the questionnaires. The process was as the followings: (1) the researcher explained the objective of the study, the protocol and the instruments used in this study; (2) the RA collected the data from the patient after implementing the intervention. In this study, the RA did not know which group each patient was included. The researcher asked the patient not to tell the RA or other patients that he/she was in the experimental group or control group.

### **Implementation phase.**

During the implementation phase, the researcher asked a nurse in each ward to select the patients based on the inclusion criteria. The eligible patients were approached. Sixty patients who agreed to participate signed the informed consent forms and completed all data collection instruments. Before they signed the informed consent forms, the researcher gave an explanation about the study including the purpose, benefits, confidentiality, and procedures. The researcher informed that they

had the right to withdraw from this study at any time without any negative consequences.

After the participant signed the informed consent form, the researcher collected data of the DDHHQ, and STAI, and used BIPQ to guide the intervention. Then, the researcher conducted the sampling and assignment group procedure. After that, the participants in the experimental group received the first session of illness representation-based intervention (IRBI). The following day, the researcher provided the second session of the IRBI. After the intervention, the RA collected the post-test data of the state anxiety scores using the SAI at discharge and one month after discharge by telephone. For the participants in the control group, they received standard care. The RA collected the post-test data of the state anxiety scores using the SAI at discharge and one month after discharge by telephone. The researcher provided the same intervention as the participants in the experimental group after the post test if they were interested in this intervention.

After the researcher finished collecting the pre-test and post-test data, the researcher used coding to maintain the subject's anonymity. Name and the other information from the participants were only for the researcher and all of the data were destroyed at the end of the study. The flow of data collection procedures of this study were presented in Figure 2:

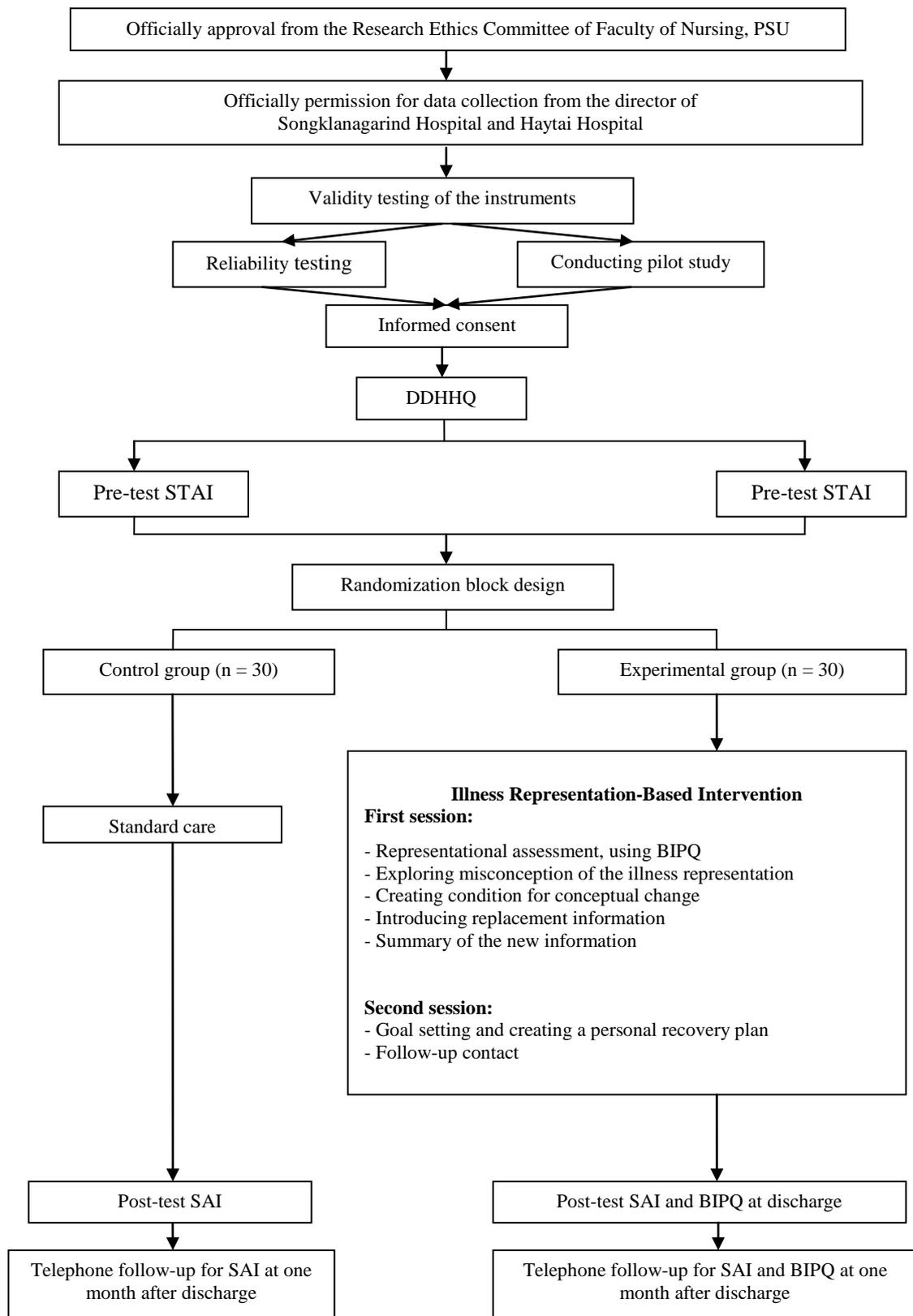


Figure 2. The Implementation Phase of the Data Collection Procedures

## **Data Analysis**

The descriptive and inferential statistics were used to answer the research questions. Descriptive statistics were used to analyze and describe the characteristics of the participants by using frequency, percentage, range, mean, and standard deviation. The demographic characteristics data including age, body weight, height, body mass index, gender, religion, marital status, education level, occupation, and income, and the clinical characteristics data including days of hospitalization, diagnosis, smoking status, history of heart disease in family, concurrent diseases, experiences of education about myocardial infarction, and treatments receiving during hospitalization were examined by frequency, percentage, mean, and standard deviation.

The inferential statistics were used to analyze the differences of the characteristics and anxiety scores between two groups. For the demographic and clinical characteristics data, independent t-test was used to examine the differences of age, height, and days of hospitalization. Chi-square was used to examine the differences of religion, education level, occupation, diagnosis, smoking status, history of heart diseases in family, and experiences of education about myocardial infarction when the data was in nominal scale.

The differences of the anxiety scores between two groups were analyzed by using independent t-test. Within group, the differences of the anxiety scores were analyzed by using repeated-measures ANOVA. Before performing independent t-test, the assumptions of normality were examined by using Skewness-Kurtosis, which were tested by examining value of skewness/ standard error and

kurtosis/ standard error. The results are presented on the appendix I. Assumption of homogeneity of variance was checked by using Levene's test.

Before performing the repeated measures ANOVA, the assumption of sphericity was check by examining the Mauchly's Test of Sphericity. The value of Greenhouse - Geisser correction was used to report the significant value when the assumption of sphericity was not assumed.

## CHAPTER 4

### RESULTS AND DISCUSSION

This chapter illustrates the results and discussion of the research's findings. The demographic characteristics and clinical data of the subjects are described. The differences of the data in the experimental group and the control group are presented as well as the effect of the illness representation-based intervention on anxiety.

#### Results

##### **Subject's Characteristics.**

The mean ages of the subjects in the experimental and the control group were 53.17 ( $SD = 10.58$ ) and 57.8 ( $SD = 9.50$ ) respectively. The mean body mass index (BMI) of the subjects in the experimental and the control group were 25.98 ( $SD = 5.18$ ) and 24.77 ( $SD = 5.55$ ) respectively, which indicated that the subjects in both groups were overweight, according to Asian populations' criteria for obesity (BMI = 25-29.9) (Center for Disease Control and Prevention, 2015). Most of the subjects in the experimental group (80.00%) and the control group (83.30%) were Buddhists. The majority of the subjects in both groups were male (93.30% for the experimental group and 96.70% for the control group). Almost all of the subjects in both groups were married (96.70%). Most of the subjects in the experimental group

graduated from college (36.70%) whereas 43.00% of the subjects in the control group had education level at elementary school. The majority of the subjects in both groups were employed (86.70% for the experimental group and 73.30% for the control group). The subjects in both groups mostly had income 10,000-50,000 Baht/month (70.00% for both groups). The Table 2 showed that there were no significant differences in the subjects' characteristics between two groups.

Table 2

*Frequencies and Percentages of Subjects' Characteristics of the Experimental Group and the Control Group (N = 60)*

| Subjects' Characteristics | Experimental group<br>(n = 30) | Control group<br>(n = 30) | $t/\chi^2$          | <i>p</i> |
|---------------------------|--------------------------------|---------------------------|---------------------|----------|
|                           | $M \pm SD$ or n (%)            | $M \pm SD$ or n (%)       |                     |          |
| Age (years)               | 53.17 ± 10.58                  | 57.8 ± 9.50               | -1.784 <sup>a</sup> | .080     |
| 30-50                     | 12 (40.00)                     | 5 (16.70)                 |                     |          |
| 51-70                     | 17 (56.70)                     | 23 (76.70)                |                     |          |
| > 70                      | 1 (3.30)                       | 2 (6.70)                  |                     |          |
| Body weight (kg)          | 70.45 ± 15.66                  | 66.62 ± 15.88             | -1.051 <sup>c</sup> | .293     |
| < 50                      | 1 (3.30)                       | 3 (10.00)                 |                     |          |
| 51-70                     | 16 (53.30)                     | 19 (63.30)                |                     |          |
| 71-90                     | 11 (36.70)                     | 7 (23.30)                 |                     |          |
| > 90                      | 2 (6.70)                       | 1 (3.30)                  |                     |          |
| Height (cm)               | 164.07 ± 6.19                  | 164.17 ± 7.10             | -0.058 <sup>a</sup> | .954     |
| Body mass Index           |                                |                           |                     |          |
| Underweight(< 18.5)       | 25.98 ± 5.18                   | 24.77 ± 5.55              | -1.087 <sup>c</sup> | .277     |
| Normal(18.5-24.9)         | 1 (3.30)                       | 3 (10.00)                 |                     |          |
| Overweight(25-29.9)       | 14 (46.70)                     | 14 (46.70)                |                     |          |
| Obese (> 30.0)            | 10 (33.30)                     | 10 (33.30)                |                     |          |
|                           | 5 (16.70)                      | 3 (10.00)                 |                     |          |
| Gender                    |                                |                           | 0.351 <sup>d</sup>  | .554     |
| Male                      | 28 (93.30)                     | 29 (96.70)                |                     |          |
| Female                    | 2 (6.70)                       | 1 (3.30)                  |                     |          |

Table 2 (Continued)

| Subjects' Characteristics | Experimental group | Control group | <i>t</i>           | <i>p</i> |
|---------------------------|--------------------|---------------|--------------------|----------|
|                           | (n = 30)           | (n = 30)      |                    |          |
|                           | n (%)              | n (%)         |                    |          |
| Religion                  |                    |               | 0.111 <sup>b</sup> | .739     |
| Buddhist                  | 24 (80.00)         | 25 (83.30)    |                    |          |
| Muslim                    | 6 (20.00)          | 5 (16.70)     |                    |          |
| Marital status            |                    |               | 2.000 <sup>d</sup> | .368     |
| Single/Widowed            | 1 (3.30)           | 1 (3.30)      |                    |          |
| Married                   | 29 (96.70)         | 29 (96.70)    |                    |          |
| Education level           |                    |               | 7.227 <sup>b</sup> | .065     |
| Elementary school         | 6 (20.00)          | 13 (43.30)    |                    |          |
| Secondary school          | 6 (20.00)          | 7 (23.30)     |                    |          |
| College                   | 11 (36.70)         | 3 (10.00)     |                    |          |
| University                | 7 (23.30)          | 7 (23.30)     |                    |          |
| Occupation                |                    |               | 1.667 <sup>b</sup> | .197     |
| Employed                  | 26 (86.70)         | 22 (73.30)    |                    |          |
| Unemployed                | 4 (13.30)          | 8 (26.70)     |                    |          |
| Income (Baht)             |                    |               | .511 <sup>d</sup>  | 1.000    |
| < 10,000                  | 8 (26.70)          | 7 (23.30)     |                    |          |
| 10,000 – 50,000           | 21 (70.00)         | 21 (70.00)    |                    |          |
| > 50,000                  | 1 (3.30)           | 2 (6.70)      |                    |          |

Note. <sup>a</sup> = Independent t-test, <sup>b</sup> = Chi-square, <sup>c</sup> = Mann-Whitney U test, <sup>d</sup> = Fisher's Exact test, *M* = Mean, *SD* = Standard Deviation

### Clinical Characteristics.

Seven clinical characteristics were examined. There were no significant differences between the experimental group and the control group (Table 3). Most of the subjects in both the experimental group and the control group (67.70% and 60.00% respectively) were diagnosed STEMI. The majority of the subjects in both groups had smoked cigarettes. Approximately one-third of the patients in the

experimental group had history of heart diseases in family. Most of the patients in the experimental group (26.2%) had hypertension as a concurrent disease whereas the patients in the control group (20.0%) had miscellaneous diseases such as gouty arthritis, benign prostatic hypertrophy, etc. However, the majority of the patients in the experimental group (28.6%) and the control group (31.1%) denied the concurrent diseases. Approximately half of the patients in the control group had experiences of education about MI. The average days of hospitalization in the experimental group was 3.67 ( $SD = 1.35$ ), and the control group was 3.63 ( $SD = 1.38$ ). Most of the patients in both groups (60%) underwent primary percutaneous coronary intervention (PCI) during hospitalization.

Table 3

*Frequencies and Percentages of Subjects' Clinical Characteristics of the Experimental Group and the Control Group (N = 60)*

| Subjects' Characteristics           | Experimental group<br>(n = 30) | Control group<br>(n = 30)     | <i>t</i>           | <i>p</i> |
|-------------------------------------|--------------------------------|-------------------------------|--------------------|----------|
|                                     | <i>M</i> ± <i>SD</i> or n (%)  | <i>M</i> ± <i>SD</i> or n (%) |                    |          |
| Days of hospitalization             | 3.67 ± 1.35                    | 3.63 ± 1.38                   | 0.095 <sup>a</sup> | .925     |
| Diagnosis                           |                                |                               | 0.827 <sup>b</sup> | .529     |
| STEMI                               | 20 (67.70)                     | 18 (60.00)                    |                    |          |
| NSTEMI                              | 10 (33.30)                     | 12 (40.00)                    |                    |          |
| Smoking status                      |                                |                               | 2.892 <sup>b</sup> | .236     |
| Current smoker                      | 12 (40.00)                     | 16 (53.30)                    |                    |          |
| Past smoker                         | 10 (33.30)                     | 11 (36.70)                    |                    |          |
| Never                               | 8 (26.70)                      | 3 (10.00)                     |                    |          |
| History of heart diseases in family | 11 (36.70)                     | 8 (26.70)                     | 0.693 <sup>b</sup> | .405     |

Table 3 (Continued)

| Subjects' Characteristics                            | Experimental group | Control group | <i>t</i>           | <i>p</i> |
|--|--------------------|---------------|--------------------|----------|
|  | (n = 30)           | (n = 30)      |                    |          |
|  | n (%)              | n (%)         |                    |          |
| Concurrent diseases                                  |                    |               | 1.667 <sup>b</sup> | .197     |
| Diabetes mellitus                                    | 4 (9.50)           | 8 (17.80)     |                    |          |
| Hypertension   | 11 (26.20)         | 7 (15.60)     |                    |          |
| Dyslipidemia   | 8 (19.00)          | 7 (15.60)     |                    |          |
| Other  | 7 (16.70)          | 9 (20.00)     |                    |          |
| None   | 12 (28.60)         | 14 (31.10)    |                    |          |
| Experiences of education about myocardial infarction | 10 (33.30)         | 16 (53.30)    | 1.364 <sup>b</sup> | .243     |
| Treatments receiving during hospitalization          |                    |               | 0.000 <sup>d</sup> | 1.000    |
| CAG  | 3 (10.00)          | 3 (10.00)     |                    |          |
| Primary PCI  | 18 (60.00)         | 18 (60.00)    |                    |          |
| Medication   | 9 (30.00)          | 9 (30.00)     |                    |          |

Note. <sup>a</sup> = Independent t-test, <sup>b</sup> = Chi-square, <sup>c</sup> = Mann-Whitney U test, <sup>d</sup> = Fisher's Exact test, *M* = Mean, *SD* = Standard Deviation

### Baseline State and Trait Anxiety Scores.

Table 4 shows the mean scores of state and trait anxiety of the experimental group and the control group before receiving the intervention. The independent t-test was used to analyze differences of the mean scores between two groups. The patients in the experimental group had slightly higher average state anxiety scores ( $M = 38.07$ ,  $SD = 9.60$ ) than those who were in the control group ( $M = 35.10$ ,  $SD = 8.10$ ). The average trait anxiety scores of the experimental group ( $M = 35.93$ ,  $SD = 6.38$ ) was slightly higher than the control group ( $M = 33.93$ ,  $SD = 7.84$ ).

However, no significant differences were found for the state and trait anxiety scores between two groups.

Table 4

*Comparison of Mean Scores of the State Anxiety and the Trait Anxiety at Baseline between Two Groups (N = 60)*

|               | Experimental group<br>(n = 30) | Control group<br>(n = 30) | <i>t</i> | <i>p</i> |
|---------------|--------------------------------|---------------------------|----------|----------|
|               | <i>M (SD)</i>                  | <i>M (SD)</i>             |          |          |
| State anxiety | 38.07 (9.60)                   | 35.10 (8.10)              | 1.29     | .201     |
| Trait anxiety | 35.93 (6.38)                   | 33.93 (7.84)              | 1.08     | .283     |

*Note.* *M* = Mean, *SD* = Standard Deviation

### **The Effect of Illness Representation-Based Intervention (IRBI) on Anxiety.**

#### **Between group effect.**

A set of statistical analyses was performed in order to determine the within-group effect of the Illness Representation-Based Intervention on anxiety. The mean scores of state anxiety before the intervention and after the intervention were examined. Independent t-test was used in order to explore the difference of the mean state anxiety scores between two groups. The results are presented as follows:

Hypothesis 1: Anxiety of patients with MI who receive the Illness Representation-Based Intervention is lower than those who do not receive the Illness Representation-Based Intervention. This hypothesis was completely supported.

According to Table 5, the mean state anxiety score of the subjects in the experimental group after the intervention at discharge ( $M = 26.53$ ,  $SD = 5.04$ ) was significantly higher than the mean state anxiety scores of the control group at discharge ( $M = 35.40$ ,  $SD = 7.61$ ). The mean state anxiety score of the experimental group ( $M = 26.43$ ,  $SD = 4.68$ ) which is also significantly higher than the mean state anxiety score of the control group ( $M = 34.23$ ,  $SD = 7.37$ ) at one month after discharge. According to the results, there were significant differences in anxiety between the experimental group and the control group after the intervention at discharge ( $t = -5.32$ ,  $p = .000$ ), and one month after discharge ( $t = -4.90$ ,  $p = .000$ ).

Table 5

*Comparison of Mean Scores of the State Anxiety at Baseline, Discharge, and One Month After Discharge between Two Groups (N = 60)*

|                                | Experimental group | Control group | <i>t</i> | <i>p</i> |
|--------------------------------|--------------------|---------------|----------|----------|
|                                | (n = 30)           | (n = 30)      |          |          |
|                                | <i>M (SD)</i>      | <i>M (SD)</i> |          |          |
| Baseline (T1)                  | 38.07 (9.60)       | 35.10 (8.10)  | 1.29     | .201     |
| Discharge (T2)                 | 26.53 (5.04)       | 35.40 (7.61)  | -5.32    | .000*    |
| One month after discharge (T3) | 26.43 (4.68)       | 34.23 (7.37)  | -4.90    | .000*    |

Note. T2 = at discharge, T3 = one month after discharge, \* =  $p < .01$

### **Within group effect.**

A set of analyses was conducted to determine the within-group effect of the Illness Representation-Based Intervention (IRBI) on state anxiety. The total mean scores of state anxiety at baseline (T1), and after the intervention at the time of discharge (T2), and one month after discharge (T3) of the experimental group and the

control group were examined. One way repeated-measure ANOVA was conducted to examine the within group comparison.

Hypothesis 2: Anxiety of patients with MI after receiving the Illness Representation-Based Intervention is lower than before receiving the Illness Representation-Based Intervention. This hypothesis was also supported.

For the experimental group, the results indicated that mean score of the state anxiety decreased from T1 to T2. However, there was no change of state anxiety at T3 (Figure 2.). Comparing mean scores of the state anxiety across time was conducted. There was a significant difference of the state anxiety score at baseline (T1), and after the intervention at the time of discharge (T2), and one month after discharge (T3)  $F(2,57) = 28.65, p = .000$  (Table 5). Post-hoc pairwise comparison was examined. The results revealed that the state anxiety was significantly decreased at discharge (T2) and one month after discharge (T3).

For the control group, the results indicated that the mean score of the state anxiety slightly decreased across time (Figure 2.). There was no significant difference of the state anxiety score at baseline (T1), and after the intervention at the time of discharge (T2), and one month after discharge (T3)  $F(2,57) = .52, p = .601$  (Table 6).

Table 6

*Comparison of the State Anxiety Scores over Time within the Experimental Group and the Control Group (N = 60)*

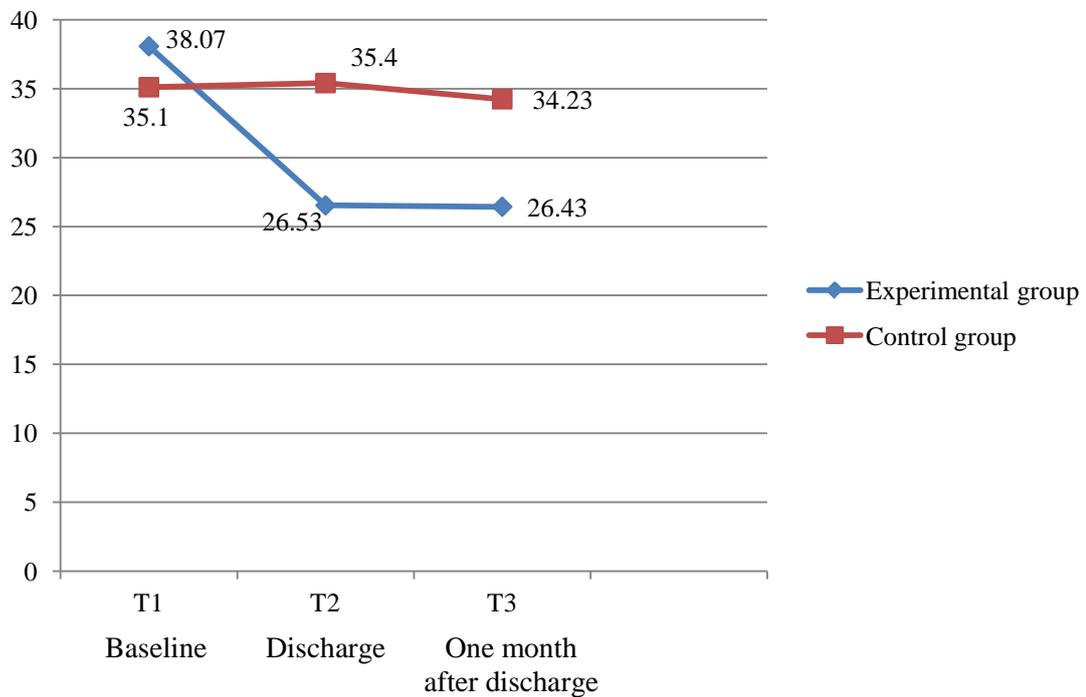
|                                   | Pretest<br>(T1) | Discharge<br>(T2) | One month after<br>discharge (T3) | <i>F</i> | <i>df</i> | <i>p</i> |
|-----------------------------------|-----------------|-------------------|-----------------------------------|----------|-----------|----------|
|                                   | <i>M (SD)</i>   | <i>M (SD)</i>     | <i>M (SD)</i>                     |          |           |          |
| Experimental<br>group<br>(n = 30) | 38.07 (9.60)    | 26.53 (5.04)      | 26.43 (4.68)                      | 28.65    | 2         | .000*    |
| Control<br>group<br>(n = 30)      | 35.10 (8.10)    | 35.40 (7.61)      | 34.23 (7.37)                      | 0.52     | 2         | .601     |

Note. Repeated Measure ANOVA, by Greenhouse-Geisser

T1 = pretest, T2 = at discharge, T3 = one month after discharge

*M* = Mean, *SD* = Standard deviation, \* =  $p < .01$

Bonferroni pairwise comparison: T1>T2, T1>T3, T2>T3



*Figure 3. Comparison of the State Anxiety Scores within the Experimental Group and the Control Group over Time*

## **Discussion**

This study examined the effects of Illness Representation-Based Intervention on anxiety in patients with MI. The discussion of this study includes the results as followed: 1) demographic characteristics data; 2) clinical characteristics data; 3) anxiety outcomes; and 4) illness representation.

### **Demographic Characteristics Data.**

According to the demographic characteristics data, most of the patients in this sample were male. This data was similar to the report of Thai Registry in Acute Coronary Syndrome (Srimahachota et al., 2012), which has indicated that the patients with MI of Thailand were predominantly male. According to Thai National Health Examination Survey IV (Health Information System Development Office, 2009), the average BMI of Thailand population was in normal range (18-25 kg/m<sup>2</sup>), which is similar to the BMI of the sample in this study. Most of the subjects in this study were Buddhists, the official religion of Thailand, followed by Muslims. According to the report of National Statistical Office Thailand (2010), most of the population are Buddhists (93.6%), followed by Muslims (4.9%). Consequently, the sample in this study can be the representative of the population.

### **Clinical Characteristics.**

According to Srimahachota et al. (2012), which reported in the Thai Registry in Acute Coronary Syndrome that Thai patients with coronary artery disease were diagnosed predominantly STEMI (55%), followed by NSTEMI (33%), and had dyslipidemia, hypertension, and diabetes respectively as concurrent diseases. Almost half of the patients in that study were smoking, and 10% of the patients had family history of coronary artery disease. Moreover, most of the patients received primary PCI. In this study, the patients also had clinical characteristics similarly. Therefore, the sample in this study can also be the representative of the population.

### **Baseline anxiety.**

The patients in the experimental group and the control group had similar trait anxiety scores. The mean state anxiety scores in both groups were not different significantly. Therefore, the homogeneous of the sample can be assured.

### **Effect of the Illness Representation-Based Intervention (IRBI) on Anxiety.**

The results of this study supported 2 hypotheses: 1) anxiety of patients with MI who receive the Illness Representation-Based Intervention is lower than those who do not receive the Illness Representation-Based Intervention, and 2) Anxiety of patients with MI after receiving the Illness Representation-Based

Intervention is lower than before receiving the Illness Representation-Based Intervention. The reason to explain the results of the study are as follows:

Throughout the program, the subjects were introduced to the intervention. All subjects knew the objectives of the study and the activities they had to participate in. The benefit of the intervention was supported by the results in the Table 4 and the Table 5. Significant reduction of anxiety of the subjects in the experimental group has been achieved.

In the light of the common-sense model of illness representation, patients respond to signs and symptoms of their illness by forming cognitive and emotional representation, guiding to coping responses. If the patients cannot cope with the threats, anxiety will occur as an outcome (Cameron & Morris, 2004). The Illness Representation-Based Intervention based on a Representational Approach to Patient Education developed by Donovan et al. (2007) was applied to assess and reorganize the patients' cognitive representation about MI. According to the Table 4, the mean score of state anxiety of the subjects in the experimental group was significantly less than the control group. Moreover, the mean score of state anxiety of the experimental group was significantly reduced over time, as shown in the Table 5.

In order to assist the patients through the accurate illness representation, the Conceptual Change Model (Hewson, 1992; Posner et al., 1982) was applied. The principle was explained that the existing concept can be changed when three conceptions are met including; 1) an individual is dissatisfied with the existing knowledge, 2) when the new conceptions can be understood easily (intelligible) and reliable (plausible), and 3) when the individual see that the new conceptions will be beneficial. In this study, the researcher followed these three

conceptions by using the Representational Approach to Patient Education (Donovan & Ward, 2001; Donovan et al., 2007).

Before performing the intervention, the researcher created a small talk conversation with the patients and family members in order to establish trust so that the patients could be confident to explain the ideas about MI and express their feelings to the researcher. Then the researcher started the first session by exploring each patient's existing representation about MI along the 5 components of the cognitive illness representation (identity, causes, timeline, consequences, and cure/control), which associated with deterioration of emotional representation. The patient could freely explain his/her thoughts in this step. The researcher, therefore, found the misconceptions and replaced with the accurate information by creating situations to encourage the patient to think about the negative consequences of those misconceptions or gaps of knowledge. This step, the patient perceived negative results of the existing representations (dissatisfaction). After that, the researcher introduced the new information to the patient according to the misconceptions or gaps. Finally, the researcher summarized the given information which helped the patient to obtain better comprehension regarding MI. The second session, the researcher encouraged the patient to write the recovery and lifestyle modification plan. This step helped the patient to create the action that appropriate with his/her circumstance, and the patient's concerns about going home were responded before discharge.

The results of this study showed that the patients in the experimental group were significantly less anxious than the control group either at discharge or one month after discharge. Therefore, the effect of the intervention appeared at discharge, approximately 3 days after the patients' admission. At discharge, the patients in the

experimental group were reorganized the representation about MI according to their misconceptions, gaps, or concerns, and replaced with the accurate information. As shown in Appendix N, the patients in the experimental group reported significantly higher mean score of comprehension, and significantly lower mean score of consequences, worry, and emotion than the control group at discharge. After the receiving the intervention, therefore, the patients in the experimental group reported lower anxiety. The effect of the intervention also lasted to one month after discharge. The patients in the experimental group had significantly higher score of personal control, treatment control, comprehension, and significantly lower score of emotion (Appendix N) because they gain more understanding about MI, according to their higher mean score of comprehension. Moreover, the patients in the experimental group had higher controllability, in accordance with higher mean scores of personal control and treatment control. When they perceived that they can control their illness, therefore, anxiety was reduced.

Several previous studies supported the positive effect of the illness representation intervention. Among the patients with MI, Several researchers attempted to develop the illness representation intervention to change patients' perception about MI. Petrie et al. (2002) conducted a randomized controlled trial of illness representation intervention in patients with MI. The results showed better prepared for leaving hospital and faster speed of return to work among the patients with MI in the experimental group compared to the control group. Broadbent et al. (2009) developed the illness representation intervention for patients with MI and their spouses. The results revealed that the patients in the experimental group had faster rate of return to work, higher perceived understanding of MI, higher intention to

attend cardiac rehabilitation, higher increases in exercise, fewer calls for consultation to their general practitioners about their heart conditions, and reduced anxiety in their spouses. However, anxiety in patients with MI after receiving the intervention has not been declared.

The illness representation intervention was also conducted among the patients in the patients with chronic condition. According to Seyyedrasooli, Rahinii, & Parvan (2013), the authors reviewed the studies on the illness representation intervention in patients with end-stage renal disease (ESRD) and found that the illness representation intervention improved adherence to fluid-intake restriction and coping with the consequences of peritoneal dialysis (PD). The results provided a confirmation that the illness representation intervention was beneficial for the patients in either acute or chronic conditions. However, the effect of the intervention on anxiety was unclear.

In conclusion, this study therefore provided empirical evidence to support that the IRBI can effectively reduce anxiety in patients with MI besides the benefit found in the previous studies, because the misconceptions of the patients were explored and corrected. The results support that the illness representation-based intervention can be applied in nursing practice.

## CHAPTER 5

### CONCLUSION AND RECOMMENDATIONS

This chapter illustrates the conclusion of the study based on the research results. The strength and limitation of the study are also presented. Furthermore, implications and recommendations for nursing practice and further study are also offered.

#### **Conclusion**

This randomized control study was designed to examine the effect of the Illness Representation-Based Intervention (IRBI) on anxiety in patients with MI, in Hatyai, Thailand. The study was conducted at Songklanagarind Hospital and Hatyai Hospital from June 2014 – December 2014. Sixty patients with MI were recruited with 30 in the experimental group and 30 in the control group. The patients in the experimental group received the IRBI and usual care, whereas the patients in the control group received only the usual care. The program consisted processes of exploration, creating condition of conceptual change, introducing replacement of information, summary, making a personal recovery plan, and addressing concerns about going home. Techniques used in this study were face-to-face interview, education session, and telephone follow-up. Before performing the intervention, the patients in both the experimental group and the control group were asked to complete the demographic characteristics data, Thai version of State-Trait Anxiety Inventory

(STAI), and Thai version of Brief Illness Perception Questionnaire (BIPQ) as baseline data. The result of internal consistency reliability (Chronbach's alpha) of STAI was acceptable (0.91 for SAI and 0.85 for TAI). The patients in both groups were measured state anxiety and BIPQ in hospital at discharge and one month after discharge by telephone.

The results of this study showed no significant differences in demographic and clinical characteristics data, baseline state and trait anxiety scores, and illness representation scores between the experimental group and the control group ( $p > .05$ ). At discharge and one month after discharge after receiving the intervention, anxiety within the experimental group decreased significantly from the baseline ( $p < .01$ ). Also, the patients in the experimental group had lower anxiety than those in the control group at discharge and one month after discharge ( $p < .01$ ). Throughout the program, anxiety of the experimental group decreased, compared to the control group over time. These data supported that the IRBI effectively reduced anxiety in patients with MI.

### **Strengths and Limitations**

This study had several strengths. Firstly, this study was a single blind design. The RA who collected the data at post-test did not know whether each patient was in the experimental group or the control group. Secondly, the patients in the experimental group received the intervention from one examiner. This design prevented instrumentation bias. Thirdly, the patients were randomly assigned to the groups. Therefore, the selection bias was prevented. Moreover, this program was

tailored to each patient according to the variation of illness representation. Each patient received the program and materials that individually appropriate with his/her representation.

Besides the strengths, this study also had some limitations. First, the intervention was implemented bedside, according to the limited area of the wards. The patients were easily distracted by nursing procedures, doctors' daily assessment, and visiting by family. Second, anxiety was assessed after the patient receiving primary PCI, which the critical condition was resolved. Therefore, the baseline anxiety scores of the subjects in this study were categorized in low level.

### **Implications and Recommendations**

This study examined the effect of the Illness Representation-Based Intervention (IRBI) on anxiety in patients with MI. The results indicated that the intervention does have an effect on anxiety reduction among the patients with MI. Through the intervention, the patients got new information, which was intelligible, plausible, and fruitful, to change their cognitive representation along the 5 components. As the anxiety reduced, the patients felt more confident to change their lifestyle by the written plan which was created individually and appropriate with each patient's limitation. According to the findings of the study, there are several recommendations for nursing practice and future research study.

### **Nursing Practice.**

The IRBI has several processes, which guides nurses to apply in nursing practice for anxiety reduction in patients with MI. In order to understand the patients' representation, the exploration of the illness representation along the five components must be applied to know misconceptions, gaps, or confusions. Then the nurses reorganize the patient's conceptual thinking about MI, and reduce the patients' concerns by encouraging the patients to create how to change his/her lifestyle that suitable for the condition and limitation that they concern. After discharge, nurses can follow-up the patients by using phone calls. Moreover, the nurses can develop the follow-up process by the referral system with the primary care unit, which can provide continuous care for the patients, and strengthen the follow-up process by interdisciplinary team in health care service.

### **Further Research Study.**

Although this study showed the positive results, there are some recommendations for further research study. The qualitative research on the patients' representation about MI along the five components should be conducted to in-depth understand the patients' illness representation. Longitudinal study is required for the future study to follow-ups over a longer period of time in order to see whether the anxiety about MI reduces or not. Moreover, the further study is recommended to measure the illness representation whether it changes or not over a long period. Additionally, another follow-up program such as home visit is suggested.

## REFERENCES

- Aalto, A. M., Heijmans, M., Weinman, J., & Aro, A. R. (2005). Illness perceptions in coronary heart disease: Sociodemographic, illness-related, and psychosocial correlates. *Journal of Psychosomatic Research*, 58(5), 393-402.  
doi:10.1016/j.jpsychores.2005.03.001
- Aghakhani, N., Sharif, F., Khademvatan, K., Rahbar, N., Eghtedar, S. & Shojaei-Motlagh, V. (2011). The reduction in anxiety and depression by education of patients with myocardial infarction. *Iranian Cardiovascular Research Journal*. 5(2). 66-69.
- Alsén, P., Brink, E., & Persson, L. O. (2008). Patients' illness perception four months after a myocardial infarction. *Journal of Clinical Nursing*, 17(5), 25-33.  
doi:10.1111/j.1365-2702.2007.02136.x
- Alsén, P., Brink, E., Persson, L. O., Brändström, Y., & Karlson, B. W. (2010). Illness perceptions after myocardial infarction: relations to fatigue, emotional distress, and health-related quality of life. *Journal of Cardiovascular Nursing*, 25(2), E1-E10.
- American College of Cardiology. (2013). Heart attack treatment guidelines. Retrieved from <https://www.cardiosmart.org/Heart-Conditions/Guidelines/Heart-Attack-Guidelines>
- American Heart Association. (2012). Lifestyle changes. Retrieved from [http://www.heart.org/HEARTORG/Conditions/HeartAttack/PreventionTreatmentofHeartAttack/Lifestyle-Changes\\_UCM\\_303934\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/HeartAttack/PreventionTreatmentofHeartAttack/Lifestyle-Changes_UCM_303934_Article.jsp)
- Bally, K., Capmbell, D., Chesnick, K., & Tranmer, J. E. (2003). Effects of patient-controlled music therapy during coronary angiography on procedural pain and anxiety distress syndrome. *Critical Care Nurse*, 23, 50-57.

- Bentzon, J. F. & Falk, E. (2003). Pathology of stable and acute coronary syndromes. In P. Théroux (Ed.), *Acute Coronary Syndromes*, (pp. 67-79). Philadelphia, Elsevier Science.
- Brink, E., Brändström, Y., Cliffordsson, C., Herlitz, J., & Karlson, B. W. (2008). Illness consequences after myocardial infarction: problems with physical functioning and return to work. *Journal of Advanced Nursing*, *64*(6), 587-594. doi: 10.1111/j.1365-2648.2008.04820.x
- Brändström, Y., Brink, E., Grankvist, G., Alsén, P., Herlitz, J., & Karlson, B. W. (2009). Physical activity six months after myocardial infarction. *International Journal of Nursing Practice*, *15*, 191-197. doi:10.1111/j.1440-172X.2009.01744.x
- Broadbent, E., Ellis, C. J., Thomas, J., Gamble, G., & Petrie, K. J. (2009). Further development of an illness perception intervention for myocardial infarction patients: A randomized controlled trial. *Journal of Psychosomatic Research*, *67*, 17-23. doi:10.1016/j.jpsychores.2008.12.001
- Broadbent, E., Petrie, K. J., Ellis, C. J., Anderson, J., Gamble, G., Anderson, D., & Benjamin, W. (2006). Patients with acute myocardial infarction have an inaccurate understanding of their risk of a future cardiac event. *Internal Medicine Journal*, *36*, 643-647. doi:10.1111/j.1445-5994.2006.01150.x
- Broadbent, E., Petrie, K. J., Ellis, C. J., Ying, J., & Gamble, G. (2004). A picture of health- myocardial infarction patients' drawings of their hearts and subsequent disability: A longitudinal study. *Journal of Psychosomatic Research*, *57*, 583- 587.
- Broadbent, E., Petrie, K. J., Main, J., & Weinman, J. (2006). The Brief Illness Perception Questionnaire (BIPQ). *Journal of Psychosomatic Research*, *60*, 631-637.

- Bureau of Non Communicable Disease Thailand (2010). *Statistics of non communicable disease*. Retrieved from <http://thaincd.com/information-statistic/non-communicable-disease-data.php>
- Burke, A. P. (2013, July 17). Pathology of myocardial infarction. *Medscape Reference*. Retrieved from <http://emedicine.medscape.com/article/1960472-overview#aw2aab6b3>
- Burke, K. M., Mohn-Brown, E. L., & Eby, L. (2011). Caring for clients with coronary heart disease and dysrhythmias. In K. M. Burke, E. L. Mohn-Brown, & L. Eby (Eds.), *Medical-Surgical Nursing Care* (3<sup>rd</sup> ed., pp. 359-394). Upper Saddle River, NJ: Pearson.
- Caldwell, P. H., Arthur, H. M., Natarajan, M. & Anand, S. S. (2007). Fears and beliefs of patients regarding cardiac catheterization. *Social Science and Medicine*, 65(5), 1038-1048.
- Cameron, L. D. (2003, February). *Conceptualizing and assessing risk perceptions: A self-regulatory perspective*. Paper presented at the Conceptualizing and Measuring Risk Perceptions Workshop. Washington DC.
- Cameron, L. D. & Moss-Morris, R. (2004). Illness-related cognition and behavior. In A. Kaptein & J. Weinman (Eds.), *Health Psychology* (pp. 84-110). Oxford, UK: Blackwell Publishing.
- Centers for Disease Control and Prevention. (2014). *CDC in Thailand: Factsheet*. Retrieved from <http://www.cdc.gov/globalhealth/countries/thailand/pdf/thailand-2014.pdf>
- Chair, S. Y., Chau, M. Y., Sit, J. W. H., Wong, E. M. L., & Chan, A. W. K. (2012). The psychological effects of a videotape educational intervention on cardiac catheterization patients. *Contemporary Nurse*. 40(2). 225-233.
- Cunningham, S., Bene, S. D., & Vaughan, A. F. (2000). Myocardial ischemia and infarction. In S. L. Woods, E. S. S. Froelicher, & S. U. Motzer (Eds.), *Cardiac Nursing* (pp. 481-505). Philadelphia, Lippincott.

- Denolett, J. (2005). DS14: Standard assessment of negative affectivity, social inhibition, and type D personality. *Psychosomatic Medicine*, 67, 89-97. doi: 10.1097/01.psy.0000149256.81953.49
- Doğan, M. V. & Şenturan, L. (2012). The Effect of Music Therapy on the Level of Anxiety in the Patients Undergoing Coronary Angiography. *Open Journal of Nursing*, 2, 165-169. doi: 10.4236/ojn.2012.23025
- Donovan, H. S. & Ward, S. E. (2001). A representational approach to patient education. *Clinical Scholarship*, 33(3), 211-216.
- Donovan, H. S., Ward, S. E., Song, M. K., Heidrich, S. M., Gunnarsdottir, S., & Phillips, C. M. (2007). An update on the representational approach to patient education. *Journal of Nursing Scholarship*, 39(3), 259-265.
- Dressler, D. K. (2010). Management of patients with coronary vascular disorders. In S. C. Smeltzer, B. G. Bare, J. L. Hinkle, & K. H. Cheever (Eds.), *Textbook of Medical-Surgical Nursing* (pp.755-796). Philadelphia, PA: Lippincott.
- Endler, N. S. & Kocovski N. L. (2001). State and Trait Anxiety Revisited. *Journal of Anxiety Disorders*, 15, 231-245.
- Frazier, S. K., Moser, D. K., O'Brien, J. L., Gravin, B. J., An, K., & Macko, M. (2002). Management of anxiety after acute myocardial infarction. *Heart & Lung*, 31(6), 411-421.
- Furze, G., Lewin, R. J. P., Murberg, T., Bull, P., & Thompson, D. R. (2005). Does it matter what patients think? The relationship between changes in patients' beliefs about angina and their psychological and functional status. *Journal of Psychosomatic Research*, 59, 323-329. doi:10.1016/j.jpsychores.2005.06.071
- Gould, K. A. (2011). A randomized controlled trial of a discharge nursing intervention to promote self-regulation of care for early discharge interventional cardiology patients. *Dimension of Critical Care Nursing*, 30(2), 117-125. doi: 10.1097/DCC.0b013e3182052324

- Grace, S.L., Krepostman, S., Brooks, D., Arthur, H., Scholely, P., Suskin, N., ..., Stewart, D. E. (2005). Illness perceptions among cardiac patients: Relation to depressive symptomatology and sex. *Journal of Psychosomatic Research*, 59(3), 153-160. doi:10.1016/j.jpsychores.2005.05.005
- Hamel, W. (2001). The effect of music intervention on anxiety in the patient waiting for cardiac catheterization. *Intensive and Critical Care Nursing*, 17, 279-285. doi:10.1054/iccn.2001.1594
- Hanssen, T. A., Nordrehaug, J. E., Eide, G. E., Bjelland, I., & Rokne, B. (2009). Anxiety and depression after acute myocardial infarction: an 18-month follow-up study with repeated measures and comparison with a reference population. *European Journal of Cardiovascular Prevention and Rehabilitation*, 16(6), 651-659. doi: 10.1097/HJR.0b013e32832e4206
- Health Information System Development Office (HISO). (2009). Health status. *The National Health Examination Survey IV*. 127-194. Retrieved from <http://www.hiso.or.th/hiso5/report/report1.php>
- Hewson, P. W. (1992, June). *Conceptual change in science teaching and teacher education*. Paper presented at a meeting on "Research and Curriculum Development in Science Teaching," under the auspices of the National Center for Educational Research, Documentation, and Assessment, Ministry for Education and Science, Madrid, Spain.
- Higgins, M., Sunn, S., & Theobald, K. (2000). The patients' perception of recovery after coronary angioplasty. *Australian Critical Care*, 13(3), 83-88.
- Huffman, J. C., Smith, F. A., Blais, M. A., Januzzi, J. L., & Fricchione, G. L. (2008). Anxiety, independent of depressive symptoms, is associated with in-hospital cardiac complications after acute myocardial infarction. *Journal of Psychosomatic Research*, 65, 557-563.

- Institute of Medicine (US) Committee on Preventing the Global Epidemic of Cardiovascular Disease. (2010). *Promoting cardiovascular health in the developing world: A critical challenge to achieve global health*. Retrieved from [www.ncbi.nlm.nih.gov/books/NBK45688/](http://www.ncbi.nlm.nih.gov/books/NBK45688/)
- Jacobson, C. (2000). Electrocardiography. In S. L. Woods, E. S. S. Froelicher, & S. U. Motzer (Eds.). *Cardiac Nursing*. (pp. 263-291). Philadelphia, Lippincott.
- Keresztes, P. A. & Wcisel M. (2009). Management of clients with functional cardiac disorders. In J. M. Black & J. H. Hawks (Eds.). *Medical-Surgical Nursing: Clinical Management for Positive Outcomes (8<sup>th</sup> ed., pp. 1410-1449)*. St. Louis, MO: Elsevier.
- Kim, K. A., Moser, D. K., Garvin, B. J., Riegel, B. J., Doering, L. V., Jadack, R. A., ..., McErlean, E. (2000). Differences between men and women in anxiety early after acute myocardial infarction. *American Journal of Critical Care*, 9(4), 245-253.
- Leventhal, H., Meyer, D., & Nerenz, D. (1980). The common sense representation of illness danger. In S. Rachman (Ed.). *Medical Psychology*, 2, 7-29. Retrieved from [www.academia.edu/259452/The\\_Common\\_Sense\\_Representation\\_of\\_Illness\\_Danger](http://www.academia.edu/259452/The_Common_Sense_Representation_of_Illness_Danger)
- Leyfer, O. T., Ruberg, J. L., & Woodruff-Borden, J. (2006). Examination of the utility of the Beck anxiety inventory and its factors as a screener for anxiety disorders. *Journal of Anxiety Disorders*, 20, 444-458.
- Maes, S. & Karoly, P. (2005). Self-regulation assessment and intervention in physical health and illness: a review. *International Association for Applied Psychology*, 54(2), 267-299.
- Marteau, T. M. & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology*, 31, 301-306.

- Martin, C. R., Lewin, R. J. P., & Thompson, D. R. (2003). A confirmatory factor analysis of the Hospital Anxiety and Depression Scale in coronary care patients following acute myocardial infarction. *Psychiatry Research*, *120*, 85-94. doi :10.1016/S0165-1781(03)00162-8
- Mayou, R. A., Gill, D., Thompson, D. R., Day, A., Hicks, N., Volmink, J., & Neil, A. (2000). Depression and anxiety as predictors of outcome after myocardial infarction. *Psychosomatic Medicine*, *62*, 212–219.
- Mierzyńska, A., Kowalska, M., Stepnowska, M., & Piotrowiz, R. (2010). Psychological support for patients following myocardial infarction. *Cardiology Journal*, *17*(3), 319-324.
- Meischke, H., Sellers, D. E., Robbins, M. L., Goff, D. C., Daya, M. R., Meshach, A., ..., Hand, M. M. (2000). Factors that influence personal perceptions of the risk of an acute myocardial infarction. *Behavioral Medicine*, *26*(1), 4-13.
- Moser, D.K., Dracup, K., Mckinley, S., Yamasaki, K., Kim, C., & Riegel, B. (2003). An international perspective on gender difference in anxiety early after acute myocardial infarction. *Psychosomatic Medicine*, *65*, 511-516.
- Moser, D. K. (2007). “The rust of life”: Impact of anxiety on cardiac patients. *American Journal of Respiratory and Critical Care Medicine*, *16*(4), 361–369.
- Moss-Morris, R., Weinman, J., Petrie, K. J., Horne, R., Cameron, L. D., & Buik, D. (2002). The revised Illness Perception Questionnaire (IPQ-R). *Psychology and Health*, *17*(1), 1-16.
- Munro, B. H. (2001). Analysis of covariance. *Statistical Method for Health Care Research* (4th ed., pp. 187-221). Philadelphia, Lippincot.
- National Statistical Office Thailand. (2010). *Executive summary the 2010 population and housing census*. Retrieved from [popcensus.nso.go.th/file/popcensus-10-01-56-E.pdf](http://popcensus.nso.go.th/file/popcensus-10-01-56-E.pdf)

- Ng, T. S. (2012). Brief illness perception questionnaire (Brief IPQ). *Journal of Physiotherapy*, 3(58), 202. doi: [http://dx.doi.org/10.1016/S1836-9553\(12\)70116-9](http://dx.doi.org/10.1016/S1836-9553(12)70116-9)
- Nilsson, U., Lindell, L. Eriksson, A., & Kellerth, T. (2009). The effect of music intervention in relation to gender during coronary angiographic procedures: A randomized clinical trial. *European Journal of Cardiovascular Nursing*, 8, 200-206. doi: 10.1016/j.ejcnurse.2009.01.001
- Norris, C. M., Ljubska, A., & Hegadoren, K. M. (2009). Gender as a determinant of responses to a self-screening questionnaire on anxiety and depression by patients with coronary artery disease. *Gender Medicine*, 6(3), 479-487. doi:10.1016/j.genm.2009.09.001
- Norton, S., Cosco, T., Doyle, F., Done, J. & Sacker, A. (2013). The Hospital Anxiety and Depression Scale: A meta confirmatory factor analysis. *Journal of Psychosomatic Research*, 74, 74-81.
- NSTEMI.org. (2014). *NSTEMI*. Retrieved from <http://nstemi.org/>
- Nyklíček, I., Dijkman, S. C., Lenders, P. J., Fonteijn, W. A., & Koolen J. J. (2012). A brief mindfulness based intervention for increase in emotional well-being and quality of life in percutaneous coronary intervention (PCI) patients: The Mindful Heart randomized controlled trial. *Journal of Behavioral Medicine*, 35(6),1-19. doi: 10.1007/s10865-012-9475-4
- Orksuk, L. & Ruisungnoen, W. (2012). Perception of symptoms and decision to seek treatment in patients with acute coronary syndrome. *Journal of Nurses Association of Thailand, North-Eastern Division*, 30(2), 89-97.
- Petrie, K. J., Broadbent, E., & Kydd, R. (2008). Illness perceptions in mental health: Issue and potential applications. *Journal of Mental Health*, 17(6), 559-564.
- Petrie, K. J., Cameron, L. D., Ellis, C. J., Buick, D., & Weinman, J. (2002). Changing illness perceptions after myocardial infarction: An early intervention randomized controlled trial. *Psychosomatic Medicine*, 64, 580-586.

- Petrie, K. J. & Wienman, J. (2006). Why illness perceptions matter. *Clinical Medicine*, 6(6), 536-539.
- Pokathip, S. & Chirawatkul, S. (2012). Perceptions of symptoms of myocardial infarction among I-Saan women: Ubonrachathani context. *Journal of Nursing Science and Health*, 35(2), 43-52.
- Polit, D. F. & Beck, C. T. (2012). *Nursing Research: Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia, Lippincot Williams & Wilkins.
- Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education*, 66(2), 211-227.
- Reges, O., Vilchinsky, N., Leibowitz, M., Manor, D., Mosseri, M., & Kark, J. D. (2011). Perceptions of cause of illness in acute myocardial infarction patients: A longitudinal study. *Patient Education and Counseling*, 85, e155-e161. doi:10.1016/j.pec.2010.12.022
- Segal, D. L., June, A., Payne, M., Coolidge, F. L., & Yochim, B. (2010). Development and initial validation of a self-report assessment tool for anxiety among older adults: The geriatric anxiety scale. *Journal of Anxiety Disorders*, 24, 709-714.
- Seyyedrasooli, A. Rahinii, Z. & Parvan, K. (2013). Review of illness perception intervention in dialysis patient. *International Research Journal of Applied and Basic Science*, 6(10), 1321-1323. Retrieved from [http://www.irjabs.com/files\\_site/paperlist/r\\_1822\\_131015215640.pdf](http://www.irjabs.com/files_site/paperlist/r_1822_131015215640.pdf)
- Somsiri, V. & Susang, J. (2011). The effects of giving planned instruction on knowledge, perceived self care abilities and self-care behavior in coronary heart disease patients receiving percutaneous coronary intervention at Songklanagarind hospital. *Princess of Naradhiwas University Journal*, 3(3), 33-45.

- Spielberger, C. D., Gorsuch, R.L., & Lushene, R. E. (1970). *STAI manual for the State-Trait Anxiety Inventory ("Self-Evaluation Questionnaire")*. Palo Alto, CA: Consulting Psychologists.
- Srimahachota, S., Boonyaratatavet, X., Kanjanavanit, R., Sritata, P., Drittayaphong, R., & Kunjara-Na-Ayudhaya, R. (2012). Thai registry in acute coronary syndrome (TRACS). *Journal of the Medical Association of Thailand*, 95(4), 508-518.
- Tacón, A. M., McComb, J., Caldera, Y. & Randolph, P. (2003). Mindfulness meditation, anxiety reduction, and heart disease: A pilot study. *Family and Community Health*, 26(1), 25-33.
- The American Heart Association. (2013). Heart disease and stroke statistics-2013 update: A report from the American Heart Association. *Circulation*, 127, e6-e245. doi: 10.1161/CIR.0b013e31828124ad
- The American Heritage. (2009). *Dictionary of the English Language*. Retrieved from <http://www.thefreedictionary.com/anxiety>
- Thepphawan, P., Watthnakitkrileart, D., Pongthavornkamol, K., & Dumavibhat, C. (2011). Cognitive representation, emotional responses and hospitalization experience in predicting decision making for receiving treatment among patients with acute coronary syndrome. *Journal of Nursing Science*, 29(2), 111-119.
- Uzun, S., Vural, H., Uzun, M., & Yokusoglu, M. (2008). State and trait anxiety levels before coronary angiography. *Journal of Clinical Nursing*, 17, 602–607. doi: 10.1111/j.1365-2702.2007.02018.x
- Wadud, A. (2012). *Unstable angina*. Retrieved from <http://nSTEMI.org/unstable-angina/>
- Wadud, A. (2014). *Framingham Risk Score*. Retrieved from <http://nSTEMI.org/framingham-risk-score/>

- Weinman, J., Petrie, K. J., Moss-Morris, R., & Horne, R. (1996). The Illness Perception Questionnaire: A new method for assessing the cognitive representation of illness. *Psychology and Health, 11*, 43105-43115.
- Williams, L., O'Connor, R. C., Grubb, N. R., & O'Carroll, R. E. (2011). Type D personality and illness perceptions in myocardial infarction patients. *Journal of Psychosomatic Research, 70*, 141-144.  
doi:10.1016/j.jpsychores.2010.07.051
- WHO Expert Consultation. (2004). Appropriate body mass index for Asian population and its implication for policy and intervention strategies. *The Lancet, 363*, 157-163.
- World Health Organization. (2004). *Cardiovascular disease*. Retrieved from [www.who.int/cardiovascular\\_diseases/en/evd\\_atlas\\_14\\_deathHD.pdf](http://www.who.int/cardiovascular_diseases/en/evd_atlas_14_deathHD.pdf)
- World Health Organization. (2008). *Waist circumference and waist-hip ratio: Report of a WHO expert consultation*. Retrieved from [http://whqlibdoc.who.int/publications/2011/9789241501491\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789241501491_eng.pdf)
- World Health Organization. (2013). *Cardiovascular disease*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs317/en/index.html>
- World Health Organization. (2011). Burden: Mortality, morbidity and risk factors. *Global Status Report on Noncommunicable Diseases 2010*, 9-31. Retrieved from [http://www.who.int/nmh/publications/ncd\\_report\\_chapter1.pdf](http://www.who.int/nmh/publications/ncd_report_chapter1.pdf)
- World Heart Federation. (2013). *Cardiovascular disease risk factors*. Retrieved from <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/>
- Yan, J., You, L. M., He, J. G., Wang, J. F., Chen, L, Liu, B. L., ... Jin, S. Y. (2011). Illness perception among Chinese patients with acute myocardial infarction. *Patient Education and Counseling, 85*, 398-405.  
doi:10.1016/j.pec.2010.11.010

Zafar, M. U., Paz-Yepes, M., Shimbo, D., Vilahur, G., Burg, M. M., Chaplin, W.,  
...Badimon, J. J. (2010). Anxiety is a better predictor of platelet reactivity in  
coronary artery disease patients than depression. *European Heart Journal*,  
31, 1573–1582. doi:10.1093/eurheartj/ehp602

## APPENDIX A

### Effect Size Calculation

The sample size of this study will be calculated by the power analysis of variance as follow

$$\text{Effect size} = \frac{M_1 - M_2}{SD_{pooled}}$$

$$SD_{pooled} = \sqrt{\frac{SD_1^2 + SD_2^2}{2}}$$

Where  $M_1$ : Mean of state anxiety in the experimental group

$SD_1$ : Standard deviation of the experimental group

$M_2$ : Mean of state anxiety in the control group

$SD_2$ : Standard deviation of the control group

$SD_{pooled}$ : Standard deviation

$$M_1 = 40.2 \quad SD_1 = 8.6$$

$$M_2 = 48.3 \quad SD_2 = 10.9$$

$$\begin{aligned} SD_{pooled} &= \sqrt{\frac{SD_1^2 + SD_2^2}{2}} \\ &= \sqrt{\frac{(8.6)^2 + (10.9)^2}{2}} = \sqrt{\frac{73.96 + 118.81}{2}} = 9.82 \end{aligned}$$

$$\text{Effect size} = \frac{M_1 - M_2}{SD_{pooled}} = \frac{40.2 - 48.3}{9.82} = 0.82 \approx 0.8$$

## APPENDIX B

### Informed Consent

Dear Participant,

My name is Pantipa Nilwilai, a master student of Faculty of Nursing, Prince of Songkla University, Thailand. I am conducting a research study titled “The Effect of Illness Representation-Based Intervention on Anxiety in Patients with Myocardial Infarction”. The findings of this study will optimize your psychological condition and perceptions related to myocardial infarction. This study has been approved by the ethics committee of Faculty of Nursing, Prince of Songkla University, Thailand. If you agree to participate in this study, I will start the intervention as follows:

#### *Explanation of the intervention*

1. You will be assigned to either the experimental group or the control group.
2. If you are in the experimental group, you will receive the illness representation-based intervention during your hospitalization.
3. If you are in the control group, you will receive standard care. However, if you would like to join the intervention, you will receive the intervention after this study has been completed.

### *Evaluation and forms*

You will be asked to fill the questionnaires including demographic data and illness history, illness perception questionnaire, and anxiety which will take about 20 minutes.

### *Risk and benefit*

There is no evidence of risk or harms from receiving the intervention. However, you may have to spend more time to receive this intervention.

Your participation in this study will be profitable to reduce your anxiety. Furthermore, the results of this study can be beneficial as a guidance for nurses and other health care providers to develop an illness representation-based program to reduce anxiety in patients with myocardial infarction.

### *Confidentiality*

All the information collected from your participation in this study will be kept confidentially. Your information will not be disclosed to others without your permission. When the results of this study are published or discussed in the conference, your identity will not be exposed. Anyway, the data will be presented in the form of group rather than individual.

### *Participation and withdrawal from this study*

You can participate in this study willfully. If you decide to participate, you may withdraw or discontinue in any time. Your withdrawal will not influence your relationship with health care providers or your treatment. Agreement and signing

of informed consent or verbal agreement to participate and return the form indicate that you agree to participate in this study. If you have any question, suggestion, or cannot participate in this study, please feel free to contact the researcher on mobile (081-0967683). Finally, if you agree to participate in this study, please sign your name on the consent form.

Thank you very much for your support,

(Pantipa Nilwilai)

Researcher

Research Information Sheet: Illness Representation-Based Intervention  
(Experimental Group)

You will receive the intervention as follows:

1. Preparation phase

You will be asked to fill the questionnaires including the demographic data and illness history questionnaire, the revised-illness perception questionnaire, and state-trait anxiety inventory. This activity will take around 20 minutes. The research assistant will help you to complete the questionnaires during this step.

2. Implementation phase

You will be encouraged to receive 4 sessions of the intervention, each session will last around 20-30 minutes.

- a. In the first session, the researcher will use the information from the BIPQ to guide the session. The researcher will ask the participant to explain his or her experience or perception about MI. The goal of this step is to explore the patient's idea about causes of MI that may have some gaps or misconceptions. The researcher will broaden the patient's perception about other causal factors that may have contributed to the development of the MI and look at how the patient's causal factors are associated with health behaviors and how the inaccurate beliefs have a negative effect to the patient. The researcher and the participant will develop a plan of recovery to alter risk factors relevant to the patient by using the data from the patient's scores on the BIPQ, and discuss about recovery plan, benefits and problems of changing behavior. Finally, the

patient will be encouraged to set the personal goals and the researcher will discuss with the patient about strategies to reach the goals. This session will take around 60 minutes.

- b. In the second session, the researcher will discuss with the patient about going home, symptoms of recovery, and symptoms of MI, the patient's concerns about their medication and benefits of medications, the importance of follow-up visit, and summarize the new information, review the plan, and revision of the plan if necessary. This session will take around 40 minutes.

At discharge, you will be asked to fill the questionnaires by the research assistant. One month after discharge, the researcher will create telephone call follow-up in order to evaluate your anxiety. You can share any barrier, question, or suggestion to the researcher to improve the intervention. The researcher will ask you to fill the questionnaires, which will take around 20 minutes.

### Informed Consent Form

Study Title: The Effect of Illness Representation-Based Intervention on Anxiety in Patients with Myocardial Infarction

Researcher: Pantipa Nilwilai (Master student of Faculty of Nursing, Prince of Songkla University, Hatyai, Thailand)

Patient's Name:.....Age:.....

#### Patient's Consent

I am....., was informed the details of the research entitled "The Effect of Illness Representation-Based Intervention on Anxiety in Patients with Myocardial Infarction" and was ensured that all of information related to personal information, health history, and research result will be kept confidentially. If any further problem or issue arises, I can discuss with the researcher. I have the right to withdraw from the study at any time without any effect to my medical service and treatment. I am willing to participate in this research study without any threat and force. Hereby, I endorse my signature.

.....(Participant)                      Date:.....

#### Researcher's note

I had clarified the detailed information of the research entitled "The Effect of Illness Representation-Based Intervention on Anxiety in Patients with Myocardial Infarction"

to the participant. The signature and the returned forms indicate that you understand what is involved and you consent to participate in this study willfully.

.....(Researcher)

Date:.....

## APPENDIX C

### Demographic Data and Health History Questionnaire (DDHHQ)

**Code:**.....

**Date:**.....

**Instruction:** This form aims to obtain information about your current demographic data consisted of general data and illness history data. Please fill in the blank in the column and check (✓) in the box which indicates your data.

#### A. Demographic Data

1. Gender :  (1) Male  (2) Female
2. Age : ..... years old
3. Marital status :  (1) Single  (2) Married  (3) Widowed
4. Religion :  (1) Buddhism  (2) Islam  
 (3) Christian  (4) Other.....
5. Educational level :  (1) None  (2) Primary School  
 (3) Secondary school  (4) College  
 (5) University
6. Occupation :  (1) Employed.....  
 (2) Unemployed

7. Average monthly income of the family.....Baht

**B. Health History**

8. Smoking status :  (1) Smoking  (2) Not smoking

9. Family history of heart disease :  (1) Yes  (2) No

10. Comorbid disease :  (1) Diabetes  (2) Hypertension

(3) Dyslipidemia  (4) Others.....

11. Regular medication use:.....

.....

12. Experience of receiving patient education

(1) Yes

(2) No

13. Days of hospital stay of this admission : .....days.

**APPENDIX D**

**The Brief Illness Perception Questionnaire**

For the following questions, please circle the number that best corresponds to your views:

|  |   |   |   |   |                         |   |   |   |   |    |
|--|---|---|---|---|-------------------------|---|---|---|---|----|
| <b>1. How much does your illness affect your life?</b> |   |   |   |   |                         |   |   |   |   |    |
| 0  | 1 | 2 | 3 | 4 | 5                       | 6 | 7 | 8 | 9 | 10 |
| No affect at all                                       |   |   |   |   | Severely affect my life |   |   |   |   |    |

**What kind of consequences do you think that they will affect your life?**

.....

.....

.....

|   |   |   |   |   |         |   |   |   |   |    |
|---|---|---|---|---|---------|---|---|---|---|----|
| <b>2. How long do you think your illness will continue?</b> |   |   |   |   |         |   |   |   |   |    |
| 0   | 1 | 2 | 3 | 4 | 5       | 6 | 7 | 8 | 9 | 10 |
| A very short time   |   |   |   |   | Forever |   |   |   |   |    |

**Why do you think that your illness will be short/ will last longer?**

.....

.....

.....

|  |   |   |   |   |                           |   |   |   |   |    |
|--|---|---|---|---|---------------------------|---|---|---|---|----|
| <b>3. How much control do you feel you have over your illness?</b> |   |   |   |   |                           |   |   |   |   |    |
| 0  | 1 | 2 | 3 | 4 | 5                         | 6 | 7 | 8 | 9 | 10 |
| Absolutely no control  |   |   |   |   | Extreme amount of control |   |   |   |   |    |

**Why do you believe that your illness can be control/cannot be control?**

.....

.....

.....

**4. How much do you think your treatment can help your illness?**

0    1    2    3    4    5    6    7    8    9    10

Not at all Extremely Helpful

**Do you believe that your illness can be control? Why?**

.....

.....

.....

**5. How much do you experience symptoms from your illness?**

0    1    2    3    4    5    6    7    8    9    10

No symptoms at all Many severe symptoms

**What are the symptoms of your illness in your opinion?**

.....

.....

.....

**6. How concerned are you about your illness?**

0    1    2    3    4    5    6    7    8    9    10

Not at all concerned Extremely concerned

**What are you worrying about your illness?**

.....

.....

.....

**7. How well do you feel you understand your illness?**

0    1    2    3    4    5    6    7    8    9    10

Don't understand at all Understand very clearly

**How do you understand it and what do you feel unclear?**

.....

.....

.....

**8. How much does your illness affect you emotionally? (e.g. does it make you angry, scared, upset, or depress?)**

0    1    2    3    4    5    6    7    8    9    10

Not at all  
affected  
emotionally

Extremely  
affected  
emotionally

How does it affect you? What are you feeling now?

.....  
.....  
.....

**9. Please list in rank-order the three most important factors that you believe caused your illness. *The most important causes for me:-***

1).....

2).....

3).....

## APPENDIX E

### State Anxiety Inventory

**Code:**.....

**Date:**.....

**Instruction:** A number of statements which people have used to describe you are feeling right now. Read each statement and then check (✓) in the appropriate number to the right of the statement to indicate *how you feel right now, at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

| Items             | 1          | 2        | 3                | 4               |
|-------------------|------------|----------|------------------|-----------------|
|                   | Not at all | Somewhat | Moderately<br>so | Very<br>much so |
| 1. I feel calm    |            |          |                  |                 |
| 2. I feel secure  |            |          |                  |                 |
| 3. I am tense     |            |          |                  |                 |
| 4. I am regretful |            |          |                  |                 |
| 5. I feel at ease |            |          |                  |                 |
| 6. ....           |            |          |                  |                 |

## APPENDIX F

### Trait Anxiety Inventory

**Code:**.....

**Date:**.....

**Instruction:** A number of statements which people have used to describe themselves are given below. Read each statement and then check (✓) in the appropriate box to the right of the statement to indicate *how you generally feel*. There is no right or wrong answer. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

| Items  | 1               | 2         | 3     | 4                |
|--|-----------------|-----------|-------|------------------|
|  | Almost<br>never | Sometimes | Often | Almost<br>always |
| 1. I feel pleasant   |                 |           |       |                  |
| 2. I tire quickly  |                 |           |       |                  |
| 3. I feel like crying  |                 |           |       |                  |
| 4. I wish I could be as happy as others seem to be                       |                 |           |       |                  |
| 5. I am losing out on things because I can't make up my mind soon enough |                 |           |       |                  |
| 6. ...   |                 |           |       |                  |



## APPENDIX G

### The Illness Representation-Based Intervention Guideline

| Session       | Process components  | Objectives  | Method and Time   | Activity   |  |
|---------------|---|---|---|--|--|
|               |   |   |   | Researcher   | Patient  |
| Introduction  | Before patient participate in the IRBI, patient<br>a. Knows the researcher<br>b. Has trust with the researcher<br>c. Knows and understands the intervention | To establish trust and explain the intervention   | Face to face introduction<br><br>10 minutes   | - Introduce self<br>- Explain the objectives, the benefits, and the procedure  | - Listen to the researcher<br>- Raise questions if the patient does not understand<br>- Negotiate if the patient does not agree with some parts                |
| First session | 1. Representational assessment  | The researcher is able:<br>a. To clearly understand patient's representation related to MI along the five components of cognitive illness representation including identity, cause, timeline, consequences, and | Use pre-test BIPQ with open-ended questions to guide the discussion by face to face<br><br>20 minutes | - Ask about subject's illness representation along the five components<br>a. Identity<br><i>Symptoms</i><br>- Please explain to me about your symptoms that you have experienced since you get MI. | - Describes his/her ideas and experiences with MI by answering the question from the researcher along the five components of cognitive illness representation. |

| Session | Process components | Objectives  | Method and Time | Activity  |         |
|---------|--------------------|---|-----------------|---|---------|
|         |                    |   |                 | Researcher  | Patient |
|         |                    | <p>controllability by using the pre-test BIPQ as a guide</p> <p>b. To identify any misconception, gaps, and/or confusions of patient's representation along the five components of cognitive illness representation</p> |                 | <p><i>Label</i></p> <ul style="list-style-type: none"> <li>- "How do you label your symptoms that are the effect of MI?"</li> <li>- "Which symptoms have the most impact on you?"</li> </ul> <p>b. Cause</p> <ul style="list-style-type: none"> <li>- "Please describe the cause of your MI or what are the factors causing your MI?"</li> </ul> <p>c. Timeline</p> <ul style="list-style-type: none"> <li>- "What do you think about the course of MI? Is it short-term or long-term, or acute or chronic?"</li> <li>- "How long do the symptoms of MI occur? Do the symptoms occur for a while, coming and going, or persistence?"</li> </ul> <p>d. Consequences</p> <ul style="list-style-type: none"> <li>- "What do you think about the consequences of MI? Or how does MI affect your life?"</li> </ul> |         |

| Session                    | Process components  | Objectives                                | Method and Time   | Activity   |         |
|----------------------------|---|---|---|--|---------|
|                            |   |   |   | Researcher   | Patient |
|                            |   |   |   |  |         |
|                            |   |   |   | <p>- “Does MI have effect to your family? If yes, please explain how it affects to your family?”</p> <p>e. Cure or controllability</p> <ul style="list-style-type: none"> <li>- Can MI be cure?</li> <li>- Can MI be controlled?</li> <li>- Please describe what sort of things might you do to reduce your symptoms?</li> <li>- How successful are those in reducing the symptoms?</li> <li>- Do you think that medication can reduce your symptoms? If no, what makes you think that?</li> </ul> |         |
| 2. Exploring misconception | The researcher is able to explore and understand the patient’s misconception, gaps, or confusion. | Face to face discussion<br><br>10 minutes | The researcher asks the question in order to encourage subject to think and describe subject’s experience leading the subject to misconception or error. For example; | - Describes his/her experiences leading to any representation that are misconceptions or gaps.   |         |

| Session | Process components                          | Objectives   | Method and Time                              | Activity  |  |
|---------|---|--|--|---|--|
|         |   |  |  | Researcher  | Patient  |
|         |   |  |  | <p>- <i>Can you think about how you come to be concerned about "A" (A is the key of misconception, gaps, or confusion)?</i></p> <p>- <i>Do you have any personal experience with "A"?</i></p> <p>- <i>Can you tell me how "A" develop?</i></p> <p><i>Ask the question to encourage the patient to explain and evaluate about the strength of those ideas</i></p> <p>- <i>How is "A" important in your life?</i></p> | - Evaluates the strength or importance of those representations in his/her life.   |
|         | 3. Creating condition for conceptual change | Patient is able:<br>a. To recognize the limitation of his/her current representation (misconception, gaps, and/or confusion)<br>b. To be dissatisfied with the current | Discussion by face to face<br><br>10 minutes | - Encourage patient to think and explain negative effects of patient's current representation that are misconception, gaps, and/or confusions by asking question as following:<br>- <i>"What are the negative effects of your current representation that you have experienced?"</i>  | - Explain the negative effect of current representation.<br>- Answer what the consequences that might happen if the patient still maintains his or her current |

| Session | Process components                     | Objectives  | Method and Time                            | Activity   |   |
|---------|--|---|--|--|---|
|         |  |   |  | Researcher   | Patient   |
|         |  | representation  |  | 2) What will happen if you still maintain your current representation in the future?<br>- Ask for the direct link between the current perception and any consequences that the patient identifies.<br>- If the patient cannot describe, the researcher will explain it.  | representation.   |
|         | 4. Introducing replacement information | The researcher is able:<br>a. To replace the current perceptions, which are misconceptions, gaps, and/or confusions by giving information that is intelligible, plausible, and fruitful.<br><br>Patient is able:<br>b. To accommodate the representation to fill gaps in knowledge, clarify | Teaching by face to face<br><br>20 minutes | - Give information related to patient's needs along the five components of cognitive illness representation.<br>a. Identity<br>- The symptoms include:<br>Chest discomfort: pain, pressure, squeezing, or fullness,<br>Discomfort of upper body: arms, back, neck, jaw, or stomach<br>Nausea and light-headedness: cramping, stomach indigestion, or throwing up<br>Other symptoms: palpitation, sweating, and shortness of breath<br>b. Cause | - Listen<br>- Pay attention<br>- Provide comment<br>- Ask further explanation if the patient does not understand about the given information. |

| Session | Process components | Objectives                           | Method and Time | Activity   |         |
|---------|--------------------|--------------------------------------|-----------------|--|---------|
|         |                    |                                      |                 | Researcher   | Patient |
|         |                    | confusions and replace misconception |                 | <ul style="list-style-type: none"> <li>- Coronary artery occlusion caused by risk factors include smoking, high blood pressure, overweight, high cholesterol, unhealthy diet, inactivity, diabetes, and family history.</li> <li>c. Timeline</li> <li>- The course of MI is acute</li> <li>- Time scale of MI symptoms are episodic</li> <li>d. Consequences</li> <li>- Lifestyle changes include smoking cessation, nutrition, reduce blood cholesterol, lower high blood pressure, be physically active every day, aim for a healthy weight, manage diabetes, reduce stress, and limit alcohol (relevant to the patient's risk factors).</li> <li>e. Cure/controllability</li> <li>- Medication for MI (antiplatelet drugs, ISDN)</li> <li>- Efficacy of medication</li> <li>- Side effect of medication</li> <li>- How to manage the side effect of medication</li> </ul> |         |

| Session        | Process components           | Objectives   | Method and Time                              | Activity   |   |
|----------------|------------------------------|--|--|--|---|
|                |                              |  |  | Researcher   | Patient   |
|                | 5. Summary                   | Patient is able to understand the benefit of new representations   | Discussion by face to face<br><br>10 minutes | <ul style="list-style-type: none"> <li>- Review the new conceptions given to the patient</li> <li>- Explain the benefit of accurate illness representation</li> <li>- Ask the patient if he/she understands about his/her illness</li> </ul>   | <ul style="list-style-type: none"> <li>- Describe the new information</li> <li>- Describe the benefit of accurate illness representation</li> </ul>   |
| Second session | 6. Goal setting and planning | Patient is able:<br>a. To develop a personal recovery plan and goals personalized to the patient's own circumstances | Discussion by face to face<br><br>15 minutes | <p>a. The goal</p> <ul style="list-style-type: none"> <li>- Encourage the patient to think and set his/her goal in order to change the patient's lifestyle by asking question<br/><i>“What is your goal related to your risk factors?”</i></li> <li>- Set the goal together with the patient and write the goal setting and strategies plan</li> </ul> <p>b. Strategies</p> <ul style="list-style-type: none"> <li>- Encourage the patient to think about the strategies in order to achieve his/her goal by asking question<br/><i>“What strategies that you will use to achieve your goal (to change your</i></li> </ul> | <p>a. The goal</p> <ul style="list-style-type: none"> <li>- Set the goal with the researcher in order to change his/her lifestyle and write in the plan</li> </ul> <p>b. The strategies</p> <ul style="list-style-type: none"> <li>- Think about the strategies that will be benefit to help him/her to achieve the goal.</li> <li>- Develop the strategies with the researcher to achieve the goal and write in the plan.</li> </ul> |

| Session     | Process components   | Objectives   | Method and Time   | Activity   |  |
|-------------|----------------------|--|---|--|--|
|             |                      |  |   | Researcher   | Patient  |
|             |                      |  |   | <i>lifestyle)?”</i><br>- Develop strategies with the patient to achieve his/her goal.<br>- Write the goal setting and strategies to help the patient see the plan easily.  |  |
|             | 7. Follow-up process | a. The researcher is able to explore the patient’s concerns about going home<br><br>b. The patient is able to identify his/her concerns about going home | - Discussion by face to face at discharge<br>- Telephone follow-up at one month after discharge<br><br>10 minutes | - Ask the patient about his/her concerns about going home such as worry about further MI, the importance of follow-up visit, and normal symptoms of recovery and assist the patient to overcome his/her concerns tailored to the patient at discharge day.<br>- Follow-up the patient if he/she had any concern regarding MI at one month after discharge. | - Identify concerns about going home that might be problems or barrier after leaving hospital.<br>- Discussion with the researcher to agreeing on the plan to overcome his/her concerns. |
| Termination |                      | To evaluate the program  | Discussion by face to face<br><br>5 minutes   | - Ask the patient about<br>a. <i>How do you feel after finishing the program?</i><br>b. <i>What do you think about this program?</i><br>- Inform the patient to terminate the program  | - Answer the questions<br>- Give recommendation if any   |



## APPENDIX H

Booklet of the Illness Representation-Based Intervention

# คู่มือการดูแลตนเอง ผู้ป่วยโรคกล้ามเนื้อหัวใจขาดเลือด



สำหรับ

.....

 จัดทำโดย

นางสาว พรรณทิพา นิลวิสัย

นักศึกษาปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์

## คำนำ

ผู้วิจัยได้จัดทำคู่มือฉบับนี้ขึ้น โดยมีวัตถุประสงค์เพื่อเป็นส่วนหนึ่งในการศึกษาเรื่อง “ผลของโปรแกรมการรับรู้ความเจ็บป่วยต่อความวิตกกังวลในผู้ป่วยโรคกล้ามเนื้อหัวใจขาดเลือด” เนื้อหาภายในจะประกอบด้วยรายละเอียดเกี่ยวกับโรคกล้ามเนื้อหัวใจขาดเลือด สาเหตุ ปัจจัยเสี่ยง การรักษา การดูแลตนเอง การรับประทานยา และตารางการฟื้นฟูสภาพและปรับเปลี่ยนพฤติกรรมเพื่อสุขภาพ เพื่อให้ผู้ป่วยโรคกล้ามเนื้อหัวใจขาดเลือดที่ได้เข้าร่วมโปรแกรมลดความกังวลเกี่ยวกับโรคและภาวะสุขภาพ การดูแลตนเองเมื่อกลับไปอยู่ที่บ้าน รวมถึงมีการวางแผนการฟื้นฟูสภาพและปรับเปลี่ยนพฤติกรรมตามความเหมาะสมที่ผู้ป่วยสามารถปฏิบัติได้

ผู้วิจัยหวังเป็นอย่างยิ่งว่า โปรแกรมการรับรู้ความเจ็บป่วยนี้ จะมีผลช่วยลดความกังวลเกี่ยวกับโรคกล้ามเนื้อหัวใจขาดเลือด รวมถึงสามารถปรับเปลี่ยนการรับรู้ภาวะความเจ็บป่วยด้วยโรคกล้ามเนื้อหัวใจขาดเลือดให้ถูกต้องเหมาะสม และสามารถช่วยให้ผู้ป่วยมีความรู้ความเข้าใจในการดูแลตนเอง การฟื้นฟูสภาพและการปรับเปลี่ยนพฤติกรรมในขอบเขตที่ผู้ป่วยสามารถปฏิบัติได้ที่บ้าน และสามารถคงไว้ซึ่งพฤติกรรมที่เหมาะสมในระยะยาวต่อไป

## สารบัญ

| เรื่อง   | หน้า |
|--|------|
| โรคกล้ามเนื้อหัวใจขาดเลือด.....                            | 1    |
| 1. สาเหตุของโรคกล้ามเนื้อหัวใจขาดเลือด.....                | 2    |
| 2. ปัจจัยเสี่ยง.....                                       | 2    |
| 3. อาการของโรคกล้ามเนื้อหัวใจขาดเลือด.....                 | 3    |
| 4. การรักษาโรคกล้ามเนื้อหัวใจขาดเลือด.....                 | 4    |
| การปรับเปลี่ยนพฤติกรรม.....                                | 6    |
| 1. การงดสูบบุหรี่.....                                     | 6    |
| 2. การควบคุมภาวะความดันโลหิตสูง.....                       | 7    |
| 2.1 การควบคุมอาหาร.....                                    | 8    |
| 2.2 การดูแลน้ำหนักตัวให้เหมาะสม.....                       | 9    |
| 2.3 การออกกำลังกายในผู้ป่วยโรคกล้ามเนื้อหัวใจขาดเลือด..... | 10   |
| 3. การควบคุมเบาหวาน.....                                   | 12   |
| เพศสัมพันธ์ในผู้ป่วยโรคกล้ามเนื้อหัวใจขาดเลือด.....        | 14   |
| ความเครียดกับโรคกล้ามเนื้อหัวใจขาดเลือด.....               | 15   |
| การใช้ยาโรคกล้ามเนื้อหัวใจขาดเลือด.....                    | 16   |
| ตารางฟื้นฟูสภาพและปรับเปลี่ยนพฤติกรรมเพื่อสุขภาพ.....      | 18   |

**APPENDIX I****Normal Distribution**

## 1. Experimental group

## State anxiety score

## a. Pre-test

$$\text{Skewness/ S.E.} = 0.536/0.427 = 1.26$$

$$\text{Kurtosis/ S.E.} = -0.349/0.833 = -0.42$$

## b. Discharge

$$\text{Skewness/ S.E.} = 1.857/0.427 = 4.35$$

$$\text{Kurtosis/ S.E.} = 4.986/0.833 = 5.96$$

## c. One month after discharge

$$\text{Skewness/ S.E.} = 0.219/0.427 = 0.51$$

$$\text{Kurtosis/ S.E.} = -0.153/0.833 = -0.18$$

## Trait anxiety score

$$\text{Skewness/ S.E.} = 0.366/0.427 = 0.86$$

$$\text{Kurtosis/ S.E.} = -0.726/0.833 = -0.01$$

## 2. Control group

### State anxiety score

#### a. Pre-test

$$\text{Skewness/ S.E.} = 0.798/0.427 = 1.87$$

$$\text{Kurtosis/ S.E.} = 1.093/0.822 = 1.31$$

#### b. Discharge

$$\text{Skewness/ S.E.} = 0.228/0.427 = 0.53$$

$$\text{Kurtosis/ S.E.} = 0.074/0.833 = 0.09$$

#### c. One month after discharge

$$\text{Skewness/ S.E.} = 0.420/0.427 = 0.98$$

$$\text{Kurtosis/ S.E.} = -1.060/0.833 = -0.29$$

### Trait anxiety score

$$\text{Skewness/ S.E.} = 0.556/0.427 = 1.30$$

$$\text{Kurtosis/ S.E.} = -0.213/0.833 = 1.05$$

**APPENDIX J****Permission of Using State-Trait Anxiety Inventory (STAI)**

For use by Pantipa Nilwilai only. Received from Mind Garden, Inc. on January 20, 2014



[www.mindgarden.com](http://www.mindgarden.com)

To whom it may concern,

This letter is to grant permission for the above named person to use the following copyright material for his/her thesis or dissertation research.

Instrument: ***State-Trait Anxiety Inventory for Adults***

Authors: ***Charles D. Spielberger, in collaboration with R.L. Gorsuch, G.A. Jacobs, R. Lushene, and P.R. Vagg***

Copyright: ***1968, 1977 by Charles D. Spielberger***

Five sample items from this instrument may be reproduced for inclusion in a proposal, thesis, or dissertation.

The entire instrument may not be included or reproduced at any time in any other published material.

Sincerely,

Robert Most  
Mind Garden, Inc.  
[www.mindgarden.com](http://www.mindgarden.com)

## APPENDIX K

### Permission of Using the Brief Illness Perception Questionnaire (BIPQ)

**Pantipa Nilwilai <aompantipa.n@gmail.com>**

1/7/  
14

to lizbroadbent

Dear Dr. Elizabeth Broadbent,

Firstly, I would like to introduce myself. My name is Pantipa Nilwilai. I am a master student in Faculty of Nursing, Prince of Songkla University, Hatyai, Thailand.

I am doing my thesis entitled "The Effect of Illness Representation-Based Intervention on Anxiety in Patients With Myocardial Infarction." Now I am in process developing my thesis article with a randomized controlled trial study. This study is aimed to reduce anxiety in patients with myocardial infarction. In doing this intervention, I will use your measurement for this study. Therefore, I would like to ask for permission to use the BIPQ in my study. If you allow me to use the BIPQ in my study, I also need permission to modify the measurement because this study is focused on the cognitive representation, so I will not use the item no.8 in my study.

Finally, I would very much thank you for your permission.

Regards,

Pantipa Nilwilai

Student of Master of Adult Nursing (International Program)

Faculty of Nursing, Prince of Songkla University

Thailand



**Elizabeth Broadbent <lizbroadbent@icloud.com>**

1/8/  
14

to me

Yes you may

Regards

Liz

## APPENDIX L

### Permission of Using Thai Version of Brief Illness Perception Questionnaire

1/7/  
14

**Pantipa Nilwilai <aompantipa.n@gmail.com>**

to nsow001

Dear Dr. [Napaporn Sowattanangoon](#),

Firstly, I would like to introduce myself. My name is Pantipa Nilwiali. I am a master student in Faculty of Nursing (International Program), Prince of Songkla University, Hatyai, Thailand.

I am doing my thesis entitled "The Effect of Illness Representation-Based Intervention on Anxiety in Patients With Myocardial Infarction." Now I am in process developing my thesis article with a randomized controlled trial study. This study is aimed to reduce anxiety in patients with myocardial infarction. In doing this intervention, I will use your Thai version of the Brief Illness Perception Questionnaire for this study. Therefore, I would like to ask for permission to use your Thai version BIPQ in my study.

Finally, I would very much thank you for your permission.

Regards,  
Pantipa Nilwilai  
Student of Master of Adult Nursing (International Program)  
Faculty of Nursing, Prince of Songkla University  
Thailand

Email: [aompantipa.n@gmail.com](mailto:aompantipa.n@gmail.com)



**NAPAPORN SOWATTANANGOON <nsow001@yahoo.com>**

1/7/  
14

to me

Dear Khun Pantipa,

Thank you for your interest in the Brief-IPQ (Thai version) questionnaire. You have the permission to use the questionnaire.

Good luck for your study.  
Kindly,  
Napaporn

## **APPENDIX M**

### **List of Experts**

Three experts examined the construct applicability for the Illness Representation-Based Intervention (IRBI), they were:

1. Weena Chanchong, RN, Ph.D.  
Nursing Lecturer, Department of Psychiatric Nursing, Prince of Songkla University, Thailand
2. Wasinee Somsiri, RN, APN (Cardiology)  
Nursing Lecturer, Department of Medical Nursing, Prince of Songkla University, Thailand
3. Noppadol Chamnarnphol, M.D., Asst.  
Cardiologist and Lecturer, Division of Cardiology, Department of Internal Medicine, Faculty of Medicine, Prince of Songkla University, Thailand

## APPENDIX N

### Additional Analysis

Table L1

*Comparison of the Illness Representation Scores at Baseline between the Experimental Group and the Control Group (N = 60)*

| Item                 | Experimental group | Control group   | <i>t</i>            | <i>p</i> |
|----------------------|--------------------|-----------------|---------------------|----------|
|                      | (n = 30)           | (n = 30)        |                     |          |
|                      | <i>M (SD)</i>      | <i>M (SD)</i>   |                     |          |
| 1. Consequences      | 6.37 (2.33)        | 6.73 (2.43)     | -0.596 <sup>a</sup> | .553     |
| 2. Timeline          | 4.70 (3.81)        | 5.83 (4.09)     | -1.112 <sup>a</sup> | .271     |
| 3. Personal control  | 7.63 (1.54)        | 8.30 (1.60)     | -1.643 <sup>a</sup> | .106     |
| 4. Identity          | 7.67 (2.29)        | 8.50 (1.96)     | -1.512 <sup>a</sup> | .136     |
| 5. Worry             | 5.30 (2.96)        | 5.37 (3.52)     | -0.079 <sup>a</sup> | .937     |
| 6. Emotion           | 4.57 (3.50)        | 4.17 (3.80)     | 0.424 <sup>a</sup>  | .673     |
|                      | Mean Rank          | Mean Rank       |                     |          |
|                      | (Sum of Ranks)     | (Sum of Ranks)  | <i>Z</i>            | <i>p</i> |
| 7. Treatment control | 26.95 (808.50)     | 34.05 (1021.50) | -1.696 <sup>b</sup> | .090     |
| 8. Comprehension     | 30.00 (900.00)     | 31.00 (930.00)  | -0.226 <sup>b</sup> | .821     |

Note. <sup>a</sup> = independent t-test, <sup>b</sup> = Mann-Whitney U Test, *M* = Mean, *SD* = Standard deviation

Table L2

*Comparison of the Illness Representation Scores at Discharge between the Experimental Group and the Control Group (N = 60)*

| Item                 | Experimental group<br>(n = 30) | Control group<br>(n = 30)   | <i>t</i>            | <i>p</i>           |
|----------------------|--------------------------------|-----------------------------|---------------------|--------------------|
|                      | <i>M (SD)</i>                  | <i>M (SD)</i>               |                     |                    |
| 1. Consequences      | 5.73 (2.85)                    | 7.57 (2.34)                 | -2.720 <sup>a</sup> | .009 <sup>**</sup> |
| 2. Timeline          | 7.63 (3.47)                    | 5.70 (4.22)                 | 1.939 <sup>a</sup>  | .058               |
|                      | Mean Rank<br>(Sum of Ranks)    | Mean Rank<br>(Sum of Ranks) | <i>Z</i>            | <i>p</i>           |
| 3. Personal control  | 34.78 (1043.50)                | 26.22 (786.50)              | -1.960 <sup>b</sup> | .050               |
| 4. Treatment control | 30.20 (906.00)                 | 30.80 (924.00)              | -0.146 <sup>b</sup> | .884               |
|                      | <i>M (SD)</i>                  | <i>M (SD)</i>               | <i>t</i>            | <i>p</i>           |
| 5. Identity          | 5.03 (4.17)                    | 3.67 (4.24)                 | 1.260 <sup>a</sup>  | .213               |
| 6. Worry             | 2.47 (2.35)                    | 5.40 (2.87)                 | -4.333 <sup>a</sup> | .000 <sup>*</sup>  |
| 7. Comprehension     | 8.73 (1.36)                    | 6.93 (3.13)                 | 2.889 <sup>a</sup>  | .006 <sup>*</sup>  |
| 8. Emotion           | 2.43 (2.84)                    | 4.20 (3.51)                 | -2.145 <sup>a</sup> | .036 <sup>**</sup> |

Note. <sup>a</sup> = independent t-test, <sup>b</sup> = Mann-Whitney U Test, *M* = Mean, *SD* = Standard deviation, \* =  $p < .01$ , \*\* =  $p < .05$

Table L3

*Comparison of the Illness Representation Scores at One Month after Discharge between the Experimental Group and the Control Group (N = 60)*

| Item                 | Experimental group<br>(n = 30) | Control group<br>(n = 30)   | <i>t</i>            | <i>p</i>           |
|----------------------|--------------------------------|-----------------------------|---------------------|--------------------|
|                      | <i>M (SD)</i>                  | <i>M (SD)</i>               |                     |                    |
| 1. Consequences      | 2.30 (2.45)                    | 3.23 (3.16)                 | -1.319 <sup>a</sup> | .193               |
| 2. Timeline          | 7.50 (3.655)                   | 7.00 (3.96)                 | 0.508 <sup>a</sup>  | .613               |
| 3. Personal control  | 9.17 (0.83)                    | 8.43 (1.36)                 | 2.522 <sup>a</sup>  | .014 <sup>**</sup> |
|                      | Mean Rank<br>(Sum of Ranks)    | Mean Rank<br>(Sum of Ranks) | <i>Z</i>            | <i>p</i>           |
| 4. Treatment control | 34.50 (1035.00)                | 26.50 (795.00)              | -2.006 <sup>b</sup> | .045 <sup>**</sup> |
| 5. Identity          | 31.00 (930.00)                 | 30.00 (900.00)              | -0.285 <sup>b</sup> | .775               |
| 6. Worry             | 26.87 (806.00)                 | 34.13 (1024.00)             | -1.754 <sup>b</sup> | .079               |
| 7. Comprehension     | 37.30 (1119.00)                | 23.70 (711.00)              | -3.384 <sup>b</sup> | .001 <sup>*</sup>  |
| 8. Emotion           | 25.30 (759.00)                 | 35.70 (1071.00)             | -2.644 <sup>b</sup> | .008 <sup>*</sup>  |

Note. <sup>a</sup> = independent t-test, <sup>b</sup> = Mann-Whitney U Test, *M* = Mean, *SD* = Standard deviation, \* =  $p < .01$ , \*\* =  $p < .05$

Table L4

*Comparison of the Illness Representation Scores over Time within the Experimental Group (n = 30)*

| Item                        | <i>M</i> | <i>SD</i> | <i>F</i> | <i>t</i>           | <i>p</i> |
|-----------------------------|----------|-----------|----------|--------------------|----------|
| 1. Consequences             |          |           | 35.49    | 0.872 <sup>a</sup> | .000     |
| - Pretest                   | 6.37     | 2.33      |          |                    |          |
| - At discharge              | 5.73     | 2.85      |          |                    |          |
| - One month after discharge | 2.30     | 2.25      |          |                    |          |
| 2. Timeline                 |          |           | 7.44     | 0.976 <sup>a</sup> | .001     |
| - Pretest                   | 4.70     | 3.80      |          |                    |          |
| - At discharge              | 7.63     | 3.47      |          |                    |          |
| - One month after discharge | 7.50     | 3.66      |          |                    |          |
| 3. Personal control         |          |           | 15.87    | 0.837 <sup>a</sup> | .000     |
| - Pretest                   | 7.63     | 1.54      |          |                    |          |
| - At discharge              | 8.77     | 1.50      |          |                    |          |
| - One month after discharge | 9.17     | 0.83      |          |                    |          |
| 4. Treatment control        |          |           | 8.48     | 0.996 <sup>a</sup> | .000     |
| - Pretest                   | 8.37     | 1.69      |          |                    |          |
| - At discharge              | 8.93     | 1.60      |          |                    |          |
| - One month after discharge | 9.67     | 0.83      |          |                    |          |
| 5. Identity                 |          |           | 92.44    | 0.868 <sup>b</sup> | .000     |
| - Pretest                   | 7.67     | 2.29      |          |                    |          |
| - At discharge              | 5.03     | 4.17      |          |                    |          |
| - One month after discharge | 0.63     | 1.07      |          |                    |          |
| 6. Worry                    |          |           | 34.22    | 0.974 <sup>a</sup> | .000     |
| - Pretest                   | 5.30     | 2.96      |          |                    |          |
| - At discharge              | 2.47     | 2.35      |          |                    |          |
| - One month after discharge | 0.90     | 1.42      |          |                    |          |
| 7. Comprehension            |          |           | 17.57    | 0.557 <sup>a</sup> | .000     |
| - Pretest                   | 7.63     | 2.06      |          |                    |          |
| - At discharge              | 8.73     | 1.36      |          |                    |          |
| - One month after discharge | 9.67     | 0.71      |          |                    |          |

| Item                        | <i>M</i> | <i>SD</i> | <i>F</i> | <i>t</i>            | <i>p</i> |
|-----------------------------|----------|-----------|----------|---------------------|----------|
| 8. Emotion                  |          |           |          | 22.750 <sup>c</sup> | .000     |
| - Pretest                   | 4.57     | 3.50      |          |                     |          |
| - At discharge              | 2.43     | 2.84      |          |                     |          |
| - One month after discharge | 0.43     | 0.86      |          |                     |          |

Note. <sup>a</sup> = Repeated Measures ANOVA, significant level at .01, by Greenhouse - Geisser

<sup>b</sup> = Repeated Measures ANOVA, significant level at .01, Sphericity assumed

<sup>c</sup> = Chi-square, *M* = Mean, *SD* = Standard deviation

Table L5

*Comparison of the Illness Representation Scores over Time within the Control Group (n = 30)*

| Item                        | <i>M</i> | <i>SD</i> | <i>F</i> | <i>t</i>            | <i>p</i> |
|-----------------------------|----------|-----------|----------|---------------------|----------|
| 1. Consequences             |          |           | 38.24    | 0.732 <sup>a</sup>  | .000     |
| Pretest                     | 6.73     | 2.43      |          |                     |          |
| At discharge                | 7.57     | 2.34      |          |                     |          |
| One month after discharge   | 3.23     | 3.16      |          |                     |          |
| 2. Timeline                 |          |           | 0.76     | 0.051 <sup>a</sup>  | .480     |
| Pretest                     | 5.83     | 4.09      |          |                     |          |
| At discharge                | 5.70     | 4.22      |          |                     |          |
| One month after discharge   | 7.00     | 3.96      |          |                     |          |
| 3. Personal control         |          |           | 1.22     | 0.080 <sup>a</sup>  | .312     |
| Pretest                     | 8.30     | 1.60      |          |                     |          |
| At discharge                | 7.93     | 1.84      |          |                     |          |
| One month after discharge   | 8.43     | 1.36      |          |                     |          |
| 4. Treatment control        |          |           |          | 0.125 <sup>b</sup>  | .939     |
| Pretest                     | 9.03     | 1.50      |          |                     |          |
| At discharge                | 9.03     | 1.45      |          |                     |          |
| One month after discharge   | 8.93     | 1.36      |          |                     |          |
| 5. Identity                 |          |           |          | 35.583 <sup>b</sup> | .000     |
| - Pretest                   | 8.50     | 1.96      |          |                     |          |
| - At discharge              | 3.67     | 4.24      |          |                     |          |
| - One month after discharge | 0.90     | 2.02      |          |                     |          |

| Item                        | <i>M</i> | <i>SD</i> | <i>F</i> | <i>t</i>            | <i>p</i> |
|-----------------------------|----------|-----------|----------|---------------------|----------|
| 6. Worry                    |          |           |          | 0.495 <sup>a</sup>  | .000     |
| - Pretest                   | 5.37     | 3.52      | 13.72    |                     |          |
| - At discharge              | 5.40     | 2.87      |          |                     |          |
| - One month after discharge | 2.20     | 2.80      |          |                     |          |
| 7. Comprehension            |          |           |          | 0.867 <sup>a</sup>  | .007     |
| - Pretest                   | 7.20     | 3.07      | 5.39     |                     |          |
| - At discharge              | 6.93     | 3.13      |          |                     |          |
| - One month after discharge | 8.20     | 2.20      |          |                     |          |
| 8. Emotion                  |          |           |          | 11.545 <sup>b</sup> | .003     |
| - Pretest                   | 4.17     | 3.80      |          |                     |          |
| - At discharge              | 4.20     | 3.51      |          |                     |          |
| - One month after discharge | 1.87     | 2.73      |          |                     |          |

Note. <sup>a</sup> = Repeated Measures ANOVA, significant level at .01, by Greenhouse – Geisser

<sup>b</sup> = Chi-square, *M* = Mean, *SD* = Standard deviation

Table L6

*The Frequency and Percentages of the Top-Three Causal Beliefs in the Experimental Group (n = 30) and the Control Group (n = 30)*

|                           | Experimental group<br>(n = 30) |            | Control group<br>(n = 30) |            |
|---------------------------|--------------------------------|------------|---------------------------|------------|
|                           | Causes                         | n (%)      | Causes                    | n (%)      |
| Pretest                   | Consuming high fat diet        | 15 (50.00) | Consuming high fat diet   | 12 (40.00) |
|                           | Smoking                        | 10 (33.33) | Less exercise             | 12 (40.00) |
|                           | Less exercise                  | 8 (26.67)  | Stress                    | 7 (23.33)  |
| At discharge              | Smoking                        | 24 (80.00) | Consuming high fat diet   | 20 (66.67) |
|                           | Consuming high fat diet        | 22 (73.33) | Less exercise             | 19 (63.33) |
|                           | Less exercise                  | 17 (56.66) | Smoking                   | 19 (63.33) |
| One month after discharge | Consuming high fat diet        | 25 (83.33) | Consuming high fat diet   | 22 (73.33) |
|                           | Smoking                        | 23 (76.66) | Smoking                   | 18 (60.00) |
|                           | Less exercise                  | 15 (50.00) | Less exercise             | 14 (46.67) |

Table L7

*The Misconceptions and Gaps about MI of the Subjects in the Experimental Group and the Control Group*

|                   | Experimental group   | Control group   |
|-------------------|--|---|
| Consequences      | <p><i>“I can’t have any exercise because exercise will damage my heart. Exercise is very dangerous. I have seen in TV, a football player died during the match, and he was diagnosed heart attack later on. See? Even a strong person died, how about a normal like me.”</i></p>                             |   |
| Timeline          | <p><i>“I believe that MI can be gone because I have seen my friend, he had been done balloon and stent insertion. Now he still smokes and lives normally.”</i></p>   | <p><i>“Yes, it’s curable. I’m very confident with the doctor, the modern medication, and medical technology of the hospital. I hope that the disease will be gone soon.”</i></p>  |
| Treatment control | <p><i>“Medication is useless. My mother took them for lifelong, but she only got worse, and died eventually. So, I don’t think taking medication will help.”</i></p> <p><i>“The doctor said I have to take medication for lifelong. If so, it means MI can’t be cured. Then, why I have to take it?”</i></p> | <p><i>“Medication is bad for liver and renal. I don’t want to have liver failure and renal failure in the future. Each day I already have to take a lot of medications, I should talk with the doctor to reduce the daily amount of my medication.”</i></p> <p><i>“Modern medication is like chemical that we use to get rid of the weed in the garden. Once we use it, not only the weed dies, but it also damage soil. Then we can’t plant anything again. But herbs are good. It’s like we get rid of the weed by the gardening tools, little by little. It results the same thing as using chemical, but it’s safer. That’s why I stop taking</i></p> |

|          | Experimental group  | Control group   |
|----------|---|---|
| Identity | <p><i>“I don’t know the signs and symptoms of MI. When I had chest pain, I thought it was gastritis.”</i></p> <p><i>“When I had chest pain, I didn’t know it was MI. I suspected that I worked too hard.”</i></p>   | <p><i>medication.” “At first I have never thought that it was MI. I just felt uncomfortable in chest and stomach. I thought it might result from the breakfast I’ve just had a few hours ago.”</i></p>  |
| Causes   | <p><i>“I think it’s caused by the pollutions in the air, food, and water. Pollutions damage our body and heart, too”</i></p> <p><i>“I suspect that it’s because of food allergy. Yesterday I had chest pain after I ate a bowl of mushroom soup that I have never tried before.”</i></p> <p><i>“My illness comes from Allah’s will. He is testing me, and I have to accept it.”</i></p> | <p><i>“We have to believe in god. He only gives us good things. The disease is also a good thing from god. He is giving me a test. It’s his will.”</i></p> <p><i>“I don’t know the cause of MI. I don’t think smoking is a cause. My neighbor had quit smoking for many years but he still had MI. Women also can be MI. So I don’t think smoking involve with MI.”</i></p> <p><i>“I don’t know what Karma I’ve done in the past that results me to have MI. It might because I killed animals when I was young.”</i></p> |

Table L8

*Worries about MI of Each Period of the Subjects in the Experimental Group and the Control Group (N = 60)*

|                           | Experimental group<br>(n = 30) |            | Control group<br>(n = 30) |            |
|---------------------------|--------------------------------|------------|---------------------------|------------|
|                           | Concerns                       | n (%)      | Concerns                  | n (%)      |
| Pretest                   | Returning to work              | 25 (83.33) | Returning to work         | 26 (86.67) |
|                           | Further cardiac events         | 18 (60.00) | Further cardiac events    | 16 (53.33) |
|                           | Social relationship            | 8 (26.66)  | Financial issue           | 5 (16.67)  |
| At discharge              | Returning to work              | 12 (40.00) | Returning to work         | 15 (50.00) |
|                           | Lifestyle modification         | 8 (26.67)  | Further cardiac events    | 5 (16.67)  |
|                           | Further cardiac events         | 5 (16.67)  | Lifestyle modification    | 4 (13.33)  |
| One month after discharge | Diet control                   | 5 (16.67)  | Diet control              | 8 (26.67)  |
|                           | Pacing activity                | 3 (10.00)  | Relaxing                  | 5 (16.67)  |
|                           | Relaxing                       | 2 (6.67)   | Smoking cessation         | 2 (6.67)   |