

**THE EFFECTS OF PROGRESSIVE MUSCLE RELAXATION
TECHNIQUE ON POSTOPERATIVE PAIN AND ANXIETY IN
CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS**

The seal of Mahidol University is a large, circular emblem in the background. It features a central blue circle with a golden Thai stupa (chedi) inside. The stupa is surrounded by golden Thai script. The outer ring of the seal also contains Thai script. The author's name is printed in black text across the center of the seal.

ACHARA JONGJAREONKUMCHOK

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

2005

ISBN 974-04-6653-2

COPYRIGHT OF MAHIDOL UNIVERSITY

Thesis
Entitled

**THE EFFECTS OF PROGRESSIVE MUSCLE RELAXATION
TECHNIQUE ON POSTOPERATIVE PAIN AND ANXIETY IN
CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS**

Achara Jongjareonkumchok

Miss Achara Jongjareonkumchok
Candidate

Usavadee Asdornwised

Assist. Prof. Usavadee Asdornwised,
Ph.D. (Nursing)
Major-Advisor

Orapan Thosingha

Assist. Prof. Orapan Thosingha,
D.N.S.
Co-Advisor

Suchart Chaiyaroj

Assist. Prof. Suchart Chaiyaroj,
MD. FACS
Co-Advisor

M. R. Jisnuson Svasti

Prof. M. R. Jisnuson Svasti,
Ph.D.
Dean
Faculty of Graduate Studies

Pornsri Sriussadaporn

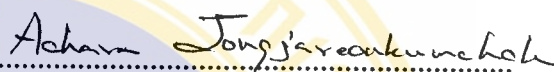
Assoc. Prof. Pornsri Sriussadaporn,
M.Ed. (Ed. Research)
Chair
Master of Nursing Science
Faculty of Nursing

Thesis
Entitled

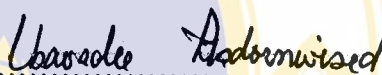
**THE EFFECTS OF PROGRESSIVE MUSCLE RELAXATION
TECHNIQUE ON POSTOPERATIVE PAIN AND ANXIETY IN
CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS**

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Nursing Science (Adult nursing)

on
27 October, 2005



Miss Achara Jongjareonkumchok
Candidate



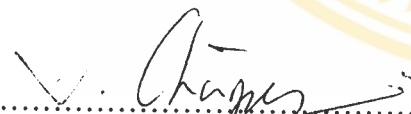
Assist. Prof. Usavadee Asdornwised,
Ph.D. (Nursing)
Chair



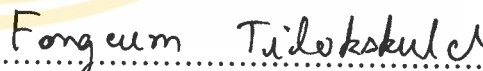
Assist. Prof. Penkae Ketumarn,
MD. (Diplomate Thai Board of
Anesthesiology)
Member



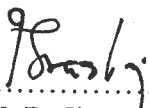
Assist. Prof. Orapan Thosingha,
D.N.S.
Member



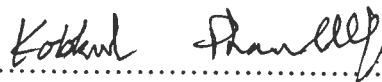
Assist. Prof. Suchart Chaiyaroj,
MD. FACS
Member



Assoc. Prof. Fongcum Tilokskulchai,
Ph.D. (Nursing)
Member



Prof. M. R. Jisnuson Svasti,
Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University



Assoc. Prof. Kobkul Phanchareonworakul,
Ph.D. (Nursing)
Dean
Faculty of Nursing
Mahidol University

ACKNOWLEDGEMENTS

This thesis can meet with success under the kindness given by my thesis advisers, Assistant Professor Dr. Usavadee Asdornwised, Assistant Professor Dr. Orapan Thosingha and Assistant Professor Dr. Suchart Chaiyaroj who gave me guidance, assistance, a correction of various errors, support and encourage me along the research procedure. I would like to express my sincere grateful and deepest appreciation to them. In addition, I would like to express my grateful and sincere appreciation to Assistant Professor Dr. Penkae Ketumarn, the external examiner and Associate Professor Fongcum Tilokskulchai, Chair of the master of Nursing Science program, for their kindness, and valuable suggestion and recommendations. Here, I am very appreciated to deliver a respectful thanks to all of them.

I am highly grateful to the Department of Mental Health, Ministry of Public Health for the intervention instrument and to all of the experts for their kindness in examining and correction the content validity of the intervention instrument. My thankful gratitude is also sent to Dr. Harry Vincenzi who proofread the draft document with his kindness.

At the same time, I am very thankful to Ms. Pornpimol Masnarakorn, the head nurse and Ms. Yupadee Kunprayoon, supervisor of Kanlayanakit Kittiyakorn Intensive care unit who encouraged me to study in Master degree. In addition, I am very thankful to all staffs in Kanlayanakit Kittiyakorn Intensive care unit, Ramathibodi Hospital, and all my wonderful classmates who gave me particularly mental support all along the time I have studied. I would like to thank to all coronary artery bypass graft patients especially to the participants for their sincerely assistance in complete this research. I am very grateful to the Faculty of Graduate Studies, Mahidol University for partial financial support for this study.

My respectful gratitude will be go directly to my family for love and highly concerned; these are considered as the great contribution, inspiration, and moral support for me. I would like to be thankful all teachers in my life for their benevolence in teaching and guiding me until come to the success of this degree.

Achara Jongjareonkumchok

THE EFFECTS OF PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON POSTOPERATIVE PAIN AND ANXIETY IN CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS

ACHARA JONGJAREONKUMCHOK 4637749 NSAN/M

M.N.S. (ADULT NURSING)

THESIS ADVISORS: USAVADEE ASDORNWISED, Ph.D.(NURSING),
ORAPAN THOSINGHA, D.N.S., SUCHART CHAIYAROJ, MD. FACS

ABSTRACT

The purpose of this study was to examine the effects of the progressive muscle relaxation technique on postoperative pain and anxiety in coronary artery bypass graft (CABG) patients. The sample comprised 30 CABG patients who were extubated within 24-72 hours after their operation in cardio-vascular-thoracic intensive care unit. This occurred at Ramathibodi Hospital between June and August, 2005. A quasi-experimental design was used with one pre-test and post-test group. After extubation, the progressive muscle relaxation treatment was used with the participants. The data collected were the results from the numerical pain scale (vertical) and the anxiety visual analogue scale. Both pain and anxiety levels were measured at the beginning and the end of intervention procedure, and again after 15, 30 and 45 minutes respectively. The mean scores of pain and anxiety were analyzed using a repeated measured ANOVA.

The findings of this study showed that the mean post-intervention scores for both the pain and anxiety scores were significantly lower than the pre-intervention scores ($p < 0.05$). In addition, 70% of the participants used the relaxation treatment again within 24 hours. This group requested fewer analgesic drugs than the group that did not receive the treatment. These findings support the effectiveness of progressive muscle relaxation as a complementary treatment to reduce postoperative pain and anxiety in CABG patients.

KEY WORDS : PROGRESSIVE MUSCLE RELAXATION/
POSTOPERATIVE PAIN/ ANXIETY/ CABG/
CARDIAC SURGERY

85 P. ISBN 974-04-6653-2

ประสิทธิผลของเทคนิคการผ่อนคลายกล้ามเนื้อต่อระดับความเจ็บปวดและระดับความวิตกกังวล
ในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ (THE EFFECTS OF PROGRESSIVE
MUSCLE RELAXATION TECHNIQUE ON POSTOPERATIVE PAIN AND ANXIETY IN
CORONARY ARTERY BYPASS GRAFT SURGERY PATIENTS)

อัจฉรา จงเจริญกำโชค 4637749 NSAN/M

พย.ม. (การพยาบาลผู้ใหญ่)

คณะกรรมการควบคุมวิทยานิพนธ์: อุษาวดี อัสศรีวิเศษ, Ph.D. (NURSING),

อรพรรณ โตสิงห์, พย.ค., สุชาติ ไชยโรจน์, MD. FACS

บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่อเปรียบเทียบระดับความเจ็บปวดและระดับความวิตกกังวลในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ ก่อนและหลังฝึกเทคนิคการผ่อนคลายกล้ามเนื้อ ประชากรที่ใช้ในการศึกษานี้เป็นผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจหลังถอดท่อช่วยหายใจ ภายใน 24-72 ชั่วโมงหลังผ่าตัด ในหน่วยบำบัดพิเศษหลังผ่าตัดหัวใจและทรวงอก โรงพยาบาลรามธิบดีระหว่างเดือนมิถุนายน-สิงหาคม 2548 จำนวน 30 ราย การวิจัยครั้งนี้ใช้ระเบียบวิธีการวิจัยกึ่งทดลองโดยใช้กลุ่มตัวอย่างกลุ่มวัดผลก่อนและหลังได้รับเทคนิคการผ่อนคลายกล้ามเนื้อหลังถอดท่อช่วยหายใจ เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูลประกอบด้วยมาตรวัดความเจ็บปวด The numerical pain scale (vertical) และมาตรวัดระดับความวิตกกังวล The anxiety VAS ผู้วิจัยวัดระดับความเจ็บปวดและระดับความวิตกกังวลก่อนและเมื่อจบการฟังแถบเสียงการผ่อนคลายกล้ามเนื้อและวัดซ้ำเมื่อเวลาผ่านไป 15, 30 และ 45 นาที เปรียบเทียบระดับความเจ็บปวดและความวิตกกังวลโดยใช้สถิติการวิเคราะห์ความแปรปรวนแบบการวัดผลซ้ำ (repeated measured ANOVA)

ผลการศึกษาพบว่าค่าเฉลี่ยระดับความเจ็บปวด และค่าเฉลี่ยระดับความวิตกกังวลของผู้ป่วย หลังฝึกเทคนิคการผ่อนคลายกล้ามเนื้อทันที และ เมื่อเวลาผ่านไป 15, 30 และ 45 นาที ต่ำกว่าก่อนการฝึกเทคนิคการผ่อนคลายกล้ามเนื้ออย่างมีนัยสำคัญทางสถิติที่ระดับ .05 นอกจากนี้ยังพบว่า 70% ของผู้ป่วย ฟังแถบเสียงซ้ำภายใน 24 ชั่วโมงโดยกลุ่มที่ฟังแถบเสียงซ้ำ มีอัตราการขอรับยาแก้ปวดเพิ่มน้อยกว่ากลุ่มที่ไม่ฟังแถบเสียงซ้ำใน 24 ชั่วโมง จากผลการศึกษาที่ได้สนับสนุนประสิทธิผลของเทคนิคการผ่อนคลายกล้ามเนื้อในการใช้เป็นการบำบัดร่วมในการลดความเจ็บปวดและความวิตกกังวลในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

CONTENTS

	Page
ACKNOWLEDGMENTS	iii
ABSTRACTS(ENGLISH)	iv
ABSTRACTS(THAI)	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
CHAPTER	
I INTRODUCTION	1
1. Background and significance of the study	1
2. Research question	5
3. Purpose of the study	5
4. Hypotheses	5
5. Conceptual framework	6
6. Assumption	7
7. Scope of the study	8
8. Definition of terms	8
9. Benefits	9
II LITERATURE REVIEW	10
1. Experiences of CABG patients	10
2. Pain in CABG patients and pain assessment tools	12
3. Anxiety in CABG patients and anxiety assessment tools	25
4. Effect of progressive muscle relaxation technique on postoperative pain and anxiety in CABG patients	31
5. Summary	36
III METHODOLOGY	38
1. Research design	38
2. Population and sampling	38

CONTENTS (continued)

CHAPTER		Page
	3. Setting	39
	4. Instruments	39
	5. Data collection	42
	6. Protection of human subjects	45
	7. Data Analysis	45
IV	RESULTS	46
	1. Demographic characteristic of the participants	46
	2. Hypotheses testing results	48
	3. Additional findings	52
	4. Summary of the results	53
V	DISCUSSION	54
	1. Demographic characteristics of the participants	54
	2. The Effects of progressive muscle relaxation on pain and anxiety in CABG participants	55
	3. Additional finding	57
VI	CONCLUSION	59
	1. Summary of the study	59
	2. Implications and recommendations	60
	3. Limitation of the study	61
	REFERENCES	63
	APPENDIX	76
	BIOGRAPHY	85

LIST OF TABLES

Table	Page
1 The demographic characteristics of the participants	47
2 The medical histories of the participants	48
3 Postoperative pain score during intervention	49
4 Anxiety score during intervention	49
5 Comparison of postoperative pain scores of the participants between control group (before starting intervention) and intervention groups (at 0, 15, 30, 45 minutes after intervention)	50
6 Multiple comparison of postoperative pain scores by LSD (The least significant difference)	50
7 Comparison of anxiety scores of the participants between control group (before starting intervention) and intervention groups (at 0, 15, 30, 45 minutes after intervention)	51
8 Multiple comparison of postoperative anxiety scores by LSD	51
9 Frequency of re-employing the progressive muscle relaxation technique by listening to the tape within 24 hours after intervention	52
10 Numbers of the participants who request extra analgesic drug within 24 hours after intervention	52

LIST OF FIGURES

Figure		Page
1	Framework of this study	7
2	Framework of pain pathway in CABG patients	17
3	Visual Analogue Scale (VAS) of pain	20
4	The numerical pain scale (vertical)	22
5	Anxiety Visual Analogue Scale (VAS)	28
6	A VAS to assess relaxation	32
7	Data collection procedures	44
8	Mean pain and anxiety score during intervention	49

CHAPTER I

INTRODUCTION

Background and Significance of the Study

In the year 2000, coronary artery disease (CAD) was reported as the leading cause of death in the world (Cunningham, Bene, & Vaughan, 2000). It has been estimated that 500,000 people in United States of America die annually from these diseases (Cannon & Smith, 1999). In 2002, cardiovascular disease was reported as the fourth leading cause of death in Thailand (Bureau of Health Policy and Strategy, 2004), and most often, the main cause of death was CAD (Cardiovascular epidemiology meeting, 2001). The prevalence of this disease is expected to increase in Asia as well as in the United States of America (Cannon & Smith; Shih, 1997).

There are many treatments to improve CAD patients' conditions, such as medication, percutaneous transluminal coronary artery angioplasty and surgery (Supannachat, Atanawanich, Towaranon, & Kitiyakorn, 1995). However, the treatment of choice is coronary artery bypass graft surgery (CABG).

Almost 600,000 CABG surgeries were performed in the United States in the year 2000. It is expected to increase 7% to 8% each year (American Heart Association, 2001, 2003). The number of CABG surgeries in Thailand is also increasing every year. There were 1,655 CABG surgeries performed in 2001 and 2,190 CABG surgeries were performed in the year 2002 (The Society of Thoracic Surgeons of Thailand, 2001, 2002).

CABG procedure is a surgical treatment to improve the physical symptoms associated with coronary hypoxia, improves quality of life in physical and psychological functions and decreased mortality for some patients (Barnett & Halpin, 2003; Masnaragorn, 2001; Oldridge, 1997). CABG often alleviates angina pectoris and can prolong life in CAD patients such as those with disease of left main and left anterior descending coronary arteries (Edmunds, 2002). Newer treatments involve performing surgery on beating hearts (without the use of cardiopulmonary bypass or CPB) or on arrested hearts with CPB and myocardial protection provided by

minimally invasive systems (Surgical Associates of Texas, 2000). Inevitably, when CABG patients wake up from their anesthetic effect in intensive care unit (ICU), there are still complications such as atrial arrhythmias (Ellis, 1998) or coughing, tiredness or fatigue (Moore, 1994). Moore also found that the other complications were sleep disturbance, depression, confusion, while anger was found in the study by Redeker and Hedges (2002), and the complication of incision pain and anxiety was reported by Foster (2002).

Incision pain in CABG surgery patients occurs within 24-72 hours after surgery (Taleb, 2001). The pain level that post CABG patients usually report was relatively severe and associated with coughing, ambulation, and position changes (D'Arcy, 1999; Watt-Watson, Stevens, Garfinkel, Streiner, & Gallop, 2001).

Likewise, in Forster's study, the level of pain in post CABG patients at rest was 2.8 (SD = 2.6) (possible range = 0-10), while during ambulation the level of pain was increased to 6.3 (SD = 2.1) (possible range = 0-10) (Forster, 1994). In Thailand, Patwee (1998) found that at the first day after operation, the level of pain in post sternotomy patients (30% of them were post CABG patients) were 6.80 (SD=2.387) (possible range = 0-10). CABG patients may be reluctant or refuse to perform active range of motion, breathing and coughing. They may also refuse to get up and walk, because the body movement can induce more incision pain (Ben-Zur, Rappaport, Ammer, & Uretzky, 2000; Hawthorne, 1993; Shih, 1997). Forrest found that the CABG patients with incision pain showed ineffective breathing and delayed ambulation, which may decrease both lung expansion and intestinal movement (Forrest, 1995). A previous study also supported that incision pain was associated with patient morbidity (Puntillo & Weiss, 1994) and their morbidity was a factor that increase patient's length of stay (Lazar et al., 1995). Even though incision pain is unavoidable, it can be controlled if it is detected and managed as early as possible. On the other hand, if incision pain is not well controlled, it may become chronic pain and cause patients more severe pain and distress. Unrelieved sensation of pain may contribute to the patient's lack of control, helplessness, and anxiety (O'Malley, Jones, Feuerstein, & Taylor, 2000; Rozanski, Blumenthal, & Kaplan, 1999; Shih, 1997).

Pain in these patients occurred all the time in the intensive care unit and the level of pain increased when they ambulate. According to the investigator's experience at

the cardiac surgery ICU at Ramathibodi hospital, nurses often avoided to administering morphine to the patients for 1-2 hours before and after extubation, in order to prevent the side effect of opioid drugs. After extubation, most of the patients have to face moderate to severe pain from their incision wounds because they were in an interval period from their pain relief medication. In addition, a research study by Patwee (1998) suggests that patients may be hesitant to complain about pain or request medicine. ICU nurses should anticipate patient concerns about pain and find effective interventions to reduce their incision pain.

Incision pain also has a negative effect on the emotions of post CABG patients. It may contribute to perceptions of lack of control, helplessness, and anxiety (O'Malley et al., 2000; Rozanski et al., 1999; Shih, 1997). Anxiety is the most common psychological response to a stressor such as surgery especially for patients undergoing CABG (Fillingim, 2000; Forster, 2003). Anxiety also is the major risk factor for other cardiac events in cardiac patients (Forster; Rozanski et al., 1999). When pain impulses are transmitted to the frontal lobe to the limbic system in the brain (Sudsuang & Singhanityom, 2002) and continue to face unknown discomforts and outcomes from the surgical trauma to their physical integrity then anxiety occurred (Atsberger, 1995). Further, there is anticipation of pain during coughing, ambulation, and movement. Postoperative anxiety may also be due to hospitalization, prognosis, complications, and other stress events. Anxiety is also known to increase pain perception and prolong recovery (Fillingim; Melzack & Wall, 1965; Oberle, Wry, Paul, & Grace, 1990).

Nurses can help the CABG patients to manage incision pain by utilizing pharmacological or non-pharmacological method. The pharmacological approach found that morphine is the most effective drug to relieve postoperative pain. Morphine can be administered through continuous intraepidural administration or intravenous (IV) injection (D'Arcy, 1999; Edmunds, 2002; Veterans Health Administration, 2003). However, side effects from this opioid are frequently found such as respiratory depression, nausea and vomiting, decreased blood pressure, and constipation (D'Arcy, Deglin & Vallerand, 2003; Mann, Pouzeratte, & Eledjam, 2003). After morphine activity ceases, pain may continue. Morphine needs to be avoided before and after extubation because it can depress the patient's respiration. Some patients may be very hypersensitive to pain stimuli or have low response to pain medication. Pain and

anxiety can effect to each other, therefore, complementary therapies, which can reduce pain and anxiety in this patient group, are highly recommended. There also needs to be more support and interest in non-pharmacologic interventions.

There are many methods of non-pharmacologic management for postoperative pain and anxiety. Relaxation techniques are the most common and effective (Patwee, 1998; Smeltzer & Bare, 1996). It is a psychological intervention, which aims to reduce pain, stress, anxiety, and depression in patients (French, 1994; Seers & Carroll, 1998) and was recommended as an intervention with conjunction with pain relief medication (American Academy of Family Physicians, 1992). There are many relaxation interventions including progressive muscle relaxation, autogenic training, guided imagery, meditation, deep breathing, and cognitive strategies (Seers & Carroll). Some relaxation interventions have been widely tested for reducing pain and anxiety such as music therapy, meditation, deep breathing, and progressive muscle relaxation.

Progressive muscle relaxation is one of the relaxation techniques, which rely on the theory that as muscle tension increases so does anxiety (Chooprayoon, 1998). Pain and anxiety are related each other and as anxiety increases, so does perception of pain. (Oberle et al., 1990). On the other hand, physical stress and pain perception should decrease as anxiety is alleviated. There are two types of progressive muscle relaxation, active progressive muscle relaxation and passive progressive muscle relaxation (Chooprayoon). Ma et al (1996) found that progressive muscle relaxation decreases respiratory rate, heart rate, muscle tension, systolic and diastolic blood pressure and increases alpha brain waves. Miller and Perry (1990) found that cardiac surgery patients who were taught a simple relaxation technique had significantly decreased blood pressure, heart rate, respiratory rate, and pain than a control group. There are no studies of the effect of progressive muscle relaxation technique on pain and anxiety in cardiac patients in Thailand. In the other groups of postoperative patients, Choorat (2001) found that patients in a spinal surgery unit who used active progressive muscle relaxation technique had significantly lower pain levels than the patients in the control group. Good (1995) examined the effects of an active progressive muscle relaxation technique on pain in abdominal surgery patients. The result showed that the experimental group had significantly lower pain levels than a control group.

There are few studies of passive progressive muscle relaxation used with surgical patients in Thailand. Roykulcharoen (2003) examined the effects of passive progressive muscle relaxation on the sensory and affective components of pain (pain distress) and anxiety in post abdominal surgery patients during ambulation. The results showed that the experimental group had significantly less sensation and pain distress when compared to the control group. In conclusion, this technique seems to be an effective approach to reduce pain and anxiety. However, Good (1995a) found that in postoperative patients the disadvantage of active progressive muscle relaxation was that some patients felt pain while performing muscle contractions. Although, both active and passive progressive muscle relaxation effectively reduces pain, passive progressive muscle relaxation seems more suitable for postoperative patients, because it does not increase pain, which can happen using the muscle tension approach.

Therefore, in this study, the investigator will explore the effects of progressive muscle relaxation focusing on the use of passive progressive muscle relaxation on pain and anxiety levels in CABG patients.

Research Question

Does progressive muscle relaxation have an effect on postoperative pain and anxiety levels in CABG patients?

Purpose of the Study

1. To compare postoperative pain levels of CABG patients before and after using progressive muscle relaxation.
2. To compare the anxiety levels of CABG patients before and after using progressive muscle relaxation.

Hypotheses

1. After using the progressive muscle relaxation technique, CABG patients will have lower postoperative pain levels than prior to the intervention.
2. After using the progressive muscle relaxation technique, CABG patients will have lower anxiety levels than prior to the intervention.

Conceptual Framework

The conceptual framework for this study is based on physiological of pain. Surgical pain results from tissue damage and tissue damage activates electrical impulses in pain-sensitive fibers called nociceptors, which are present at the incision area. The impulses are transmitted via small-diameter unmyelinated C sensory afferent fibers and large-diameter myelinated A-delta to spinal cord transmission (T) cells. After the pain impulse ascends the spinal cord, information is sent to higher centers in the brain, including the reticular formation, limbic system, thalamus, and sensory cortex. Pain perception is the interactional systems of sensory- discriminative, motivation-affective and cognitive-evaluative. The sensory- discriminative system, the nerve transmission occurs between the thalamus and sensory cortex, processes information of pain. Motivational-affective system is interaction between the reticular formation and limbic system. This system creates a defensive response, controlling emotional response and coping with pain. Finally, the cognitive-evaluative system interprets the intensity and quality of pain so that an appropriate action can be taken. Culture, experience with pain and emotion influence this system. Progressive muscle relaxation technique relieves pain by decreased stimulating impulses (nociceptive input) such as muscle tension to S fibers, and changes the affective pain perception in the brain (with calm modulating input). When nociceptive input decreases, nociceptive transmission is diminished in the substantia gelatinosa (SG) in dorsal horn of the spinal cord. When nociceptive transmission stops, it also promotes the reduction of muscular tension and decreases sympathetic stimulation of the hypothalamus. In addition, this action increases endogenous opiate secretion such as endorphine in the central nervous system, the higher pain perception centers, which relieve the sense of pain and the emotional reaction of pain such as anxiety. Moreover, progressive muscle relaxation technique results in distraction of mind as the patient direct their away from the pain sensation. Attention from nurse decreases patients' negative emotion and perception of pain (Jurf & Nirschl, 1993; Mc.Caffery, Beebe, & Lathem, 1994; Melzack & Wall, 1965; Potter & Perry, 1995; Sudsuang & Singhaniyom, 2002). The framework of this study is shown in Figure 1.

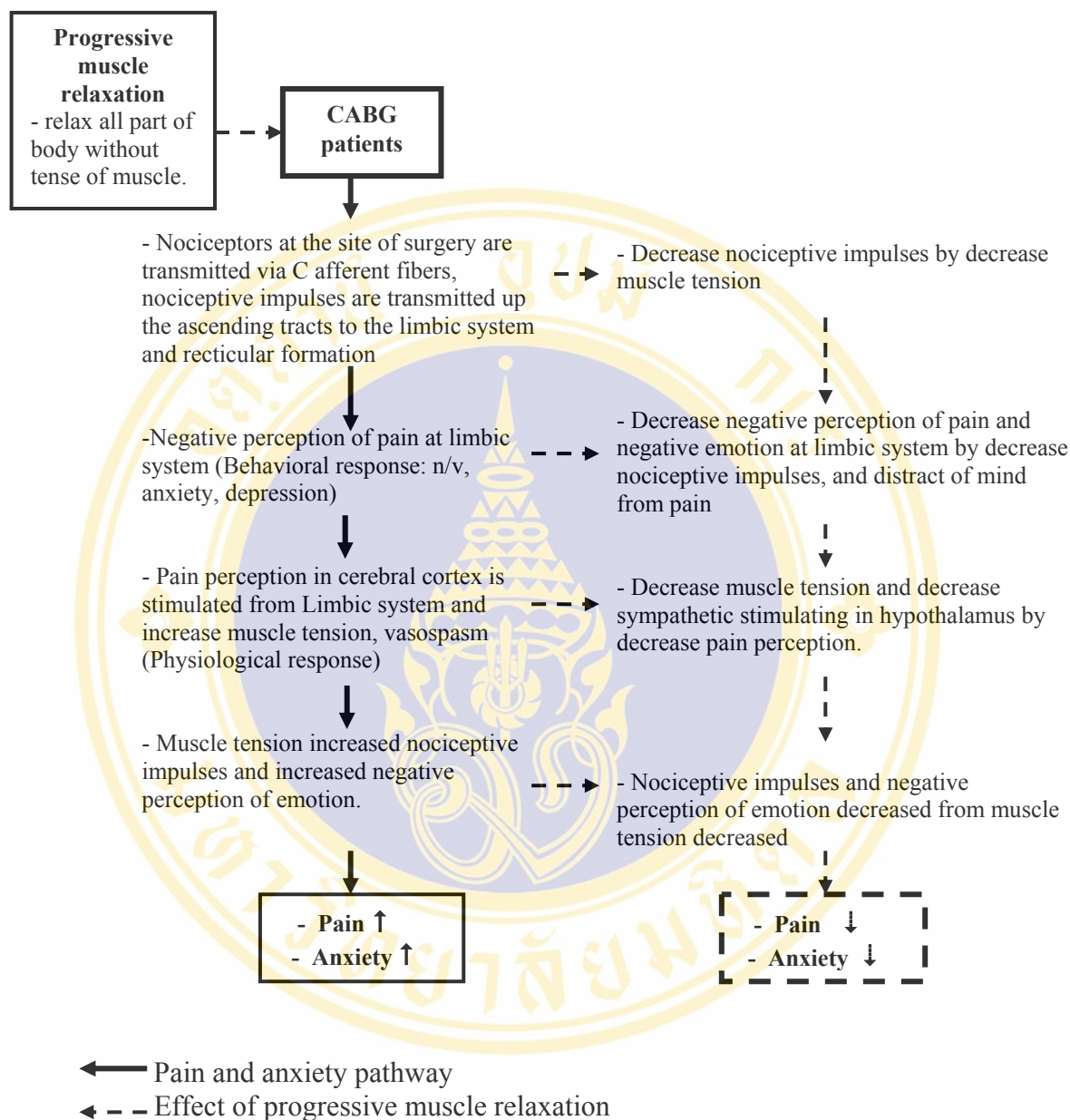


Figure 1. Framework of this study

Assumption

The relaxation treatment intends to supplement, but not replace analgesic drugs for relief of postoperative pain.

Scope of the Study

This study aimed to examine the effect of progressive muscle relaxation on postoperative pain and anxiety levels in CABG patients after extubation within 24-72 hours. The participants in this study were patients who received CABG and were admitted to a cardio-vascular-thoracic ICU of Ramathibodi Hospital. The data were collected during the months of June-August 2005. There were 30 participants in this case study.

Definition of Terms

Pain was defined as an individual feeling of hurt related to the tissue damage and the emotional threat from surgery. However, pain can be whatever the experiencing person says it is, existing whenever the experiencing person says it does (Jurf & Nirschl, 1993; Mc.Caffery et al., 1994). In this study, pain level refers to the intensity of postoperative pain level after extubation, which was expressed by each CABG patient, and measured by the vertical visual analogue scale of pain (Mc.Caffery et al., 1994).

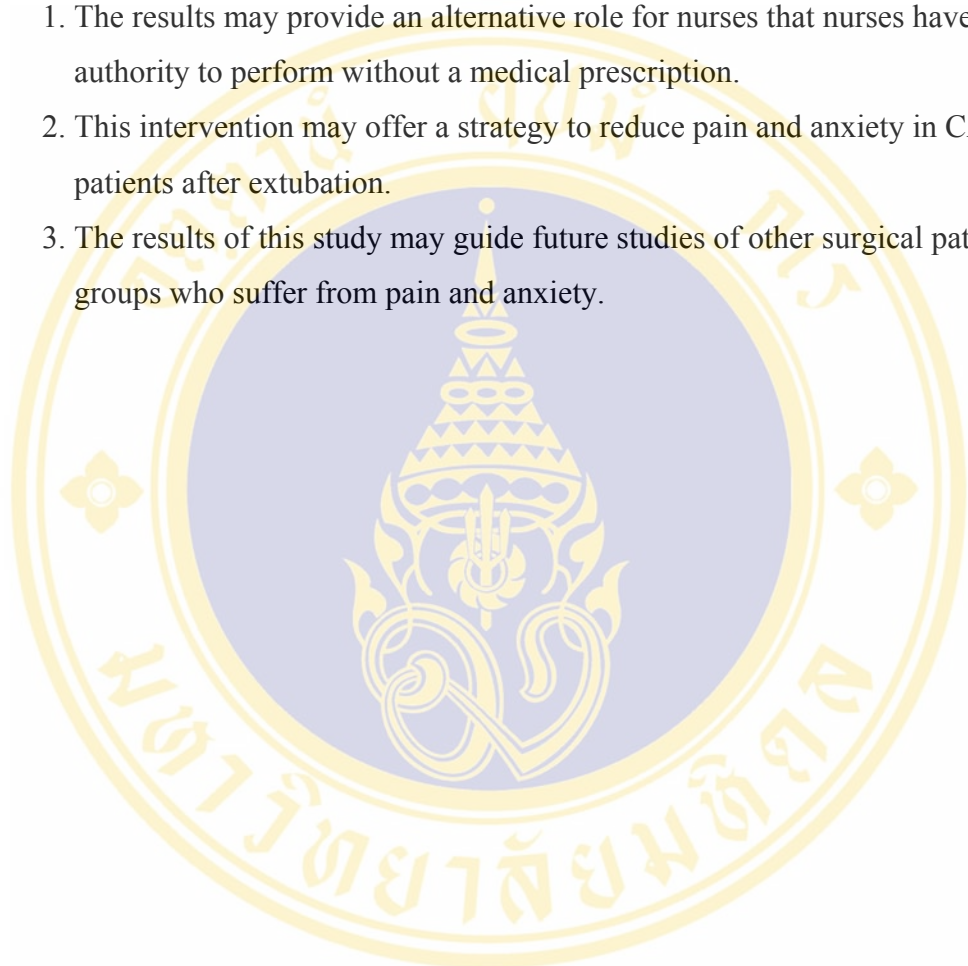
Anxiety was defined to the amount of emotional tension, apprehension, nervousness and worry experienced by postoperative patients (Roykulcharoen, 2003). In this study, anxiety level referred to anxiety level after extubation in post CABG patients as measured by the Anxiety Visual Analogue Scale (VAS) (Puang-ngern, 2001).

Progressive muscle relaxation technique was defined as a relaxation technique that relies on the theory that increased muscle strain results in increased anxiety. Conversely, the relief of physical stress should decrease the level of pain and anxiety (Chooprayoon, 1998). Progressive muscle relaxation technique is composed of both passive and active progressive muscle relaxation. In this study, the only technique used was passive progressive muscle relaxation. This intervention technique involved relaxing each major body part in succession, beginning with relaxing the forehead, then the face, neck, hands, arms, fingers, and then moving to the body, chest, abdomen, and legs. In this study, this technique took about 30 minutes using the relaxation tape. The content of the relaxation tape used in this study is based on, the basic of progressive muscle relaxation technique of Chooprayoon and applies by the

Department of Mental Health, Ministry of Public Health (2004). The patients listened to the relaxation tape and then they had to follow the instructions.

Benefits

1. The results may provide an **alternative** role for nurses that nurses have authority to **perform** without a medical prescription.
2. This intervention may offer a strategy to **reduce pain and anxiety** in CABG patients after extubation.
3. The results of this study may guide future studies of other surgical patient groups who suffer from pain and anxiety.



CHAPTER II

LITERATURE REVIEW

The aim of this study was to explore the effect of progressive muscle relaxation technique on postoperative pain and anxiety in coronary artery bypass graft (CABG) patients. The literature, which related to the study was reviewed and presented in sequence as follows:

- Experiences of CABG patients
- Pain in CABG patients and pain assessment tools
- Anxiety in CABG patients and anxiety assessment tools
- Effect of progressive muscle relaxation technique on postoperative pain and anxiety in CABG patients.

Experiences of CABG Patients

CAD was reported in 2001 as the main cause of death in cardiovascular disease patients, the forth-leading cause of death in Thailand (Cardiovascular epidemiology meeting, 2002). The prevalence of this disease is reported to increase continuously in Asia as well as in the United States of America (Cannon & Smith, 1999; Shih, 1997). CABG procedure is the surgical treatment for patients who had CAD. It aims to improve patients physical associated with coronary hypoxia. Thus, this surgery improves patients' quality of life both physically and psychologically. There are evidences to support that CABG can decreases patients' mortality (Asdornwised, 2000; Barnett & Halpin, 2003; Masnaragorn, 2001). These symptoms were reported both in immediate postoperative period, postoperative recovery period and discharge period (Moore, 1994; Redeker & Hedges, 2002; Shih, 1997; Utriyaprasit, 2001). The symptoms in CABG patients were incisional pain at chest and legs, anxiety, atrial fibrillation after surgery (occurring in 30%), had trouble sleeping, coughing, tiredness or fatigue, confusion and anger (Ellis, 1998; Moore; Redeker & Hedges; Shih; Utriyaprasit). Shih found that incisional pain was reported as the most frequency symptom of post cardiac surgery patients in ICU period. These symptoms occurred

continuously from post operation to recovery phase in CABG patients. Other symptoms occurred in recovery phase were neck and shoulder or back discomfort (Moore; Utriyaprasit). These symptoms are factors that cause sleep disturbance among CABG patients. Moore indicated that depression was an emotional problem that was reported in immediate postoperative period and the frequency increased over the first month of recovery.

Moreover, in immediate postoperative period while patients stayed in an ICU, they usually experience restlessness, irritability, panic, powerlessness, lack of control, and sensory over stimulation from noise and light (Shih, 1997).

Other concerns of CABG patients were how to care themselves, the strategies to help them manage their emotional problem, their ability to do things for themselves, the effect of surgery on the relationship with their spouses, how to occupy their time during recovery, financial problem, and when they could begin rehabilitation and resume work (Moore, 1994; Shih et al., 1998).

There were many strategies which CABG patients use to recover from their symptoms both non-medications and medication. In discharge period, helpful behaviors described by patients focused on pharmacological treatment for incision pain and muscle discomfort, tried to sleep more, adapted to home setting, and need special techniques to ease the discomfort of moving (Moore, 1994; Shih, Meleis, Yu, Hu, Lou, & Huang 1998). The significant persons of CABG patients such as family members, friends, other CABG patients and health professionals could help patients to cope their problems (Shih, 1997; Shih et al.1998). In Thai culture Asdornwised found that thai family is the source of protection and supporter for CABG patients. Another factors that could help patients improve their self behavior were social support and education level (Asdornwised; Pringpreud, 1995). Nurses can use complementary therapy such as music, imagery, deep breathing (Aragon, Farris, & Byers, 2002; Deisch, Soukup, Adams, & Wild, 2000; Miller & Perry, 1990) addition with medication to relieve their pain and anxiety.

In summary, patients after CABG have experienced symptoms in both physical and psychological symptoms. The physical symptoms reported are chest and legs incision pain, sleeping disturbance, neck and shoulder or back discomfort, coughing, atrial fibrillation and tiredness. The psychological symptoms were depression,

confusion, anxiety, restlessness, irritability panic, and anger. In addition, the patients reported impairment of intellectual function, powerlessness, lack of control, reduced self esteem, alteration of body image and sensory over stimulation from noise and light and concern about how to manage themselves while they were at home. The major symptom of patients in ICU, which is the focus of this study, was incisional pain and anxiety. The study of Shih (1997) showed that 83% of CABG patients experience incisional pain and 90% of them experience anxiety while they were in ICU. Patients need strategies to relieve their discomfort especially in immediate postoperative period. The duration of recovery period was positively associated with patients' physical and psychological function. Therefore, in order to promote early recovery, there should be strategies to control patients, physical symptoms as well as their psychological problems to improve functional outcomes of patients.

Pain in CABG Patients and Pain Assessment Tools

This section includes definition of pain, incidence of pain, mechanism and the gate control theory of pain in CABG patients, impact of pain in CABG patients, pain assessment tools, and pain relieving interventions. Pain is personal and participative experience. It is a multidimensional phenomenon. Therefore, it is difficult to define. Health care practitioners have defined pain in many different ways.

1. Definition of pain

The International Association for the Study of Pain (1979 cited in American Pain Society, 2004) defined pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.

Mc.Caffery, Beebe and Lathem (1994) defined pain as whatever the experiencing person say it is, existing whenever the experiencing person when it does.

Jurf and Nirschl (1993) defined pain as an individual feeling of hurt, which is due to the tissue damage and mental threat from surgery.

Rosomoff (1996) defined pain as a universal experience that is unique to every individual. The expression of pain is derived from the deeply personal construct of body and mind and is interpreted through the fabric of developmental, cultural, religious, and social experiences.

McCaffery and Pasero (1999) defined pain as a phenomenon with multiple components that makes an impact on a person's psychological and physical functioning.

Good (1999) defined pain as the components of sensory of pain and affective of pain. The sensory component of pain was defined as the unpleasant, physical perception of hurt and the affective component of pain was defined as the emotion reaction to the sensation.

Pain Encyclopedia Britannica (2004) defined pain as a complex experience consisting of physiological (bodily) response to a noxious stimulus followed by an affective (emotional) response to that event. Pain is a warning mechanism that helps to protect an organism by influencing it to withdraw from harmful stimuli; it is primarily associated with injury, or the threat of injury, to bodily tissues.

From these definitions, it may be summarized that, pain is a phenomenon with multiple components as the sensory component and affective component of pain that makes an impact on a person's psychological and physical functioning. The sensory component of pain is defined as the unpleasant, physical perception of hurt and the affective component of pain is defined as the emotion reaction to the sensation, which is due to the actual or potential tissue damage and mental threat from surgery. Pain is a warning mechanism that helps to protect an organism by influencing it to withdraw from harmful stimuli. Pain is a universal experience that is unique to every individual. Pain is a participative experience with no objective measures. It also stresses that the patient, not clinician, is the authority on the pain and that his or her self-report is the most reliable indicator of pain, and derived from the deeply personal construct of body and mind and is interpreted through the fabric of developmental, cultural, religious and social experiences.

In this study, the investigator defined pain as an individual feeling of hurt which is due to the tissue damage and emotional threat from surgery, whatever the experiencing person says it is, existing whenever the experiencing person says when it does (Jurf & Nirschl, 1993; Mc.Caffery et al., 1994).

2. Incidence of pain, the physiological of pain in CABG patients

2.1 Incidence of pain

Pain in CABG patients is usually occurred within 24-72 hours after surgery which is called an acute pain (Toleb, 2001). Sensation of pain levels in some CABG patients is severe pain (Aragon et al., 2002; D'Arcy, 1999; Watt-Watson et al, 2001). Patwee (1998) found that post sternotomy patients (include 30% of post CABG patients) had the most pain (pain score 6.82 SD 2.167 possible range 1-10) on second day after surgery. The pattern of their pain was spontaneous and unpredictable but associated with activities and coughing. This pattern was called as breakthrough pain (Chowwalit, 2000). The sensation of pain has been described by CABG patients in different ways as being sharp, prickling, cutting, tearing, stabbing, burning, dull, a grabbing feeling, tightness, pressure and tingling (Moore, 1994). However, patients differ in their physiological response to tissue injury and in their subjective report of pain. The emotional feelings associated with incisional sensory pain was conceptualized as the effective component of pain (Good, 1999; McGuire, 1997). This component of postoperative pain is the undesirable, dynamic, feelings and thoughts that the sensation of pain can provoke and is a consequence of sensory pain (Craig, 1999). The affective components of pain may be manifested as anger, depression, irritability, anxiety or distress (Willis, 1995). Patwee also found that the patients' life also was interfered in deep breathing, coughing, mobilization, and sleeping by moderate to severe postoperative pain.

The factor influenced to incidence of CABG patients' pain is gender (Abdel-Shaheed, Rollman, Gillespie, & Jone, 2002; Fillingim, 2000; LeResche, Aloisi, & Unruh, 2002), Gender differences in the biology of pain and pain modulation, specifically as related to biological substrates of emotion and cognition by gonadal hormones (Fillingim; LeResche et al., 2002). LeResche et al. (2002) found that female rats are more affected than males by painful stimulation. Gender is difference in appraisal of pain, impact on disability and coping. Differences in social role expectation with respect to pain may cause women, men to think, and response differently to pain. Males had significantly pain tolerance than females on pressure task and role, however, women significantly more times on management of pain (Abdel-Shaheed et al., 2002).

Abbott et al. (1992) investigated the prevalence of pain in hospitalized patients and resolution over a period of six months and recommend that patients do not have the necessary knowledge about pain relief to contribute effectively in their own pain management and current strategies to improved pain management need to be critically reviewed. Patwee (1998) found that the methods that the post sternotomy patients use to relief their pain are relax their body by slow breathing (95%), change to relax position (91%) and touch their skin near the surgical wound (87%). In addition, she found that only 63% of them request for analgesic drugs when they feel pain and 33% of them never request for analgesic drugs although they had severe pain. Patients' request for pain medication was considered an indication that sensory pain has occurred and reflects the patient's subjective perception of pain and the nurses' assessment in the early postoperative period. Watt-Watson et al. (2001) has reported that nursing staff underestimate the time between request and response and the nurse waits for the patient to be in severe pain before administering analgesia, which contributes significantly poorly to pain management.

2.2 Physiological of pain in CABG patients

Pain in CABG patients occurred from many factors such as tissue damage, increase pressure in chest cavity, movement, personality traits and the stress response to surgical trauma (Bonica, 1990; Good, 1995b; Willis, 1995).

The factors which had the most direct effect are tissue damage (Bonica, 1990; Puntillo, Miaskowski, & Summer, 2003). Pain stimuli provides the sensory component of pain, while the adverse reaction to pain forms the affective component of pain, and central control activities influence both the pain experience and the motor response (McGuire, 1997). The sensory and affective components of postoperative pain are in complex interaction (Cousins & Power, 1999). Bonica indicated that the sensation of pain was primary a result of incision and accompanied by muscle tension and the affective component in the early postoperative period.

When tissue is damaged, the physiological pathways of pain include the ascending spinal cord pathways that transmit nociceptive information from the peripheral nociceptors. The resultant damage stimulates nociceptors at the site of surgery (Jurf & Nirschl, 1993) that inflamed and where many substances are releases after the operation, including substance P, arachinodic cascade metabolites

(prostaglandins, leukotrienes), histamine, serotonin and bradykinin. These inflammatory mediators are an aspect of injury response, which sensitize and activate nociceptors. The impulses are transmitted via small-diameter, myelinated A-delta and large-diameter unmyelinated C sensory afferent fibers to spinal cord transmission (T) cells (Jurf & Nirschl, 1993). McCaffery & Pasero (1999) suggested three interactional systems of pain perception as sensory-discriminative, motivational-affective, and cognitive-evaluative. Pain impulses travel along the spinal nerve to the dorsal roots and enter the spinal cord. The afferent pain fibers terminate on the neurons in the dorsal horn (Guyton & Hall, 1996). In dorsal horn, a projection of nerves impulses (the nociceptive information) to higher levels of the central nervous system. The nerves that are primarily responsible for the sensory component of pain consist of ascending neurons in the spinothalamic tract, the thalamus and the somatosensory cortex, where they synapse with neurons that provoke the sensory, affective, and behavior responses or call as the sensory- discriminative system (McCaffery & Pasero; Willis, 1995). The affective components of pain occurs when pain impulses are transmitted to the frontal lobe to the limbic system in the brain where affective pain is produced and may also be associated with personality traits and the stress response to surgical trauma. The interaction between the reticular formation and limbic system is motivational- affective system. The reticular formation creates a defensive response. Limbic system controls emotional response and coping of pain. The cognitive-evaluative system is based on higher cortical centers in the brain, and influences perception. Unrelieved sensation of postoperative pain tends to arouse and enhance the affective component of pain (Craig, 1999; McCaffery & Pasero).

There are also descending pathways that modulate pain (Craig, 1999). Descending fibers start from the area of pons and medulla, these fibers possess the ability to modulate the noxious impulses (Paice, 1991). These fibers terminate in the midbrain and activate areas that send descending projections to the dorsal horn of the spinal cord (Cousins & Power, 1999; Paice). The activation of the thalamus initiates the sensation of pain and the reflexive protection the injured body part. When the hypothalamus is activated by surgical pain, the sympathetic nervous system releases stress responses. Fiber of the descending pathway release substances such as norepinephrine, which stimulates the adrenal medulla and inhibit the transmission of

nociception which in the dorsal horn. However, sympathetic nervous system activity influences the microcirculation of the nociceptive tissue and releases epinephrine. Thus, sympathetic nervous system activity is an important factor to control. This activates nociceptors and increases the transmission of noxious impulses from the area of tissue trauma to the brain, thus producing more pain (Jurf & Nirschl, 1993). The pain pathway as previously described is summarized in Figure 2

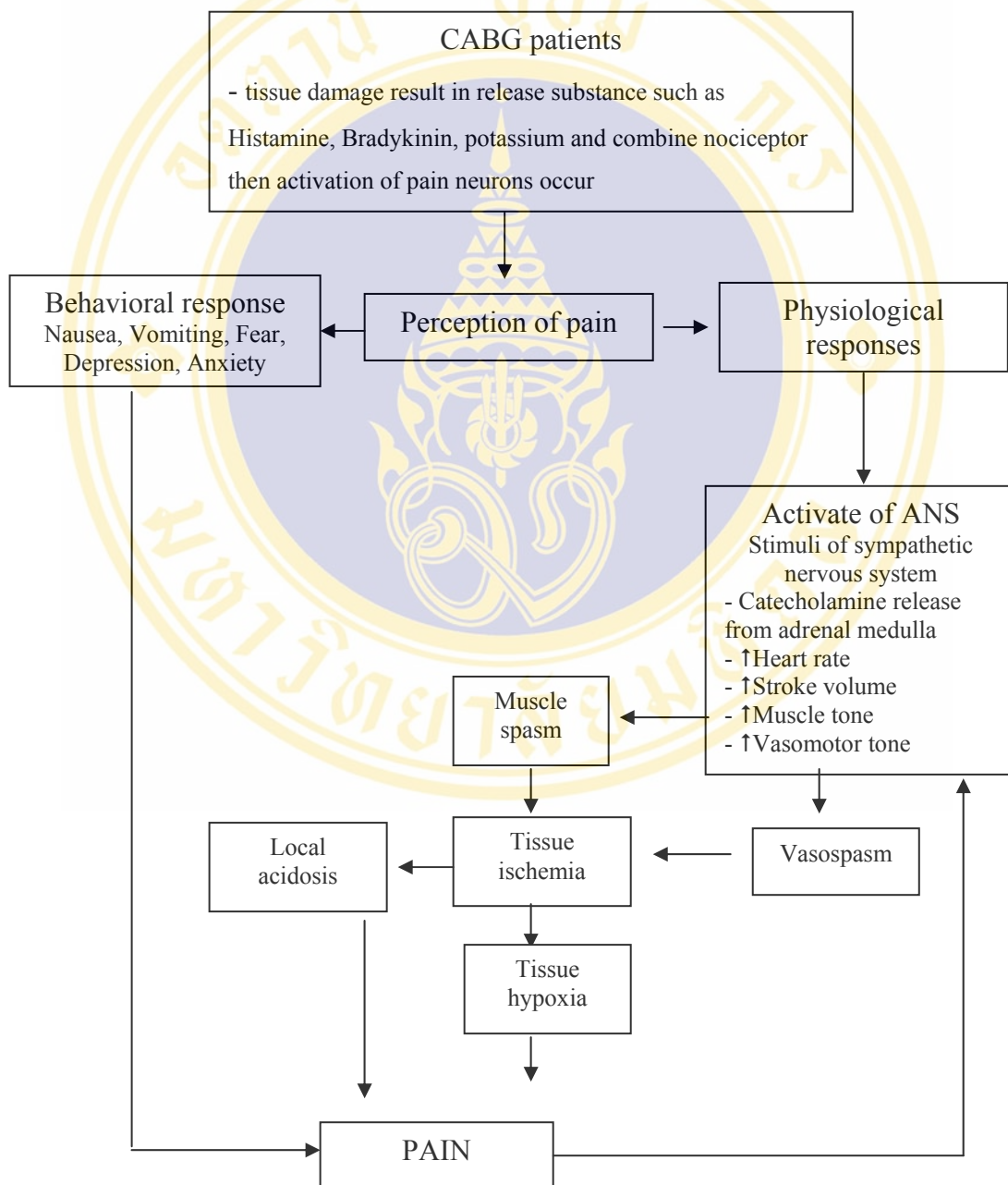


Figure 2: Framework of pain pathway in CABG patients

[Applied from The acute pain cycle of Boss & Goloskov (Lewis & Collier, 1992)]

Muscle tension can influence emotional tension, and together the psychological tension increases sympathetic outflow. Muscle tension is a reflex in response to pain, but it also influences brain centers, which affect the sensory and affective components of pain perception. These components in turn affect each other. Furthermore, behavioral and emotional factors influence the gate through the descending inhibition mechanism (McCaffery & Pasero, 1999; Sudsuang & Singhanियom, 2002). Descending fibers release substances such as nor epinephrine which inhibit the transmission of noxious impulses within the dorsal horn (Jurf & Nirschl, 1993). This is the mechanism that explanation of the interaction between mind and body.

The location of the surgery is an important factor that has physiological implications for the degree of post surgical sensory pain. Incision in the thoracic area are reputed to produce the greatest amount of pain and related discomfort after surgery due to the motion of the respiratory system (Cousins & Power, 1999).

CABG patients reported that complaints of incisional pain are related to the increased sensation associated with coughing and movement, especially during ambulation and position change. From the study of (Good, 1999) found that both of sensation and distress of pain level increased 30% to moderate or severe pain during ambulation.

3. Impact of pain in CABG patients

The impact of pain in CABG include skeletal muscle spasm and vasospasm in the peripheral vessels which be initiated by segmental reflexes in the spinal cord. Muscle tension is a reflex in response to pain, but it also influences brain centers, which affect the sensory and affective components of pain perception.

Pain activated the autonomic nervous system to initiate suprasegmental reflexes in the brain to increase catecholamines, glucocorticoid, and antidiuretic hormone release and subsequently increase heart rate, respiratory rate and blood pressure (Jurf & Nirschl, 1993).

The response of pain in the hypothalamus also contribute to increase anxiety and the emotional aspects of pain (Sudsuang & Singhanियom, 2002), so anxiety usually occur with acute pain (Mc.Caffery et al., 1994). These components in turn affect each other and increase postoperative pain. Anxiety and suffering provoke the autonomic nervous system which sets up a complex interrelation between physiological and

psychological factors that affects the experience of pain during surgical pain (Donovan, 1990; Walding, 1991).

Patients may reluctant and refuse to get out of bed after surgery because the movement can cause more postoperative sensory pain (Moore, 1994; Shih, 1997). This has a negative effect on their comfort as well as their recovery. As Zalon (1993), patients experienced unrelieved pain after surgery and they do not received adequate analgesia, ineffective pain management caused patients to increased pain sensitivity and opioid tolerance (Mao, Lia, & Simonnet, 2002). This seems to be a likely indication that pain is a serious problem in clinical practice. Early pain management and healing of wound will improve the symptom in the short time (Toleb, 2001). If postoperative sensory pain is not controlled, unrelieved sensation of pain could increase the distress of pain (Kittisup, 1993; Shih) and may contribute to perceptions of lack of control, helplessness and anxiety (O'Malley et al., 2000; Rozanski et al., 1999; Shih). For instance, when the patient experiences the sharp, tenderness and tearing-apart sensations associated with coughing and ambulation, the stress, and fear of pain assume importance and inhibit the patient to exercise (Kittisup; Sudsuang & Singhaniyom, 2002). Stress and fear can also decrease natural defenses and increase postoperative complication (Bonica, 1983) including complications in the cardiovascular and respiratory system, ineffective ambulation in recovery phase (Good & Moore, 1996; Jurf & Nirschl, 1993; Mann et al., 2003; Shih), increase hospitalization and turn to be chronic pain if pain is not controlled in a long time (Toleb). In the other ways, effective pain management help patients able to ambulate more quickly, had shorter lengths of stay and provide more effective nursing care (Aragon et al., 2002; D'Arcy, 1999; Shih).

4. Pain assessment tools

Pain is a subjective experience that the patient might no be able to describe fully. It is therefore an important for a nurse to be aware of what to look for in assessing an individual's pain. The nurse can categorize assessment criteria into biophysical, psychological, and sociocultural factors. First, assessment of biophysical pain target pain type, location, duration, intensity, pattern, behavioral response and aggravating or alleviating factors. Second, the psychological factors evaluated in this assessment include accompanying life events, emotional response, tolerance for pain and methods

of coping with pain. Finally, sociocultural parameters highlight occupation factors, meaning of pain, social response and other modifying factors (Veterans Health Administration, 2003).

A variety of tools can help the nurse in assessing the patient's pain, while numerous pain assessment tools have been developed. For pain assessment tools to be useful, they must satisfy the following criteria (Hancock, 1996; Smeltzer & Bare, 1996):

- (1) Be sensitive to small changes in the intensity of pain
- (2) Be easy to understand for all of the patient population
- (3) Be reliable tool in similar the patient groups
- (4) Be possible to record data accurately

The Visual Analogue Scale (VAS) and Numerical Rating Scale (NRS) are recognized for their simplicity, reliability and appear adaptable to the immediate postoperative period (Hancock, 1996; Jensen & Karoly, 1994; Puntillo et al., 2003).

4.1 Visual Analogue Scale (VAS)

A VAS consists of line, usually 10 cm long, whose ends are label as the extremes of pain (e.g., “no pain” to “pain as bad as it could be”) as shown in Figure 3.



Figure 3: Visual Analogue Scale (VAS) of pain (Jensen & Karoly, 1994)

The patient is asked to rate pain from 0 to 10, with 0 equaling no pain and 10 equaling the worst possible pain. The distance from the no pain to mark made by the patient is that patients' pain intensity score, that can measure in centimeters or in millimeters (Jensen & Karoly, 1994). There is much evidence supporting the validity of VASs for pain intensity, such scales demonstrate positive relations to other self-report measures of pain intensity (Jensen, Karoly, & Braver, 1986). Jensen and Karoly indicated that VASs are more sensitive to treatment effects than other measures and the scores of VASs appear to have the quality of ratio data.

One of the problems with VASs is that scoring is more time-consuming than scoring the other measures of pain intensity. Also, research consistently shows that

VASs are more difficult to than other measures of pain intensity, especially among persons at risk for cognitive difficulties, such as elderly or persons on high doses of opioid analgesic (Jensen et al., 1986). Many of researchers had recommended that NRS is proper to measuring intensity of pain in elderly adults than other measures of pain (Bulechek & McCloskey, 1999; McCaffery & Pasero, 1999; Puntillo et al., 2003).

To address this problem, several investigators have created specific points along the line that are labeled with intensity-denoting adjectives or numbers called a mechanical VAS. Mechanical VASs usually is indicated numerically, and measuring in millimeters. Mechanical VASs have been shown to be strongly associated with classic VASs and have good test-retest reliability over a 2-hour period, and have ratio qualities as classic VASs (Jensen & Karoly, 1994; Paiboonvorachart & Boonsong, 2001).

Good (1999) had examine concurrent validity correlation between VAS and NRS, the result shown strong correlation ($r=0.92$).

Aragon et al. (2002) had tested reliability of VAS in post CABG patients, the result shown VAS has good test – retest reliability ($r=0.88$)

4.2 Numeric Rating Scales (NRS)

NRS will refer to all the possible combinations of pain rating scales that use numbers, whether they are verbally or graphically presented and whether they contain word descriptors or not. NRSs do not require paper or pencil, one simply asked patients to verbally state his or her pain intensity and record the number that best represents their pain intensity (Jensen et al., 1986; McCaffery & Pasero, 1999). The validity of the 0 to 10 NRS has been well proved and it is easy to score. McCaffery and Pasero found that the correlation between the VAS and the NRS was strong, supporting the validity of the verbally administration NRS. The primary weakness of NRSs is that they may not have ratio qualities and NRS have represents a 33% decrease in perceived pain from VAS (Jensen & Karoly, 1994).

Serlin, Mendosa, Nakamura, Edwards, and Cleeland (1995) described that pain score could divide in 5 levels. 0 = no pain, 1-3 = mild pain, 4-6 = moderate pain, 7-9 = severe pain, and 10 = the worst pain.

As a result, in this study the investigator used one of mechanical VASs “the vertical visual analogue scale of pain” that is easily administered in writing and is easy

to score and record. In addition, it is considered more reliable to use with CABG patients than other types of scales. The numerical pain scale (vertical) is illustrated in Figure 4.

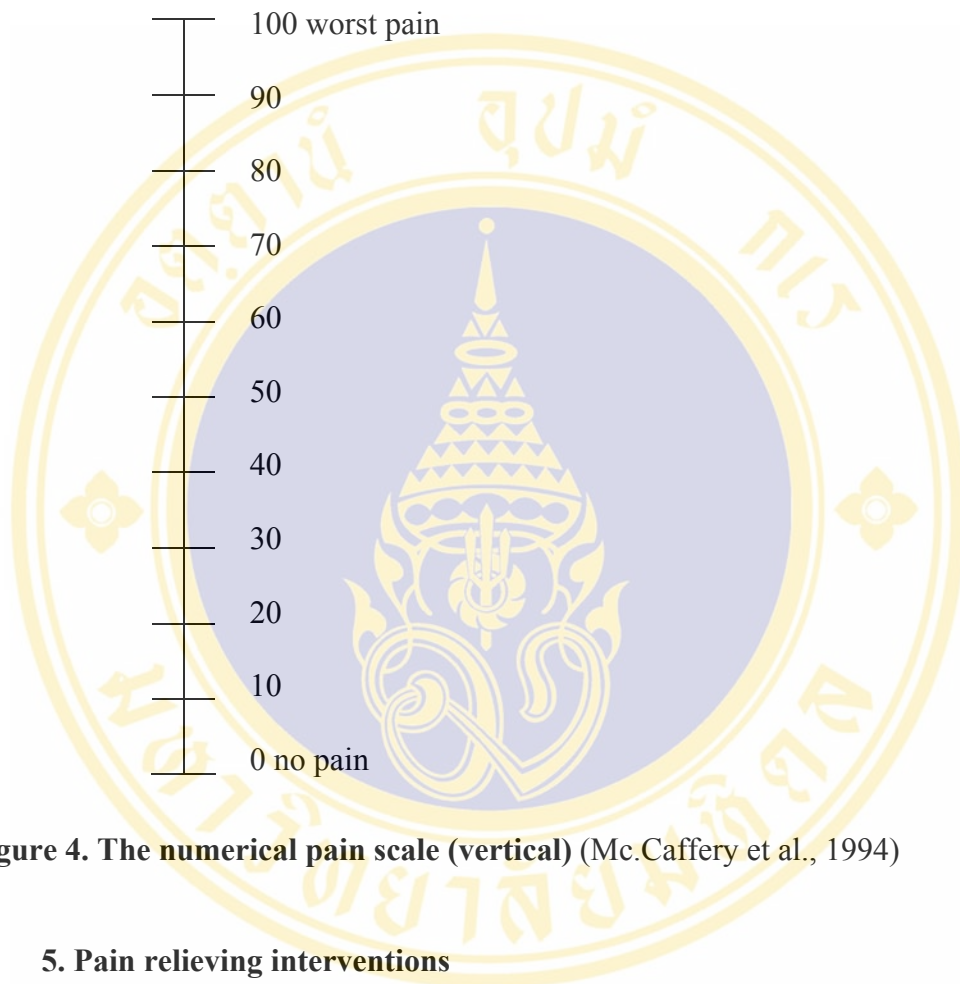


Figure 4. The numerical pain scale (vertical) (Mc.Caffery et al., 1994)

5. Pain relieving interventions

The nurse can help reduce pain by administering pain-relieving intervention, which includes both pharmacologic and non-pharmacologic methods, assessing the effectiveness of those interventions, monitoring for adverse effects, and serving as advocate for the patient when the prescribed intervention is ineffective in relieving pain.

5.1 Pharmacologic interventions

Several pharmacological agents provide pain management that requires a physician's order. Nurses must maintain the analgesia, assess its effectiveness, and report if the intervention does not achieve desired outcomes or forms side effects. Analgesic that is used in pain management such as opioids (narcotics) can be

administered through a variety of routes. However, the side effects of opioid are severally. There are number of pharmacological agents provide pain management in CABG patients as follow:

Opioids (narcotics) such as morphine are recommended to be the most effective drug to relieve pain in postoperative pain (D'Arcy, 1999; Edmunds, 2002; Veterans Health Administration, 2003). Veterans Health Administration described that opioids are routinely prescribed and administered for relieve pain. Opioids can be administered through a variety of routes, including oral, intravenous, subcutaneous, intraspinal, rectal, and transdermal routes. For postoperative patients, the nurses have given opioid via intramuscular (IM), continuous intraepidural administration, or intravenous (IV) injection.

Opioid analgesics attach to opioid receptors in the central nervous system which causing hyperpolarization of nerve cells, inhibition of nerve firing and presynaptic inhibition of transmitter release (Mycek, Harvey, & Champe, 1997). In addition, opioid receptors mediate inhibition of the release of substance P at the terminals of primary afferent nerves, which reduce transmission of the noxious impulses to the brain. Further opioid analgesics antagonize the effect of substance P by exerting postsynaptic inhibitory actions on neurons of the spinothalamic tract, which conveys nociceptive information to higher centers in the brain. Antagonism of substance P results in decreased pain (Jaffe & Martin, 1990). There was the correlation between opioid intake 2.5 hours before record sensation of pain and the patients' report of sensation of pain ($r = 0.31$) (Good, 1995a).

However, the side effects of opioid are several such as respiratory depression, nausea and vomiting, decrease blood pressure, constipation, addiction and tolerance and inadequate pain relief (D'Arcy, 1999; Deglin & Vallerand, 2003; Mann et al., 2003).

Acetaminophen inhibits the synthesis of prostaglandin in the central nervous system and blocks the generation of pain impulses peripherally. Disadvantage is highly hepatotoxic and liver damage is reported in patients who have take 5 to 8 grams per days over several weeks or 3 to 4 grams daily for a year or more. In addition, it is still associated with an increased risk of end-stage renal disease in a dose-dependent fashion (Mycek et al., 1997)

The COX-2-specific NSAIDs agents block the pain-mediating prostaglandin precursors at the COX-2 receptors but spare the COX-1 inhibitors to release cytoprotective prostaglandin. Although patients should be monitored for signs of gastrointestinal bleeding, their profile of side effects is lower than that of the nonsalicylate-based NSAIDs agents (Anderson, 2000).

5.2 Nonpharmacologic interventions

One of the most basic nursing responsibilities is protecting the patient from harm. Many nonpharmacologic therapies reduce the perception and reception of pain. Especially when there is severe pain that lasts for hours or days, combining nonpharmacologic techniques with medications may be the most effective way to relieve pain. There are methods of nonpharmacologic therapies to use with acute pain (Smeltzer & Bare, 1996), in this review is presented into 3 groups: psychological interventions, physical therapies, and nerve blocks.

Psychological interventions Psychological interventions have many components such as distraction, music, muscle relaxation technique, guided imagery, sensitive listening and hypnosis. These can alter affective-motivational and cognitive pain perception in the patient (Namnabati, 2002; Potter & Perry, 1993; Sharav & Tal, 2002; Smeltzer & Bare, 1996). Many of interventions were proved their effective to reducing pain. Namnabati evaluated the effect of distraction on intensity of pain during burn dressing in patients and result shown mean intensity of pain is significantly less than routine method ($p < 0.01$). Sharav & Tal examined the magnitude of placebo under hypnosis patients, and found that hypnotic analgesia and hypnotic relaxation reduced pain significantly.

Physical therapies In physical therapies some form of stimulation is applied to the skin and superficial tissue. The commonly used techniques in practice include cutaneous stimulation and massage, ice and heat therapies, transcutaneous electrical nerve stimulation (Smeltzer & Bare, 1996).

Nerve blocks Nerve blocks are possibly used to relieve pain by blocking the nerve pathways along the pain stimuli which is conducted to central nervous system (Gorcoran, 1995).

In conclusion, the importance of pain control for optimal recovery has been emphasized. In hospitalized patients, pain may be associated with increased length of

stay, longer recovery time, and poorer patient. Therefore, nurses should take a major role in assessing and providing both pharmacological and nonpharmacological interventions to relieve postoperative pain (Good & Moore, 1996; Jurf & Nirschl, 1993). However, many of the interventions can be and are practiced by nurses without formal training or education. Therefore, a selection of holistic interventions that easily to learn and use in cardiovascular nursing is included.

Anxiety in CABG Patients and Anxiety Assessment Tools

Anxiety is a fundamental emotion that people are familiar with because it is found in daily life. Anxiety has its terminology roots in Greek, which means to press tight or to strangle. In Latin, it has a similar meaning. It means narrow or shrunken and discomfort. The meanings also cover the feeling of restless and worry toward uncertain situations. Sometimes it refers to the fear of consequences. People feel impatient, oppressed, and fearful or frighten over the unknown, uncertain or unsure future incidents (Stuate and Sundeen cited in Puang-ngern, 2001). There are many definitions of anxiety explained below.

1. Definitions of anxiety

Roykulcharoen (2003) has defined anxiety as the amount of emotional tension, apprehension, nervousness and worry that experienced by postoperative patients.

Spielberger (1972 cited in Puang-ngern, 2001) explained anxiety because of the anticipation of danger of incidents. The differences in the anticipation vary in accordance to the perception and evaluation process of an individual. In a situation, one may think that a situation is dangerous and violent and in response will be as violent as the perception. If the violent response is beyond control, the person will feel helpless and hopeless. Of the same situation, other people may feel that it is not violent because they assess the situation as less violent for them.

Freud (1970 cited in Sopajaree, 1993) indicated that anxiety is a personal discomfort. It is frightening and stressful feeling without a distinct cause. It is related to an unconscious process occurring from a conflict of reflecting forces of Id (mostly sexual drive force and aggression) and the control of Ego and Superego. Several of reflecting forces of Id may be threatening people as they can be in conflict with people's value or norm of society.

In conclusion, anxiety is a result of the anticipation of danger of incidents. It is a personal discomfort, frightening and stressful feeling. The differences in the anticipation vary in accordance to the perception and evaluation process of an individual related to an unconscious process occurring from a conflict of reflecting forces of Id and the control of Ego and Superego. Several of reflecting forces of Id may be threatening people as they can be in conflict with people's value or norm of society. Anxiety composes with an individual disposition that remains relatively stable over time or trait anxiety and a transitory emotional state in the period, which presents the amount of emotional tension, apprehension, nervousness, and worry perceived threats such as postoperative period, hospitalization, prognosis and the uncertainties of the recovery period or state anxiety.

2. Pathology of anxiety in patients undergoing CABG surgery

Anxiety is an emotion associated with postoperative pain, surgery, and illness. Any surgery is a major psychological event for patients. This is especially true for patients undergoing coronary artery bypass graft surgery (Fillingim, 2000; Forster, 2003; Utriyaprasit, 2001). Anxiety is the amount of emotional tension, apprehension, nervousness and worry that is experienced by postoperative patients (Roykulcharoen, 2003), and be the major risk factor for other cardiac events in cardiac patients (Forster, 2003; Rozanski et al., 1999). Although some researchers have studied postoperative anxiety as an emotional reaction of pain or distress of pain (Good, 2001). Roykulcharoen indicated that it is difficult to separate anxiety, which is due to pain from general anxiety after surgery. Anxiety in the post operative period occurred as part of continuum of anxiety that may originate in the illness and the decision for surgery.

Anxiety is the most common psychological response to a stressor such as surgery and hospitalization (Oberle et al., 1990). Uncertainty about the surgical procedure, past experience of anesthesia and surgery, suggestions and concerns from family, friends and fellow postoperative patients (McCleane & Cooper, 1990). This anxiety may be due to the anticipation of postoperative pain but may also be due to the anticipation of losing control during anesthesia or to the nature of the illness itself. Anxiety is influenced by patient's concern about uncertainty regarding the illness the

future, the surgery and fear of death as well as anticipated postoperative pain and discomfort (Egan, Ready, Nelssy, & Geer, 1992).

State anxiety after surgery was found to be significant higher than that of medical patients and was also higher than preoperative anxiety (Fox, O'Boyle, Lennon, & Keeling, 1987). Postoperative anxiety occurs because patients have pain and continue to face unknown discomforts and outcomes from the surgical trauma to their physical integrity (Atsberger, 1995). In addition, the surgical trauma evokes intense physical and emotional stress reaction from patients. Further, there is anticipation of pain during coughing, ambulation, and movement. Postoperative anxiety may also be due to hospitalization, prognosis, complications, and other stress events. Anxiety is also known to increase pain perception and effect to recovery (Fillingim, 2000; Melzack & Wall, 1965; Oberle et al., 1990).

In addition, there is a general physiological response to surgery, which is due to the activation of the sympathetic nervous system stimulated by the hypothalamus and potentiated by nor epinephrine, GABA, serotonin and adrenalin from the adrenal medulla to produce stress responses. Nor epinephrine plays an important role on patients' emotional conditions. When a person is anxious, it is hard to control the noradrenergic system and behavioral bursts are result. Serotonin, there are several serotonin receptors that cause anxiety because there are neurotransmissions to Amydala and Hippocampus, the area that cause anxiety. GABA, There is a hypothesis explaining that anxiety is due to GABA and the dysfunction of GABA_A receptor (Kaplan & Sadock, 1998; Melzack & Wall, 1965). This physiological response increases anxiety and may also increase arousal, awareness, muscle tension and perception of pain. The increased tension in muscles adjacent to the incision places a strain on incisional tissue, further stimulating pain sensation and therefore increasing distress and anxiety. Anxiety have significant negative effects with coronary artery disease, which results in poor physical rehabilitation after bypass surgery (Forster, 2003; Utriyaprasit, 2001). Prolonged anxiety has physiological effects and psychological effects. It leads to elevated protein breakdown, decreased wound healing, decreased immune response and delayed recovery for postoperative patients (Mc.Caffery et al., 1994; Walding, 1991). Therefore, when their length of stay increases, their coping skill may begin to wear thin and increase anxiety (Forster).

3. Assessment of anxiety

Anxiety is a subjective experience that patients might not be able to fully describe. It is therefore important for nurses to be aware of what to look for in assessing an individual's anxiety. A variety of tools can help nurses in assessing patients' anxiety. For clinical assessment, the tools that most commonly used are shown as follows.

3.1 Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS) is recognized for their simplicity, reliability and appear adaptable to the immediate postoperative period (Aragon et al., 2002; Wewers & Lowe, 1990). A VAS consists of line, usually 10 cm long, which had the number indicated the level of anxiety ranging from 0-10, and ends of line are labeled as the extremes of anxiety (e.g., “ no anxiety” to “as much as it could be possible”) (Puang-ngern, 2001) as shown in Figure 5. The patient is asked to rate anxiety from 0 to 10, with 0 equaling no anxiety and 10 equaling the worst possible anxiety. The distance from the no pain to mark made by the patient is that patients' anxiety score, that can measure in centimeters or in millimeters(Wewers & Lowe). The concurrent validity of VAS for anxiety level measuring was tested by Kumwicha (1991) ($r = 0.73$), and the scores of VASs appear to have the quality of ratio data (Aragon et al., 2002).

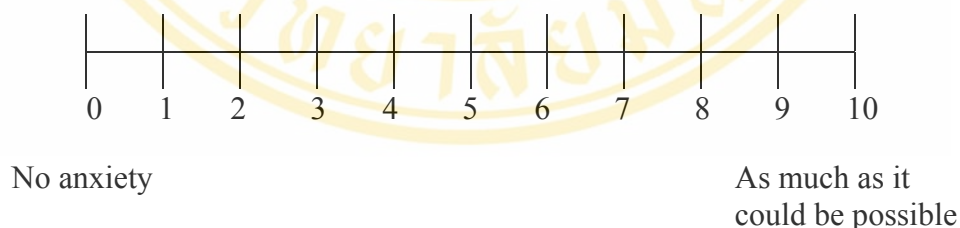


Figure 5. Anxiety Visual Analogue Scale (VAS) (Puang-ngern, 2001)

3.2 The State Anxiety Inventory (STAI) of Spielberger (Spielberger, 1983 cited in Roykulcharoen, 2003)

The State Anxiety Inventory (STAI) of Spielberger consists of 20 statements for the trait and for the state anxiety scale. For trait anxiety, subjects respond on a four-point Likert scale according to how they usually feel with responses of “1 = almost never, 2 = sometimes, 3 = often and 4 = almost always”. For state anxiety,

subjects respond on a four-point Likert scale according to how they feel now. The state anxiety scale responses are “1 = not at all, 2 = somewhat, 3 = moderately so and 4 = very much so”. On each scale, scores can range from 20 to 80 with higher scores indicating greater anxiety (Spielberger, 1983 cited in Roykulcharoen, 2003).

In this study, the investigator use Visual Analogue Scale (VAS) to measuring anxiety level because this instrument is simply to use in postoperative period, appear to have the quality of ratio data and take lesser time than other instruments.

4. Anxiety management

A significant role in nursing practice is the improvement of patient outcome and functional status for postoperative patients. Developing strategies for management of anxiety to maximize patient tolerance to early ambulation is one of the most significant aspects of nursing practice, which needs attention from both physical and psychological perspectives. This is because of the interaction of multiple factors such as serious medical treatment, personality, psychiatric illness, medication and critical care environment can be a cause of anxiety (McCartney & Boland, 1994; Shih, 1997). They are several methods to relieving anxiety in the patients, including as follows:

Psychological Intervention

In post CABG patient, the factors contributing to anxiety are precipitated by critical care environment, limited mobility, and pain. They should be identified and systematically dealt with to improve the patients' sense of control (Criner & Isaac, 1994; Forster, 2003; Johnson & Sexton, 1990) One of the psychological interventions is to provide a setting that minimizes patient seclusion. There are several studies indicate psychological problems commonly seen in critically ill patients may arise from the environment (Isaac, Hungerpillar, & Criner, 1989; Shih, 1997). There are strategies to minimize environment stress by placing patients in individual rooms, minimizing nocturnal interventions to maximize the period of uninterrupted sleep, reducing the amount of monotonous sensory input by placing monitoring equipment outside a patients' room, increasing patient mobility as much as possible, equipping a patient's room with orientation aids such as clocks, radio etc. And making an outside window visible to each patient (Urban, 1988 cited in Puang-ngern, 2001).

In addition, give concrete information or sensory information(Johnson, Christman, & Stitt, 1985; Leventhal & Johnson, 1983) and Behavioral instructions can

reduce anxiety. Give concrete information or sensory information assist individuals to cope with anxiety experience. According to the theory of self-regulation (Leventhal & Johnson, 1983), the individual constructs a mental image or representation of an illness event that can be changed by new information and experiences. The person who receives concrete information will form a clear schema of the objective features of the experience and then process the experience as an expected and certain event. An expected and certain event is likely to cause less anxiety than an uncertain, unexpected event (Leventhal & Johnson, 1983; Moore, 1994).

Behavioral instructions (Leventhal & Johnson, 1983). Behavioral instructions regarding the specific actions that individual can take to enhance feelings of control over their environment assist the individuals to construct additional coping responses for dealing with a threatening situation that cause more anxiety (Johnson et al., 1985; Leventhal & Johnson; Moore, 1994).

In some patients, the selective use of psychotropic medication may be used in addition to behavioral techniques and support psychotherapy. Short-acting anxiolytic agents, specifically benzodiazepines, may be useful in treating extreme anxiety (Sindhu, 1986).

Cognitive-behavioral strategies

Before becoming a patient, most individuals have a repertoire of coping and anxiety-reducing skills. Acknowledgment these skills and assisting the patient to use them while they are in post operation period are useful for the patient. There are many interventions such as relaxation techniques, music therapy, chiropractic, massage, imagery, biofeedback, or hypnosis. Cognitive-behavioral therapies were mostly used reducing stress or anxiety. They are in a category of self-regulation strategies that are helpful in treating patient's distress caused by anxiety (Eisenberg, Kessler, & Foster, 1993). These interventions work to change patient perceptions of the known stressful experience. They can easily accompany the physiologic care of patients (Miller & Perry, 1990).

The review of anxiety-reducing interventions, which based on body-mind perspective or holism, showed that the parts or processes of all things are combined into wholes rather than separate fragments. Biobehavioral interventions are used to treat the anxiety, stress in acute and chronic illnesses. They are used to establish a

sense of balance and control in one's emotional status. However, these strategies might be too difficult for the patients. In post CABG patients, the interventions that appropriate to assist patients should to not stimulate pain intensity of patients, does not require much practice and concentration by patients to be effective (Puang-ngern, 2001).

In conclusion, anxiety is psychological event in post CABG surgery patients that increase cardiac patients' risk for developing other cardiac events, results in poor physical rehabilitation after bypass surgery and delayed recovery for postoperative patients. The effective nursing interventions that can improve anxiety management in cardiac patients after surgery should be focus.

Effect of Progressive Muscle Relaxation Technique on Postoperative Pain and Anxiety in CABG Patients.

Progressive muscle relaxation is techniques that induce relax to the patients. Relaxation is the voluntary reducing the tension or stress to a state relative freedom from physical, skeletal muscle tension, mental and mind. Relaxation may be present throughout the body, and bring the mind of the individual to a state of balance and peace. Some sort of action on both physical and cognitive processes has thus been suggested. (Mc.Caffery et al., 1994; Seers & Carroll, 1998). Relaxation may used to reduce pain, stress, anxiety and depression in all types of patients (French, 1994; Seers & Carroll).

The relaxation response is integrated between physiologic response and cognitive response. The physiologic response originating in the hypothalamus leads to generalized decrease in central nervous system arousal. This focused attention is associated with a decreasing the sympathetic nervous system activity. The physiological characteristics of the relaxation response result in reduced oxygen consumption, respiratory rate, heart rate, muscle tension and increase alpha waves (Benson & Klipper, 1975; Mandle, Jacobs, Acari, & Domar, 1996). Likewise, Wells-Federman, Deckro and Baim (1995) found that relaxation response resulting in lower heart rate, blood pressure, respiratory rate, metabolic rate and muscle tension., which are associated with feelings of well being and relaxation. In cognitive response, when a patient manages to direct his attention away from the pain, there is considerable

relaxation that can reduce the pain perception (French, 1994). In addition, the relaxation can improve mood, sleep and energy (Kulich, 1991). Relaxation can reduce level of pain sensation and helping to control the anxiety associated with painful episodes. Sympathetic over activity may contribute painful. Relaxation can directly influence pain sensation by reducing tonic muscle contractions or by increase blood flow because of decreased sympathetic tone.

Relaxation assessment

Reid and Curtsinger (1975) had studied effect of hypnosis on physiological changes and found that when participants are relaxed, their heart rate and relaxation rate begin to decrease. Mean of decreasing heart rate is 3 beats/min and Mean of decreasing respiratory rate is 4 times/min. When muscle had relax, there had effect on physiological changes, the criteria to assess muscle relaxation is heart rate of patients decreased 3 beats/min and respiratory rate decreased 2 /min (Gift, Moore, & Soeken, 1992). In addition, relaxation is voluntary reducing the tension to a state relative freedom from both skeletal muscle tension and mind. Miller and Perry (1990) applied a visual analogue scale (VAS) with a marker that moves from the number “0” meaning no relaxation at all to “10” which means the most relaxation to assess relaxation in clinical practice a shown in Figure 6.

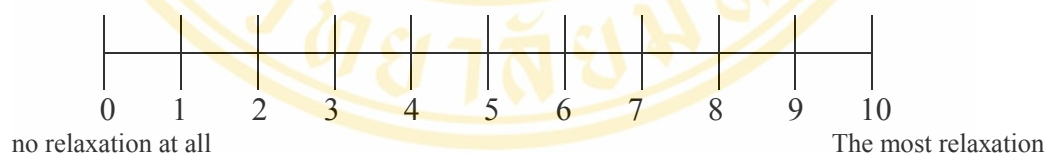


Figure 6: AVAS to assess relaxation (Miller & Perry, 1990)

There are several relaxation techniques, which evoke the same physiological changes as relaxation response such as progressive muscle relaxation, autogenic training, guided imagery, mediation, deep breathing, and cognitive strategies (Seers & Carroll, 1998). A number of studies have been carried out in relaxation techniques as follows:

1. Music therapy

Kittisup (1993) studied the effect of music on pain and anxiety in 40 Thai open heart surgery patients. The result showed the experimental group had significantly less pain levels and anxiety levels compared with the control group. As Aragon, et al. (2002) studied the effect of music on pain in 30 American open heart surgery patients. The result showed the experimental group had significantly lower pain level than the control group. The limitation to use music therapy is that music preference is individual and difference patients' responses due to difference types of music (Evans, 2003; Kittisup).

2. Deep breathing

Deep breathing is an autonomic, self-regulatory function but can also be under voluntary control. Slow deep breathing technique can be used to decrease postoperative pain and anxiety (Good, 1995b). Miller and Perry (1990) studied the effect of deep breathing on pain in 15 post-cardiac surgery patients and found that a slow, deep-breathing reduced pain on visual descriptor scale. Sopajareeya (1992) investigated the effects of breathing on pain relief during wound scrub in Thai burned patients. The participants consists 12 patients equally divided into the control group and the experimental group. The results revealed that the patients in the experimental group had lower scores of facial expression of pain, pulse rates, respiratory rates, and blood pressure during the wound scrub than patients in the control group. Deep breathing is one part of progressive muscle relaxation technique (Chooprayoon, 1998).

3. Guided imagery

Tusek, Cwynar, and Cosgrove (1999) found that cardiac surgery patients who listened to a preoperative guided imagery surgical tape had significantly less pain, anxiety, and two days shorter hospital stay. Deisch, et al. (2000) replicated the study of Tusek, et al. (1999) in CABG patients and found significantly shorter hospital stay and trends in decreased pain and anxiety. A disadvantage of this intervention is need of the frequency of trainings (Kulich, 1991).

Pain is a complex symptom, the use of relaxation in addition to analgesic medication offers patients an integrated approach to pain relief (Atsberger, 1995), generally promotes patient well-being without the risk of additional invasive or drug therapies. In addition, relaxation may enhance an individual's feelings of control

(Mandle et al., 1996). Relaxation also leads to decrease anxiety, a mental calmness, and slow alpha waves in brain, which in turn effect with pain and muscle tension. One advantage of relaxation in a clinical situation where nurses have so much control is that patients can use it independently (Cole & Brunk, 1999). Relaxation technique can be used effectively to decreased pain after CABG (Forster, 2003) and has been found to reduce sensory and affective components of pain and decrease opioid intake, which may shorten recovery and hospital stay (Good, 1999; McCaffery, et al., 1994). Related to the effect of relaxation, Progressive muscle relaxation technique seems to be suitable and can be used effectively to decrease pain and anxiety after CABG.

Progressive muscle relaxation technique

Progressive muscle relaxation technique is one of muscle relaxation techniques complied on the basis that muscle strain as a physical response to anxiety, the more muscle strains, the more anxiety rises. On the other hand, the relief of physical stress should decrease pain due to alleviate the anxiety (Chooprayoon, 1998). This technique is included with active and passive progressive muscle relaxation. The patients were taught to alternately contract and relax muscles to help them realize the difference between the contraction and the relaxation of muscles and relax their bodies easily (Chooprayoon; Snyder, 1998). If they could not to contract, their muscles or they had used this technique more time, they could to spend on relaxation only, and it was called as passive progressive muscle relaxation (Chooprayoon).

Progressive muscle relaxation technique is the intervention to relax each major body part in succession. This intervention is starting with the forehead, head, hands, and arms, the fingers and moving from the fingers up the body to the chest and whole body. In gate control theory, progressive muscle relaxation technique is proposed to be an activity that closes the gate by the inhibition of noxious impulses transmission from the spinal cord to descending neural projections and neurotransmitters. This type of relaxation also promotes the reduction of muscular tension and decreases sympathetic stimulation of the hypothalamus (Ma, et al, 1996), and increases endogenous opiate secretion in the central nervous system (Cole & Brunk, 1999) on the higher pain perception centers and also at the pain gating mechanism. Descending fibers start from the areas of pons and medulla to decrease the propagation of pain impulses and modulate the perception of pain by provides a sense of calm, pleasure and refreshment

(Atsberger, 1995) which relieving the sensory of pain and emotional reaction of pain such as anxiety.

In CABG patient with pain, the potential benefits of using relaxation are related to the interaction between pain, muscle tension, and anxiety. The usual responses to pain, especially initially and when it may not be avoided. This reaction induces muscle tension such as restriction of movement. The anxiety, pain and muscle tension tend to intensity of each other, and the situation proceeds from bad to worse. To help the patient with pain, this technique attempts to interrupt this spiraling process with skeletal muscle relaxation (Mc.Caffery, et al., 1994).

Progressive muscle relaxation intervention has been widely tested for reducing pain and anxiety. A number of studies have been carried out in progressive muscle relaxation technique on pain and anxiety as follows:

Levin, Malloy, and Hyman (1987) compared the effect of breathing, progressive muscle relaxation, and distraction on pain in post abdominal surgery patients and found that progressive muscle relaxation technique resulted in significantly less pain levels than other groups.

Ma and colleagues (1996) found that progressive muscle relaxation technique decrease the heart rate, muscle tension, blood serum levels of cortisone, systolic and diastolic blood pressure, postoperative pain in abdominal surgery patients and increase alpha brain waves.

Good (1999) studied the effect of progressive muscle relaxation, music and the combination of relaxation and music on postoperative pain and anxiety after major abdominal surgery on the first and the second postoperative days in 500 participants. The participants were randomly assigned to relaxation, music, relaxation, plus music and control groups. Interventions were taught preoperatively and tested postoperatively. The findings indicated that the three treatment groups had significantly less pain and anxiety than the control group, which was confirmed by the univariate analysis of covariance.

Choorat (2001) studied the effect of progressive muscle relaxation on postoperative pain after spinal surgery on the first and the second postoperative days. The finding indicated that the experimental period had significantly less pain than the control period significantly.

In conclusion, progressive muscle relaxation technique has been found effectively to decrease pain and anxiety. This technique teaches a person how to tense and relax muscle groups. This technique provides the person with a sense of control over the pain and anxiety that in turn each other. The disadvantage of using the complete program in this technique is when tensing the muscles may increase pain in postoperative patients (Good, 1995a). In the other way, passive progressive muscle relaxation part seems to be more appropriate to use.

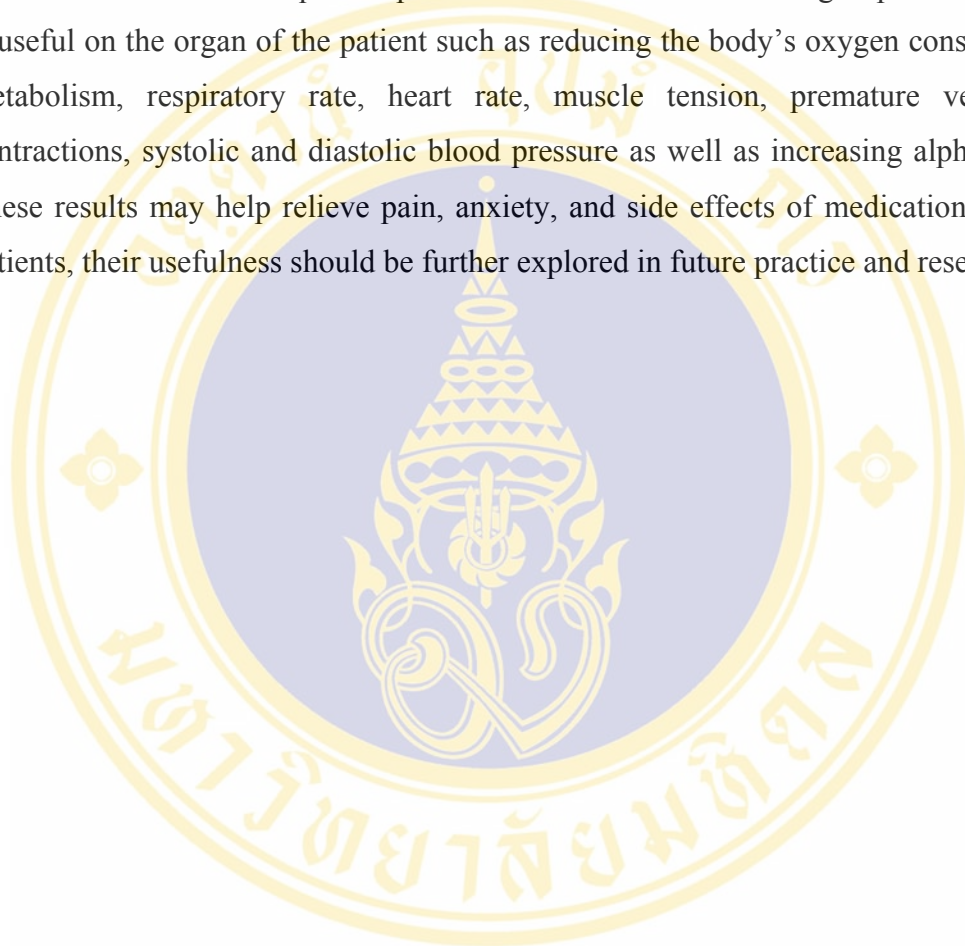
There are few studies of this intervention in Thailand. Roykulcharoen (2003) examined the effect of passive progressive muscle relaxation technique on postoperative pain, opioid intake and anxiety during ambulation in 102 post abdominal surgery patients. The results showed significantly less pain and anxiety in experimental group than control group. There were no significant group differences in opioid intake. She found that the postoperative patients needed 3 times of progressive muscle relaxation technique to guide them relax as the studies of Good (1995a, 1999).

Thus, the investigator chooses the progressive muscle relaxation technique in the part of passive progressive muscle relaxation to be tested in CABG patients during extubation time, which is, a complementary therapy to decrease pain.

Summary

Patients after CABG have experienced symptoms in both physical and psychological symptoms. The major symptoms of patients were incisional pain (83%) and anxiety (90%). Nurse spends more time with patients in pain and anxiety than do any other health professionals. Therefore, nurses have opportunity to assess the pain, perform pain management, and evaluate the effectiveness of the intervention. As a result, nurse must be sufficiently prepared to undertake this active role in pain management to help them more comfortable both body and mind. From the results of the existing study, the progressive muscle relaxation technique is the method that can relieve pain in hospitalized patients, especially post surgical patients. While having ambulation after extubation, CABG patients suffer from incisional pain, prolong interval of pain relieving medication and movement. Moreover, CABG patients were anxiety from ICU environment and faced to uncertain situations that could increased level of pain. A pain considered temporary which could go away with the rest and

analgesic. Nevertheless, in some patients, pain is not relieved and may lead to permanent pain. It can be conducted that pain management a major nursing challenge. Therefore, the investigator selected the progressive muscle relaxation technique in the part of passive technique and used in these patients because not increase pain due to tense muscle. This technique is a procedure to relax of the muscle groups. Moreover, it is useful on the organ of the patient such as reducing the body's oxygen consumption, metabolism, respiratory rate, heart rate, muscle tension, premature ventricular contractions, systolic and diastolic blood pressure as well as increasing alpha waves. These results may help relieve pain, anxiety, and side effects of medication in some patients, their usefulness should be further explored in future practice and research.



CHAPTER III

METHODOLOGY

Research Design

This study was a quasi-experimental study, with one group pretest-posttest design. The purpose of this study was to study the effect of progressive muscle relaxation technique on postoperative pain and anxiety in CABG patients.

Population and Sampling

The populations of this study were adult patients aged from 20 years old or more, both men and women who undergoing CABG surgery within 24-72 hours after operation in Ramathibodi hospital, Bangkok. The sampling method was purposive sampling. The inclusion criteria for the eligible participants in this study were as follows:

1. They never trained with the progressive muscle relaxation technique.
2. They have no prior CABG or cardio-thoracic surgeries to control their experiences of pain from surgeries.
3. They were able to understand, read, and speak Thai language to assure reliability in performing the relaxation technique.

The exclusion criteria in this study were as follows:

1. They have problem with cardiac arrhythmias event during intervention.
2. Their pain score and anxiety score were zero at starting intervention.

The eligible participants were chosen according to the inclusion criteria. The sample size was calculated based on Power analysis (Polit, 1999). The effect size used in this study based on the effect size of the study by Roykulcharoen (2003), which examined the effect of passive progressive muscle relaxation on pain in postoperative patients.

$$\gamma = \frac{\mu_1 - \mu_2}{\sigma}$$

γ = estimated effect of independent variables on dependent variables

$\mu_1 - \mu_2$ = population mean group difference

σ = population standard deviation

The effect size of her study was calculated as a large effect (more than 0.8). Thus, for this study, a large effect size $\gamma = 0.8$, power of .8 for main effect and $\alpha = .05$ were chosen, the sample size was 25 participants. To account for loss, 30 participants were entered into the study. The participants were selected preoperatively from the surgery schedule and received progressive muscle relaxation postoperatively after extubation.

Setting

The study was conducted in the cardio-vascular-thoracic (CVT) ICU, Ramathibodi hospital, Bangkok, which was a tertiary care hospital. The statistics of the patients admitted in Ramathibodi hospital and received CABG surgery during January 2003- December 2003 were about 111 cases (9 cases per month). All CABG patients were given intravenous morphine (prescribed doses of 3mg/ 3-4 hours) on the first and second postoperative days and were prescribed acetaminophen after the patients were extubated. On the extubation day during June 2004-December 2004, only 7.7% of the CABG surgery patients were administrated the intravenous morphine with in 1-2 hours before extubation. After extubation, the surgeon changed the pain relief medication from morphine per intravenous to acetaminophen per oral to prevent the side effect of opioid.

Instruments

The instruments used in this study were consisted of two parts:

Part 1. The instrument for intervention

1.1 Relaxation tape

The content in relaxation tape used in this study was progressive muscle relaxation technique, which developed by the Department of Mental Health, Ministry

of Public Health (2004) and was proved for content validity by psychologist team in the Department of Mental Health and tested in psychiatric patients. The content of technique was applied from progressive muscle relaxation technique by Chooprayoon (1998) which was tested the effectiveness on pain relieving in several studies. The relaxation tape is 30 minutes in length of passive progressive muscle relaxation instruction which recorded by the investigator. Participants listened to the tape by using earphones.

Content validity

Before using this technique in this research study, the investigator evaluated the content of this technique for the content validity, prompt and safety to use with CABG surgery patients by one psychologist who expert in relaxation training, one psychiatrist who expert in clinical stress reduction and one CVT surgeon (Appendix A). All of them approved for this tape and gave some suggest. The investigator corrected the content as they commented. The correcting content was recorded in the tape by the investigator. Before recording the tape, the investigator trained to control rhythm, and tone of speech with one psychologist. A pilot study was done with five participants who had characteristics similar to the participants in order to check the assurance the relaxation effect of this tape and the implication of this technique. The result showed that five participants relaxed after listened to the tape. One participant could not follow the instruction of the tape for deep breathing. After the investigator told him to breathing as he could but control his cycle of breathing follow the tape, he could follow the tape and felt relax. The investigator added this information for the participants before start the intervention.

Part 2. The instrument for data collection

Three instruments were used for data collection. They were described as the following:

2.1 Demographic data questionnaire (Appendix B)

Demographic characteristics of the participants included gender, age, marital status, level of education, current occupation, types of the payment and medical histories such as length of surgery procedure, numbers of graft replaced, length of stay in ICU and length of hospitalization after operation.

2.2 Pain measurement

The pain measurement was the numerical pain scale (vertical) by Mc.Caffery et al. (1994) (Appendix C). The numerical pain scale consisted of 10-cm. line between the anchor indicating 'no pain' and 'worst possible pain' for the intensity scale. Each participant was asked to rate pain level from 0 to 10, with 0 equaling no pain and 10 equaling the worst possible pain by marking on the line. The distance from no pain to mark was measured in millimeters and was interpreted as participants' pain score. The more length of distance that the participant marked, the more of pain that participant had.

Validity and Reliability

There is much evidence supporting the validity of numerical pain scale for pain intensity, such scales demonstrating positive relations to other self-report measures of pain intensity (Jensen et al., 1986). A pilot study was done with five participants who had the same surgery in order to check the objectivity of this instrument. Five participants understood and could rate their pain scores with this instrument.

2.3 Anxiety measurement

The anxiety measurement was the anxiety visual analogue scale (VAS) by Puang-ngern (2001) (Appendix D). A VAS consists of line, usually 10 cm long, which had the number indicated the level of anxiety ranging from 0-10, and ends of line are label as the extremes of anxiety (e.g., " no anxiety" to "as much as it could be possible"). The participant was asked to rate anxiety from 0 to 10, with 0 equaling no anxiety and 10 equaling the worst possible anxiety by marking on the line. The distance from the no anxiety to mark made by the patient is that patient's anxiety score, measured in millimeters. A VAS is recognized for their simplicity, reliability and appear adaptable to the immediate postoperative period (Aragon et al., 2002; Wewers & Lowe, 1990).

Validity and Reliability

The concurrent validity of VAS for anxiety level measuring was tested by Kumwicha (1991) ($r = 0.73$). A pilot study was done with five participants who had characteristics similar to the participants in order to check the objectivity of this

instrument. Five participants understood and could rate their anxiety scores with this instrument.

Data Collection

The data collection procedures were as follows and shown in Figure 7:

1. The investigator submitted the introduction letter issued by Graduate School, Mahidol University to the Ethical Committee and the director of Ramathibodi Hospital, Bangkok, requesting the permission for this data collection.
2. After permission was granted (Appendix E), the investigator met the head of the cardio-vascular-thoracic unit, surgery department, the head nurse of Kanlayanakit Kittiyakorn intensive care unit and the coordinator of surgery and orthopedics nursing department, Ramathibodi hospital, to explain the objectives and the method of the research for coordination in data collection.
3. The participants were selected according to inclusion criteria. Then, the investigator introduced herself to the participants, and informed the participants about the objectives of this study, research procedures, and benefit. Their right in their decision-making on participation or withdrawal from this study was informed. They could withdraw at anytime if they desired with no negative effect on the treatment they have received from the hospital. Then, participants' cooperation were requested. After the participants signed the information consent form, the demographic data of the participants were collected.
4. Then, the participants were explained about nursing care and the environment in ICU to control the standard of preoperative information and participants were trained to use tape players, earphones, the vertical VAS of pain, and the anxiety visual analogue scale (VAS).

Experimental period

5. On the extubation day, the investigator checked participants' history about analgesic drug received before extubation and recorded.
6. After extubation, the investigator recorded the participants' pain level and anxiety level. If their pain score and anxiety score were zero after extubation, they were excluded.

7. Before starting the relaxation technique, all participants lay down in comfortable position.

8. The participants listened to the relaxation tape via earphones. The investigator turned on the tape player and let the participants to adjust the tape volume, as they preferred. Then the investigator told the participants to do follow the tape instruction.

9. During the intervention, the investigator observed the cardiac arrhythmias, the participants' attention during the intervention and other interfering factors. If they had complications such as cardiac arrhythmias, breathing difficultly, the investigator notified the doctor and stopped the intervention.

10. When the participants finished listening the relaxation tape, the pain level of each participant was measured immediately, 15, 30 and 45 minutes after the intervention by using the of vertical VAS of pain.

11. Then, the anxiety level of the participants was measured immediately, 15, 30 and 45 minutes after the intervention by using the anxiety visual analogue scale (VAS).

12. The investigator left the relaxation tape and tape player with the participants for 24 hours after the intervention and told them that they could use the tape all the time they need.

13. After 24 hours after intervention, the investigator asked the participants for the frequency of tape using and recorded the extra dose of analgesic drugs given to the participants within 24 hours after intervention.

14. After finishing the study, the investigator thanked the participants for their participation in this study.

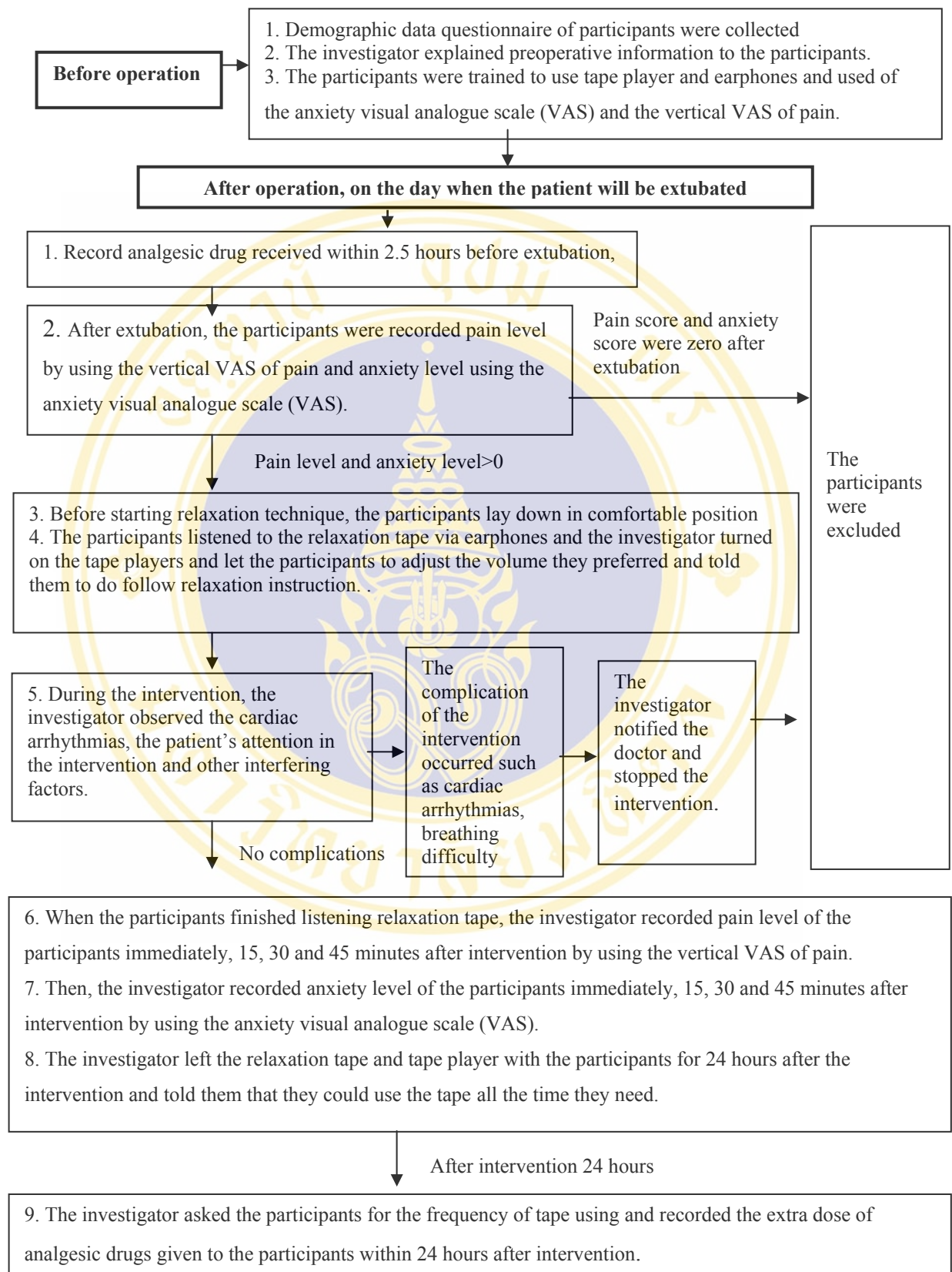


Figure 7: Data collection procedures.

Protection of Human Subjects

The investigator conducted the study according to the permission of Ethical Committee on human rights relate to research involving human subjects. The investigator introduced herself to the participants. The objective of the study and the data collection procedures were fully explained to the participants by the investigator. The participants read the information in information sheet for participants (Appendix F) before signing in informed consent form (Appendix F). They were told the benefit of this study in helping postoperative pain in CABG patients. The investigator informed that these procedures were not harmful to the participants and were not involve any medication. Their rights to refuse the procedure at anytime and their refuse no effect on any care or services were explained. They had opportunities to ask questions and were given answers. To maintain confidentiality, a number were identified the participants during the study and information about participants were kept in a locked file during the study. Permission to use information from the participants were obtained by written consent. Any report of the study was presented in aggregation and personal identifying information was not utilized.

Data Analysis

The data were analyzed as follows:

1. Range, means and standard deviation were used to analyze age, length of surgery procedure, numbers of graft replaced, length of stay in ICU and length of hospitalization after operation.
2. Frequency and percentage were used to analyze gender, age, marital status, education level, current occupation, and type of the payment for treatment.
3. Means and standard deviation were used to analyze the pretest pain score and four posttest pain scores.
4. Means and standard deviation were used to analyze the pretest anxiety score and four posttest anxiety scores.
5. A comparison between the pretest and posttest pain scores were done by using repeated measured analysis of variance (ANOVA).
6. A comparison between the pretest and posttest anxiety scores were done by using repeated measured analysis of variance (ANOVA).

CHAPTER IV

RESULTS

The purpose of this study was to examine the effects of progressive muscle relaxation technique on postoperative pain and anxiety in coronary artery bypass graft (CABG) patients. The results were presented in two sections, demographic characteristics of the participants and hypotheses testing results. Additional findings of the frequency of using this relaxation technique and extra analgesic drugs by the participants within 24 hours after intervention were addressed.

Demographic Characteristic of the Participants

The populations of this study were adult CABG patients after extubation within 24-72 hours after operation in a cardio-vascular-thoracic (CVT) intensive care unit (ICU), Ramathibodi hospital, Bangkok. Thirty-four patients who reached the inclusion criteria were asked to participate in this study. There were 32 (94 %) participants who gave consent forms and 2 (6 %) who refused to participate in this study. One of them refused because he felt uncomfortable to participate in the study and another felt uncomfortable to sign the consent form. Two of 32 participants were excluded from the study because they were reoperated due to bleeding within 6 hours after the first operation. The attrition rate of this study is 11.76%.

The demographic characteristic of the participants are presented in Table 1 and 2. There were 25 (83%) male and 5 (17%) female. Their ages ranged from 38 to 81 years with an average age of 59.97 years. The majorities were over 60 years old (53.3%), married (80%), and retired (30%). The majorities of their education levels were primary education (36.7%) and bachelor degree or higher (30%). Nearly two-third of them were paid for the medical expenses by government (60%). Concerning the medical histories, twenty-five of them were received non-CPB technique (83.3%) and five were not (16.7%).

Table 1 The demographic characteristics of the participants (N = 30)

Characteristics	Number	Percentage
Gender		
Male	25	83.00
Female	5	17.00
Age range 38-81 years (mean 59.97 years, SD 10.24)		
< 40 years	1	3.30
40-50 years	5	16.70
51-60 years	8	26.70
> 60 years	16	53.30
Marital status		
Single	3	10.00
Married	24	80.00
Widow	3	10.00
Level of education		
Primary education	11	36.70
Secondary education	7	23.30
Vocational education	3	10.00
Bachelor degree or higher	9	30.00
Occupation		
Retired	9	30.00
Government retired	6	20.00
Government services	5	16.70
Day-labored	1	3.30
Contact-labored	3	10.00
Self-employed	6	20.00
Medical Payment		
Self and/ or family	1	3.30
Government	18	60.00
Universal coverage card(30 bath)	9	30.00
Social welfare	2	6.70

Table 2 The medical histories of the participants (N = 30)

Medical histories	Non- CPB (N = 25)			On CPB (N = 5)			Total		
	Range	Means	SD	Range	Means	SD	Range	Means	SD
Number of grafts	2 - 5	4	1	4 - 4	4	0	2-5	4	1
Length of surgical time (min)	145-345	246	51.44	210-390	297	72.25	145-390	254.50	57.30
Length of stay in ICU (days)	3-9	4.20	1.22	5-9	6.60	1.52	3-9	4.60	1.55
Length of stay after surgery (days)	9-18	11.20	2.14	10-17	12.72	7.86	9-18	11.76	2.43

In this study, the surgical time of total participants ranged from 145 to 390 minutes with an average of 254.5 (SD 57.3) minutes. The numbers of graft were ranged from two to five. The length of stay in ICU of total participants ranged from three to nine days with an average of 4.6 (SD 1.55) days and the length of stay after surgery ranged from 9 to 18 days with an average of 11.76 (SD 2.43) days. For non-CPB group (N=25), their average surgical time was 246 (SD 51.44) minutes, the length of stay in ICU ranged from 3 to 9 days with an average of 4.2 (SD 1.22) days and the length of stay after surgery ranged from 9 to 18 days with an average of 11.21 (SD 2.19) days. An average surgical time of the patients who were undergone CPB technique was 297 (SD 72.25) minutes. Their length of stay in ICU ranged from five to nine days with an average of 6.6 (SD 1.52) days. The length of hospital stay after surgery ranged from 10 to 17 days with an average of 12.72 (SD 7.86) days.

Hypotheses Testing Results

The purpose of this study was to examine the effects of progressive muscle relaxation technique on postoperative pain and anxiety in CABG patients. Postoperative pain scores and anxiety scores during intervention of 30 participants in this study are presented in Figure 8, Table 3 and 4.

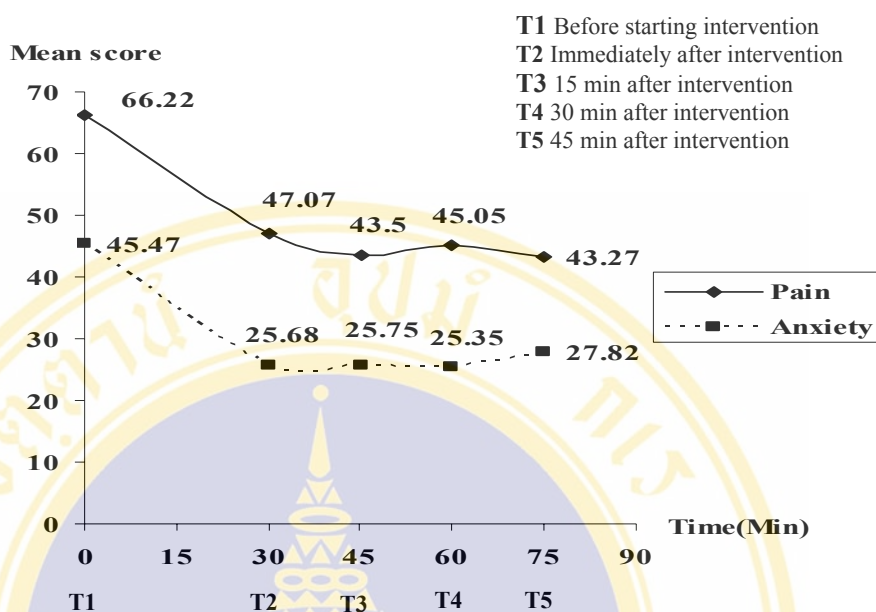


Figure 8: Mean of pain and anxiety scores during intervention

Table 3 Postoperative pain scores during intervention (N = 30)

Pain score	Range	Mean	SD
Before starting intervention	16.00-100.00	66.22	23.36
Immediately after intervention	7.00-100.00	47.07	21.75
15 minutes after intervention	3.00-90.00	43.50	24.75
30 minutes after intervention	2.50-100.00	45.05	25.29
45 minutes after intervention	1.00-99.00	43.27	27.05

Table 4 Anxiety scores during intervention (N = 30)

Anxiety score	Range	Mean	SD
Before starting intervention	30.00-100.00	45.47	29.26
Immediately after intervention	10.00-96.00	25.68	23.41
15 minutes after intervention	0-90.00	25.75	23.83
30 minutes after intervention	0-99.00	25.35	26.48
45 minutes after intervention	0-100.00	27.82	28.08

Analysis of variance (ANOVA) was used for testing the hypotheses. Before analysis of the data, each group of pain scores and anxiety scores were tested for normal distribution. Levene's test was utilized for equal variances of pain and anxiety scores, which were recommended with ANOVA test. The multiple comparisons of mean of pain scores were tested by the least significant difference (LSD). For postoperative pain, it was found that the participants had significantly lower means of pain score after receiving immediate progressive muscle relaxation technique ($p < 0.05$). However, pain score measurement done at 15, 30 and 45 minutes after the procedure did demonstrated significant lower means of pain score of $p < 0.01$ (Table 5 and 6).

Table 5 Comparison of postoperative pain scores of the participants between control group (before starting intervention) and intervention groups (at 0, 15, 30, 45 minutes after intervention)

Source of variation	df	Ss	Ms	F
Between Groups	4	7247.21	1811.81	2.90*
Within Groups	145	90696.03	625.49	
Total	149	97943.24		

* $p < 0.05$

Table 6 Multiple comparison of postoperative pain scores by LSD (The least significant difference)

Mean of pain score before intervention (I)	Time after intervention	Mean of pain score after intervention (J)	Mean Difference (I-J)	95% Confidence Interval	
				Lower Bound	Upper Bound
66.22	0	47.07	19.15*	-.06	25.46
	15	43.50	22.72**	5.39	30.91
	30	45.05	21.17**	4.27	29.80
	45	43.27	22.95**	5.72	31.25

* $p < 0.05$

** $p < 0.01$

For anxiety, the multiple comparisons of anxiety scores were tested by LSD. It was found that the participants had significantly lower means of anxiety score after received immediate progressive muscle relaxation technique. Also the same results were shown, this technique was shown to be effective to reduce anxiety scores at time 15, 30 and 45 minutes after intervention with $p < 0.01$ (Table 7 and 8).

Table 7 Comparison of anxiety scores of the participants between control group (before starting intervention) and intervention groups (at 0, 15, 30, 45 minutes after intervention)

Source of variation	df	Ss	Ms	F
Between Groups	4	8634.86	2158.72	3.04*
Within Groups	145	102935.80	709.90	
Total	149	111570.66		

* $p < 0.05$

Table 8 Multiple comparison of postoperative anxiety scores by LSD

Mean of anxiety score before intervention (I)	Time after intervention	Mean of anxiety score after intervention (J)	Mean Difference (I-J)	95% Confidence Interval	
				Lower Bound	Upper Bound
45.47	0	25.68	19.79**	5.55	32.75
	15	25.75	19.72**	5.69	32.88
	30	25.35	20.12**	6.05	33.25
	45	27.82	17.65**	3.79	30.98

** $p < 0.01$

In this study, no participant received analgesic drug within 2.5 hours before starting intervention. After the participants listened to the tape, all of them told that they were relax. During intervention, no events of the complication or interrupting the intervention occurred with the participants.

Additional Findings

Twenty-one participants (70%) were found to use this relaxation technique again within 24 hours after the first intervention. Eight participants of this group had tried this technique for one time (38%), 12 participants had tried this tape for two times (57%) and one participant had tried this tape for three times (5%) within 24 hours after the first intervention. Table 9 demonstrated the frequency of employing this technique by the participants.

Table 9 Frequency of re-employing the progressive muscle relaxation technique by listening to the tape within 24 hours after intervention (N = 30)

Frequency to use relaxation tape	Number	percentage
0	9	30
1	8	27
2	12	40
3	1	3

Ten participants requested extra analgesic drug within 24 hours after intervention. There were fewer participants who required extra analgesic drug within 24 hours in the group that the relaxation tape was allowed to be used deliberately by the participants wished (Table 10).

Table 10 Numbers of the participants who request extra analgesic drug within 24 hours after intervention (N=30)

Group	Requested extra analgesic drug	Did not request extra analgesic drug
Use relaxation technique within 24 hours (N=21)	6 (29%)	15 (71%)
Did not use additional relaxation technique within 24 hours (N=9)	4 (44%)	5 (56%)

The means of pain score after intervention of four participants in this study were not decrease. The means pain score of them before start intervention were lower than

50. Concerning anxiety, all participants were had lower means of anxiety score after intervention than prior the intervention.

Summary of the Results

In this intervention, 30 participants were post CABG patients admitting in the CVT intensive care unit, Ramathibodi hospital. They provided data for testing the effects of progressive muscle relaxation on postoperative pain and anxiety after the operation. The results indicated that the participants had significantly lower means of pain and anxiety scores at the end of the technique measured immediately after listening to the tape and also at time 15, 30, 45 minutes afterwards. Seventy percent of the participants employed the relaxation tape again within 24 hours after receiving intervention. Moreover, the percentage of participants who requested extra analgesic drug in the group that repeated listening to the tape within 24 hours after intervention was less than the group that did not.

CHAPTER V

DISCUSSION

The purpose of this study was to compare postoperative pain levels, anxiety levels of coronary artery bypass graft (CABG) patients before and after using the progressive muscle relaxation technique. The participants were 30 adult CABG patients after extubation within 24-72 hours after their operation in a cardio-vascular-thoracic intensive care unit, Ramathibodi hospital, Bangkok. The results were discussed in term of demographic characteristics of the participants, the hypotheses, and additional findings as followed.

Demographic Characteristics of the Participants

The majority of the participants were male (83%), aged over 60 years old (53%) which are consistent with previous studies(Asdornwised, 2000; Masnaragorn, 2001). The possible explanation for gender difference in this study may be because a man possesses higher risk for ischemic heart disease than women do. A study of Leelahakul, Chavalitnitikul, Leelahakul, Puthadejakum and Pasunant (2003) supported that men's absolute risk estimate for coronary artery disease (CAD) was higher than women.

Most of participants were over 60 years old. Half of these were retired (30%) or governmental retired (20%). Although, the majority of the participants were unemployed, but most of them were supported by various healthcare compensation. The biggest sources of supported came from government (60%) and the rest were Universal coverage Scheme (30%). The 30-Bath Universal Coverage Card just was lunched in 2002 by the government aiming to motivate equal opportunity to access, healthcare services. This program would help reduce the medical expenses for poor people (Nitayarumpong & Pannarunothai, 1998).

The majority of the participants in this study (83%) received non-cardiopulmonary bypass (non-CPB) technique of CABG surgery. The mean duration of surgery, mean length of stay in ICU and mean length of stay after operation in non-

CPB group (246 minutes, 4.2 days, and 11.2 days) were shorter than on CPB group (297 minutes, 6.6 days and 12.72 days). The reason of this finding could be explained that the CPB or heart-lung machine cause hemodilution, hypothermia, and anticoagulation but not with the non-CPB technique. For non-CPB technique, the surgery is performed on a beating heart by using stabilizer equipment. The latter decreases perfusion problems which affects the brain, kidneys, lungs, and also requires less blood transfusion, and less time spent on mechanical ventilation (Hyett, 2004; Tazbir & Keresztes, 2005). Therefore, the recovery process of the participants who received non-CPB or off pump technique was faster than on CPB group.

It seems the mean duration of the surgery in this study too longer than the normal average time of CABG surgery. This finding could be explained that Ramathibodi hospital is medical center hospital. There are many groups of staffs. There were many procedures to prepare the participants before start surgery. With my experience, the duration was about 90 minutes when the participants were transferred from their bed until they were received the surgery.

The Effects of progressive muscle relaxation on pain and anxiety in CABG participants

The results of this study indicate that progressive muscle relaxation significantly decreases postoperative pain and anxiety in CABG patients. This result is consistent with the previous researches, which studied about the effectiveness of progressive muscle relaxation on pain in other surgical patients groups. (Good (1999): the effect of progressive muscle relaxation on pain in post abdominal surgery patients in USA, and Roykulcharoen (2003): the effect of progressive muscle relaxation on pain and anxiety in post abdominal surgery patients in Thailand) Moreover, this result is consistent with the study of Choorat (2001) which found that progressive muscle relaxation technique significantly decrease postoperative pain in post spinal surgery patients.

Progressive muscle relaxation technique conducted the participants to relax by guided them to decrease their tension of muscles. The participants had to lie down on the bed with calm. Without movement, the pain level of the participants could be decreased.

Pain in postoperative patients could be recorded with many phases of activities such as spontaneous pain or pain at rest, and incidence pain or pain on movement. With the effectiveness of this technique, the participants had to lie down and rest. In conclusion, it can be stated that progressive muscle relaxation is an effective strategy for controlling pain at rest among patients undergoing CABG.

Although the result of this study showed that progressive muscle relaxation technique was effective on pain in CABG patients. After the intervention, all participants still had the moderate pain scores (43.3 -47.1) when comparing with the pain level before the intervention was started (66.2). This result is consistent with Kittisup (1993) study. Both mean pain scores after intervention of cardiac patients in control group (45.5) and experimental group (40) were in moderate level. Likewise the study of Deisch et al., (2000), Guide imagery: Replication study using coronary artery bypass graft patients, the mean pain score in control group (47.4) and experimental group (32.3) were in mild to moderate pain. From the results of this study, it can be concluded that even though progressive muscle relaxation technique can significantly reduce the pain scores in post CABG patients, but it can not yield a significance clinical effect. Although, it seem that this technique could not decrease pain level, but the means of pain scores after intervention in this study were lower than the pain level that the patients requested for analgesic drug (pain score < 50) (Patwee, 1998). In order to achieve an effective pain control in post CABG patients during the early phase post operation, pharmacological management should be the main pain management technique. Progressive muscle relaxation technique should be added as a complementary therapy.

Concerning anxiety, the result of this study is consistent with other researchers who used other technique of relaxation such as music and imagery to decrease anxiety in post cardiac surgery patients. For example, Kittisup (1993) studied the effect of music on pain and anxiety in Thai open-heart surgical patients. The result showed that the experimental group had significantly less pain and anxiety levels compared with the control group. Similarly to the study of Aragon et al. (2002), the effects of harp music in vascular and thoracic surgical patients, demonstrated that the experimental group had significantly less anxiety levels compared with the control group. Likewise Deisch, Soukup, Adams, and Wild (2000) who found that cardiac surgery patients who

listened to a preoperative guided imagery surgical tape had significantly less pain, anxiety, and two days shorter hospital stay than control group. Nevertheless, the result of this study is inconsistent with the study of Roykulchareon (2003) which found no effect when progressive muscle relaxation was used to reduce anxiety. This inconsistency may come from the different of the patients' environment and their concern after surgery. CABG patient realizes that their heart is the most important organ in the body and frequently affected abnormal emotion and develop emotion distress (Bernat, 1997; Carpenito, 1995). After surgery, CABG patients have to face new and unknown environment in the ICU while post abdominal surgery patients mostly come back to their own room where they were already accustomed.

In summary, progressive muscle relaxation technique was effective on postoperative pain and anxiety in CABG patients. The mechanism of this findings may be due to emotional modulation system. This technique may diminish the perception of pain by the brain centrally (Sudsuang & Singhaniyom, 2002). The effect on descending modulation of noxious impulse at spinal gate may have to be explored further. The effect of progressive muscle relaxation technique may distract the participants' attention on pain, anxiety, and reduce muscle tension, so called distraction technique. Therefore, this method is useful to be an additional alternative therapy with analgesic drugs for nurses to help postoperative CABG patients relief their pain and decrease anxiety.

Additional Finding

From the results of this study, most of the participants continued to use progressive muscle relaxation tape after the intervention (70%). The participants gave the reason that they felt like doing meditation. They said, "It makes me feel calm like I do meditation". Some participants use this technique to help them sleep easier, for example, "I like this tape. When I want to sleep, I listen to the tape. It helps me sleep easier especially when the ICU environment was not calm". Therefore, it seems that the participants not only used this progressive muscle relaxation technique for relieving pain but also for decreasing anxiety, promoting their calmness, and help them sleep well. Nurses can use this technique to help strengthening relationship with patients and increasing patients' satisfaction.

Moreover, this finding is consistent with Patwee' study (1998): Pain experience and pain management in open heart surgery patients. The results showed that the top two strategies, which post cardiac patients use to control their pain were slow deep breathing (95%) and sleep in comfort position (91%). The result also revealed that the cardiac patients had already used progressive muscle relaxation technique as their pain coping method.

The participants who requested extra analgesic drugs in the group that use progressive muscle relaxation deliberately within 24 hours (29%) were less than another group that did not employ the technique (44%). This result supports that progressive muscle relaxation technique was effective in decreasing analgesic drugs intake. Anyway, this finding may have been influenced by the variation of sample size in each group, individually response to postoperative pain and also amount of analgesic drugs intake. Thus, further researches are needed.

CHAPTER VI

CONCLUSION

Summary of the Study

This research was a quasi-experimental study, with one group pretest-posttest design. The purpose of this study was to explore the effects of progressive muscle relaxation technique on postoperative pain and anxiety in coronary artery bypass graft (CABG) patients. The participants were 30 adult CABG patients after extubation within 24-72 hours after operation in a cardio-vascular-thoracic intensive care unit, Ramathibodi hospital, Bangkok. The data were collected from June-August 2005. The participants were recruited by the following criteria: adult patients aged from 20 years old or more, both men and women who were undergone CABG surgery within 24-72 hours after the operation, never trained with the progressive muscle relaxation technique and no prior CABG or cardio-thoracic surgeries. The research instruments were consisted of demographic data questionnaire, the vertical visual analogue scale (VAS) of pain and the anxiety visual analogue scale. The procedure for providing progressive muscle relaxation technique involved the following steps. The investigator recorded pain score and anxiety score of the participants. Then, the participants were instructed to lie in comfortable position with their eyes closed and do follow the instruction from tape. The participants listen to the progressive muscle relaxation tape via earphones for 30 minutes. The investigator remained with the participants until end of tape. Then the investigator recorded pain score and anxiety score immediately and 15, 30, 45 minutes after intervention. The investigator left the tape with the participants for 24 hours and informed them to use as needed. Twenty-four hours after intervention, the investigator recorded the frequency of the patient's listening to the tape and extra analgesic drugs that were administered to the participants. Both mean anxiety scores and pain scores at various periods were compared by repeated measure ANOVA. The results of the study are summarized as followed:

The majority of the participants were male, over 60 years old. Most of them were married and retired. The majority of their education levels were primary education and Bachelor degree or higher. Nearly two-third of them were paid for the medical expenses by government. For the medical histories, Most of them were received CABG with non-CPB technique. The numbers of graft were ranged from two to five. The average surgical time of total participants was 254.5 (SD 57.3) minutes. The average length of stay in ICU of total participants was 4.6 (SD 1.55) days. The average length of hospital stay after surgery of total participants was 11.76 (SD 2.43) days. The average surgical time, the length of ICU stay and the length of hospital stay after surgery for non-CPB group were less than on CPB group.

From the study, it was found that the participants had significantly lower mean pain score and lower mean anxiety score after receiving immediate progressive muscle relaxation technique and at time 15, 30, 45 minutes afterwards ($p \leq 0.05$). Seventy percent of the participants used this technique again within 24 hours after intervention. Moreover, the percentage of participants who requested extra analgesic drug in the group that re-listened to the tape within 24 hours after the intervention was less than the group that did not.

Therefore, the result supported the hypotheses that progressive muscle relaxation technique provides an effective means of reducing postoperative pain and anxiety among CABG patients.

Implications and Recommendations

Implications

In this study, the investigator suggests that nurses can utilize progressive muscle relaxation technique as a non-pharmacological intervention for managing postoperative pain and anxiety in CABG patients. However, progressive muscle relaxation technique is cognitive behavioral approaches that distracts attention away from pain and relax tense muscles. The effect could be related to concentration on technique and elicit the relaxation response (Chooprayoon, 1998). The patients need to train this technique before operation to help them relax easier. Patients can use the audiotape of progressive muscle relaxation technique via earphones in order to have repeated verbal suggestions as frequently as they wanted until they feel relaxed. When

listen to the tape via earphones, the patients will be able to concentrate to what they are listening and also not causing any annoyance to other patients. This technique need to use with the patients at rest and had pain level over five before started this technique. The investigator suggests that nurses can develop a work instruction on this relaxation technique. The technique can also be employed in other special clinics as well, in order to achieve best nursing practices, and promote this guideline to be a pain guideline policy for nurses.

Recommendations

For further study, the effect of progressive muscle relaxation technique should be replicated with a design that has control of extraneous variables. The effectiveness of progressive muscle relaxation technique on pain and anxiety in CABG patients in CABG patients who have difference of pain or anxiety onset levels, at other phases after operation, and in other groups of postoperative patients should be tested. The effectiveness of progressive muscle relaxation on other symptoms such as sleep disturbance both in CABG patients and other groups of patients should be an area of interest for researchers. The autonomic nervous system changes which can be measured by vital signs such as blood pressure, heart rate, and respiratory rate should be measured to confirm patients' relaxation, pain and anxiety level. The risk factors of pain and anxiety such as age, marital status, sex, and severity could be identified as predicting factors for progressive muscle relaxation use. In addition, in the further study both of pain at rest and pain on movement should be assessed.

Limitation of the Study

There were several limitations in this study as followed;

1. The most of participants in this study were elderly and those who received CABG operation. Thus, the results are not generalizable to adults or those who received other operation.
2. The research design was one group pre-post test design with the limitation of time and population; therefore, there were various effects on the results of the study.
3. Progressive muscle relaxation technique is a self-intervention requiring patient's participation, it was impossible to blind the participants to the treatment. Therefore, experimental expectation may have influenced the results.

4. In this study, the investigator used suggested question, “Are you relax?” to evaluate patients’ relaxation state. Such question might give patients direction and leading to a positive response. It is strongly recommended that the question should be “What are you feeling at this moment?” in further studies.



REFERENCES

- Abbott, F. V., Donald, K. G., Sewitch, M. J., Johnston, C. C., Edgar, L., & Jeans, M. E. (1992). The prevalence of pain in hospitalized patients and resolution over six months. *Pain*, 50(1), 15-28.
- Abdel-Shaheed, J., Rollman, G. B., Gillespie, J. M., & Jone, K. S. (2002). Current pain response and its relationship to past pain experiences: Gender effects. In International Association for the Study of Pain Committee (Ed.), *ABSTRACT: 10th WORLD CONGRESS ON PAIN*. Seattle, WA: IASP Press.
- American Academy of Family Physicians. (1992). *Acute pain management in adults: operative procedures - Clinical Practice Guidelines; Quick Reference Guide*. Retrieved December 20, 2004, from http://www.findarticles.com/p/articles/mi_m3225/is_n1_v46/ai_12450736
- American Heart Association. (2001). *Heart and Stroke Statistical Update; 2000*. Dallas, USA: American Heart Association.
- American Heart Association. (2003). *Heart and Stroke Statistical Update; 2002*. Dallas, USA: American Heart Association.
- American Pain Society. (2004, January 1). *Pain: Current Understanding of Assessment, Management and Treatments*. Retrieved December 12, 2004, from http://www.ampainsoc.org/ce/npc/I/b_definitions.htm
- Anderson, C. (2000). What's new in pain management? *Home Health Care Nurse*, 18(10), 649-658.
- Aragon, D., Farris, C., & Byers, J. F. (2002). The effects of harp music in vascular and thoracic surgical patients. *Alternative Therapies in Health and Medicine*, 8(5), 52-59.
- Asdornwised, U. P. (2000). *Self-care and dependent-care experiences of Thai patients recovering from coronary artery bypass graft surgery: An ethnographic study*. Unpublished Dissertation, University of Pennsylvania, Pennsylvania.
- Atsberger, D. B. (1995). Relaxation therapy: Its potential as an intervention for acute postoperative pain. *Journal of Post Anesthesia Nursing*, 10(1), 2-8.

- Barnett, S. D., & Halpin, L. S. (2003). Functional status improvement in the elderly following coronary artery bypass graft. *Journal of Nursing Care Quality*, 18(4), 281-287.
- Bernat, J. J. (1997). Smoothing the CABG patients' road to recovery. *American Journal of Nursing*, 97(2), 23-27.
- Benson, H., & Klipper, M. Z. (1975). *The relaxation response*. New York: William Morrow and Company.
- Ben-Zur, H., Rappaport, B., Ammer, R., & Uretzky, G. (2000). Coping strategies, life style changes, and pessimism after open-heart surgery. *Health & Social Work*, 25(3), 201-209.
- Bonica, J. J. (1983). Current status of postoperative pain theory. In J. Y. R. Dubner (Ed.), *Current topics in pain research and therapy* (pp. 169-189). Tokyo: Excerpta Medica.
- Bonica, J. J. (1990). Definitions and taxonomy of pain. In J. J. Bonica (Ed.), *The management of pain* (2nd ed., pp. 18-27). Philadelphia: Lea & Febiger.
- Bulechek, G. M., & McCloskey, J. C. (1999). *Nursing Interventions; Effective Nursing Treatments* (3rd ed.). Philadelphia: W.B. Saunders Company.
- Bureau of Health Policy and Strategy. (2004). *Number and Percentage of Deaths by Diseases Sex and Age Group, 1998 - 2002*. Retrieved December 20, 2004, from <http://203.157.19.191/45%20table%202.3.34%20cause.xls>
- Cannon, C. E., & Smith, S. C. (1999). Current therapies for secondary prevention after myocardial infarction. *Current opinion in Cardiology*, 14(2), 155-158.
- Carpenito, L. J. (1995). Clinical nursing care plan: Coronary Artery Bypass Grafting. In *Nursing Care Plans & Documentation: Nursing Diagnosis and Collaborative Problems* (2rd ed., pp. 499-508). Philadelphia: J. B. Lippincott.
- Choorat, P. (2001). *The effect of progressive muscle relaxation technique on postoperative pain of patients undergoing spinal surgery*. Unpublished Master's thesis, Mahidol University, Bangkok, Thailand.
- Cole, B. H., & Brunk, Q. (1999). Holistic interventions for acute pain episodes: An integrative review. *Journal of Holistic Nursing*, 17(4), 384-396.

- Cousins, M., & Power, I. (1999). Acute and postoperative pain. In P. D. Wall & R. Melzack (Eds.), *Textbook of pain* (4th ed., pp. 331-343). New York: Churchill Livingstone.
- Craig, K. D. (1999). Emotion and psychology. In P. D. Wall & R. Melzack (Eds.), *Textbook of pain* (4th ed., pp. 331-343). New York: Churchill Livingstone.
- Criner, G. J., & Isaac, L. (1994). Psychological problems in the ventilator - dependent patient. *Critical Pulmonary Medicine*, 1, 47-57.
- Cunningham, S., Bene, D. S., & Vaughan, F. A. (2000). Myocardial ischemic and infarction. In S. L. Woods, E. S. Froelicher & S. U. Motzer (Eds.), *Cardiac Nursing* (pp. 481-540). Philadelphia: Lippincott.
- D'Arcy, Y. (1999). Management postoperative CABG pain. *Nursing*, 29(9), 17.
- Deglin, J. H., & Vallerand, A. H. (2003). *DAVIS'S DRUG GUIDE FOR NURSES.FRONT MATTER*. Retrieved April 1, 2004, from <http://online.statref.com/document.aspx?DocID=1&...58&offset=132&level=2&SessionID=F08F9KZUSKKOVJVQ>
- Deisch, P., Soukup, S. M., Adams, P., & Wild, M. C. (2000). Guided imagery: replication study using coronary artery bypass graft patients. *Nurse Clinics of North America*, 35(2), 417-425.
- Donovan, M. I. (1990). Acute pain relief. *Nursing Clinics of North America*, 25(4), 851-891.
- Edmunds, L. H. (2002, April 4). *Cardiac Surgery in the Adult*. Retrieved April 4, 2004, from <http://edmunds.cos.com/edmunds/Chapter8section9.html>
- Egan, K. J., Ready, L. B., Nelssy, M., & Geer, B. E. (1992). Self-administration of midazolam for postoperative anxiety: a double blind study. *Pain*, 49, 3-8.
- Eisenberg, D. E., Kessler, R. C., & Foster, C. (1993). Unconventional medicine in the United States: Prevalence, Costs, and patterns of use. *New England Journal of Medicine*, 328, 246-252.
- Ellis, M. F. (1998). Atrial fibrillation following cardiac surgery. *Dimensions of Critical Care Nursing*, 17(15), 226-235.
- Evans, D. (2003, November 7). *Music as an intervention in Hospitals. A Systemic Reviews*. Retrieved January 26, 2004, from http://www.joannabriggs.edu.au/best_practice/BPISmusic.php

- Filligim, R. B. (2000). *Sex, Gender, and Pain*. Seattle, WA: IASP Press.
- Forrest, J. (1995). Assessment of acute and chronic pain in older adults. *Journal of Gerontological Nursing*, 6, 15-20.
- Forster, A. (2003). Healing broken hearts. *Journal of Psychosocial Nursing*, 41(6), 45-49.
- Forster, E. L. (1994). Effect of TENS on pain, medication, and pulmonary function following coronary artery bypass graft surgery. *Chest*, 106, 1343-1348.
- Fox, E., O'Boyle, C., Lennon, J., & Keeling, P. W. N. (1987). Trait anxiety and coping style as predictor of pre-operative anxiety. *British Journal of Clinical Psychology*, 28, 89-90.
- French, S. (1994). The psychology and sociology of pain. In P. E. Wells, V. Frampton & D. Browsher (Eds.), *Pain Management by Physiotherapy*. New York: Bath Press Ltd. Avon.
- Gift, A. G., Moore, T., & Soeken, K. (1992). Relaxation to Reduce Dypnea and Anxiety in COPD patients. *Nursing Research*, 41(4), 242-246.
- Good, M. (1995a). A comparison of the effects of jaw relaxation and music on postoperative pain. *Nursing Research*, 44(1), 52-57.
- Good, M. (1995b). Relaxation techniques for surgical patients. *American Journal of Nursing*, 5, 39-43.
- Good, M. (1999). Relief of postoperative pain with jaw relaxation, music, and their combination. *Pain*, 81, 163-172.
- Good, M., (2001). Relaxation and music to reduce postsurgicalpain. *Journal of Advanced Nursing*, 33(2), 208-215.
- Good, M., & Moore, S. M. (1996). Clinical practice guidelines as a new source of middle-range theory focus on acute pain. *Nursing Outlook*, 44(2), 74-79.
- Gorcoran, R. (1995). The management of pain. In J. Penson & R. Fisher (Eds.), *Palliative care for people with cancer* (2nd ed., pp. 23-55). Philadelphia: W.B. Saunders.
- Guyton, A. C., & Hall, J. E. (1996). *Textbook of medical physiology* (9th ed.). Philadelphia: W. B. Saunders.

- Hancock, H. (1996). The complexity of pain assessment and management in the first 24 hours after cardiac surgery: implication for nurse. Part II. *Intensive and Critical Care Nursing*, 12(6), 346-353.
- Hawthorne, M. H. (1993). Women Recovering from Coronary Artery Bypass Surgery. *Scholarly Inquiry for nursing*, 7(4), 223-244.
- Hyett, M. J. (2004). Caring for a patient after CABG surgery. *Nursing*, 34(7), 48-49.
- Isaac, L., Hungerpillar, J., & Criner, G. (1989). Neuropsychologic Deficits in Chronic Ventilator-Dependent Patients. *Chest*, 92, 2553.
- Jaffe, J. H., & Martin, W. R. (1990). Opioid analgesics and antagonists. In A. G. Gillman, T. W. Rall, A. S. Nies & P. Taylor (Eds.), *Goodman and Gillman's the pharmacological basis of therapeutics* (8th ed., pp. 485-521). New York: Pergamon Press.
- Jensen, M., & Karoly, P. (1994). Self-Report Scales and Procedures for Assessing Pain in Adults. In M. Mc.Caffery, A. Beebe & J. Lathem (Eds.), *Pain: Clinical Manual for Nursing Practice* (pp. 15-34). Aylesbury: Mosby.
- Jensen, M. P., Karoly, P., & Braver, S. (1986). The measurement of clinical pain intensity: A comparison of six methods. *Pain*, 27, 117-126.
- Johnson, J. E., Christman, N. J., & Stitt, C. (1985). Personal control intervention: Short and long term effects on surgical patients. *Research in Nursing & Health*, 8, 131-145.
- Johnson, M., & Sexton, D. (1990). Distress during mechanical ventilation: patient perceptions. *Critical Care Nurse*, 10, 48-57.
- Jurf, J. B., & Nirschl, A. (1993). Acute postoperative pain management: A comprehensive review and update. *Critical Care Nursing Quarterly*, 16, 8-25.
- Kandel, E. R., Schwartz, J. H., & Jessel, T. M. (2000). *Principle of Neural Science* (4th ed.). New York: McGraw-Hill.
- Kaplan, H. I., & Sadock, B. J. (1998). *Synopsis of Psychiatry Behavioral Science/clinical psychiatry* (8th ed.). New York: Plenum press.
- Kulich, R. J. (1991). Relaxation Therapy. In C. A. Warfeild (Ed.), *Manual of Pain Management*. Philadelphia: Lippincott.

- Lazar, H. L., Fitzgerald, C., Gross, S., Heeren, T., Aldea, G. S., & Shemin, R. J. (1995). Determinants of Length of Stay After Coronary Artery Bypass Graft Surgery. *Circulation*, 92:20-24(20-24).
- LeResche, L., Aloisi, A. M., & Unruh, A. M. (2002). Sex and Gender Issues in Pain: The Interaction of Hormones, Emotion and Cognitions. In International Association for the Study of Pain Committee (Ed.), *ABSTRACT: 10th WORLD CONGRESS ON PAIN* (pp. 115). Seattle, WA: IASP Press.
- Leventhal, H., & Johnson, J. E. (1983). Laboratory and field experimentation: Development of a theory of self-regulation. In M. Schmitt, J. Skipper & R. Leonard (Eds.), *Behavioral science & nursing theory*. St. Louis, MO: Mosby.
- Levin, R. F., Malloy, G. B., & Hyman, R. B. (1987). Nursing management of postoperative pain: Use of relaxation techniques with female cholecystectomy patients. *Journal of Advanced Nursing*, 12, 463-472.
- Lewis, S. M., & Collier, I. C. (1992). *Medical Surgical Nursing Assessment and Management of Clinical Problems* (3rd ed.). St. Louis: Mosby Year Book.
- Ma, Y. L., et. al. (1996). Relaxation training on stress to abdominal surgery. *Chung Hua Hu Li Tasa Chih*, 31(7), 377-380.
- Mandle, C. L., Jacobs, S. C., Acari, P. M., & Domar, A. D. (1996). The efficacy of relaxation response interventions with adult patients: A review of literature. *Journal of Cardiovascular Nursing*, 10(3), 4-26.
- Mann, C., Pouzeratte, Y., & Eledjam, J.-J. (2003). Postoperative Patient- Controlled Analgesia in the Elderly. Risks and benefit of Epidural Versus Intravenous Administration. *Drug Aging*, 20(5), 337-345.
- Mao, J., Lia, J., & Simonnet, G. (2002). Increased Pain Sensitivity and Opioid Tolerance: Mechanisms and Clinical Implications. In International Association for the Study of Pain Committee (Ed.), *ABSTRACT: 10th WORLD CONGRESS ON PAIN*. Seattle, WA: IASP Press.
- Masnaragorn, P. (2001). *Comparison of quality of life in coronary artery disease patients between before and 3 months after coronary artery bypass graft*. Unpublished master's thesis of nursing science (adult nursing), Mahidol university, Bangkok, Thailand.

- McCaffery, M., Beebe, A., & Lathem, J. (1994). *Pain: Clinical Manual for Nursing Practice*. Aylesbury, England: Mosby.
- McCaffery, M., & Pasero, C. (1999). *Pain: clinical manual* (2nd ed.). St. Louis, MO: Mosby.
- McCartney, J., & Boland, R. (1994). Anxiety and Delirium in the Intensive Care Unit. *Critical Care Clinics*, 10, 673-680.
- McCleane, G. J., & Cooper, R. (1990). The nature of pre-operative anxiety. *Anesthesia*, 45(2), 153-155.
- McGuire, D. B. (1997). Measuring pain. In M. Frank-Stromborg & S. J. Olsen (Eds.), *Instruments for clinical health-care research* (2nd ed., pp. 528-564). Boston: Jones and Bartlett.
- Melzack, R., & Wall, P. D. (1965). Pain mechanisms: A new theory. *Science*, 150, 971-979.
- Miller, K. M., & Perry, P. A. (1990). Relaxation Technique and Post Operation Pain in Patients Undergoing Cardiac Surgery. *Heart & Lung*, 19(2), 136-146.
- Moore, S. M. (1994). Development of Discharge Information for Recovery After Coronary Artery Bypass Surgery. *Applied Nursing Research*, 7(4), 170-177.
- Mycek, M. J., Harvey, P. C., & Champe, P. C. (1997). *Pharmacology* (2nd ed.). Philadelphia: J. B. Lippincott Company.
- Namnabati, M. (2002). The effect of distraction on children's pain intensity during burn dressing. In International Association for the Study of Pain Committee (Ed.), *ABSTRACTS: 10th WORLD CONGRESS ON PAIN* (pp. 69). Seattle, WA: IASP Press.
- Nitayarumpong, S., & Pannarunothai, S. (1998). Achieving universal coverage of healthcare through health insurance: the Thai situation. In S. Nitayarumpong & A. Mills (Eds.), *Achieving universal coverage of healthcare*. Bangkok, Thailand.
- Oberle, K., Wry, J., Paul, P., & Grace, M. (1990). Environment, anxiety, and postoperative pain. *Western Journal of Nursing Research*, 12(6), 745-757.
- Oldridge, N. B. (1997). Outcome Assessment in Cardiac Rehabilitation. *Journal of Cardiopulmonary Rehabilitation*, 17, 179-194.

- O'Malley, P. G., Jones, D. L., Feuerstein, I. M., & Taylor, A. J. (2000). Lack of Correlation between Psychological Factors and Subclinical Coronary Artery Disease. *The New England Journal of Medicine*, 343(18), 1298-1304.
- Paiboonvorachat, S., & Boonsong, P. (2001). Pain management in Maharaj Nakorn Chiangmai Hospital. In P. Prateepavanich & P. Chaudakshetrin (Eds.), *Diversity In Pain Management; The 12th Annual Scientific Meeting of Thai Pain Society (The Thai Chapter of International Association for the Study of Pain)* (pp. 23-24). Bangkok, Thailand: Amarin Printing and publishing.
- Paice, J. A. (1991). Unraveling the mystery of pain. *Oncology Nursing Forum*, 18(5), 841-848.
- Pain Encyclopedia Britannica. (2004, December 9). *Encyclopedia Britannica online*. Retrieved December 12, 2004, from <http://www.britannica.com/eb/article?tocId=9058009>
- Polit, D. F. (1999). *Nursing Research: Principle and Methods*. Philadelphia: Lippincott.
- Potter, P. A., & Perry, A. G. (1995). *Basic nursing theory and practice*. St. Louis, MO: Mosby.
- Potter, P. A., & Perry, A. G. (1993). Comfort. In *Fundamentals of nursing* (3rd ed., pp. 1175-1213). St. Louis, MO: Mosby-Year Book.
- Puang-ngern, S. (2001). *Effectiveness of Music Therapy on Anxiety, Physiological responses, Vital Capacity and Oxygen Saturation in Mechanically Ventilated Patients*. Unpublished Master's Thesis of Nursing Science (Adult Nursing), Mahidol University, Bangkok, Thailand.
- Puntillo, K., & Weiss, S. (1994). Pain: its mediators and associated morbidity in critically ill cardiovascular surgical patients. *Nursing research*, 43, 31-36.
- Puntillo, K. A., Miaskowski, C., & Summer, G. (2003). Pain. In V. Carrieri-Kohlman, A. M. Lindsey & C. M. West (Eds.), *PATHOLOGICAL PHENOMENA IN NURSING: Human Responses to Illness* (3rd ed., pp. 235-254). St. Louis: SAUNDERS.
- Redeker, N. S., & Hedges, C. (2002). Sleep during hospitalization and recovery after cardiac surgery. *The Journal Of Cardiovascular Nursing*, 17(1), 56-68.

- Reid, A. F., & Curtsinger, G. (1975). Physiological changes associated with hypnosis: The effect of hypnosis on temperature. *International Journal of Clinical and Experimental Hypnosis*, 1968(16), 111-119.
- Rosomoff, R. S. (1996). The painful truth about pain management. *Rehabilitation Nursing*, 21(1).
- Roykulcharoen, V. (2003). *The effect of a systematic relaxation technique on postoperative pain in Thailand*. Unpublished doctoral dissertation, Case Western Reserve University, Cleveland, Ohio.
- Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors in the pathogenesis of cardiovascular disease and implications for therapy. *Circulation*, 99(16), 2192-2217.
- Seers, K., & Carroll, D. (1998). Relaxation technique for acute pain management: A Systematic Review. *Journal of Advanced Nursing*, 27(3), 466-475.
- Serlin, V. R., Mendosa, T. R., Nakamura, Y., Edwards, K., & Cleeland, C. S. (1995). When id cancer pain mild, moderate or severe? Grading pain severity by its interference with function. *Pain*, 61, 277-284.
- Sharav, Y., & Tal, M. (2002). Hypnotic Analgesia and Hypnotic Relaxation, How Much of a Placebo Effect? In International Association for the Study of Pain Committee (Ed.), *ABSTRACT: 10th WORLD CONGRESS ON PAIN*. Seattle, WA: IASP Press.
- Shih, F. J. (1997). Perception of self in the intensive care unit after cardiac surgery among adult Taiwanese and American-Chinese patients. *International Journal Nursing Studies*, 34(1), 17-26.
- Shih, F. J., Meleis, A. I., Yu, P. J., Hu, V. Y., Lou, M. F., & Huang, G. S. (1998). Taiwanese patients' concerns and coping strategies: Transition to cardiac surgery. *Heart & Lung*, 27(2), 82-98.
- Sindhu, S. (1986). Psychosocial Issues in Chronic Obstructive Pulmonary Disease. *Clinical Chest Medicine*, 7, 625-642.
- Smeltzer, S. C., & Bare, B. G. (1996). *Brunner and Suddarth's textbook of medical-surgical* (8th ed.). Philadelphia: Lippincott-Raven.

- Snyder, M. (1998). Progressive muscle relaxation. In M. Snyder & R. Lindquist (Eds.), *Complementary/alternative therapies in nursing* (3rd ed., pp. 1-14). New York: Springer Publishing Company.
- Surgical Associates of Texas, P. A. (2000, October 25). *Coronary Artery Bypass Surgery - CABG and MIDCAB*. Retrieved January 10, 2004, from <http://www.texheartsurgeons.com/CABG.htm>
- Tazbir, J., & Keresztes, P. A. (2005). Management of clients with functional cardiac disorder. In J. M. Black & H. J. Hawks (Eds.), *Medical Surgical Nursing: Clinical Management for Positive Outcomes* (7th ed., pp. 1267-1670). Philadelphia: Elsevier.
- Toleb, K. (2001). Acute Pain Service Nurses. In P. Prateepavanich & P. Chaudakshetrin (Eds.), *Diversity In Pain Management; The 12th Annual Scientific Meeting of Thai Pain Society (The Thai Chapter of International Association for the Study of Pain)* (pp. 68-72). Bangkok, Thailand: Amarin Printing and publishing.
- Tusek, D. L., Cwynar, R., & Cosgrove, D. M. (1999). Effect of guided imagery on length of stay, pain and anxiety in cardiac surgery patients. *Journal of Cardiovascular Management*, 10(2), 22-28.
- Utriyaprasit, K. (2001). *The relationship between recovery symptoms and functional outcomes in Thai CABG patients*. Unpublished doctoral dissertation, Case Western Reserve University, Cleveland, Ohio.
- Veterans Health Administration. (2003). *Management of Postoperative Pain*. Retrieved June 30, 2004, from www.OPQ.med.va.gov/cpg/PAIN/pain_cpg/algo1frameset.htm
- Walding, M. F. (1991). Pain, anxiety and powerlessness. *Journal of Advanced Nursing*, 16, 388-397.
- Watt-Watson, J., Stevens, B., Garfinkel, P., Streiner, D., & Gallop, R. (2001). Relationship between nurses'pain knowledge and pain management for their postoperative cardiac patients. *Journal of Advanced Nursing*, 36(4), 535-545.
- Wells-Federman, C. I., Deckro, J. P., & Baim, M. (1995). The mind-body connection: the psychophysiology of many traditional nursing interventions. *Clinical Nurse Specialist*, 9(1), 59-66.

- Wewers, M. E., & Lowe, N. K. (1990). A critical review of visual analogue scales in the measurement of clinical phenomena. *Research in Nursing & Health*, 13227-13236.
- Willis, W. D. (1995). From nociceptor to cortical activity. In B. Bromm & J. E. Desmedt (Eds.), *Advances in pain research and therapy* (pp. 1-19). New York: Raven.
- Zalon, M. L. (1993). Nurses' assessment of postoperative patients' pain. *Pain*, 54(3), 329-334.
- กรมสุขภาพจิต. (2547). (The Department of Mental Health, Ministry of Public Health, 2004). *การผ่อนคลายความเครียด [แถบเสียง]*. กรุงเทพมหานคร
- โครงการระบาดวิทยาโรคหัวใจและหลอดเลือด. (2544). รายงานการประชุม *Cardiovascular Epidemiology meeting* วันที่ 31 พฤษภาคม – 1 มิถุนายน พ.ศ. 2544. Retrieved June 30, 2004, from <http://www.thaiheart.org/epidemiology/index.htm>
- จุไรพร โสภารจารย์. (2536). (Sopajaree, J., 1993). ผลของการใช้เทคนิคการผ่อนคลายต่อการลดความเจ็บปวดขณะได้รับการล้างแผลในผู้ป่วยแผลใหม่. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลอายุรศาสตร์และศัลยศาสตร์, มหาวิทยาลัยเชียงใหม่, เชียงใหม่.
- โณมนภา กิตติศัพท์. (2536). (Kittisup, C., 1993). ผลของคนตรีต่อการลดความเจ็บปวด และความวิตกกังวลในผู้ป่วยผ่าตัดหัวใจแบบเปิด. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลศาสตร์, บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.
- ภัสพร จำวิษา. (2534). (Kumwicha, P., 1991). ผลของการสัมผัสต่อความวิตกกังวลของผู้ป่วยก่อนผ่าตัด. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลศาสตร์, บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

ราตรี สุตทรวง, และ วีระชัย สิงหนิยม. (2545). (Sudsuang, R., & Singhanियom, W., 2002).

ประสาทศรวิทยา (พิมพ์ครั้งที่ 4). กรุงเทพมหานคร: บริษัท เท็กซ์ แอนด์ เจอร์นัล
พับลิเคชั่น จำกัด.

ละเอียด ชูประยูร. (2541). (Chooprayoon, L., 1998). การฝึกฝนคลายกล้ามเนื้อ. ใน เอกสาร
ประกอบการอบรมเชิงปฏิบัติการ "การให้บริการในคลินิกคลายเครียด". กรุงเทพมหานคร:
กรมสุขภาพจิต กระทรวงสาธารณสุข.

วิเศษ สุพรรณชาติ, สุขุม อตนวนิช, ปรีชา ไตรวานนท์, และ กัลยาณกิติ์ กิตติยากร(ม.ร.ว.). (2538).
(Supannachat, V., Atanawanich, S., Towaranon, P., & Kitiyakorn, K., 1995).
ศัลยกรรมโรคหัวใจขาดเลือด. ใน สมบูรณ์ บุญเกษม (บก.), ศัลยกรรมโรคหัวใจและ
ทรวงอก กัลยาณกิติ์ กิตติยากร (หน้า 334-343). กรุงเทพมหานคร: ชัยเจริญ.

วินัส ลิฬหกุล, อุษาพร ชาวลิตนธิกุล, ไพโรจน์ ลิฬหกุล, สุภาณี พุทธเดชาคุ้ม, และ นิตยา ภาสุนันท์.
(2546). (Leelahakul, V., Chavalitnitikul, U., Leelahakul, P., Puthadejakum, S.,
& Pasunant, N., 2003). การศึกษาพฤติกรรมสุขภาพและความเสี่ยงต่อการเกิดโรคหลอดเลือด
หัวใจของผู้ใหญ่วัยกลางคนในเขตบางกอกน้อย. วารสารพยาบาลศาสตร์, 21(1), 56-
67.

สมาคมศัลยแพทย์ทรวงอกแห่งประเทศไทย. (2544). (The Society of Thoracic Surgeons of
Thailand., 2001). สรุปสถิติการผ่าตัดหัวใจในประเทศไทย ปี 2544. กรุงเทพมหานคร:
สมาคมศัลยแพทย์ทรวงอกแห่งประเทศไทย. ไม่ตีพิมพ์.

สมาคมศัลยแพทย์ทรวงอกแห่งประเทศไทย. (2545). (The Society of Thoracic Surgeons of
Thailand., 2002). สรุปสถิติการผ่าตัดหัวใจในประเทศไทย ปี 2545. กรุงเทพมหานคร:
สมาคมศัลยแพทย์ทรวงอกแห่งประเทศไทย. ไม่ตีพิมพ์.

สุคัญญา พัทวี. (2541). (Patwee, S., 1998). *ประสบการณ์ความปวดและการจัดการกับความ*

เจ็บปวดในผู้ป่วยหลังผ่าตัดหัวใจและทรวงอกชนิดผ่ากลางกระดูกสันอก. วิทยานิพนธ์

ปริญญาพยาบาลศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลผู้ใหญ่, บัณฑิตวิทยาลัย

มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

สุพร พริงเพรช. (2538). (Pringpreud, S., 1995). *ความสัมพันธ์ระหว่างการรับรู้ภาวะสุขภาพการ*

สนับสนุนทางสังคมกับพฤติกรรมการดูแลตนเองของผู้ป่วยภายหลังการผ่าตัดหลอดเลือด

แดงโคโรนารี. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาการพยาบาลศาสตร์,

บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

อรัญญา เชาวลิต. (2543). (Chawalit, A., 2000). *หลักการพยาบาลผู้ป่วยที่มีความเจ็บปวด*. ใน

พัชรียา ไชยลังกา, นวลจันทร์ รมนารักษ์, จารุวรรณ มานะสุการ และ อรัญญา เชาวลิต

(บก.), *ตำราการพยาบาลผู้ป่วยผู้ใหญ่1 (อายุรศาสตร์)* (หน้า 34-55). สงขลา: ห้างหุ้นส่วน

จำกัด เอส ซี วี.



APPENDIX A

Lists of Experts

ผู้ทรงคุณวุฒิ ตรวจสอบเนื้อหาของแถบเสียง “เทคนิคการผ่อนคลายความเครียด”

รองศาสตราจารย์ วิเศษ สุพรรณชาติ

หัวหน้าหน่วยสัลยกรรมหัวใจและทรวงอก

คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

รองศาสตราจารย์ ชัชวาลย์ ศิลปกิจ

รองหัวหน้าภาควิชาจิตเวชศาสตร์ คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

นางสาว อินทิรา ปัทมินทร

นักวิชาการ 8 สำนักพัฒนาสุขภาพจิต กระทรวงสาธารณสุข

APPENDIX B**Demographic Data Questionnaire**

แบบบันทึกข้อมูลส่วนบุคคลและข้อมูลทั่วไป

1. ชื่อ..... HN..... หอผู้ป่วย.....
2. อายุ.....ปี
3. เพศ.....
4. สถานภาพสมรส.....
5. อาชีพ.....
6. ระยะเวลาในการศึกษา ปี
7. การจ่ายค่ารักษาพยาบาล.....
- 8.....
- 9.....
- 10.....

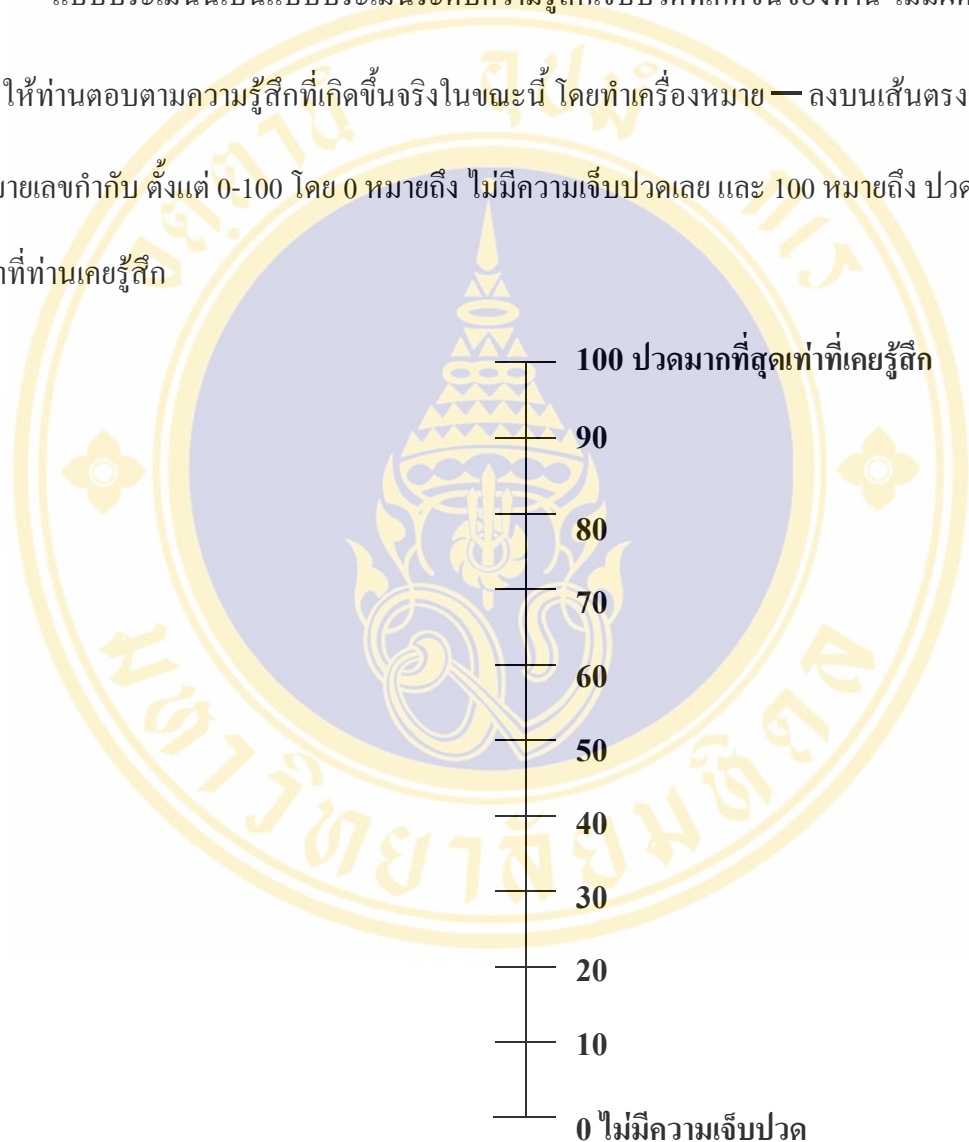
APPENDIX C**The Numerical Pain Scale (Vertical)****แบบประเมินระดับความรู้สึกเจ็บปวด**

แบบประเมินนี้เป็นแบบประเมินระดับความรู้สึกเจ็บปวดที่เกิดขึ้นของท่าน ไม่มีผิดหรือถูก

ขอให้ท่านตอบตามความรู้สึกที่เกิดขึ้นจริงในขณะนี้ โดยทำเครื่องหมาย — ลงบนเส้นตรงที่มี

หมายเลขกำกับ ตั้งแต่ 0-100 โดย 0 หมายถึง ไม่มีความเจ็บปวดเลย และ 100 หมายถึง ปวดมากที่สุด

เท่าที่ท่านเคยรู้สึก



APPENDIX D**The Anxiety Visual Analogue Scale (VAS)****แบบประเมินระดับความวิตกกังวล**

แบบประเมินนี้เป็นแบบประเมินระดับความวิตกกังวลที่เกิดขึ้นของท่าน ไม่มีผิดหรือถูก

ขอให้ท่านตอบตามความรู้สึกที่เกิดขึ้นจริงในขณะนี้ โดยทำเครื่องหมาย — ลงบนเส้นตรงที่มี

หมายเลขกำกับ ตั้งแต่ 0-100 โดย 0 หมายถึง ไม่มีความวิตกกังวลเลย และ 100 หมายถึง วิตกกังวล

มากที่สุดเท่าที่ท่านเคยรู้สึก



APPENDIX E
Documentary Proof of Ethical Clearance Committee
on Human Rights



คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
ถนนพระราม 6 กทม. 10400
โทร. (662) 354-7275, 201-1296 โทรสาร (662) 354-7233
Faculty of Medicine, Ramathibodi Hospital, Mahidol University
Rama VI Road, Bangkok 10400, Thailand
Tel. (662) 354-7275, 201-1296 Fax (662) 354-7233

เอกสารรับรองโดยคณะกรรมการจริยธรรมการวิจัยในคน
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี
มหาวิทยาลัยมหิดล

เลขที่ ๐๔๖๗/๒๕๕๘

ชื่อโครงการ ประสิทธิภาพของเทคนิคการพ่นกลายกล้ามเนื้อต่อระดับความเจ็บปวดและระดับความวิตกกังวลในผู้ป่วย ภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

เลขที่โครงการ/รหัส ID ๐๓-๔๘-๑๕๖

ชื่อหัวหน้าโครงการ นางสาวอัจฉรา จงเจริญกำโชค

ที่ทำงาน ภาควิชาพยาบาลศาสตร์
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี
มหาวิทยาลัยมหิดล

ขอรับรองว่าโครงการดังกล่าวข้างต้นได้ผ่านการพิจารณาเห็นชอบโดยสอดคล้องกับแนวปฏิบัติ
เอลซิงกิ จากคณะกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี


ลงนาม _____
ประธานกรรมการจริยธรรมการวิจัยในคน (ศาสตราจารย์ นายแพทย์กฤษฏา รัตนโอฬาร)


ลงนาม _____
คณบดีคณะแพทยศาสตร์โรงพยาบาลรามาธิบดี (ศาสตราจารย์ นายแพทย์รัชตะ รัชตะนาวิน)

APPENDIX F

Information Sheet for Participants and Informed consent Form

Information Sheet for Participants

เอกสารชี้แจงข้อมูล/คำแนะนำสำหรับผู้เข้าร่วมการวิจัย

ชื่อโครงการ การวิจัยเรื่องประสิทธิผลของการฟ่อนคลายกล้ามเนื้อต่อระดับความเจ็บปวดและความวิตกกังวลในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ (Coronary artery bypass graft operation)

ชื่อผู้วิจัย นางสาว อัจฉรา จงเจริญกำโชค นักศึกษาระดับปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

นางสาว อัจฉรา จงเจริญกำโชค 52 ซอย อินทพรพิทักษ์ 3 บางยี่เรือ ธนบุรี กรุงเทพมหานคร 10600
ท่านสามารถโทรติดต่อได้ที่ โทรศัพท 0-2465-5838, 0-9881-1906

ความเป็นมาของโครงการ

การผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ (Coronary Artery Bypass Graft operation) เป็นวิธีการรักษาอย่างหนึ่งที่ใช้เพื่อรักษาโรคเส้นเลือดหัวใจอุดตัน แม้ว่าการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ จะช่วยให้ผู้ป่วยรอดชีวิต หรือมีอาการดีขึ้น แต่ยังคงมีผลกระทบที่เกิดขึ้นแก่ผู้ป่วยภายหลังได้รับการผ่าตัด อาการที่เกิดขึ้นมากที่สุดทั้งในระยะหลังผ่าตัดคือความเจ็บปวดจากบาดแผลที่ทำการผ่าตัดและความวิตกกังวล หากไม่สามารถควบคุมความเจ็บปวดและความวิตกกังวลได้ จะเป็นผลให้ผู้ป่วยไม่สามารถเคลื่อนไหวร่างกาย หรือหายใจ ได้อย่างมีประสิทธิภาพ อารมณ์แปรปรวน ต่อต้านในการรักษาและมีผลต่อเนื่องไปถึงระยะฟื้นฟู การควบคุมอาการปวดในผู้ป่วยหลังผ่าตัดได้อย่างมีประสิทธิภาพที่สุดคือ การให้ยาแก้ปวด ในผู้ป่วยบางราย ระดับยาที่ไม่ก่อให้เกิดอาการข้างเคียงไม่สามารถควบคุมอาการปวดได้เพียงพอ ดังนั้นกิจกรรมที่สามารถลดความวิตกกังวลและความเจ็บปวดร่วมกับการให้ยาแก้ปวดเพื่อช่วยควบคุมความเจ็บปวดและความวิตกกังวลในผู้ป่วยกลุ่มนี้ ให้ดียิ่งขึ้นจึงมีความสำคัญและมีความจำเป็นอย่างยิ่ง ผู้วิจัยในฐานะพยาบาล จึงมีความสนใจที่ศึกษาประสิทธิผลของเทคนิคการฟ่อนคลายกล้ามเนื้อ ในการลดความเจ็บปวดและความวิตกกังวลในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ เนื่องจากเทคนิคการฟ่อนคลายวิธีนี้ มีกลไกลดอาการเจ็บปวด โดยการลดความตึงตัวของกล้ามเนื้อ, เบี่ยงเบนความสนใจจากความเจ็บปวด และความวิตกกังวล ซึ่ง 3 สิ่งนี้เป็นปัจจัยที่กระตุ้นความเจ็บปวด ดังนั้นน่าจะช่วยให้

ได้ผลดีกับผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจซึ่งพบว่าผู้ป่วยมีความเจ็บปวดและความวิตกกังวลเป็นปัญหาที่พบมากที่สุด เพื่อให้ผู้ป่วยลดความทุกข์ทรมานจากความเจ็บปวด สุขสบายมากขึ้นและสามารถฟื้นฟูสภาพร่างกายได้เร็วขึ้น รวมทั้งยังเป็นบทบาทอิสระที่พยาบาลสามารถทำได้

วัตถุประสงค์ เพื่อเป็นแนวทางในการลดความเจ็บปวดในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมวิจัย การวิจัยครั้งนี้จะรบกวนท่านในการตอบคำถามประมาณ 5 นาที 1 ครั้ง และแบบประเมินต่างๆ ทั้งหมด 3 ครั้ง และใช้เวลาในการทดลองประกอบด้วยการฟัง แถบเสียงและปฏิบัติตามคำแนะนำในแถบเสียง ใช้เวลาประมาณ 30 นาที ท่านสามารถสอบถามในสิ่งที่ท่านสงสัยเกี่ยวกับการวิจัยได้ตลอดเวลา โดยดิฉันยินดีจะตอบคำถามด้วยความเต็มใจ ไม่ปิดบังจนท่านพอใจ ท่านสามารถถอนตัวจากการวิจัยได้ทุกเมื่อโดยไม่กระทบต่อการดูแลรักษาที่พึงได้รับตามปกติ โดยการยกเลิกไม่มีผลต่อการดูแลรักษาใดๆ

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมวิจัย ผลของการศึกษานี้จะทำให้สามารถจัดการความเจ็บปวดและความวิตกกังวลหลังผ่าตัดของท่านได้ดีขึ้น และเป็นประโยชน์ในการดูแลผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจท่านอื่นๆ การวิจัยครั้งนี้ไม่ก่อเกิดอันตรายใดๆหรือเกิดน้อยที่สุด ท่านจะได้รับการดูแลรักษาที่พึงได้ตามปกติ การวิจัยครั้งนี้จะรบกวนท่านในการใช้เวลาตอบคำถาม 5 นาทีและแบบประเมินต่างๆ ทั้งหมด 4 ครั้ง ไม่เกิน 2 นาทีในแต่ละครั้ง และร่วมการทดลองประมาณ 30 นาที

การเก็บข้อมูลเป็นความลับ ข้อมูลเฉพาะเกี่ยวกับตัวท่านจะถูกเก็บเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย หรือการเปิดเผยข้อมูลต่อผู้มีหน้าที่ที่เกี่ยวข้องกับการสนับสนุนและกำกับดูแลการวิจัย

ถ้าท่านมีข้อข้องใจหรือมีความกังวลใจ เกี่ยวกับวิธีดำเนินการวิจัยของโครงการวิจัยนี้ ท่านสามารถติดต่อได้ที่ ประธานกรรมการจริยธรรมการวิจัยในคน คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี หน่วยจริยธรรมการวิจัยในคน สำนักงานวิจัยคณะฯ อาคารวิจัยและสวัสดิการ ชั้น 3 (ห้อง 3) โทรศัพท์ 02-201 1544 ในเวลาราชการ

อัจฉรา จงเจริญกำโชค

นักศึกษาระดับปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

Informed consent Form

เอกสารแสดงความยินยอมโดยได้รับการบอกกล่าวและเต็มใจ

ชื่อโครงการ การวิจัยเรื่องประสิทธิผลของการผ่อนคลายกล้ามเนื้อต่อระดับความเจ็บปวดและความวิตกกังวลในผู้ป่วยภายหลังการผ่าตัดทำทางเบี่ยงหลอดเลือดหัวใจ (Coronary artery bypass graft operation)

ชื่อผู้วิจัย นางสาว อัจฉรา จงเจริญกำโชค นักศึกษาระดับปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

*ชื่อผู้เข้าร่วมวิจัย

อายุ.....เลขที่เวชระเบียน

คำยินยอมของผู้เข้าร่วมวิจัย

ข้าพเจ้า นาย/ นาง/ นางสาว.....ได้ทราบรายละเอียดของโครงการวิจัยตลอดจนประโยชน์ และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้วอย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้น และยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้น และข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้น ข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่เข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้า ต่อหน่วยงานต่างๆที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ลงนาม.....(ผู้เข้าร่วมวิจัย)

ลงนาม.....(พยาน)

ลงนาม.....(พยาน)

วันที่ลงนามแสดงความยินยอม.....เดือน.....พ.ศ.

คำอธิบายของผู้วิจัย

ข้าพเจ้าได้อธิบายรายละเอียดของโครงการ ตลอดจนประโยชน์ของการวิจัย รวมทั้งข้อเสี่ยงที่อาจจะเกิดขึ้นแก่ผู้เข้าร่วมการวิจัยทราบแล้วอย่างชัดเจน โดยไม่มีสิ่งใดปิดบังซ่อนเร้น

ลงนาม.....(ผู้วิจัย)

วันที่ลงนามแสดงความยินยอม.....เดือน.....พ.ศ.

หมายเหตุ: * ผู้เข้าร่วมวิจัย หมายถึง ผู้ยินยอมคนให้ทำวิจัย

BIOGRAPHY

NAME	Achara Jongjareonkumchok
DATE OF BIRTH	26 November 1967
PLACE OF BIRTH	Bangkok, Thailand
INSTITUTIONS ATTENDED	Mahidol University, 1990: Bachelor of Science (Nursing) Mahidol University, 2005: Master of Nursing Science (Adult Nursing)
RESEARCH-GRANT	Supported in part by the Thesis Grant, Faculty of Graduate Studies, Mahidol University
POSITION & OFFICE	270 Ramathibodi Hospital, Bangkok, Thailand Position : Nurse Tel. 0-2201-1319, 0-2201-1329 E-mail: achy@kittymail.com
HOME ADDRESS	52 Soi Intharapitak3, Dhonburi, Bangkok, Thailand Tel. 0-2465-5838