THE EFFECTS OF PASSIVE PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON POST OPERATIVE ABDOMINAL SURGERY PAIN IN THE ELDERLY PATIENTS

PITOON VUTISO

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
2007

Thesis

Entitled

THE EFFECTS OF PASSIVE PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON POST OPERATIVE ABDOMINAL SURGERY PAIN IN THE ELDERLY PATIENTS

.....

Mr. Pitoon Vutiso

Candidate

.....

Assist. Prof. Orapan Thosingha,

D.N.S.

Major-Advisor

.....

Lect. Ketsarin Utriyaprasit,

Ph.D. (Nursing)

Co-Advisor

.....

Assist. Prof. Wallada Chanruangvanich,

D.N.S.

Co-Advisor

.....

Prof. M.R. Jisnuson Svasti,

Ph. D.

Dean

Faculty of Graduate Studies

.....

Assoc. Prof. Pornsri Sriussadaporn,

M.Ed. (Ed.Research)

Chair

Master of Nursing Science

Faculty of Nursing

Thesis

Entitled

THE EFFECTS OF PASSIVE PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON POST OPERATIVE ABDOMINAL SURGERY PAIN IN THE ELDERLY PATIENTS

was submitted to the Faculty of Graduate Studies, Mahidol University

for the degree of Master of Nursing Science (Adult Nursing)

on

28 February, 2007

.....

Mr. Pitoon Vutiso

Candidate

.....

Assoc. Prof. Kaimook Wichiencharoen,

Ed. D (Curriculum Research and Development)

Chair

.....

Lect. Varunyupa Roykulcharoen,

Ph.D.(Nursing)

Member

.....

Assist. Prof. Orapan Thosingha,

D.N.S.

Member

.....

Assist. Prof. Wallada Chanruangvanich,

D.N.S.

Member

.....

Lect. Ketsarin Utriyaprasit,

Ph.D.(Nursing)

Member

.....

Prof. M.R. Jisnuson Svasti,

Ph.D.

Dean

Faculty of Graduate Studies

Mahidol University

.....

Assoc. Prof. Kobkul Phancharoenworakul,

Ph.D. (Nursing)

Dean

Faculty of Nursing

Mahidol University

ACKNOWLEDGEMENTS

The success of this study has been contributed by thesis advisors, Assistant Professor Dr. Orapan Thosingha, Assistant Professor Dr. Wallada Chanruangvanich and Dr. Ketsarin Utriyaprasit who gave me guidance, assistance, a correction of various errors, support and encourage me along the research procedure.

I would like to thank the experts who are kind to validate the instruments used in this study to be accurate and effective.

A special thank to the participants in this study, the investigator's assistants and all staff nurses of the general surgical departments of Saraburi hospital for their help and facilitation in data collection.

My respectful gratitude will be going directly to my family for love and highly concerned. 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.

Pitoon Vutiso

THE EFFECTS OF PASSIVE PROGRESSIVE MUSCLE TECHNIQUE ON POST OPERATIVE ABDOMINAL SURGERY PAIN IN THE ELDERLY PATIENTS

PITOON VUTISO 4737726 NSAN/M

M.N.S. (ADULT NURSING)

THESIS ADVISOR: ORAPAN THOSINGHA, D.N.S., KETSARIN UTRIYAPRASIT, Ph.D. (NURSING)., WALLADA CHANRUANGVANICH, D.N.S.

ABSTRACT

The purpose of this research was to study the effects of passive progressive muscle relaxation technique (PPMR) on post-operative abdominal surgery pain in elderly patients. The sample size in this study was 64 elderly patients who underwent abdominal surgery in the surgical department, Saraburi Hospital. They were enrolled into the study at the pre-operative period. Thirty two of them were randomly assigned into the experimental group, while the other thirty two were in the control group. The experimental group received the usual care and instruction in passive progressive muscle relaxation technique (PPMR), while the control group received only the usual care. Pain level was measured by utilizing the Numerical Rating Scale at rest, immediately after the first ambulation, 30 minutes and 90 minutes after bed rest. The use of analgesic drugs required within 12 hours was recorded. Independent t-test was employed to test the difference of pain level between the experimental and the control group. One way analysis of variance (ANOVA) was employed to test the difference between the level of pain pre and post-intervention in the experimental group and control group. Chi-square was employed to test the difference between the analgesics used in experimental and control groups.

The study revealed that after receiving PPMR the mean score of pain level between the experimental group and the control group were significantly different (p value $< .05$). Moreover, the mean score of pain level between different time points were significantly different (p value $< .01$). However, the usage of analgesics between the two groups was not statistically different. The finding in this study supported the effect of passive progressive muscle relaxation technique (PPMR) on post-operative pain reduction among the elderly patients. This technique should be used for complementary post-operative pain reduction.

KEY WORDS : PASSIVE PROGRESSIVE MUSCLE RELAXATION / POSTOPERATIVE PAIN/ABDOMINAL SURGERY/ ELDERLY PATIENT

66 P.

ผลของการใช้เทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อต่อความปวดหลังผ่าตัดช่องท้องในผู้ป่วยสูงอายุ (THE EFFECTS OF PASSIVE PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON POST OPERATIVE ABDOMINAL SURGERY PAIN IN THE ELDERLY PATIENTS)

ไพฑูรย์ วุฒิโส 4737726 NSAN/M

พย.ม. (การพยาบาลผู้ใหญ่)

คณะกรรมการควบคุมวิทยานิพนธ์: อรพรรณ โตสิงห์, พย.ด., เกศรินท์ อุทริยะประสิทธิ์, Ph.D. (Nursing), วัลย์ลดา ฉันท์เรืองวณิชย์, พย.ด.

บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาผลของการใช้เทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อต่อความปวดหลังผ่าตัดช่องท้องในผู้ป่วยสูงอายุ กลุ่มตัวตัวอย่างในการศึกษาครั้งนี้ คือ ผู้ป่วยสูงอายุ จำนวน 64 คน ซึ่งเข้ารับการผ่าตัดช่องท้องในโรงพยาบาลศูนย์สระบุรี ผู้ป่วยสูงอายุถูกสุ่มอย่างง่ายเพื่อเข้ากลุ่มในช่วงเวลาก่อนการผ่าตัดเป็นกลุ่มทดลอง จำนวน 32 คน กลุ่มควบคุม จำนวน 32 คน กลุ่มทดลองได้รับการดูแลตามปกติและถูกสอนให้ใช้เทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อ ขณะที่กลุ่มควบคุมได้รับเพียงการดูแลตามปกติเท่านั้น ระดับความเจ็บปวดถูกประเมินโดยการใช้มาตรวัดความปวดชนิดตัวเลข (NRS) ซึ่งทำการวัดระดับความเจ็บปวดก่อนและหลังการให้ผู้ป่วยลุกเดินครั้งแรก และวัดซ้ำเมื่อเวลาผ่านไป 30 นาทีและ 90 นาทีหลังการลุกเดิน และบันทึกการใช้ยาภายใน 12 ชั่วโมง หลังการลุกเดินจากนั้นนำข้อมูลมาวิเคราะห์เปรียบเทียบระดับความเจ็บปวดระหว่างกลุ่มควบคุมและกลุ่มทดลองในแต่ละช่วงเวลาโดยใช้สถิติ Independent t-test เปรียบเทียบระดับความเจ็บปวดในแต่ละช่วงเวลาของกลุ่มควบคุมและของกลุ่มทดลองโดยใช้สถิติ One way analysis of variance (ANOVA) และเปรียบเทียบการใช้ยาระหว่างกลุ่มควบคุมและกลุ่มทดลองโดยใช้สถิติ Chi-square

ผลการศึกษาพบว่าค่าเฉลี่ยของคะแนนความเจ็บปวดระหว่างกลุ่มควบคุมและกลุ่มทดลองในแต่ละช่วงเวลามีความแตกต่างอย่างมีนัยสำคัญทางสถิติ (p value<.05) และค่าเฉลี่ยคะแนนความเจ็บปวดในแต่ละช่วงเวลาภายในทั้งสองกลุ่มมีความแตกต่างอย่างมีนัยสำคัญทางสถิติ (p value<.01) แต่การใช้ยาระหว่างกลุ่มควบคุมและกลุ่มทดลองไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ผลการศึกษาที่ได้สนับสนุนประสิทธิผลของเทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อในการใช้บำบัดร่วมในการลดความเจ็บปวดในผู้ป่วยสูงอายุภายหลังการผ่าตัดช่องท้อง

66 หน้า.

CONTENTS

CONTENTS (continued)

LIST OF TABLES

LIST OF DIAGRAMS

CHAPTER I
INTRODUCTION

Background and Significance of the study

Abdominal surgery caused damage to tissue. The infectious process from damage of tissue activated histamine, bradykinin, prostaglandin, and serotonin. These chemical agent stimulated sensory receptor at the nerve ending such as A-delta and C-fiber which then the pain signal was transmitted to dorsal horn where substance P. was consecutively produced and then activated the cell in substantia gelatinosa to produce nerve impulse transmitting to cerebral cortex where the pain is perceived.

Patients with abdominal operative wound suffered persistence pain since the wound usually situated near by diaphragm which always moved according to breathing and a lot of nerve fiber passed through abdominal operative area (Jurf & Nirschl, 1993). The often found abdominal operative organs were uterus, ovary, gastric, small intestine, large intestine, gall, and pancreas. The consequences of injury caused patient to suffer with pain. Approximately 15% of patients with abdominal surgery had severe pain and 75% had moderate pain (Sjostrom, Dahlgren, & Haljamal, 1999). Especially in the 72 hours post surgery, post-operative pain had physiological effect such as increased blood pressure, pulse & breathing, pupil dilation, and perspiration. Moreover, pain caused patient to have restlessness and fear of incoming pain (Ignatavious, Workman, & Mishler, 1995; Bonica, 1990).

Elderly patients were a group of patients which nurse should have paid attention to their post-operative pain. Most of elderly patients undergone abdominal surgery, 62%, had severe intensity of pain (8-10 points) which 35 % occurred during the first 24 hours post-surgery. The U.S. Public Health Service reported that elderly patients had the double intensity of postoperative pain compare with other population (Acute Pain Management Panel, 1992; Closs, 1994).

Severe intensity of pain hindered physical mobility since the more ambulation induced more pain. In fact, the ambulation such as turn body over the bed, sit up from lying on bed, or walking can enhance functionality of digestive system, respiratory

system, circulation system, and elimination system. Moreover, ambulation can prevent or alleviate flatulence, urinary retention, and constipation. Pain from upper abdominal surgery restricted ambulation of patient as well as limited breathing and coughing which caused sputum accumulation in respiratory tract. Lying on bed for 5 to 7 days without get up to sit upright can have caused infection in respiratory system with the prevalence rate for18.6% (Shea, Brooks, Dayhoff, & Keck, 2002). Consequently, atelectasis can have been a result leading to hypoxemia which in turn stimulated anaerobic respiration producing Lactic acid which then stimulated sensory receptor of nerve ending. The pain signal was then transmitted to the brain where the intensity of pain was amplified. Thus the medical expense and treatment time increased due to pain and complication from pain. (Shea, Brooks, Dayhoff & Keck, 2002).

The effective pain therapy in 72 hours postoperative period was using analgesia and other pain management technique, i.e., distraction, massage, imagery, meditation, touch, muscle relaxation, transcutaneous elective nervous stimulation (TENS), biofeedback, acupuncture, and hypnosis. These techniques were used as a supplement of analgesic administration to get higher effectiveness in pain management. However, analgesic administration had been the mainstream to alleviate the postoperative pain. The most widely used analgesics were morphine and Pethidine which were narcotic analgesics. Morphine had the highest effectiveness in pain relief (Punthusak, 1997; Austrup & Korean, 1999). The action of Morphine was last long for 3-5 hours (Bonica, 1990). Pethidine was a synthetic drug which had the similar microstructure and action with morphine which the action was last long for 2-4 hours (Black & Matssarin-Jacobs, 1993). In addition to analgesic action, Morphine and Pethidine also created side effect such as nausea, vomit, constipation, respiratory control suppression and emotional swing. However, almost half of postoperative patient who got analgesic administration in regular time still reported inadequate analgesic action (Jacox, Ferrell, Heidrich, Hester, & Miokowski, 1992; Jurf, & Nirschl, 1993; Watt-Watson, Garfinkel, Gallop, Stevens & Streiner, 2000; Gloria & Denise, 2004).

Some pain management techniques were used effectively in concurrent with analgesic administration (Good, et al., 2001) and were able to reduce the health problem from drug side effect which finally brought patient more comfortable

(Boonsawat, 2001; Jamonman, 1989). Progressive Muscle Relaxation (PMR) technique relaxed body, mind and emotion from stress (Day, 2000; Sloman, 1995) as well as reduced emotional stimulus which caused production of Endogeneous Opioid which alleviated intensity of pain. In addition there are a lot of studies which supported the effectiveness of PMR technique. Jamonman (1989) studied the effect of relaxation techniques to intensity of pain in 34 post abdominal operative patients divided into 14 experimental samples and 14 controlled samples. The result showed that breathing exercise, passive PMR, and positive visualization technique were able to reduce pain sensation and pain distress as well as the amount of analgesics used in 24 hours ($p<0.05$). This finding was in accordance with Choorat (2001) who studied the effect of PMR techniques to post operative pain intensity in 20 vertebrae operative patients divided into experimental and controlled group. The result indicated active progressive relaxation technique was able to reduce pain intensity in day 1 and 2 with statistical significance ($p<0.05$). The other concordance result was obtained from Roykulcharoen & Good (2004) who studied the effect of systematic relaxation technique to pain intensity, pain distress, and anxiety in 102 post abdominal operative patients divided into 61 samples in experimental group and 61 samples in controlled group. The result demonstrated that systematic relaxation technique was able to reduce pain intensity, pain distress and anxiety ($p<0.05$). According to Jongjaroenkumchok (2005) who studied the effect of PMR technique to pain intensity alleviation in 32 post coronary artery bypass graft patients which divided into 2 groups. The result showed that PMR technique was able to reduce pain intensity and anxiety ($p<0.05$). PMR technique can have been managed in adjuvant with analgesics therapy in postoperative patient to alleviate pain intensity effectively without any side effect or health hazard, as a result, the analgesics dosing size can be reduced. In addition, patients were able to learn and practice PMR by themselves anywhere they wished (Doody, Smith, & Webb, 1991; Roykulcharoen & Good, 2004). From review of the outcome of pain management and procedure of pain management, researcher was convinced that Passive Progressive Muscle Relaxation technique (PPMR) took effect in whole body relaxation without the needs to stress the abdominal muscle. This technique was also appropriate and easy to practice especially for elderly post abdominal operative patients. The effect of PPMR technique to pain intensity in elderly post abdominal

operative patient had not been specifically studied since most of studies were conducted on adult patients who were 49.9 years old averagely (Jamonman, 1989) and 42 years old averagely (Roykulcharoen &Good, 2004). Researcher was therefore interested in studying pain management using Passive Progressive Muscle Relaxation technique (PPMR) in elderly abdominal operative patients as well as the effectiveness of this technique in reducing pain intensity. The outcome would not be only beneficial directly for patients but also for nursing professional as the extension of knowledgebase in term of independent nurse role in elderly patient pain management.

Research Question

Can Passive Progressive Muscle Relaxation technique (PPMR) reduce the post abdominal operative pain in elderly patients, and how?

Purpose of the Study

1. To compare pain intensity in post abdominal operative elderly patients before and after practicing Passive Progressive Muscle Relaxation technique (PPMR).
2. To compare pain intensity between Passive Progressive Muscle Relaxation technique (PPMR) practice and non practice group of post abdominal operative elderly patients.
3. To compare the usage of analgesic drug between experimental group and control group.

Hypotheses

1. After using Passive Progressive Muscle Relaxation technique (PPMR), post abdominal operative pain intensity in elderly patients is lower than before using the technique.
2. Elderly patients who use Passive Progressive Muscle Relaxation technique (PPMR) had lower post abdominal operative pain intensity than the patients who doesn’t use the technique.

3. Elderly patients who use Passive Progressive Muscle Relaxation technique (PPMR) had lower usage of analgesic drug than the patients who doesn't use the technique.

Conceptual Framework

The neurological pathway of postoperative pain concept was adopted as conceptual framework of this study. As the peripheral free nerve ending was stimulated, nerve impulse was then conveyed through spinal cord then carried via lateral spinothalamic tract to sensation area of cerebral cortex where the pain sensation was interpreted.

Abdominal surgery caused tissue damage which stimulated the histamine, bradykidin, prostaglandin, and Serotonin production which then stimulated A-delta and C-fiber nerve ending which then aroused the ascending nerve impulse to Substantia Gelatinosa (S.G.) in dorsal horn part of spinal cord. The nerve impulse therefore activated substance P. production in SG. cells which then relayed the nerve impulse to the opposite side of spinal cord carried beside ventral horn then ascending to cerebrum via lateral spinothalamic tract. Postoperative pain perception can be divided into 2 levels, i.e., pain at rest: was a mild to moderate pain, pain at movement: was a moderate to severe pain (Shea, Brooks, Dayhoff, & Keck, 2002). From pain sensation, Somatosensory cortex resided in cerebral cortex stimulated hypothalamus to arouse the nerve impulse that triggers change in autonomous nervous system. This caused physiological change such as blood pressure, respiration, and pulse rate as well as limbic system arousal which consecutively influenced the change of emotional control (Rutishauser, 1994; Seaward, 1999). Passive progressive muscle relaxation technique (PPMR) was introduced to alleviate the limbic system arousal thus emotional control was promoted leading to relaxation. As a result pituitary gland produced Endogenous opioid which matched up opiate receptor thus inhibit Substantia Gelatinosa cells from producing Substance P in dorsal horn area (McCaffery & Pasero, 1999). Therefore, T-cell was not activated. Consequently, no nerve impulse conveyed to cerebrum. Thus the pain intensity was reduced and patient was more comfortable. In addition, the Endogenous opioid also influenced hypothalamus to reduce nerve impulse generation thus sympathetic nervous system was less activated. As a result, the parasympathetic nervous system dominated thus heart rate, respiration, and blood pressure thus the patient was more comfortable as shown in diagram 1.

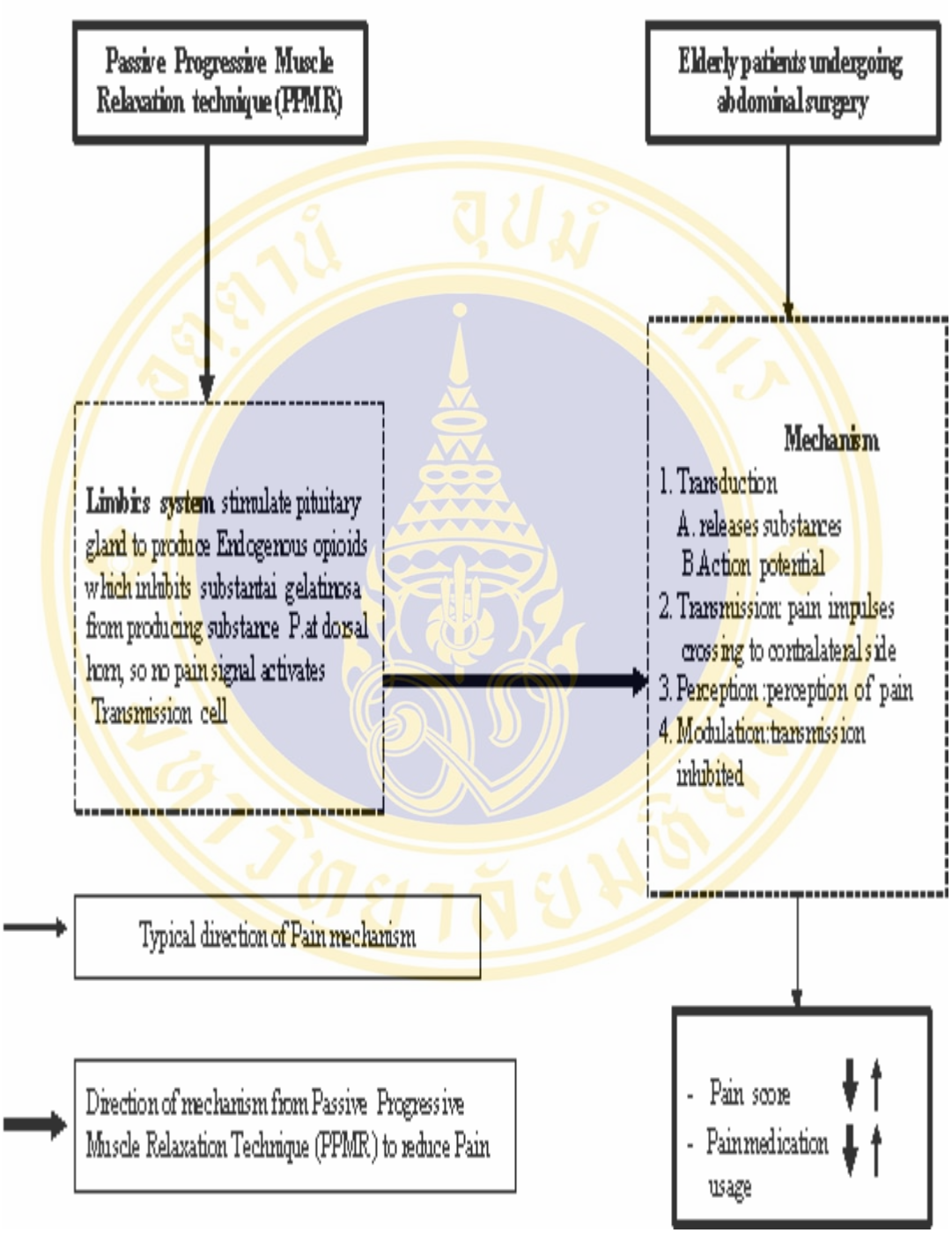


Diagram 1: Research conceptual framework: demonstrating Passive Progressive Muscle Relaxation technique (PPMR) mechanism.

Scope of the Study

This study concerns the effect of Passive Progressive Muscle Relaxation technique (PPMR) on the post abdominal operative pain intensity in elderly patients who aged 60 years old and older both male and female who attended operative ward for abdominal surgery in a tertiary hospital during March to September, 2006.

Definition of Terms

1. Passive Progressive Muscle Relaxation technique (PPMR) refers to a techniques used to relax muscle tension start from forehead, face, neck, arm, hand, finger, chest, abdomen, and leg, by training the patients until they are able to do it by themselves. This study adopted body relaxation from head to toe without muscle stress for 30 minutes until the whole body was relaxed as per detailed in instructional cassette tape produced by mental health department (2004). The outcome of Passive Progressive Muscle Relaxation technique was assessed by slower respiratory rate at least 2 cycles/minutes, and slower pulse rate for at least 3 beats per minute (Gift, et al., 1992).

2. Post abdominal operative pain refers to the phenomena which affect physical and psychological functionality (McCaffery & Pasero, 1999). In this study, this term refers to physical uncomfortable sensation of elderly patient caused by damaged tissue from surgery which is the pain occur within 72 hours post surgery. The assessment of post abdominal operative pain intensity can be measured by Numerical Rating Scale (NRS) start from 0 signified no pain, 10 signified intolerable severe pain.

Benefits

1. Elderly patient is able to practice PPMR to reduce post abdominal operative pain.

2. Nurse and health care team possess PPMR to reduce post abdominal operative pain which is an independent role intervention.

3. The outcome of research can be a database or guideline for further research in the related topic.

CHAPTER II
LITERATURE REVIEW

The related literature, theory, and research document were reviewed in the following topics

1. Neurological pathway of postoperative pain
2. Pain theory
3. Factor related to postoperative pain
4. Postoperative pain assessment
5. Effect of postoperative pain in elderly patient
6. Postoperative pain management in elderly patient
7. Progressive Muscle Relaxation technique
8. Summary of literature review

1. Neurological Pathway of Postoperative Pain

The perception of pain started from nerve ending stimulation which produced neurotransmission through 3 serial phase of neuron, the first phase was the dorsal root ganglion situated in spinal cord, the second phase was the lateral spinothalamic tract which passing through Thalamus, and then the third phase was the neuron on sensory section of cerebral cortex which interpreted the neurotransmission into pain sensation. Neurological pathway of pain can be divided into 4 mechanisms as follows

1. Transduction

The free nerve ending distributed through out all tissues in the body. When it was stimulated with direct stimulant such as mechanical energy, electrical energy, chemical, heat, and cool, or when the tissue was damaged and produced the chemical such as bradykinin or histamine, these chemicals stimulated the free nerve ending. As the stimulation exceeded the threshold, pain nerve impulse was generated.

2. Transmission

The generated pain nerve impulse was then transmitted through small nerve fiber, i.e., A-delta and C fiber. These 2 nerve fibers transmitted sharp pain or pricking

pain stimuli impulse to spinal cord in high velocity (3-20 meter/second) whilst V-fiber transmitted dull pain and burn pain stimuli impulse in low velocity (0.5-2 meter/second).

These nerve fibers transmitted the impulse into dorsal horn area of spinal cord. In this area, there were synapses which, when stimulated, produced Substance P neurotransmitter consecutively stimulated the neuron in substantia gelatinosa to generate the impulse to the opposite side of spinal cord through ventral horn then conveyed to the brain via lateral spinothalamic tract comprising of 2 groups of nerve fiber as follows.

1. Neospinothalamic tract: the nerve fibers in this tract were mostly A delta transmitting pain stimuli nerve impulse to dorsal thalamus which was able to perceive pain but unable to identify the details of pain, then transmitted to sensory cortex to interpret the details information of severity, characteristics, and position of pain.

2. Paleospinothalamic tract: the nerve fibers in this tract were mostly C fiber transmitting impulse to reticular formation, medial thalamus, hypothalamus, limbic system, and frontal cortex which had emotional stimulation function and control the physical reaction of the body.

3. Perception

Pain perception was the third steps of pain neurological pathway occurred at cerebral cortex (McCaffery & Pasero, 1999). The perception and interpretation of pain depended on individual experience, stimulant, and social. In addition, the other factors related to pain perception were anxiety, experience, attention and injury situation perception (Black and Jacobs-Matassarin, 1997).

4. Modulation

Modulation was the change or inhibition of pain impulse at brain stem which induced the descending fibers to produce endogenous opioids, serotonin (5 HT), norepinephrine (NE), y-aminobutyric (GABA), and neurotensin down to dorsal horn which can inhibit and alleviate pain.

In summary, after abdominal operation, the damaged tissue stimulated the pain impulse through the pathway to brain where the impulse was interpreted, perceived, changed, and inhibited so the pain was modulated into appropriate intensity and less threaten.

2. Pain Theory

Gate control theory (Melzack & Wall, 1983) explained the pathway of pain symptoms. When the tissue was damaged, the chemical was reduced and stimulated pain receptor which was called nocicepter which was distributed over all tissue in the body. The stimulated nocicepter fired the painful nerve impulse through 2 types of nerve fiber, i.e., A fiber which was divided into A alpha, A beta, A gamma, and A delta which was the myelinated somatic nerves and C fibers which was unmyelinated somatic nerves. A alpha fiber was the largest fiber transmitted motor control stimuli, A beta fiber transmitted skin pressure or touching stimuli, A gamma fiber transmitted muscle tension stimuli, and A delta fiber transmitted pain stimuli. C fiber transmitted alarm stimuli related to pain. When the pain impulse entered motor neuron in dorsal horn situated in spinal cord, the pain impulse was relayed and transmitted to spinothalamic tract to cerebrum for interpretation. At limbic system pain stimuli was interpreted and then emotional and feeling response to the pain stimuli was taken place. Emotional and feeling response was based on past experience and learning then the limbic response descending stimuli was conveyed to spinal cord then to the position where the tissue were damaged which then arouse the pain perception and activated immediate response to avoid that pain.

Gate control theory concerned the pain stimuli from larger fiber (A-beta) inhibited pain stimuli to be lessen or eliminate which was called “close the gate”. When the pain stimuli was fired on nocicepter and the impulse of pain stimuli was carried in ascending smaller nerve fibers (A-delta and C), the alarm message was also carried with the impulse thus “open the gate” of pain. Stimulation of larger nerve fiber was done by massaging or compression on the skin and muscle thus able to relieve or eliminate pain. Rather than the neurological pathway of pain explanation, this phenomena was else explained by neurophysiology of pain that when the body was threaten by physical injury, heat, cool, chemical, pressure or any other external force, serotonin, histamine, and bradykinin were produced in response of the threaten stimuli which can in turn control the pain (Nantachaipat, 2003).

1. Spinal gate mechanism: Substantia Gelatinosa (SG.) was the location where spinal gate mechanism occurred. The nerve impulse of pain stimuli was conveyed in larger fiber and smaller fiber to the synapse of transmission cell (T-cell) which then

carried the pain stimuli to central nervous system to interpret and perceive the pain. Prior reaching T-cell the nerve impulse of pain stimuli had to get synapse with SG. Cell which inhibited or close the gate of pathway to T-cell. The magnitude of inhibition depended on the relative magnitude of impulse in larger nerve fiber and smaller nerve fiber. If the nerve impulse of larger nerve fiber was of larger magnitude than nerve impulse of smaller nerve fiber, the impulse of larger nerve fiber stimulated SG cell to inhibit the pain stimuli from smaller fiber to stimulate T-cell. As a result, the gate of ascending nerve pathway was closed, the pain stimuli was not able to reach the central nervous system. On the contrary, if the magnitude of impulse of pain stimuli in small nerve fiber was larger, the SG cell action to inhibit the pain stimuli was inhibited so the pain stimuli was conveyed to CNS or “opened gate” thus the pain interpretation and perception occurred. In summary, the impulse from 2 type of nerve fiber entered into the gate control, if the impulse from small nerve fiber was larger than that of the large nerve fiber, the gate was opened and the pain stimuli was conveyed to Thalamus and cerebral cortex where the pain was interpreted and perceived. But if the impulse from large nerve fiber was larger than small nerve fiber, the gate was closed and the pain stimuli were inhibited so no pain perception occurred.

2. Central controlled system: the stimulation was conveyed through large nerve fiber from dorsal horn to thalamus then transmitted to cortical and limbic. The large nerve fiber conveyed the impulse into 2 branches, one to gate control and the other to central control system via dorsal column pathway. The central control system produced feed back impulse to influence the gate control. The central control system performed the following function;

- Motivational affective component: comprised of thalamus, cortical, and limbic, which influence the feeling of uncomfortable and dissatisfaction to pain.
- Cognitive component: was the primary function of cortical to analyze the importance of threaten stimuli by combining the information received from peripheral nervous system and central nervous system, so, its function was perception, memorization, and choose responsive strategies both in conscious and subconscious level then took action accordingly.
- Sensory discriminative component: was also the cortical function concerning time, location and severity and other of pain information.

Central control system therefore performed the coordinative function of the 3 components. When the impulse stimulated T-cells, it transmitted the gate controlled impulse to CNS which emotional arousal system analyzed the information of such impulse. The system was then able to identify the location, threat, and severity of pain. Next, the perception system interpreted all the information of pain stimuli impulse to seek for appropriate response then took action accordingly. The descending impulse pathway from CNS was conveyed on 3 ways i.e., via corticospinal tract to gate control to modulate pain stimuli, to reticular formation, and motor control system to regulate appropriate responsive behavior to the pain.

3. Central biasing system: was the reticular formation function in brain stem. It took inhibiting action to the ascending impulse from peripheral nervous system then modulated the pain stimuli impulse to the appropriate magnitude. Information in efferent impulse conveyed from Central control system influenced the function of reticular formation function in the mean time the efferent impulse was also conveyed down to spinal cord level to regulate gate control impulse.

4. Motor control: the outcome of pain perception was a complex responsive behavior such as fight or flee or other type.

In summary, the gate control theory described that after the pain stimuli fired the nociceptor and the impulse was conveyed to gate control system, if the impulse of pain stimuli in small nerve fiber was of larger magnitude than the impulse in large nerve fiber, pain stimuli would be transmitted to CNS where the pain was perceived. On the contrary, if the impulse in large nerve fiber was of larger magnitude, the gate was closed and no pain stimuli transmitted to brain so the pain was not perceived.

Endogeneous pain control theory: Pert & Synder (1973) discovered opiate receptor distributed in the pain related area of brain and spinal cord. Hughes et al. (1975) discovered endogenous opiate which had morphine-like characteristics which had received vastly interest by researcher to synthesize non-narcotic analgesics. Later, the gate control theory was found involving in 2 substance, i.e., enkephalin and substance P. (Bowsher, 1978). As the firing of pain stimuli occurred, smaller nerve fiber released substance P. at dorsal horn of spinal cord in the mean time the larger nerve fiber and efferent nerve fiber from CNS stimulated Substantia Gelatinosa to secrete endogenous opiate to inhibit substance P. function, as a result, no pain stimuli

reaching and stimulating T-cell thus no pain stimuli ascended to the brain. However, if the enkephalin amount was inadequate to inhibit all substance P. function, the T-cell was consequently stimulated and the impulse then transmitted to the brain, thus the pain was perceived.

The morphine-like substances in the body which was found to control the pain effectively were enkephalin, endorphin, and dynorphin (Meinhart & McCaffery, 1983; Nathan, 1980). These substances were polypeptide comprised of amino acid in different short and long series chain with different pain control effectiveness.

- Enkephalin: this substance was a neurotransmitter having analgesic effect easy to be destroyed by enzyme. Its pharmacological action was as same as analgesics effect of morphine but having the ¼ - ½ times of morphine magnitude of action whilst the duration of pharmacological action took only minutes. It can be found in Limbic system, periaqueductal gray matter, trigerminal spinal neucleus, and Substantia Gelatinosa area of spinal cord.
- Endorphine: was a neuromodulator and hormone. Its analgesics action was 10 times in magnitude of action more than morphines with 2-3 hours duration of action. It can be found in hypothalamus, thalamus, pituitary gland, and blood. The patient with high pain threshold had high endorphine level (Wilson & Elmassian, 1981).
- Dynorphin was 50 times more effective in pain control action than endorphin, so it was also called dynamite endorphin.

In summary, Endogenous pain control theory stated the mechanism of endogenous opiate that inhibit the small nerve fiber from releasing substance P at dorsal horn area of spinal cord, so, no T-cell stimulation occurred therefore no pain stimuli impulse carried to the brain thus no pain was perceived. In this research, PPMR technique was adopted to activate endogenous opiate which inhibit the substance P from activating T-cell, so, no impulse conveyed to the brain thus pain sensation reduced.

3. Factor Related to Postoperative Pain

Pain is a reaction of a person to threatening stimuli. There were many factors affecting the perception and expression of pain:

- Gender

Gender is an important influence on experiences of pain. Sex differences in pain perception have been noted in multiple studies, with women typically displaying lower pain tolerance than men, but it is unknown whether the mechanisms underlying these differences are hormonal, genetic or psychosocial in origin. For example, some researchers have suggested that men are more motivated to express a tolerance for pain because masculine stereotyping encourages it, while feminine stereotyping encourages pain expression and lower pain tolerance (Fillingim, 2003**).** In reviewed studies of clinical and laboratory pain (Fillingim, 2000; Riley, Robinson, Wise, Myers, & Fillingim, 1998; Robinson, Riley, & Myers, 2000; Rollman, Lautenbacher, & Jones, 2000; Unruh, 1996) have generally concluded that women and men differ in their perceptions and experiences of pain. For example, Unruh (1996) reviewed research on clinical pain and found that women were more likely than men to experience recurrent pain, as well as frequent, severe, and longer-lasting pain. Women also tended to experience more pain-related disability and to receive unwarranted psychogenic attributions for pain by health professionals from whom they sought treatment. Reviewers (Rollman, Lautenbacher, & Jones, 2000) have also concluded that women typically report greater sensitivity to and less tolerance for experimentally induced noxious stimulation than men do. Despite these generalizations, some studies of clinical pain (Faull & Nichol, 1986; Lester, Lefebre, & Keefe, 1994) and experimental pain (Lautenbacher, Moeltner, & Strian, 1991; Sullivan, Bishop, & Pivik, 1995; Sullivan, Rouse, Bishop, & Johnston, 1997) have not demonstrated gender differences in perception of pain. According to Roykulcharoen & Good (2004) who studied the effect of systematic relaxation technique to pain reduction, distress, anxiety and drug administration within 6 hours postoperative of patient with abdominal operation, age, gender, and chronic pain had no significant relationship with postoperative pain, distress from pain, and anxiety. This finding was in concordance with Good et al. (1999), Nelson et al (1998), Scott et al. (1983) who reported that age was not correlated with postoperative pain. However, from the literature review of

Roykulcharoen & Good (2004) cited Chin (1999) who found that age was significantly related with postoperative pain which was in accordance with Holl (1995) who reported age were correlated with requesting for analgesics in postoperative patient.

-Opioid

Roykulcharoen & Good (2004) who reviewed studies of opioid intake before treatment that found may be expect to exert some influence on postoperative pain. When testing relaxation, Good (1992) found correlation (r=.42) between opioid intake 2.5 hours before the test and 24 hour opioid intake after ambulation. Therefore, analgesic intake before the test was measured. The greatest effect of both IM and IV pro re nata (PRN) opioid intake on pain occurs during this time frame. If the correlation with posttest pain scores within the treatment groups had been equal or greater than .30, opioid intake 2.5 hours before the treatment wound have been used as a covariate (Cook & Campbell, 1979)

Researcher therefore designed the experiment by control excess variable from various factors, i.e., control the balance of age, gender, and postoperative duration of both group of samples who were all hospitalized in the same hospital and had pain intensity level measurement pre- and post ambulation.

4. Postoperative Pain Assessment

There had been many pain measuring instruments. So, pain assessor should realize characteristics and value of each instrument in order to apply it effectively. Most pain measuring instruments were designed for adult but rarely for elderly. The one dimensional pain measuring instrument although cannot have covered all aspects of pain but still adequate to assess the efficacy of intervention and took little time to assess (Bird, 2005). The one dimensional pain measuring instrument in elderly are:

- Numeric Rating Scale: was more appropriate to measure the intensity of pain in elderly patient than the other instrument (Bulecheck & McCloskey, 1999; McCaferry & Pasero, 1999; Puntillo, Miakowski & Summer, 2003). Paice and Cohen (1997) used Numeric rating scale to measure pain in cancer patient and determine the correlation with the result from Visual Analog Scale (VSA) and found the high degree of correlation(r = 0.847) which showed the reliability of the instrument. This finding was in accordance with Dulayatham(2000) who adopted the pain measurement using

Numeric rating scale in research and had performed the reliability test of instrument before using it in 10 postoperative patient undergone femur open reduction with internal fixation by means of inter-rater method then analyzed the pain score using Pearson Product Moment Correlation Coefficient: rxy and got rxy equal to 0.88 signified that the instrument was reliable. The scoring system ranged 1-10 whilst 0 signified no pain at all and 10 signified intolerable intense pain (Figure 2). The method of measurement was having patient assessed their pain then mapped and marked on the corresponding linear numeric scale or verbally estimated their pain in number for assessor.

- Visual analogue scale: was difficult to use with elderly since the deterioration of elderly patient's visibility and having analgesics could have changed level of consciousness making the pain measurement inaccurate (Baillie, 1993). This method was appropriate for postoperative patient. This measurement used the straight line from 0-10 represented no pain – intolerable pain. The patient assessed their pain then marked on the line accordingly. This method was widely used and accepted. The sensitivity of measurement was good and easy to use. However, the limitation of this instrument was inappropriate to used with elderly patient with poor visibility or patient having CNS suppressing drug. Freeman K, Smyth C, Dallam L, and Jackson (2001) comparison of the visual analogue and faces rating scales in measuring pressure ulcer pain and found the high degree of correlation (r = 0.92) which showed the reliability of the instrument.

- Faces pain scale: was the assessment using the face expression from smiling to crying face with the description underneath the face together with the score from 0-10. This measurement was also called Wong Baker Faces Pain Scale (Wong & Baker, 1988). This measurement can be used both in child and adult. The scoring system was the same as the above measurement which 0 signified no pain and 10 signified intolerable intense pain (Nantachaipat, P., 2003).

- Verbal rating scale: patients verbally indicated their pain by themselves which was an appropriate measuring instrument for elderly patient.

- Physiological assessment was a pain assessment from the autonomous nervous system response and reflex, i.e., change of blood pressure, pulse, and respiration rate (Black & Metassarin-Jacobs, 1993; Carroll, 1993). These responses

did not only occur from pain but also from the other cause such as stress. So, it was not appropriate with postoperative pain management (Dodson, 1985).

Precision and sensitivity

Conti P.C., de Azevedo L.R., de Souza N.V., and Ferreira F.V. (2001) who reviewed studies of evaluation of precision and sensitivity of different scales and found significant differences ($P<0.05$) for all scales, but the NS ($P>0.05$), when the two initial measurements were analysed. Regarding the sensitivity, all pain scales demonstrated general symptom improvement of 30–50%, when initial and final figures were compared ($P<0.01$). Also, the most significant improvement occurred in the first 2 months after beginning the management program. Those results, the NS was more accurate to measure reproducibility of pain. As for the capacity of expressing changes during the treatment, all scales demonstrated symptom decrease of 30–50% in a period of 6 months.

In summary, many pain measuring instruments stated above had been applied in many researches. In this research, Numerical Rating Scale was adopted by researcher since it was a reliable and accurate instrument which was appropriate with elderly patient.

5. Effect of Postoperative Pain in Elderly Patient

Pain which was left untreated may have become an important problem which affected physical and psychological well being of patient (Chawalit, 2000, Bray, 1986; Caunt, 1992; Ferrel, 1995) which can be detailed as follows;

5.1 Fatigue and Sleep disturbance: the acute pain disturbed physical functionality which affected fatigue and sleep disturbance. Closs (1990) interviewed 200 postoperative patients and found 179 patients had sleep disturbance due to postoperative pain. This finding was in agreement with Potharos (1995) who reported postoperative pain precipitated sleep disturbance in patient as well as fatigue.

5.2 Stimulating higher sympathetic nervous system activity which affected higher blood circulation, higher heart rate, more oxygen demand of cardiac muscle which led to the risk of arrhythmia, myocardia ischemic (Ferrante & VadeBouncouer, 1993).

5.3 Gastrointestinal system: postoperative pain stimulated gastrointestinal juice secretion and irritated sphincter caused nausea, vomiting and flatulent.

5.4 Functionality: postoperative pain affected ADL functionality since the tissue was usually swell and extended after operation. These changes stimulated nociceptor directly (Waikakul, 1994).

5.5 Pneumonia complication: according to Shea et al. (2002), postoperative elderly patient usually had pneumonia, in which14.3% was found in patient who was able to move, 28.6% was found in patient who needed other's support for movement, and 100% in non-movement patient.

5.6 Fear and Anxiety: acute pain was a danger alarm signal which produced the physiological response as fear and anxiety. Fear was a response to alarm signal when there was any threat posted on sympathetic nervous system. Flee from threat reduced the pain threshold. Anxiety involved with unhappy emotion against the threat. Both of them caused muscle tension and increased pain intensity.

5.7 Posttraumatic stress disorder (PTSD): acute pain was a precipitating factor to stress with prevalence rate 50% (Hickling, Blanchard, Silverman, &Schwarz, 1992). According to comparison study between PTSD and chronic pain (N = 139), it was found that 95.2% got pain and 34.7% got PTSD which can have been summarized that chronic pain caused PTSD.

Summary: postoperative pain directly affected physical and psychological dimension of patient. The response to pain of patient enabled nurse to assess pain intensity level accurately which reflected pain management efficacy. So, nurse should have paid attention to the factors affecting pain management so that they were able to assess pain accurately and quickly, as a result, better quality of life of patient can have attained.

6. Postoperative Pain Management in Elderly Patient

Nurses were the closest personnel to patients during hospitalization. So, they were responsible for assessing, follow up, and protecting the patient's right to manage the pain in highest efficacy. The pain management strategies in elderly patient was divided into medication and non-medication or alternative medicine which can be detailed as follows;

6.1 Pharmacological Pain Management

The analgesics widely used nowadays were narcotic type and non-narcotic type. The narcotic analgesics, i.e., morphine and pethidine had action on central nervous system. Morphine was the main drug the had been widely used for a long time, the peak action was attained within 7-10 minutes after intravenous injected and 15-30 minutes after muscle injected (Punthusak, 1997; Austrup & Korean, 1999) and the duration of pharmacological action was 3-5 hours (Bonica, 1990). Pethedine was a synthesis drug having similar molecular structure as morphine although the magnitude of pharmacological action was 10 times lower than morphine. The peak action was attained within 15-30 minutes with the duration of 2-4 hours (Black & Matssarin-Jacobs, 1993). In addition, the non-narcotic analgesics frequently used was paracetamol which reached it peak action within 30 minutes after oral taking (Wattana Phuntusak, 1997) with the duration of 4-6 hours (Bonica, 1990), however, these analgesics produced side effect to physiological system (Ferrante & Vadebouncouer, 1993).

Analgesic administration no matter which type, should be done promptly after patient was just started getting conscious to prevent severe pain. Analgesics administration during the severe pain with safe dozing size was usually not sufficient to control the pain. So, for the postoperative patient with severe pain intensity, the analgesics should be administrated on temporal basis (McCaffery & Beebe, 1989).

6.2 Non Pharmacological Pain Management

6.2.1 Distraction

Distraction the patient attention from pain was a strategy to control the pain. The distraction of attention stimulated hypothalamus which stimulated pituitary to secrete endorphin to control the pain thus alleviate the pain intensity level and increase pain endurance (Boss, 1992; Brown in Potter & Perry & Eds, 1999).

6.2.2 Heat and cold therapy

Heat therapy caused vasodilation thus enhanced circulation and waste elimination, reduced muscle spasm, and made patient more comfortable. Pain reduction was related to pain control mechanism of gate control theory. Heat stimulated thermal receptor in skin which fired the thermal stimuli through large nerve fiber which inhibited the pain stimuli carried by small nerve fiber so the gate was

closed and thus less pain stimuli can have reached the cerebrum so the localized pain reduced. As a result, the accumulation of blood and fluid on that location was also reduced leading to infection and edema reduction (Wright & Sluka, 2001). Cold therapy reduced the activity of tissue and nerve fibers so that the transmission of pain stimuli conveyed on small nerve fiber was slower. In addition, cold therapy could have increased pain endurance and decreased sensitivity of nociceptor (Wright & Sluka, 2001).

6.2.3 Music Therapy

Music rejuvenated emotion and mind in cortical which is the upper part of brain thus persuaded patient calm, relax, and distraction from pain. Also, music stimulated the brain impulse. The emotional arousal stimulated pituitary gland to secreted endorphin which increased pain threshold. According to pain management in postoperative patient undergone femur open reduction with internal fixation, the group which having music therapy had lower pain intensity level than the group without music therapy in first 24 hours and 24-48 hours post operative period (Dulayatham, 2000).

6.2.4 Massage therapy

Massage inhibited transmission of pain stimuli at spinal cord. In addition, massage can reduce muscle tension and enhance circulation which thus enhanced blood oxygen level so decreased the chance to have lactic acid so it did not further stimulate the nociceptor so the pain reduced (McCaffery, 1979). In addition, touching during massage also encouraged patient distraction from pain and increased patient's confidence in treatment.

6.2.5 Imagery therapy

Imagery of a pleasance can reduce emotional arousal thus cutting the continuous cycle of pain thus reduce pain intensity (Jacox, Ferrell, Heidrich, Hester, & Miakowski, 1992; McCaffery, 1979). There were studies on the effect of imagery therapy by listening to cassette tape and using relaxation technique in adjuvant with imagery therapy which reported decreased pain intensity level, anxiety level, and amount of analgesics require (Pholnork, 1999; Good, Stanton-Hicks, Grass, Anderson, Choi, Scoolmeesters, & Salman, 1999).

6.2.6 Touching Therapy

Touching therapy alleviated anxiety, fear, and uncertainty. Touching therapy in adjuvant with analgesics increased pharmacological effect thus brought patient to be more relax and comfortable. In addition, touching also induced positive feeling such as getting empathy, encouragement, and care (Weiss, 1986).

6.2.7 Biofeedback

This was a therapeutic behavior in giving information concerning physiological feedback and the strategies to control such feedback.(Potter & Perry, 1995). This method was aimed to alleviate muscle tension, sympathetic feedback, and anxiety, as a result, pain reduction was also effect.

In summary, postoperative pain management strategy like medication had drowsy side effect when used with elderly patient which retard the efficacy of pain intensity level assessment and also yield insufficient pain management outcome. So selecting appropriate adjuvant therapy might have given the better pain management outcome which would enhance elderly patient quality of life.

7. Progressive Muscle Relaxation Technique

Day (2000) stated the definitions of relaxation as the state of which the body was physically, psychologically, and emotionally free of stress and anxiety as well as the muscles were free of tension. Jamonman (1989) studied the effect of relaxation on postoperative pain management in patient undergone abdominal operation and reported the relaxation technique was able to reduce pain intensity level and amount of analgesics requirement of patient. Sopajaree (1993) studied the effect of relaxation technique on wound cleansing pain management and reported patient practicing relaxation technique had less increment of pain intensity level compare with the controlled patient. The continuous cycle comprised of pain -> anxiety - > muscle tension -> pain were interrelated. Relaxation technique was able to break this cycle and inhibited the interaction. Progressive relaxation muscle technique can be divided into 2 types:

7.1 Active Progressive Muscle Relaxation (APMR): the muscle was undergone attentive contraction and relaxation from one part of body to the other in order to feel the difference between stress and relaxation then progress through the whole part of

body. The unaware muscle contraction was now become aware. Patient started to learn from the feet by forcing the maximum contraction then gradually relaxed it until reaching complete relaxation and felt the difference between contraction and relaxation. Then progressed the attention to the next part of the body, i.e., both calves, shanks, upper legs, abdomen, chest, both hands, arms, shoulders, necks, foreheads, eyes, cheeks, mouth, and tongue. Both eyes should be closed during active progressive muscle relaxation. After finish, scanned through out the body which part was still stiff or contracted then relaxed that part until entire body muscle relaxed then patients opened their eyes (Piyamanotham, cited in Jamonman, 1989). According to Choorat (2001) who studied the effect of active progressive muscle relaxation technique on pain management in 20 postoperative patients undergone vertebrae operation by randomly drawing the assignment ticket whether he was in the controlled group or experimental group in the first day postoperative then assign to the alternate group in the second day postoperative. The experimental group practiced active progressive relaxation technique for 20 minutes. The results showed the pain intensity level during practicing active progressive muscle relaxation technique was lower than during routine nursing intervention significantly both day 1 and day 2.

7.2 Passive Progressive Muscle Relaxation (PPMR): was the muscle relaxation by directing all thought, feeling, and perception on each part of the body and mindfully relaxed the muscle. The relaxation started from around the eyes and face, jaw, neck, shoulders, upper arms, hands, chest, abdomen, leg, calf, ankle and feet until every part of body was under relaxation state (Tapanya, cited in Jamonman, 1989). Jamonman (1989)'s studied the effect of relaxation technique on pain management of 23 postoperative patients undergone abdomen surgery aged averagely 49.9 years old, the controlled group had standard routine intervention from staff nurse and the experimental group practiced breathing exercise, progressive relaxation, and imagery technique and found that patient in experimental group had lesser pain intensity and distress score within 1-3 days postoperative and lesser amount of analgesic injection within 24 hours postoperative than patients in controlled group significantly ($p<0.05$), longer duration of next analgesic injection from the first analgesic injection ($p<0.05$), lesser pain intensity level and distress level at 24, 48, and 72 hours postoperative than at the right postoperative time ($p<0.05$, $p<0.01$), the pulse rate at 24, 48, and 72 hours

postoperative was higher than preoperative period ($p<.05$. $p<.01$). Obviously passive progressive relaxation, imagery technique, and breathing exercise could have reduced muscle contraction and tension (Vateraus, 1979) as well as reduced stress and anxiety, in addition distracted the patient attention from pain to pleasure atmosphere (Tapanya, 2003).

Relaxation technique made muscle relax, reduce oxygen utilization, metabolism, respiratory rate, pulse rate, blood pressure, muscle tension, and premature ventricular contraction, as well as increased alpha wave in brain, distract patient's attention from pain in combination with relaxing the muscle the pain can be palliated or pain threshold can be increased. Relaxation technique pacified emotional stimuli of central nervous system which in turn promoted gate closing in gate control mechanism at the spinal cord level thus the pain can have been controlled. Abdominal cavity was the area where a lot of nerve fibers were situated and the upper abdomen situate close to diaphragm. As a result, PPMR which the muscle was mindfully relaxed required no muscle tension or contraction, which was a simple and easy technique to reduce muscle tension and anxiety thus alleviated the pain (Titler & Rakel, 2001). This technique was therefore appropriate for elderly patient who required simple pain management strategy. There had been no research in Thailand on alternative postoperative pain management strategy in elderly patient undergone abdominal surgery. Only Roykulcharoen & Good (2004) studied the effect of relaxation technique on reduction of pain intensity level and anxiety level in 102 patients aged averagely 40 years old and reported the relaxation technique was able to reduce pain intensity and anxiety with statistically significance.

8. Summary of Literature Review

Post abdominal operative elderly patient had to suffer pain from motion or coughing. The pharmacological pain management using analgesics only was found insufficient to control pain thus pain further adversely impacted patient health status physically and psychologically. Uncertainty and lack of confidence to the outcome of pain management was also a precipitating factor to increased pain. So, strong attention must have been paid in the pain intensity level measurement using instrument such as Numeric Rating Scale which was proven a highly effective machine to assess elderly

patient (Bird, 2005). Finding the effective and pain management strategy was a challenge mission of nurse. According to recent research, passive progressive muscle relaxation was an effective, easy, and appropriate technique for postoperative pain management in elderly patient undergone abdominal operation. In Thailand, there had been studies in the effect of PPMR system in adult patient but not in elderly patients. So, the researcher was convinced to study the effect of PPMR on postoperative pain intensity level reduction in elderly patient undergone abdominal operation. Since this technique did not increase the pain from abdominal muscle contraction in addition reduce oxygen utilization, metabolism, respiratory rate, heart rate, blood pressure, and arrhythmia as well as increased alpha wave in the brain thus alleviated pain sensation.

CHAPTER III
METHODOLOGY

Research Design

This study was a quasi-experimental research, with pre-post test control design. The purpose of this study was to study the effect of PPMR on post abdominal operative pain intensity between experimental and control group of elderly patients in Saraburi Hospital.

Population and Sampling

The population of this study was elderly patients aged 60 years and over both male and female having abdominal operation in operative department, Saraburi Hospital. The samples were obtained by means of proposive sampling.

Inclusive criteria

1. Age 60 years old and over.
2. Pain intensity score 4-7 at the first pain measurement before ambulation.
3. Having analgesics therapy prescribed by physician.
4. Never engaging in any other passive progressive relaxation technique.
5. First ambulation within 72 hours post operation.
6. No cognitive or sensory impairment or psychosis.
7. Able to communicate in Thai.
8. No history of opioid-dependent.

Exclusion criteria

Participants were excluded from the study if they experienced any of the following.

1. Administrated analgesic within 2 hours before starting the experiment.
2. Postoperative complication which caused decreased level of consciousness or had cardiovascular complication which was not able to be remedy by nursing intervention.

Sampling size calculation

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

The effect size of her study was calculated as a large effect (more than 0.8). Thus, for this study, choose means of sorting on Cohen (1988) table with the following specification; the effect size = 0.7, Power = 0.8, $\alpha = 0.05$ (one-tailed test); yielded the sample size equal to 32. The extra persons (10%) were added into each group in the event of loss. As this research was designed as two groups experimental study, so the sample had to be recruited totally 2 groups with 32 sample each. The 32 samples in controlled group did not use PPMR. The 32 samples in experimental group used PPMR. The sampling recruitment into controlled group and experimental group was done by pairing the gender factors then random assign the sample into either experimental or controlled group until completed 32 pairs.

Sampling procedures: a simple random sampling technique was employed via probable coin. It began by paired gender and each of them were employed random sampling via probable coin to decide in which group, control or experimental. Each group contained 13 men and 19 women.

Setting

The settings of research were three surgical wards in surgical nursing department of Saraburi Hospital. Each ward had 30 beds capacity and the nurse: patient ratio was 1:10. These three wards were regular units so the patients' bed was not separated in a private section. The privacy for each patient was relatively limited. However, the research tried to provide privacy for patients in the experimental group during relaxation intervention by using a curtain. The hospital provided health care service for public client and health care education to health science students. There were approximately 80 elderly patients having abdominal operation during March till September or approximately 10 patients/ months. Education support on self care knowledge in pre operative phase, i.e., breathing, coughing, ambulation, analgesic administration currently used i.e. paracetamol, morphine, and pethidine, was given to

patient in pre operative phase. In present, nurse performed various pain management strategies such as hot or cold compression, mild soothing, and lay still in bed. Nowadays, there had been no nursing practice guideline in post abdominal operative pain management in elderly patient. The assessment of pain intensity level was done by verbal inquiries and no validated pain measuring instrument was used. There had been no passive progressive relaxation technique for pain management applied in the setting.

Instruments

The research instrument can be divided into 2 groups as follows;

1. Intervention instrument:

1.1 Sphygmomanometer

1.2 Clock with second indicator

1.3 Cassette tape player, ear speaker, and Passive progressive muscle relaxation cassette tape. The content of this cassette tape was developed by Department of Mental Health, Ministry of Public Health (2004) in which the psychiatrist team modified the content from Chooprayoon (1998). The muscle relaxation started from forehead, face neck, arms, fingers, chest, abdomen, and leg. The total time of passive progressive relaxation was 30 minutes recorded by research assistance and let the patient listen to the cassette tape by ear speaker.

Content validity

Prior the actual implementation, Passive progressive relaxation was submitted to 3 experts, i.e., 1 abdominal surgeon and 2 nursing science lecturers, to check validity of contents. The experts fed back and researcher modified the cassette tape according to expert opinion.

Objectivity

Passive progressive muscle relaxation cassette tape was taken into test in actual situation on 5 volunteers having similar characteristics as the samples to evaluate the effectiveness and actual implementation technique. The test results revealed that 5 volunteers were able to follow the cassette tape instruction and attained muscle relaxation after finished the cassette tape.

2. Data collection instrument

2.1 Demographic and clinical characteristics data (Appendix B)

Age, gender, date of admission, diagnosis, concurrent disease, type of operation, duration of operation, surgeon name, religion, experience in having operation, education, and amount of analgesics administration.

2.2 Pain intensity level measurement

Numerical rating scale (NRS) was developed from pain measurement form of McCaffery & Pasero (1999) comprised of 11 points and had patient visualize the scale and indicate their pain intensity. The score ranged from 0-10, 0 signified no pain and 10 signified intolerable severe pain. Patients may have indicated their pain intensity level by verbal or by marking.

Validity and reliability

Paice and Cohen (1997) reported reliability of NRS as r = 0.847 and Dulayatham (2000) reported reliability level of NRS as r = 0.88. Both research results supported the high level of validity and reliability of NRS to be used as pain intensity measurement. According to pilot study with 5 patients similar in characteristics to samples, elderly patients were able to understand and able to measure pain intensity level by themselves.

Data Collection

The data collecting procedure was shown in Diagram 3

1. Researcher submitted a permission request letter via Dean of nursing science faculty to research ethic committee, Mahidol University and director of Saraburi hospital to ask for permission to carry out data collection.

2. When receiving the letter of permit from ethic committee, Mahidol university and Director of Saraburi hospital, researcher met head of nursing division and head of operative ward to introduce self, advise objective and ask operative ward staff to participate in the research.

3. Preparing research assistance

3.1 The research assistance in this study was a registered nurse who worked at Boromarajonani College of Nursing, Saraburi as a nursing instructor at a surgical ward for 10 years.

3.2 The researcher met the research assistance to advise the objectives of research and explained the data collection procedure and data recording method. The research assistance task was emphasized on recording pain intensity level of patients in both experimental and control group.

3.3 Trained the research assistance to collect the data incorporated with the researcher. The training was performed in 5 patients who volunteered to be patients in the pilot study.

4. Data collecting procedure.

4.1 Investigated the records of patients with abdominal operative operation in operative ward and selected the patients who met the inclusion criteria.

4.2 The researcher introduced self to patients, advised the objectives of research, the methodology of research, expected benefit and patient's right to withdraw from research participation without any consequence of health care service quality, then asked patient to sign the consent form to participate in the research then start collecting demographic data.

4.3 Explained the nursing intervention according to nursing practice guideline in postoperative pain management developed by Siriraj hospital which provided standard patient database control and educated patients in the experimental group to use cassette tape player, ear speaker, and pain intensity measuring instrument.

4.4 Provided nursing intervention according to nursing practice guideline in postoperative pain management which can be detailed as follows;

Control group: Preoperative

- The researcher met the patients and relatives, who got information support concerning the effect of postoperative pain upon rehabilitation, analgesic and non-analgesic postoperative pain management, postoperative pain intensity measurement, pain management strategies, requested for analgesic to control postoperative pain and the time period to get analgesic action after administration.

Control group: 1-3 days Postoperative

- The research assistance assessed the patient's postoperative pain intensity using The Numerical Rating Scale (NRS) if the pain intensity score ranged between 4-7 at the pain measuring point, had patient start ambulation. After finishing ambulation, the patient was measured for pain intensity again by using NRS.
- The research assistance assessed pain intensity at 30 minutes after ambulation using NRS.
- The research assistance assessed pain intensity at 90 minutes after ambulation using NRS
- The researcher recorded the usage of analgesics drug administrated within 12 hours after ambulation.

Experimental group: Preoperative period

- The researcher met patients and relatives, who got information support concerning the effect of postoperative pain upon rehabilitation, analgesic and non-analgesic postoperative pain management, postoperative pain intensity measurement, pain management strategies, request for analgesic to control postoperative pain and the time to get analgesic action after administrated analgesic drug.
- PPMR was trained by the researcher at least 3 times on a day before surgery. Each time the researcher spent 30 minute with the patients. Fifteen patients received the intervention only for a day before surgery. There were seventeen patients who stayed in the hospital for more than 3 days before surgery, these patients received the intervention more than one day (2-3 days). However, the patients and their families were advised to perform the PPMR at any time that they wished. In order to provide a relaxation and privacy environment, the researcher used the curtain to separate the patients in the experimental group from the ward environment. To verify the use of the PPMR, attentiveness to the tape was measured as the tape started. As each patient in the treatment group began to use the PPMR technique, the researcher observed whether they were attentive to the tape. The researcher took a 15-second look at the patient: appears to be listening, not talking, and not sleeping. If a patient did not attend to the tape, the researcher stop the tape and gently encourage them to listen more attentively. When the patient practice PPMR which started relaxing the muscle in arm,

shoulder, chest, back, leg, neck, and face respectively. Relaxation stage which was able to be assessed by at least 2 respiration cycle per minute slower and at least 3 pulse per minute slower than before practicing relaxation (Gift et al., 1992). Then, the researcher observed again at the end of the 30 minutes for mastery such as face relaxed, no grimace or frown, arm relaxed when raised, no tension around mouth, and not talking. If the patient was unable to master the treatment, the researcher would positive reinforcement and feedback until the patient could take mastery.

Experimental group: 1-3 days postoperative

- The research assistance assessed patient's postoperative pain intensity using The Numerical Rating Scale (NRS) if the pain intensity score ranged between 4-7 at the pain measuring point, had patient start ambulation. After finished ambulation assessed patient pain intensity again using NRS.
- The researcher had patient practiced PPMR which started relaxing the muscle in arm, shoulder, chest, back, leg, neck, and face respectively by listening to cassette tape until reaching the whole relaxation stage. In this step, each patient was advised to practice by him/herself while the researcher served as a facilitator and provided help only on request. However, all patients were accompanied by the researcher throughout the PPMR process to assure that they were relaxed.
- The research assistance assessed pain intensity at 30 minutes after ambulation using NRS.
- The research assistance assessed pain intensity at 90 minutes after ambulation using NRS
- The researcher recorded the usage of analgesics administrated within 12 hours after ambulation.

5. Statistical Analyzed the collected data, i.e., NRS scores, analgesic administration of both groups of samples and compare the statistics of both groups.

The process of experimental

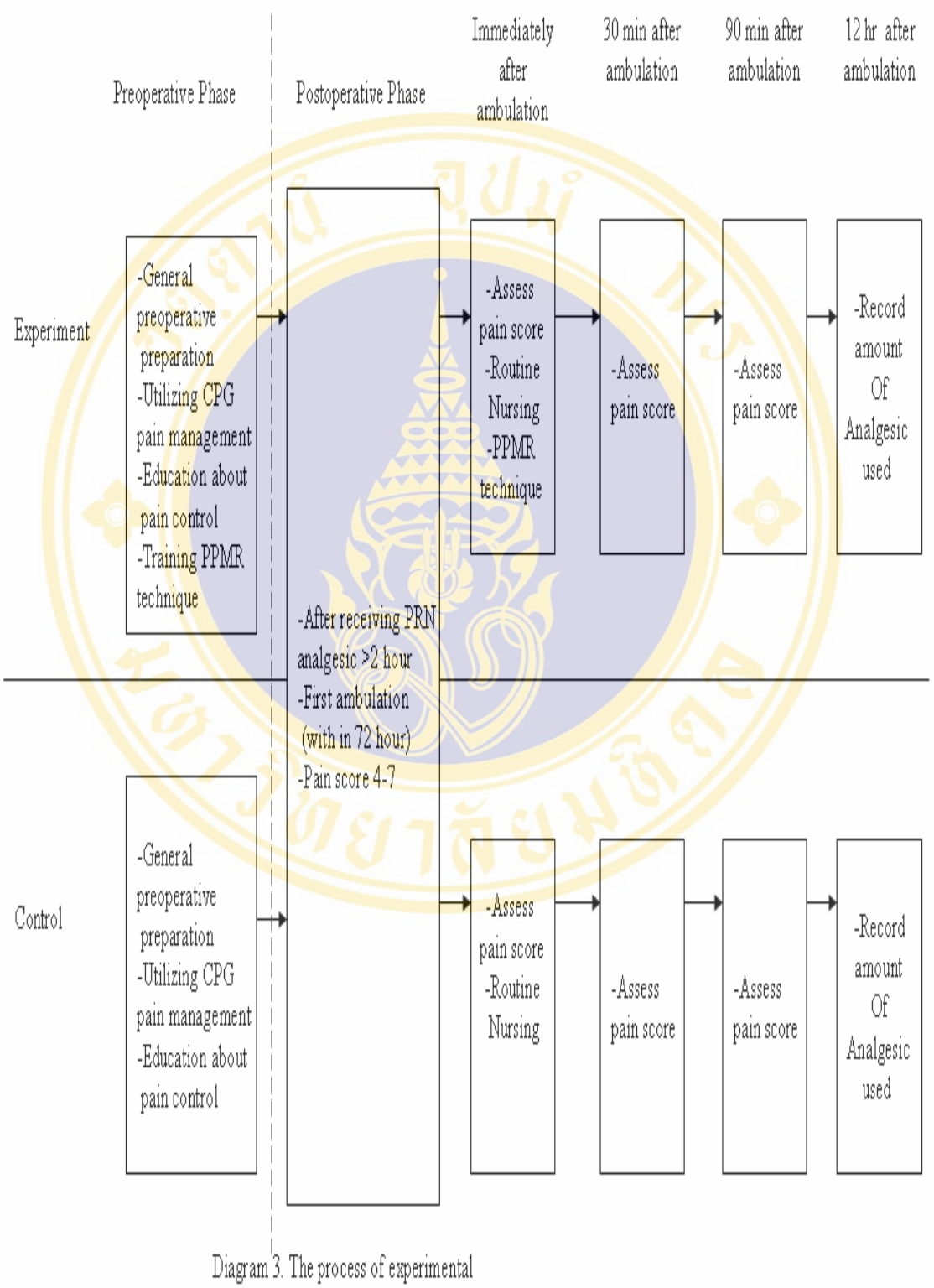


Diagram 3. The process of experimental

Protection of Human Subjects

The research proposal was submitted via Dean of The Faculty of nursing Mahidol University to Research Ethic Committee of Mahidol University and Director of Saraburi hospital concerning the right protection of human subject issues in this research. After receiving permission to carry out the research, the researcher then started conducting the research. The researcher introduced self to patient who met inclusion criteria then advised the objectives and methodology of research, as well as risk and benefit from research participation. The researcher then advised them about the right to participate or quit the research whenever they want without any consequences to health care service quality. The research information document and consent form of participation were then given to patients who may have read by himself or had researcher read for them. Then the researcher asked the patients for voluntarily participation in research. The patient then sign off the consent form to participate in the research. The data taken from samples in this research were treated as strictly confidential. The publishing or presentation of research data would be performed in overall picture and no sample name would be published or presented.

Data Analysis

Demographic data, NRS scores, amount and times of analgesic administration were analyzed by statistical methodology as follows;

1. Demographic data of samples i.e. gender, religion, diagnosis, type of operation, experience in operation, were analyzed by frequency distribution and percentage.

2. Comparing age, years of formal education, duration of operation, and time post operative until first ambulation between the experimental and the control group using Independent t-test.

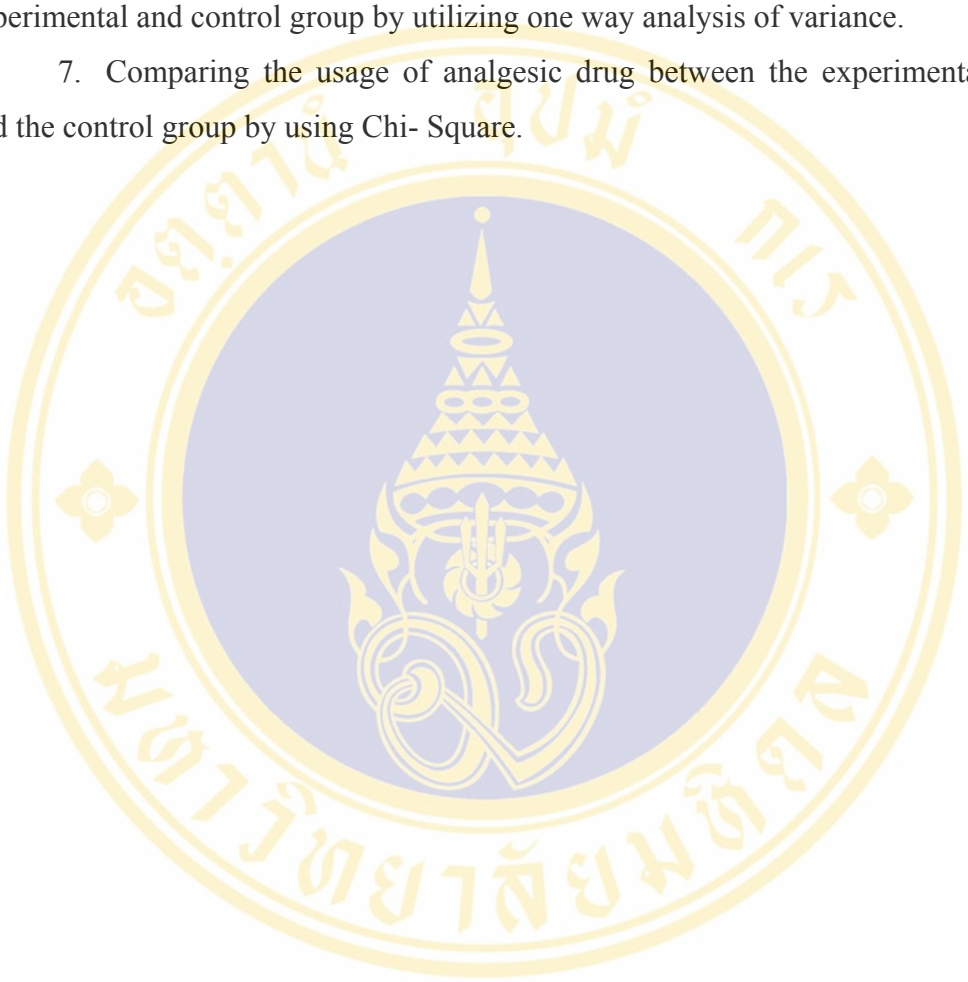
3. Comparing the difference in gender, religions, educational level, adjuvant disease and operative experiences between experimental and control group using Chi-Square.

4. Analyzing pain intensity level of the experimental group and the control group in each postoperative period using arithmetic mean and standard deviation.

5. Comparing pain level between the experimental and the control by utilizing Independent t-test.

6. Comparing pain level in the different time points (immediately after ambulation, 30 minutes after ambulation and 90 minutes after ambulation) in both experimental and control group by utilizing one way analysis of variance.

7. Comparing the usage of analgesic drug between the experimental group and the control group by using Chi- Square.



CHAPTER IV
RESULT

The purpose of this research was to study the effect of PPMR on postoperative pain between the experimental group who underwent PPMR and the control group underwent routine nursing intervention. Patients in this study were those who underwent abdominal surgery at Saraburi Hospital. The results were presented in 2 parts; the first part was demographic and clinical characteristics data and the second part was the result regarding hypothesis testing.

1. Demographic Data of Samples

Table 1: Frequency distribution, percentage and Chi-square statistics of gender, religion, education, concurrent disease, and operative experience.

General appearance	Control group (N=32) N (%)	Experimental group(N=32) N (%)	χ^2
Gender			0.00^{ns}
Male	13 (40.6)	13 (40.6)	
Female	19 (59.4)	19 (59.4)	
Religion			0.00^{ns}
Buddhism	32 (100)	32 (100)	
Education level			1.16^{ns}
None	3 (9.4)	6 (18.8)	
Primary school	29 (90.6)	26 (81.3)	
Adjuvant disease			0.00^{ns}
No	23 (71.9)	23 (71.9)	
Yes	9 (28.1)	9 (28.1)	

Table 1: Frequency distribution, percentage and Chi-square statistics of gender, religion, education, concurrent disease, and operative experience.(Continued)

General appearance	Control group (N=32) N (%)	Experimental group(N=32) N (%)	χ^2
Operative experience			1.24^{ns}
No experience	21 (65.6)	25 (78.1)	
Experience	11 (34.4)	7 (21.9)	

NS = Non significant

According to Table 1, totally 64 participants were divided into control group and experimental group for 32 participants each. The majority of participants were female (59.4%). All participants of both groups were Buddhism (100%). Most samples which were 29 participants (90.6%) of control group and 26 participants (81.3%) of the experimental group educated to primary school (Prathom 1-6). Most participants which were 23 participants (71.9%) of both group had no concurrent disease. Most participants which were 21 participants (65.6%) in the control group and 25 participants (78.1%) in experimental group had no operative experience. According to Chi-square test, it was found that gender, education, religion, operative experience and adjuvant disease had no significant difference between statistics of the control group and the experimental group($p > .05$).

Table 2: Frequency distribution and percentage of diagnosis and type of surgery of samples.

General appearance	Control group (N=32) N (%)	Experimental group (N=32) N (%)
Diagnosis		
gall stone/ cholecystitis/ CBD stone	17 (53.1)	19 (59.4)
CA intestinal/CA colon/ CA rectum	6 (18.8)	4 (12.5)
CA esophagus	1 (3.1)	2 (6.3)
Gut obstuction	4 (12.5)	2 (6.3)
CA stomash	2 (6.3)	1 (3.1)
Cholangio CA/CA pancrease	1 (3.1)	2 (6.3)
renal calculi	1 (3.1)	2 (6.3)
Type of operation		
open cholecystectomy	16 (50.0)	19 (59.4)
explor lap with cholecystectomy	1 (3.1)	1 (3.1)
explor lap with colonal anastomosis	2 (6.3)	1 (3.1)
explor lap with whipple	1 (3.1)	1 (3.1)
explor lap with lysis adhesion	5 (15.6)	1 (3.1)
esophagectomy	1 (3.1)	2 (6.3)
explor lap with total gastectomy	2 (6.3)	1 (3.1)
Right half colectomy	3 (9.4)	3 (9.4)
explore lap with end colostomy	0 (0)	1 (3.1)
Pyelolithotomy	1 (3.1)	2 (6.3)

Table 2 showed the frequency distribution and percentage of diagnosis and type of surgery, it was found that most of participants which were 17 participants (53.1%) of the control group and 19 participants (59.4%) of the experimental group had gall stone or cholecystitis or CBD stone. Most participants which were 16 participants (50%) of control group and 19 participants (59.4%) had open cholecystectomy.

Table 3: Mean, Standard deviation, and Independent t-test statistics of age, formal education year, operative duration, and time postoperative until first ambulation duration.

General appearance	Control group (N=32)		Experimental group (N=32)		t
	M	*(SD)*	*M*	*(SD)*	
Age (year)	65.6	(6.5)	67.3	(7.3)	0.96^{ns}
Education level (year)	3.8	(1.6)	3.3	(1.7)	-1.14^{ns}
Operative duration (minutes)	84.4	(49.5)	91.3	(57.6)	-0.57^{ns}
Time postoperative until first ambulation (hours)	35.9	(16.8)	36.6	(17.1)	0.15^{ns}

NS = Non significant

According to table 3 which showed statistical analysis of Mean, standard deviation, age, formal education year, operative duration, and time postoperative until first ambulation duration, it was found that, for control group and experimental group, the average age were 65.6 years old (SD = 6.5) and 67.3 years old (SD = 7.3), average formal education year were 3.8 years (SD = 1.6) and 3.3 years (SD = 1.7), average operative duration were 84.4 minutes (SD = 49.5) and 91.3 minutes (SD = 1.7), and average time postoperative until first ambulation duration were 35.9 hours (SD = 16.8) and 36.6 hours (SD = 17.1). The t-statistics showed that the statistics of both group had no significant difference ($p > .05$).

2. Hypothesis Test

Hypothesis 1 After using Passive Progressive Muscle Relaxation technique (PPMR), post abdominal operative pain intensity in elderly patients is lower than before using the technique.

Analysis of variance (ANOVA) was used for testing the hypothesis. Before analysis of the data, pain scores was test for normal distribution and homogeneity of variance. The data were not normal distribution, but had equal homogeneity of variance. For post operative pain in experimental group (table 4), it was found that the participants had significantly lower means of pain score at 30 min after ambulation and 90 min after ambulation ($p < .01$). For post operative pain in control group (table 5), it was found that the participants had significantly lower means of pain score at 30 min after ambulation and 90 min after ambulation ($p < .01$), as well.

Table 4: Comparing pain level in the different time points (immediately after ambulation, 30 minutes after ambulation and 90 minutes after ambulation) in the experimental group by utilizing one way analysis of variance.

Source of variance	df	Ss	Ms	F
Between Groups	2	182.15	91.07	157.39**
Within Group	93	53.81	.58	
Total	95	235.96		

**p value <.01

Table 5: Comparing pain level in the different time points (immediately after ambulation, 30 minutes after ambulation and 90 minutes after ambulation) in the control group by utilizing one way analysis of variance.

Source of variance	df	Ss	Ms	F
Between Groups	2	153.69	76.34	190.28**
Within Group	93	37.31	.40	
Total	95	190.00		

**p value <.01

Hypothesis 2 Elderly patients who use Passive Progressive Muscle Relaxation technique (PPMR) had lower post abdominal operative pain intensity than the patients who doesn't use the technique.

Table 6: Comparing pain intensity between the control group and the experimental group in each duration using Independent t-test statistics.

Time	Control group (N=32)		Experimental group (N=32)		t
	M	*(SD)*	*M*	*(SD)*	
T_1	4.41	(0.49)	4.44	(0.50)	0.25^{ns}
T_2	8.84	(0.68)	8.69	(0.82)	-0.83^{ns}
T_3	7.84	(0.57)	7.41	(0.84)	-2.44*
T_4	5.81	(0.64)	5.34	(0.60)	-3.01*

* p value < .05
NS = Non significant

T1= Before starting ambulation
T2 =Immediately after ambulation
T3= 30 min after ambulation
T4 =90 min after ambulation

According to table 6 which showed mean and standard deviation of pain intensity score, it was found that the mean pain intensity score before starting ambulation of the control group was 4.41 (SD = 0.49) and the experimental group was 4.44 (SD = 0.5). The mean of pain intensity score immediately after ambulation of the control group was 8.84 (SD = 0.68) and the experimental group was 8.69 (SD = 0.82). The mean of pain intensity score at 30 minute after ambulation of the control group was 7.84 (SD = 0.57) and the experimental group was 7.41. The mean of pain intensity score at 90 minutes after ambulation of the control group was 5.81 (SD = 0.64) and the experimental group was 5.34 (SD = 0.6). Pain intensity score comparison between the control group and the experimental group was analyzed using

Independent t-test. It was found that pain intensity score measured before ambulation and immediately after ambulation of both group were not significantly different ($p > .05$). On the contrary, pain intensity score measured 30 minutes after ambulation and 90 minutes after ambulation were significantly different ($p < .05$).

Hypothesis 3 Elderly patients who use Passive Progressive Muscle Relaxation technique (PPMR) had lower usage of analgesic drug than the patients who doesn't use the technique.

Within 32 patients in control group 14 (43.75%) was using and 18 (56.25%) was non-using whereas 32 patients in the experimental group 11 (34.38%) was using and 21 (65.62%) was non-using. When comparing the usage of analgesic dose used between the experimental and the control group by utilizing Chi- Square (Table 7), it was found that non significant between group ($p > .05$).

Table 7: Comparing the usage of analgesic drug between the experimental group and the control group by using Chi- Square.

Analgesic	**Control group (N=32)**		**Experimental group (N=32)**		X^2
	N	***(%)***	***N***	***(%)***	
					0.442^{ns}
Using	14	(43.75)	11	(34.38)	
Non-using	18	(56.25)	21	(65.62)	

NS = Non significant

CHAPTER V
DISCUSSION

The objective of this research was to test the effect of Passive Progressive Muscle Relaxation technique intervention on pain intensity within 72 hours postoperative in elderly patient aged 60 years old and older both male and female hospitalized in Surgical building, Saraburi Central Hospital. The discussion was carried out in 2 sections, i.e., demographic data and effect of PPMR technique on postoperative pain intensity reduction in elderly patient undergone abdominal operation.

Most samples of both groups were female (59.4%). The average age of controlled group was 65.6 years old and of experimental group was 67.3 years old. Most samples were admitted to get Open Cholecystectomy which was 50% of controlled group and 59.4% of experimental group. The average operative duration of samples in control group was 84.4 minutes and in experimental group was 91.3 minutes. The operative duration of samples in experimental group was longer due to variety of types and locations of the operation. Moreover, there were many surgeons on duty in Saraburi Central Hospital. As a result, the operative durations were not different. This finding was in accordance with Jongjareonkumchok (2005) who found that non-CPB (M = 246) operation had shorter duration than CPB operation due to variety of surgeons and operative technique.

The outcome of research analysis can be explained according to the hypotheses as follows:

In the experimental group, the average pain score after using PPMR technique reduced significantly from 8.69 (SD = 0.82) to 7.41 (SD = 0.84) and 5.34 (SD = 0.60) at 30 minutes and 90 minutes, respectively, and less than the control group ($p<.05$). This findings support the research hypothesis and confirms the theory that the PPMR technique affected limbic system stimulate to the pituitary gland leading to increased endorphins secretion (Dougans, 1996). Endorphins are endogenous opiate neuropeptides with the same action of morphine in human bodies. It also inhibited the

secretion of substance P causing reduced neurotransmitters to T-cells and the brain that caused decreased pain perception (Watt-Watson & Long, 1993). During the PPMR technique the patients were relaxed so that the abdominal muscle decreased its tension which decreased of chemical substances; Bradykinin, Prostaglandin, Histamine, and Serotonin secretion. Therefor, the free nerve endings (A-delta and C-fiber) reduce to sent the nerve impulse to the cell of substantia gelatinosa in the dorsal horn at the spinal cord cells and the brain that caused decreased pain perception.

In the between groups, the average pain score at 30 minute after ambulation had significantly lower mean pain score than patients who did not use the technique at $p < 0.05$ ($t = -2.44$) . This may be because the approach of PPMR technique is a temporary muscle relaxation, distraction of pain, and immobility body. It directly influenced the brain and motivated the neurotransmission through the descending pathway prohibiting the opening-closing gate mechanism at the spinal cord (Phungvithaya, 1997 & Reynold, 1996) that caused reduce pain at rest in patients who use the technique. However, the approach of bed rest is only immobility body that reduced damaged of tissue and flow of chemical substances such as Bradykinin, Prostaglandin, Histamine, and Serotonin that cause reduced pain on movement patients who doesn't use the technique.

The finding of the present study revealed that the usage of analgesic drug in 12 hours after ambulation of those who usage of PPMR technique were not significantly difference those of the patients who did not usage of PPMR at $p > 0.05$ level (See Table 7). This finding did not support the hypothesis of the present study. One plausible is that while usage of PPMR technique, person shift their attention, so they feel relaxed. If the patients do not usage of PPMR technique, there is nothing to deviated their attention from pain, so they usage of analgesic drug did not difference in 12 hours after ambulation.

The result of study showed that post abdominal operative elderly patients in 72 hours postoperative period who got PPMR technique intervention had decreased postoperative pain at 30 minute after ambulation with statistical significance. This finding was in accordance with a past studies on the effect of PMR technique on pain reduction in abdominal operative patient. Jongjaroenkumchok (2005) conducted a study on the effect of PMR technique on pain intensity and anxiety level of post

coronary artery bypass graft patients and reported significant decrease of average pain intensity at immediately after PMR intervention, 30 minutes after PMR intervention, and 60 minutes after PMR intervention compared with before intervention ($p < .05$, M = 47.07, 43.5, 45.05, 43.27). Choorat (2001) studied the effect of PMR technique intervention on postoperative pain of patient undergone vertebrae operation and reported moderate pain intensity (M = 55.5) indicated by patients after PMR intervention in the first day postoperative, in comparison with the pain intensity measured before intervention (M = 77.50) and still moderate pain intensity (M = 33.25) was indicated after PMR intervention in the second day compared with pain intensity before intervention (M = 54.00). Jamonman (1989) studied the effect of PMR technique on pain reduction in post abdominal operative patient and reported patient with PMR and imagery intervention within 24 hours postoperative demonstrated moderate pain (M = 59.2), then demonstrated mild pain intensity (M = 45.7) within 48 hours postoperative, and finally demonstrated mild pain intensity (M = 66.5) at 72 hours postoperative. Roykulcharoen & Good (2004), studied the effect of systematic relaxation technique on pain, distress, and anxiety in patient undergone abdominal surgery and found that patient having systematic relaxation technique intervention had lower pain intensity after ambulation (M = 26.3) than patient who had no systematic relaxation technique intervention after ambulation (M = 58.9).

Although many studies confirmed the effectiveness of PPMR technique on reducing postoperative pain intensity in elderly patient undergone abdominal operation elderly patients still suffered moderate to severe pain intensity after PPMR intervention (M = 5.34-7.41) compared with severe pain intensity before intervention (M = 8.69) since ambulation affected directly to damaged tissue and increased pain intensity incorporated with the limitation of elderly patients who had lesser ability to cope with pain compare with adult and adolescence (Higgins et al, 2004 cited in Bird, 2005). In summary, the intervention of PPMR technique was able to decrease pain intensity significantly. Nevertheless, in clinical point of view, PPMR technique intervention was able to reduce the pain intensity in small amount as well as lying still on the bed also reduced pain intensity. So, after ambulation patient should have lain still in the bed at least 90 minutes thus the pain intensity decreased (M = 5.34-5.81).

In summary, PPMR technique intervention was able to palliate post abdominal operative pain effectively since emotional mechanism was adjusted appropriately leading to pain perception decrease in central nervous system (Jongjareonkumchok, 2005). In addition, PPMR technique distracted the patient's attention from pain and decreased tension of muscle. PPMR technique was able to be used as an alternative therapy in adjuvant with analgesics administration to decrease postoperative pain intensity in elderly patient undergone abdominal operation.

CHAPTER VI
CONCLUSION

Summary of the Study

This study was two-group experimental research with pre-post test control group design aimed to investigate the effect of Passive Progressive Muscle Relaxation technique (PPMR) on postoperative pain intensity in elderly patient undergone abdominal surgery at Saraburi central hospital which was divided into control group and experimental group. The experimental group adopted Passive Progressive Muscle Relaxation technique (PPMR) and the control group did not adopt Passive Progressive Muscle Relaxation technique (PPMR). The population of study was the elderly patients aged 60 years old and older both male and female recruited by purposive sampling. The duration of data collection was during March to September, 2006. The inclusion criteria of samples were: post abdominal operative elderly patient who had pain intensity score 4-7 at the first measurement before ambulation: post abdominal operative elderly patient having on-demand analgesics administration, post abdominal operative elderly patient who had never used Passive Progressive Muscle Relaxation technique (PPMR) before and had the first ambulation within 72 hours postoperative. There were 3 types of research instrument in this study, i.e., Demographic data collection instrument, Numeric Rating Scale–pain measurement, and PPMR technique.

Totally 64 samples were divided into control group and experimental group with 32 samples each. Most of patients were female for the amount of 19 samples in each group. All samples were Buddhism or 100% of both groups. The education level of samples were mostly Primary school (Prathom 1-6), i.e., 29 samples (90.6%) of controlled group and 26 samples (81.3%) of experimental group. Most samples, 23 samples (71.9%) of both groups, had no concurrent disease, most sample, 21 samples (65.6%) of control group and 25 (78.1%) of experimental group had no operative experience. There was no significant difference between control group and experimental group. Most samples, 17 samples (53.1%) of control group and 19

samples (59.4%) of experimental groups had Gall stone, Cholecystitis, and CBD stone. Most of patient, 16 samples (50%) and 19 samples (59.4%), had open cholecystectomy.

According to the study, the postoperative pain in elderly patient undergone abdominal surgery between the experimental group and the control group were significantly different ($p < .05$). Moreover, the mean score of pain level between different time points were significantly different ($p < .01$). When comparing the usage of analgesic drug between the experimental and the control group by utilizing Chi-Square (Table 7), it was found that non significant between two group ($p > .05$).

Implementation and Recommendations

Although the intervention of PPMR technique was able to decrease the postoperative pain in elderly patient undergone abdominal operation effectively, however, moderate pain intensity still existed after the intervention. Having patient slept still on the bed also gradually and naturally palliated the pain, PPMR technique was a method that could have induced patient to sleep effectively.

Therefore, PPMR technique in adjuvant with promoting patient's rest and sleep was a palliative intervention that can be applied to elderly patient undergone abdominal operation in concurrent and supportive with analgesics administration.

Recommendation for nursing

Although pain medication is the most powerful pain relief tool available to nurses, it is not the only tool. PPMR technique nursing activities can assist in relieving pain with usually low risk to the patient. Although such measures are not a substitute for medication, they may be all that is necessary or appropriate to relieve episodes of pain lasting only seconds or minute. In instances of severe pain that lasts for hours or days, combining PPMR technique with medications may be the most effective way to relieve pain.

Recommendation for study

The PPMR technique study should concern the effectiveness test in pain intensity reduction in postoperative elderly patient undergone operation in the other part of body or anxiety level reduction in the aforementioned patients in order to manage sleep disorder problem. The factors related to gender in explaining links between gender and pain. Self-efficacy is one plausible factor that may mediate the relation between gender and pain, in light of its associations with both gender and pain perception. The decrease of pain intensity measured by physiological response such as pulse rate, blood pressure, and respiratory rate should be as well carried out.

Limitation of the study

There were several limitations in this study as followed:

1. All patients in this study were elderly and received abdominal surgery. Thus, the results may not be generalized to those who received other type of surgery.
2. The research design could not double blind. Therefore, experimental expectation may have influenced the results.
3. The research design not control confounding factor. Therefore, they might influence the results.

REFERENCES

Acute Pain Management Panel. (1992*). Acute pain management: Operative or medical procedures and trauma. Clinical practice guideline.* AHCPR Pub. No. 92-0032. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, US Department of Health and Human Services.

Austrup, M.L., & Korean, G. (1999). Analgesic Agents for the Postoperative Period: Opioids. *Surgical Clinics of North America*, *79*(2), 253-273.

Baillie, I. (1993). A review of pain assessment tools. *NursingStandard*, *7*(23), 25-29.

Benesh, L. (1997). Tools for assessing chronic pain in elderly women. In. Bird, J. (2005). Assessing pain in older people. *Nursing Standard, 19*(19), 45-52.

Bird, J. (2005). Assessing pain in older people. *Nursing Standard*, *19*(19), 45-52.

Black, J.M., & Matssarin-Jacobs, E. (1993). Pain assessment and intervention. *In Luckman and Sorensen's medical surgical nursing: A psychophysiologic approach.* (4th ed., pp. 331-358). Philadelphia: W.B.Saunders.

Black, J.M., & Jacobs-Matassarin, E. (1997). *Medical-Surgical Nursing.* (5th ed.). Philadelphia: W.B. Saunder.

Bonica, J.J. (1990). Definition and taxonomy of pain. In J.J. Bonica (Ed.), *The management of pain* (2nd ed., pp. 18-27). Philadelphia: Lea & Febiger.

Boss, B.J. (1992). Nursing assessment and role in management: Pain. In. S.M. Lewis & I.C. Collier (Eds.), *Medical-Surgical Nursing: Assessment and Management of Clinical Problems.* (3rd ed., pp1497-1518). St. Loui: Mosby.

Bowsher, D. (1978). Pain pathways and mechanisms. Anaesthesia. *England Journal of Medicine, 33*(10), 935-944.

Bray, C.A. (1986). Postoperative pain. *The Association of Perioperative Registered Nurses (AORN) Journal*, *43*(3), 672-673.

Brown, V.M. (1999). Comfort. In. P.A. Potter & A.G. Perry (Eds.), Basic Nursing: *A Clinical Thingking Approach.* (4th ed., pp. 912-942). St. Louis: Mosby.

Bulechek, G.M., & McCloskey, J.C. (1999). *Nursing Intervention: Effective Nursing Treatment* (3rd ed.). Philadelphia: W.B. Sauders Company.

Carroll, D. (1993). Pain assessment. In D. Carroll & D. Bowsher (Eds.), *Pain: Management and Nursing Care.* (pp.17-28). Oxford: Butterwort-Hienemann.

Caunt, H. (1992). Reducing the psychological impact of postoperative pain. *British Journal of Nursing, 1*(1), 13-19.

Conti, P.C., de Azevedo, L.R., de Souza, N.V., & Ferreira, F.V. (2001). Pain measurement in TMD patients: evaluation of precision and sensitivity of different scales. *J Oral Rehabil, 28,* 534-539.

Chin, C. (1999). *The effects of back massage on surgical tress responses and postoperative pain.* Unpublished doctoral dissertation, Case Western Reserve University, Cleveland, OH.

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.

Closs, J. (1990). An exploratory analysis of nurses provision of postoperative analgesic drugs. *Journal of Advanced Nursing, 15,* 42-49.

Closs, S.J. (1994). Pain in elderly patients: a neglected. *Journal of Advanced Nursing, 19,* 1072-1081.

Day, W. (2000). Relaxation: A nursing therapy to help relieve cardiac chest pain. *Australian Journal of Advanced Nursing, 18*(1), 40-44.

Dodson, M.E. (1985). *The Management of Postoperative Pain.* London: Edward Arnold.

Doody, S.B., Smith, C., & Webb, J. (1991). Nonpharmacologic intervention for pain management. *Clinical Care Nursing Clinics of North America, 3*(1), 69-75.

Dougans, I. (1996). *The complete illustrated guide to reflexology therapeutic foot massage for health and well-being.* USA: Element Books.

Faull, C., & Nichol, A. R. (1986). Temperament and behaviour in six-year-olds with recurrent abdominal pain: A follow up. *Journal of Child Psychiatry and Allied Disciplines, 27,* 539-544.

Ferrante, F.M., & VadeBouncouer, T.R. (1993). *Postoperative Pain Management.* New York: Churchill Livingston.

Ferrel, B.R. (1995). The impact of pain on quality of life. *Nursing Clinics of Nursing Research, 30*(4), 609-624.

Fillingim, R. B. (2000). Sex, gender, and pain: Progress in pain research and management. *Seattle: International Association for the Study of Pain.*

Fillingim, R.B. (2003, April 9). *Higher pain tolerance in males can't be bought.* Retrieved April 9, 2003, from www.eurekalert.org/pub_releases/2003-04/cfta-hpt040903.php.

Freeman, K., Smyth, C., Dallam, L., & Jackson, B. (2001). Pain measurement scales: a comparison of the visual analogue and faces rating scales in measuring pressure ulcer pain. *J Wound Ostomy Continence Nurs, 28,* 290-296.

Gift, A.G., Moore, T., & Soeken, K. (1992). Relaxation to Reduce Dyspnea and Anxiety in COPD patients. *Nursing Research, 41*(4), 242-246.

Gloria, A.F., & Denise, K. (2004). The Use of Guided Imagery to Manage Pain in an Elderly Orthopaedic Population. *Orthopaedic Nursing, 23*(5), 335 - 340.

Good, M., Stanton-Hicks, M., Grass, J.A., Anderson, G.C., Choi, C., Scoolmeesters, L.J., & Salman, A. (1999). Relief of postoperative pain with jaw relaxation, music, and their combination. *Pain, 81,* 163-172.

Good, M., Stanton-Hicks, M., Grass, J.A., Anderson, G.C., Salman, A., & Duber, C. (2001). Pain outcomes after intestinal surgery. *Outcome Management of Nursing Practice, 5*(1), 41-46.

Hickling, E.J., Blanchard, E.B., Silverman, D.J., & Schwarz, S.P. (1992). Motor vehicle accidents, headaches and post-traumatic stress disorder: Assessment findings in a consecutive series. *Headache, 32*(3), 115-123.

Higgins et al,.(2004). Chronic pain in elderly nursing home residents the need for nursing leadership. Cite in Bird, J. (2005). Assessing pain in older people. *Nursing Standard, 19*(19), 45-52.

Holl, R.M. (1995). Surgical cardiac patient characteristics and the amount of analgesics administered in the intensive care unit after extubation. *Intensive and Critical Care Nursing, 11,* 192-197.

Howangsuwannakorn, S. (2003). *Effects of foot reflexology on pain level,vital signs,and satisfaction in post-abdominal surgical patients.* Unpublished Master's thesis, Mahidol University, Bangkok, Thailand.

Hughes, J., Smith, T.W., & Kosterlitz, H.W., Fothergill, L.A., Morgan, B.A., &. Morris, H.R. (1975). *Indentification of two related pentapeptides from the brain with potent opiate agonist activity. Nature. (London), 258,* 577-579.

Ignatavicios, D.D., Workman, M.L., & Mishler, M.A. (1995*). Medical-surgical nursing: A nursing process approach. Vol.1* (2nd ed). Philadelphia: W.B. Saunders.

Jacox, A., Ferrell, B., Heidrich, G., Hester, N., & Miaskowski, C. (1992). A guideline for the nation: Managing acute pain. *American Journal of Nursing, 92*(5), 49-55.

Jongjareonkumchok, A. (2005). *Effects of progressive muscle relaxation technique on postoperative pain and anxiety in coronary artery bypass graft surgery patients.* Unpublished Master's thesis, Mahidol University, Bangkok, Thailand.

Jurf, J.B., & Nirschl, A.L. (1993). Acute postoperative pain management: A comprehensive review and update. *Critical Care Nursing Quarterly, 16* (1), 8-25.

Lautenbacher, S., Moeltner, A., & Strian, F. (1991). Psychophysical features of the transition from pure heat perception to heat pain perception. *Perception and Psychophysics, 52,* 685-690.

Lester, N., Lefebre, J. C., & Keefe, F. J. (1994). Pain in young adults: I. Relationship to gender and family pain history. *Clinical Journal of Pain, 10,* 282-289.

McCaffery, M. (1979). *Nursing management of the patient with pain.* (2nd ed.). New York: J.B. Lippincott.

McCaffery, M. & Pasero, C. (1999). *Pain clinical manual.* (2nd ed). St.Louis: Mosby Year-Book.

McCaffery, M., & Beebe, A. (1989*). Pain: Clinical manaul for nursing practice.* St. Louis: Mosby.

McCaffery, M. (1979). *Nursing management of the patient with pain.* (2nd ed.). New York: J.B. Lippincott.

Meinhart, N.T., & McCaffery, M. (1983). *Pain: A nursing approach to assessment and analysis.* Norwalk: Appleton-Century-Crofts.

Melzack, R., & Wall, P. (1983). *The Challenge of Pain.* New York: Basic Books.

Nathan, P. (1980). Recent advances in understanding pain. *The British Journal of Psychiatry, 136,* 509-510.

Nelson, F.V., Zimmerman, L., Barnason, S., Nieveen, J., & Schmaderer, M. (1998). The relationship and influence of anxiety on postoperative pain in the coronary artery bypass graft patient. *Journal of Pain and Symptom Management, 15*(2), 102-109.

Paice, J.A., & Cohen, F.L. (1997). Validity of a verbally administered numeric rating scale to measure cancer pain intensity. *Cancer Nursing, 20*(2), 88-93.

Pert, C.B., & Synder, S.H. (1973). *Opiate receptor: Demonstration in nervous tissue*. Science. New York: Basic Books.

Polit, D.F., & Hungler, B.F. (1999). *Nursing research: Principle and method* (5th ed.). St. Louis: Mosby Year- book.

Potter, P.A., & Perry, A.G. (1995). *Basic nursing theory and practice.* St. Louis, MO: Mosby.

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.). St. Loius: Saunders.

Reynold, D. (1996). Endogenous opiates. In C.A. Warfield (Ed.), *Manual of pain management.* Philadephia: J.B. Lippincott.

Riley, J. L., Robinson, M. F, Wise, E. A., Myers, C. D., & Fillingim, R. B. (1998). *Sex differences in the perception of noxious experimental stimuli: A meta-analysis. Pain, 74*, 181-187.

Robinson, M. E., Riley, J. F, & Myers, C. D. (2000). *Psychosocial contributions to sex-related differences in pain responses.* In R. B. Fillingim (Ed.), Sex, gender, and pain: Progress in pain research and management (pp. 41-68). Seattle: International Association for the Study of Pain.

Rollman, G. B., Lautenbacher, S., & Jones, K. S. (2000). *Sex and gender differences in responses to experimentally induced pain.* In R. B. Fillingim (Ed.), Sex, gender, and pain. Progress in pain research and management (pp. 165-190). Seattle: International Association for the Study of Pain.

Roykulcharoen, V., & Good, M. (2004) . Systematic relaxation to relieve postoperative pain. *Journal of Advanced Nursing*, *48*(2), 140–148.

Rutishauser, S. (1994). *Physiology and anatomy: A basis for nursing and health care.* New York: Churchill Livingstone.

Sauaia, A., Min, S.J., Leber, C., Erbacher, A., Abrams, F., & Fink, R. (2005). Postoperative Pain Management in Elderly Patients: Correlation Between Adherence to Treatment Guidelines and Patient Satisfaction. *Journal of the American Geriatrics Society, 53*(2), 274.

Seaward, B.L. (1999). *Principles and strategies for health and well being.* (2nd ed.). Massachusett: Jones and Bartlett Publishers.

Scott, L.E., Clum, G.A., & Peoples, J.B. (1983). Preoperative predictors of postoperative pain. *Pain, 15,* 283-289.

Shea R.A., Brooks J.A., Dayhoff N., E., & Keck J. (2002). Pain intensity and postoperative pulmonary complecation among the elderly after abdominal surgery. *Heart & Lung, 31*(6), 440-449.

Sjostrom, B., Dahlgren, O. L., & Haljamal, H. (1999). Strategies in postoperative pain assessment: Validation study. *Intensive and critical Care Nursing, 15,* 247-258.

Sloman, R. (1995). Relaxation and the relief of cancer pain. *Nursing Clinics of North America, 30*(4), 697-709.

Sullivan, M. Bishop, S., & Pivik, J. (1995). The Pain Catastrophixing Scale: Development and validation. *Psychological Assessment, 7,* 524-532.

Sullivan, M., Rouse, D., Bishop, S., & Johnston, S. (1997). Thought suppression, catastrophizing, and pain. *Cognitive Therapy and Research, 21,* 555-568.

Summers, S. (2001). Evidence-based practice part 2 reliability and validity of selected acute pain instruments. *Journal of Perianesthesia Nursing, 16*(1), 35-40.

Titler, M.G., & Rakel, B.A. (2001). Nonpharmacologic treatment of pain. *Clinical Care Nursing Clinics of North America, 13*(2), 221-231.

Unruh, A. M. (1996). Gender variations in clinical pain experience. *Pain, 65,* 123-167.

Vateraus, E. (1979). “A holistic approach to nursing the patient in pain” *The Canadian Nurse, 10,* 22-27.

Watt-Watson, J., Garfinkel, P., Gallop, R., Stevens, B., & Streiner, D. (2000). The impact of nurses’ empathic responses on patients’ pain management in acute care. *Nursing Research, 49*(4), 191-200.

Watt-Watson, J.H., & Long, B.C. (1993). Pain.In B.C.Long,W.J.Phippa, & V.L. Cassmeyer (Eds.). *Medical-Surgical nursing: A nursing Process approach.* St.Louis:Mosby Year Book.

Weiss, S.J., (1986). Psychophysiologic effects of caregiver touch on incidence of cardiac dysrhythmia. *Heart & Lung, 15*(5), 495-502.

Wilson, R.W., & Elmassian, B.J. (1981). Endorphins. *Am J Nurs, 81*(4), 722-725.

Wong, D., & Baker, C. (1988). Pain in children comparison of assessment scales. *Paediatric Nursing, 14*(1), 9-17.

Wright, S.P., & Sluka, K.A. (2001). Non-pharmacological treatment for musculoskeletal pain. *The Clinical Journal of Pain, 17*(1), 33-46.

กรมสุขภาพจิต. (2547). (The Department of Mental Health, Ministry of Public Health, 2004). *การผ่อนคลายเครียด* (แถบเสียง). กรุงเทพมหานคร.

จุไรพร โสภาจารีย์. (2536). (Sopajaree, J., 1993). *ผลของดนตรีต่อการลดความเจ็บปวด และความวิตกกังวลในผู้ป่วยผ่าตัดหัวใจแบบเปิด*. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

ดวงดาว ดุลยธรรม. (2543). (Dulayatham, D., 2000). *ผลของดนตรีบำบัดต่อการลดปวดในผู้ป่วยหลังผ่าตัดยึดกระดูกต้นขา*. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต มหาวิทยาลัยสงขลานครินทร์.

ดารัสนี โพธารส. (2538). (Potharos, D., 1995). *คุณภาพการนอนหลับและสิ่งรบกวนการนอนหลับของผู้ป่วยหลังผ่าตัดในโรงพยาบาลรามาธิบดี*. วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

พิกุล นันทชัยพันธ์. (2546). (Nantachaipat, P., 2003). *ความเจ็บปวดทางออร์โธปิดิกส์*. เชียงใหม่: คณะพยาบาลศาสตร์ มหาวิทยาลัยเชียงใหม่.

รุ่งทิพย์ จามรมาน. (2532). (Jamonman, R., 1989). *ผลของการผ่อนคลายต่อการลดความเจ็บปวดในผู้ป่วยหลังผ่าตัดช่องท้อง*. วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล, กรุงเทพมหานคร.

ละเอียด ชูประยูร. (2541). (Chooprayoon, L., 1998). การฝึกผ่อนคลายกล้ามเนื้อ. *ใน เอกสารประกอบการอบรมเชิงปฏิบัติการ " การให้บริการในคลินิกคลายเครียด"* กรุงเทพมหานคร: กรมสุขภาพจิต กระทรวงสาธารณสุข.

วัฒนา พันธุศักดิ์. (2540). (Punthusak, W., 1997). ยาระงับปวด. ใน วัฒนา พันธุศักดิ์ และวิลาวรรณ ทองเจริญ (บรรณาธิการ), *เภสัชวิทยาทางการพยาบาล*. (พิมพ์ครั้งที่ 3, หน้า 215-239). กรุงเทพมหานคร: สามเจริญพาณิชย์ จำกัด.

วันเพ็ญ บุญสวัสดิ์. (2544). (Boonsawad, W., 2001). *ผลของการนวดแผนไทยต่อการลดความปวดในผู้ป่วยมะเร็ง*. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต, สาขาการพยาบาลผู้ใหญ่. บัณฑิตวิทยาลัย มหาวิทยาลัยสงขลานครินทร์.

วัลลภ ปิยะมโนธรรม. (2536). (Piyamanotham, W., 1989). *เทคนิคการรักษาโรคประสาทด้วยตนเอง*. กรุงเทพฯ: เยียร์บุ๊คพับลิชเชอร์.

ศิริภรณ์ ฟุ้งวิทยา. (2540). (Phungvithaya, S., 1997).*ยาระงับปวด*. กรุงเทพมหานคร : จุฬาลงกรณ์มหาวิทยาลัย.

สมบัติ ตาปัญญา. (2546). (Tapanya, S., 2003). *การพยาบาลผู้ป่วยออร์โธปิดิกส์*. คณะพยาบาลศาสตร์ มหาวิทยาลัยเชียงใหม่.

สารเนตร ไวคกุล. (2537). (Waikakul, S., 1994). ขบวนการกระตุ้นความเจ็บปวดในระบบกระดูกหัก เอ็น ข้อและกล้ามเนื้อที่ระบบประสาทส่วนปลาย. *วารสารออร์โธปิดิกส์ม 1*(1), 24-32.

แสงหล้า พลนอก. (2542). (Pholnork, S., 1999). *ผลของการสร้างจินตภาพต่อความเจ็บปวดในผู้ป่วยแผลไหม้*. วิทยานิพนธ์พยาบาลศาสตรมหาบัณฑิต มหาวิทยาลัยเชียงใหม่, เชียงใหม่.

อรัญญา เชาวลิต. (2543). (Chawalit, A., 2000). หลักการพยาบาลผู้ป่วยที่มีความเจ็บปวด. ใน พัชรียา ไชยลังกา, นวลจันทร์ รมณารักษ์, จารุวรรณ มานะสุรการ และอรัญญา เชาวลิต (บรรณาธิการ), *ตำราการพยาบาลผู้ใหญ่ 1 (อายุรศาสตร์)*. (หน้า 33-55). สงขลา: ห้างหุ้นส่วนจำกัด เอส.ซี.วี.บัสสิเสส์.

APPENDIX

APPENDIX A

List of Experts

ผู้ทรงคุณวุฒิ ตรวจสอบเนื้อหาของแถบเสียง “เทคนิคการผ่อนคลายกล้ามเนื้อแบบไม่ต้องเกร็งกล้ามเนื้อสำหรับผู้ป่วยสูงอายุหลังผ่าตัดช่องท้อง”

ผู้ช่วยศาสตราจารย์ ดร.วรรณา คงสุริยะนาวิน
อาจารย์ประจำภาควิชาการพยาบาลจิตเวช คณะพยาบาลศิริราช มหาวิทยาลัยมหิดล

ผู้ช่วยศาสตราจารย์ ดร.ทิพา ต่อสกุลแก้ว
อาจารย์ประจำภาควิชาการพยาบาลศัยศาสตร์ คณะพยาบาลศิริราช มหาวิทยาลัยมหิดล

นายแพทย์วรัญญู กิตติเพชรดี
ศัลยแพทย์โรงพยาบาลสระบุรี

APPENDIX B

Demographic Data Questionnaire

แบบบันทึกข้อมูลส่วนบุคคลและข้อมูลทั่วไป

คู่ที่……..

กลุ่ม () A () B

1. ชื่อ-สกุล……..อายุ……ปี เลขที่โรงพยาบาล……
2. วันที่รับรักษาในโรงพยาบาล……หอผู้ป่วย…….
3. การวินิจฉัยโรค……
4. โรคร่วม…….
5. ชนิดของการผ่าตัด……วันที่……..
6. ระยะเวลาทำผ่าตัด……นาที
7. ศัลยแพทย์ที่ทำผ่าตัด……
8. .....
9. .....
10. .....

APPENDIX C

The Numerical Rating Scale (NRS)

มาตรวัดความปวดชนิดตัวเลข

คำชี้แจง

แบบประเมินนี้เป็นแบบประเมินระดับความรู้สึกเจ็บปวดที่เกิดขึ้นของท่าน เริ่มตั้งแต่หมายเลข 0 หมายถึง ไม่มีความรู้สึกปวด จนกระทั่งถึง 10 หมายถึง มีความปวดมากที่สุด ไม่มีผิดหรือถูกขอให้ท่านตอบความความรู้สึกที่เกิดขึ้นจริงในขณะนี้ โดยทำเครื่องหมายกากบาท (X) ลงบนตัวเลขที่ใดก็ได้ ตั้งแต่ 0 – 10 ซึ่งท่านคิดว่า ตรงกับความรู้สึกปวดของท่านในขณะนี้มากที่สุด

APPENDIX D

Documentary Proof of Ethical Clearance Committee on Human Rights

No. MU 2006-041

Documentary Proof of Ethical Clearance
The Committee on Human Rights Related to
Human Experimentation
Mahidol University, Bangkok

Title of Project. The Effect of Passive Progressive Relaxation Technique on Post Operative Abdominal Surgery Pain in the Elderly Patient
(Thesis for Master Degree)

Principle Investigator. Mr. Pitoon Vutiso

Name of Institution. Faculty of Nursing

Approved by the Committee on Human Rights Related to Human Experimentation

Signature of Chairman. .....
(Professor Dr.Sasin Khusmith)

Signature of Head of the Institute. .....
(Professor Dr.Pornchai Matangkasombut)

Date of Approval. 15 MAR 2006

Date of Expiration. 14 MAR 2007

APPENDIX E

Information Sheet for Participants and Informed consent Form

Information Sheet for Participants

เอกสารชี้แจงผู้เข้าร่วมการวิจัยและแบบฟอร์มใบยินยอม

เรียน ผู้ตอบแบบสอบถามทุกท่าน

เนื่องด้วยกระผม นายไพฑูรย์ วุฒิโส นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล กำลังทำวิทยานิพนธ์เรื่อง “ผลของเทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อ ต่อการลดความปวดหลังผ่าตัดช่องท้องในผู้ป่วยสูงอายุ” ซึ่งวัตถุประสงค์ของการวิจัยครั้งนี้เพื่อเปรียบเทียบระดับความปวดของผู้สูงอายุหลังผ่าตัดช่องท้องก่อนและหลังการใช้เทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อและเพื่อเปรียบเทียบระดับความปวดของผู้ป่วยสูงอายุหลังผ่าตัดช่องท้องระหว่างกลุ่มที่ใช้เทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อ และกลุ่มที่ไม่ใช้เทคนิคการผ่อนคลาย โดยจะมีผู้เข้าร่วมวิจัยทั้งสิ้น 64 คน จะใช้เวลาทั้งหมด 8 สัปดาห์
การผ่าตัดช่องท้องทำให้เกิดความเจ็บปวดมากเมื่อมีการเคลื่อนไหวบริเวณทรวงอกขณะหายใจเข้าและออกเนื่องจากบริเวณผ่าตัดอยู่ใกล้กับกระบังลมและเป็นบริเวณที่มีเส้นประสาททอดผ่านครอบคลุมจำนวนมาก ผู้สูงอายุส่วนใหญ่ร้อยละ 62 จะมีความปวดในระดับรุนแรง ซึ่งร้อยละ 35 เกิดในช่วง 24 ชั่วโมงแรกหลังผ่าตัด นอกจากนั้น ยังมีได้รายงานว่าผู้สูงอายุมีระดับความปวดมากกว่ากลุ่มประชากรอื่นๆ เป็นสองเท่า ท่านจึงเป็นบุคคลสำคัญที่สามารถให้ข้อมูลที่เป็นประโยชน์ต่อการศึกษาครั้งนี้

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้เพราะท่านเป็นผู้สูงอายุที่ต้องได้รับการผ่าตัดช่องท้องและจะมีความเจ็บปวดเกิดขึ้นหลังจากการผ่าตัด เมื่อท่านยินยอมเข้าร่วมการวิจัยแล้ว ผู้วิจัยจะคัดเลือกผู้เข้าร่วมการวิจัยโดยการจับคู่และจับฉลากจำนวน 32 คู่ จากนั้นจึงใคร่ขอความร่วมมือจากท่าน ในการตอบแบบสัมภาษณ์ ซึ่งประกอบด้วย 2 ส่วน ได้แก่ แบบบันทึกข้อมูลส่วนบุคคล และแบบประเมินอาการเจ็บปวด โดยใช้เวลาในการตอบแบบสัมภาษณ์แต่ละครั้งประมาณ 20 นาที ในการตอบจะไม่มีคำตอบที่ถูกหรือผิด จึงไม่มีผลกระทบใด ๆ โดยจะสัมภาษณ์ข้อมูลส่วนบุคคลของท่านไว้ก่อนและสัมภาษณ์อาการเจ็บปวด ทั้งหมด 4 ครั้ง คือ ก่อนการลุกเดินครั้งแรก หลังเสร็จสิ้นการลุกเดินทันที 30 นาทีหลังการหลังเสร็จสิ้นการลุกเดินและ1 ชั่วโมง 30 นาทีหลังการเสร็จสิ้น

การลุกเดิน จึงใคร่ขอความร่วมมือจากท่านให้ตอบตรงตามความรู้สึกของท่านมากที่สุด เพื่อนำผลการสัมภาษณ์ที่ได้ไปศึกษา

ผลของการวิจัยที่ได้จะแปลผลออกมาและเก็บเป็นความลับ โดยไม่มีการเปิดเผยชื่อให้คนอื่นทราบ ข้อมูลจะวิเคราะห์เป็นภาพรวมเพื่อประโยชน์ในการวิจัยและการพยาบาลเท่านั้น

ในการวิจัยครั้งนี้ผู้วิจัยรับรองว่าจะไม่เกิดความเสี่ยงหรือเป็นอันตรายต่อตัวท่าน ถ้าหากพบว่ามีความผิดปกติใดๆเกิดขึ้นท่านจะได้รับการดูแลเบื้องต้นและส่งต่อที่เหมาะสมต่อไป
ในการเข้าร่วมวิจัยนี้ ผู้เข้าร่วมการวิจัยไม่ต้องรับผิดชอบค่าใช้จ่ายใดๆทั้งสิ้น
ท่านสามารถติดต่อผู้วิจัยได้ตลอดเวลาตามที่อยู่ที่แนบมา

การตัดสินใจเข้าร่วมการวิจัยครั้งนี้เป็นไปตามความสมัครใจของท่าน และไม่ว่าท่านจะเข้าร่วมการวิจัยหรือไม่ก็ตาม จะไม่มีผลกระทบใด ๆ ต่อตัวท่าน ถึงแม้ว่าท่านจะยินยอมเข้าร่วมการวิจัยแล้ว ท่านก็มีสิทธิ์ที่จะยกเลิกการเข้าร่วมการวิจัย ได้ตลอดเวลาตามที่ท่านต้องการโดยไม่มีข้อแม้ใด ๆ

ผู้วิจัยขอขอบคุณท่านที่ได้เสียสละเวลาให้ความร่วมมือในการตอบแบบสอบถามครั้งนี้

ไพฑูรย์ วุฒิโส
ผู้วิจัย

ข้าพเจ้าได้รับทราบรายละเอียดในเอกสารนี้ครบถ้วนแล้ว

ลงชื่อ.....
(.....)
วันที่.....

ติดต่อผู้วิจัย
ไพฑูรย์ วุฒิโส
วิทยาลัยพยาบาลบรมราชชนนี พระพุทธบาท

Informed Consent Form

แบบฟอร์มใบยินยอมให้ทำการวิจัยโดยได้รับการบอกกล่าวและเต็มใจ

การวิจัยเรื่อง ผลของเทคนิคการผ่อนคลายกล้ามเนื้อทีละส่วนโดยไม่ต้องเกร็งกล้ามเนื้อ ต่อการลดความปวดในผู้ป่วยสูงอายุหลังผ่าตัดช่องท้อง

ชื่อผู้วิจัย นายไพฑูรย์ วุฒิโส นักศึกษาระดับปริญญาโท คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

ชื่อผู้เข้าร่วมวิจัย.....อายุ.....เลขที่เวชระเบียน.....

วันให้คำยินยอม วันที่ ..... เดือน ..... พ.ศ. .....

ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายจากผู้วิจัยถึง วัตถุประสงค์ของการวิจัย วิธีการวิจัย อันตราย หรืออาการที่อาจเกิดขึ้นจากการวิจัยหรือจากยาที่ใช้ รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียด และมีความเข้าใจดีแล้ว

ผู้วิจัยรับรองว่าจะตอบคำถามต่าง ๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจ ไม่ปิดบังซ่อนเร้น จนข้าพเจ้าพอใจ

ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ และเข้าร่วมโครงการวิจัยนี้ โดยสมัครใจ และการบอกเลิกการเข้าร่วมการวิจัยนี้ จะไม่มีผลต่อการรักษาโรคที่ข้าพเจ้าจะพึงได้รับต่อไป

ผู้วิจัยรับรองว่าจะเก็บข้อมูลเฉพาะที่เกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยได้เฉพาะ ในรูปที่สรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่าง ๆ ที่เกี่ยวข้องกระทำ ได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ผู้วิจัยรับรองว่าหากเกิดอันตรายใด ๆ จากการวิจัยดังกล่าว ข้าพเจ้าจะได้รับการรักษาพยาบาล โดยไม่คิดมูลค่าตามมาตรฐานวิชาชีพ และจะได้รับการชดเชยรายได้ที่สูญเสียไประหว่างการรักษาพยาบาลดังกล่าว ตลอดจนเงินทดแทนความพิการที่อาจเกิดขึ้น

ผู้วิจัยรับรองว่าหากมีข้อมูลเพิ่มเติมที่ส่งผลกระทบต่อการวิจัย ข้าพเจ้าจะได้รับการแจ้งให้ทราบ โดยไม่ปิดบังซ่อนเร้น

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว และมีความเข้าใจดีทุกประการ และได้ลงนามในใบยินยอม นี้ด้วยความเต็มใจ

ลงนาม ..... ผู้ยินยอม
ลงนาม ..... พยาน
ลงนาม ..... พยาน

ในกรณีที่ผู้ยินยอมตนให้ทำการวิจัยไม่สามารถอ่านหนังสือได้ จะต้องได้รับการยินยอมในขณะ ที่ยังมีสติสัมปชัญญะ และระบุข้อความไว้ตามนี้ ข้าพเจ้าไม่สามารถอ่านหนังสือได้ แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้ว ข้าพเจ้าจึงลงนาม หรือประทับลายนิ้วแม่มือขวา ของข้าพเจ้าในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม ..... ผู้ยินยอม
ลงนาม ..... พยาน
ลงนาม ..... พยาน

BIOGRAPHY

NAME	Pitoon Vutiso
DATE OF BIRTH	10 July 1974
PLACE OF BIRTH	Saraburi, Thailand
INSTITUTION ATTENDED	Naresuan University, 1997: Bachelor of Science (Nursing) Mahidol University Master of Nursing Science (Adult Nursing)
POSITION & OFFICE	Boromarajonani College of Nursing, Praputhabat Saraburi, Thailand, 18120 Position : Nurse Tel. 036-266170 E-mail: g4737726@yahoo.co.th
HOME	67 moo 2 Kudnokpowl Saraburi, Thailand, 18000 Tel. 036-214276