PAIN PERCEPTION AND BREATH CONTROL USE TO RELIEVE POSTOPERATIVE PAIN

A THESIS

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CHAPTER 1

INTRODUCTION

Pain is inevitable. Everyone has past or present experience with pain. The exception to pain experience would be those rare cases of sensory impairment since birth. One of the primary concerns of nurses is the alleviation of pain since nurses encounter patients with pain in all areas of patient care. This is particularly true in the case of postoperative patients. When patients have surgery, they expect to have pain, but they also expect that the pain will be relieved. All too often, nurses alleviate pain in postoperative patients by administering analgesics rather than using other pain relief measures such as distraction, diversion, or comfort.

Distraction by controlled breathing can be effective in relieving pain. It is a technique the nurse can incorporate in preoperative teaching, and the patient can use it any time without relying on the presence of a health team member. By teaching patients methods they can use to control their pain, they should require less analgesics and their surgical course should be less

traumatic. This study was undertaken to assess if differences in pain perception and use of narcotics occurred in patients who used controlled breathing.

Problem of Study

Is there a difference in pain perception and a difference in the use of narcotics between postoperative hysterectomy patients who have and who have not been taught controlled breathing?

Justification of Problem

Pain control is an important aspect in the care of the surgical patient. Many patients are concerned about the possibility of postoperative pain. By including instruction in the use of controlled breathing to reduce pain during the preoperative phase, nurses can help their patients reduce or alleviate pain in the postoperative course.

The Lamaze method of controlled breathing has been effective in reducing the painful labor of childbirth, but it has not been widely incorporated as a method of reducing other painful conditions such as those experienced in the postoperative course. Most of the research that has been conducted regarding postoperative pain

relief has involved some form of relaxation as a nursing intervention. Incisional pain is probably the most significant postoperative complication in the eyes of the patient (Phipps, Long, & Woods, 1979). Generally, postoperative pain lasts from 24 to 72 hours. Measures to reduce anxiety and apprehension such as informing the patients of their condition and expected procedures and outcomes can reduce pain (Phipps et al., 1979). Another nursing measure which can decrease pain is assisting the patient to change positions and more frequently. The administration of narcotics is probably the most often used method for alleviating pain. It has been found that narcotics have a greater effect if they are administered before pain becomes severe (Phipps et al., 1979).

Another method which can be used to reduce postoperative pain is a controlled breathing technique. The effectiveness of this technique is enhanced by teaching it to the patient preoperatively. The nurse teaches the patient to inhale through the nose and to exhale through the mouth, to prevent excessive drying of the oropharyngeal cavity. The patient inhales to the count of 2 and exhales to the count of 4. This interval can be

modified for patient comfort. This technique can be used to decrease pain encountered when moving in bed and getting out of bed, as well as other short-term pain occurrences.

Although no research studies were found on using this technique with postoperative patients, Hudson (1977) described her actual experience in using breath control to ease postoperative pain. Hudson used breath control after surgery whenever she needed to move. After returning to work on an obstetrical-gynecological unit, she taught, with good results, the breath control technique to 20 patients who were having gynecologic surgery. Hudson encouraged these patients to use the technique when they were turning in bed or getting out of bed. Her colleagues also began using the technique with their patients.

This controlled breathing technique could prove valuable in reducing or alleviating postoperative pain. The patient needs to be given the best care available. By using this technique and hopefully reducing the amount of narcotic required to control pain, the nurse can promote the psychological and physical comfort of the patient. This research study was designed to determine

if a controlled breathing technique could reduce or alleviate postoperative pain.

Theoretical Framework

The gate control theory of pain has added to the knowledge of pain and ultimately increased the knowledge of methods to control pain. Proposed by Melzack and Wall in 1965 (cited in Melzack, 1973), the gate control theory of pain is most applicable to nursing in that it includes the total person in the pain experience. Basically, the theory indicates that a neural mechanism in the dorsal horns of the spinal cord acts like a gate to increase or decrease the flow of nerve impulses from peripheral fibers to the central nervous system (Melzack, 1973). The degree to which the gate increases or decreases sensory transmission is determined by the activity of large-diameter and small-diameter fibers and by descending influences from the brain (Melzack, 1973).

The substantia gelatinosa is an area of densely packed nerve fibers in the dorsal horns that extends throughout the length of the spinal cord (Melzack, 1973). It is this area that acts like a gate in the transmission of nerve impulses. The small afferent nerve fibers act

to close the gate, thus preventing painful stimuli from reaching the transmission cells and proceeding up the spinal cord to the cerebral cortex (Melzack, 1973). The whole brain is considered to be the pain center because the brainstem reticular formation, thalamus, and cerebral cortex all contribute descending nerve fibers which can close the gate (Melzack, 1973). "The brainstem acts as a central biasing mechanism through its neural connections with somatic, visual, and auditory systems" (Siegele, 1974, p. 500).

The thalamus and cerebral cortex comprise the central control system. It is activated by stimulation of dorsal horn transmission cells. When activated, the central system triggers a descending blocking action which closes the gate to incoming pain signals. The central control system affects attention, anxiety, anticipation, suggestion, and memory of past experiences.

The cerebral processes are divided into sensory-discriminatory, motivation-affect, and cognitive activities.

> Sensory-discrimination gives information about time, location or space, and intensity. Motivation-affect activities indicate the presence of discomfort or unpleasantness, which triggers action to decrease the noxious stimulation. Cognitive

> processes analyze past experiences, probable outcome, meaning of pain, and so on. (Siegele, 1974, pp. 500-501)

When noxious stimuli are introduced, the central biasing and central control systems interact to alter the perception of pain before that input evokes a pain response. Stimulation of large diameter sensory fibers can close the gate and block noxious sensory input of small diameter fibers. The application of the gate control theory to pain relief has broadened the scope of techniques used. It has also provided a theoretical basis for some of the old remedies such as massaging or rubbing the injured area. By rubbing or massaging the injured area, the large diameter fibers are stimulated to carry impulses from small diameter fibers and close the gate to incoming pain signals.

The gate control theory also recognizes that cognitive activities such as anxiety, attention, and suggestion may influence pain by acting at the earliest levels of sensory transmission (Melzack, 1973). The degree of control exerted is partly determined by the temporal-spatial properties of the input. With rapidly increasing unbearable pain, such as cardiac pain, the patient has difficulty achieving control. However, slowly rising

temporal patterns are amenable to central control (Melzack, 1973). "Intervening to alter sensory-discrimination, motivation-affect, and cognitive processes before perception of pain can lessen the clinical manifestation of pain" (Siegele, 1974, p. 501).

Preoperative and postoperative teaching can lessen pain by using the motivation-affect processes, thereby enabling the patient to participate actively in his/her care instead of being dependent (Siegele, 1974). The Lamaze method can decrease pain by using the cognition processes to alter the perception of sensory input. The distraction of focusing on breath control sends descending impulses from the cortex which closes the gate, thus preventing ascending pain impulses from being perceived. By using the cognitive activities and the motivation-affect processes in preoperative teaching, it would seem possible that the majority of patients would achieve control over postoperative pain.

Assumptions

The assumptions for this study included:

1. Individuals react differently in perceiving pain according to their own past and present experience with pain.

2. An individual has the capability of decreasing pain perception by tactile or cognitive activities.

3. The relationship between the stimulus and pain perception is different for different people in different situations.

4. The relationship between the stimulus and pain perception is different for the same people in different situations.

Hypothesis

The two hypotheses tested in this study were:

1. Between 24 and 30 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing have a lower score on the Pain Perception Questionnaire compared with posthysterectomy patients who have not been taught controlled breathing.

2. At 24 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing receive fewer milligrams of narcotics compared with posthysterectomy patients who have not been taught controlled breathing.

Definition of Terms

The definitions pertinent to this study included the following:

1. Pain perception--the point at which an individual recognizes that pain is present and responds to it. It was measured by the Pain Perception Questionnaire with a score of 4 or more indicating pain and 14 being the worst possible pain.

2. Utilization of narcotics--use of drugs with a predominant pain-relieving action which is given when pain relief medication is requested. Narcotics included opiate alkaloids and related synthetic drugs and were measured in total milligram amount of narcotics required by the subject during the first 24 hours postoperatively (Goth, 1976).

3. Posthysterectomy patient--a female who had all or part of her reproductive organs removed through an abdominal incision, who was between 24 and 30 hours postoperative, and who was taking narcotics for pain relief.

4. Controlled breathing--a variation of rate and depth of inhalations and exhalations. An individual inhales to the count of 2 and exhales to the count of 4. This rate can be varied, such as to a 3-6 count, according

to what is comfortable for each individual; this breathing was used in an attempt to decrease pain perception.

Limitations

The limitations that could have influenced the conclusion of this study included:

1. The interaction of personalities between the researcher and patient may have contributed to the effects of the study in an unknown manner.

2. The "Hawthorne effect," or knowledge of being in a study, may cause a change in an individual's behavior, thus obscuring the effect of the independent variable (Polit & Hungler, 1978).

3. All subjects who were taught the controlled breathing technique may not have used it.

4. The emotional impact of a hysterectomy may differ with different individuals.

Summary

Pain is an unpleasant factor associated with surgery. This study was undertaken to test a distraction technique for postoperative pain relief. Based on the gate control theory of pain which has physiological and cognitive aspects, pain can be reduced by a controlled breathing

technique. This technique is similar to breathing techniques taught in psychoprophylactic childbirth and focuses on cognitive methods of pain relief.

CHAPTER 2

REVIEW OF LITERATURE

The concept of pain and the research which has previously been conducted are discussed in this chapter as they pertain to the present study. The gate-control theory of pain, the psychoprophylactic approach to pain used in labor and delivery, and distraction techniques for the alleviation of pain are the three areas which are included.

Gate Control Theory

Although the gate control theory was initially discussed in the theoretical framework, more information about the theory will be discussed here. Melzack and Wall (1970) proposed a new pain theory in which a gate control regulates sensory input before pain perception and response are elicited. Stimulation of skin initiates nerve impulses that are transmitted to three spinal cord systems: (a) cells of the substantia gelatinosa in the dorsal horn, (b) dorsal column fibers that project to the brain, and (c) central transmission (T) cells in the dorsal horn. The proposed theory stated that the substantia gelatinosa functions as the gate control mechanism

that screens impulses before they influence the T cells; the afferent patterns in the dorsal column act as a central control trigger which can send descending signals to influence the gate control system; and "the T cells activate neural mechanisms which comprise the action system responsible for perception and response" (Melzack & Wall, 1970, p. 11). The control over transmission of painful impulses depends on two factors: the afferent impulses acting on the gating mechanism and descending impulses from the brain (Melzack & Wall, 1970).

It was originally thought that pain perception and response were perceived when the barrage of impulses on the T cells reached or exceeded a certain preset level. With a better understanding of physiology, some revision of the gate control theory has occurred. The basic premise of the theory appears to be valid, but the actual mechanism of action has not been unequivocally explained (Melzack & Wall, 1970). Anatomical gaps still exist because the substantia gelatinosa cells are difficult to stain; the interconnections are very complex, the morphology of functional synapses is uncertain; and the ultimate destination of projecting axons is unknown. Another problem is that it is difficult to assess the

significance of descending impulses from the brain on the dorsal horn. In spite of the problems, the evidence for an extended gate control theory is present (Melzack & Wall, 1970).

A description of existing knowledge regarding the anatomy of the gate control theory follows. The dorsal most portion of the dorsal horn has a series of laminae, which interconnect with dendrites or axons and serve as the termination points for afferent fibers. Lamina 1 consists of a thin layer of marginal cells which is still a mystery. Lamina 2 is the substantia gelatinosa and contains terminals of afferent fibers, dendrites of deeper cells, and small cells and their interconnections (Melzack & Wall, 1970). The afferent fibers are fine afferents which contrast to the large myelinated cutaneous afferents found in lamina 3. The small cells in lamina 3 receive primary afferents and project their axons into lamina 2. In lamina 4 there are large cell bodies which send dendrites into lamina 2 and 3. Lamina 5 is in the narrowest part of the dorsal horn. It receives afferent fibers and projects axons in many directions including unknown end-stations in the brain and thalamus (Melzack & Wall, 1970).

While an exact understanding of the physiology is lacking, much more is now known about the functions of transmitting cells. Melzack and Wall (1970) believed that the lamina 5 cells are the most likely transmitter cells concerned with triggering pain reactions. These cells have larger cutaneous stimuli and are involved in the reception of impulses from deep and visceral structures. This contrasts with cells in the other laminae. Lamina 4 cells have small cutaneous receptive fields and respond to light pressure stimuli; lamina 1 cells are few in number and have large receptive fields but do not project in white matter; and laminae 2 and 3 still have an unknown physiology but it has been suggested that they modulate impulses from the afferents to the larger cells (Melzack & Wall, 1970).

The cutaneous receptive fields of lamina 5 have three components which produce a three-zoned receptive field. In the center of this field the cell is excited by a wide range of mechanical stimuli and inhibition follows light stimuli while facilitation follows heavy stimuli. Around this zone is an area where large-fiber stimulation produces inhibition and small-fiber stimulation produces excitation and some facilitation. An even

larger zone encompasses these two areas in which natural stimuli produce inhibition rather than exitation (Melzack & Wall, 1970).

"The intensity of inhibition is controlled by the brainstem" (Melzack & Wall, 1970, p. 18). All cells are excited by the small afferents and inhibited by large-diameter cutaneous afferents. If the frequency of nerve impulses leaving any of these cells rises above some critical level, pain reactions will be triggered (Melzack & Wall, 1970).

Melzack and Wall (1970) assumed that gating the input at the dorsal horn level is the beginning of repeated modulation, filtering and abstraction of the input as it ascends toward and into the brain. Melzack and Casey (1968) proposed that the selection and modulation of sensory input through the neospinothalamic system partly accounts for the enurological basis of the sensory-discriminative dimension of pain. Melzack and Casey also felt that activation of the reticular and limbic structures was the basis of the motivational drive and unpleasant affect that triggered the organism into action; and the higher central nervous system processes exerted control over activity in the discriminative and

motivational systems. These three forms of activity could influence motor mechanisms responsible for the overt responses that characterize pain (Melzack & Wall, 1970).

Central nervous system activities such as those dealing with emotion, past experience, and attention can exert control over sensory input. Melzack and Wall (1970) suggested that a central control trigger acted as a nervous system mechanism to activate selective brain processes and exert control over sensory input. This meant that signals must be identified, interpreted, localized, and inhibited before the action system responsible for pain perception and response was activated.

In a simplified manner, Hedlin and Dostrovsky (1979) explained the gate control theory of pain. The nerve fibers that conduct pain signals to the brain have been divided into two groups--the A fiber group and C fiber group. Both fibers are small diameter fibers, but the A fibers conduct more rapidly than the C fibers. This may account for a dual pain sensation in which an initial sharp pain is followed by a more prolonged, burning type of pain. Pain impulses enter the spinal cord through the dorsal horn and go primarily to the midline region of the thalamus by way of the spinothalmic tract.

The reticular formation and limbic system influence the motivational-affective dimension of pain. In other words, they influence behavior related to anticipation of pain or response to it (Hedlin & Dostrovsky, 1979).

The cerebral cortex and thalamus are the major higher-level structures involved in pain. The exact mechanisms of cortex involvement are not clear, but cognitive activity is a possible contribution. Factors such as attention, suggestion, and emotional status could be relayed from the cortex to the thalamus, limbic system, or reticular formation to modify the pain experience. Cultural influences such as how the male should react to pain are cognitive aspects which can also modify the pain experience. The cortex could also be responsible for the localized sensation of pain as each area of sensory cortex receives impulses from specific cutaneous regions. The spinal cord also affects pain transmission to the brain. Whether pain is recognized or not depends on the input from large and small fibers, as well as inhibitory impulses descending from the brain. Through memory, emotion, and preoccupation with other activities, the higher brain centers can exert extensive control over the spinal cord central transmission cells. This control

can prevent central conduction of pain impulses (Hedlin & Dostrovsky, 1979).

The nursing implications for pain control are varied. Emotions such as anxiety and fear can aggravate the pain experience. By decreasing anxiety and fear through patient teaching about the experiences a patient can expect, pain can be decreased. Using the inhibitory influence of the higher brain centers can maximize pain relief. Distraction measures such as diverting attention during dressing changes, stimulating conversation, and counting aloud or counting backwards sends inhibitory impulses from the cortex to close the gate to pain signals (Hedlin & Dostrovsky, 1979).

Kim (1980) critiqued the gate control theory of pain. The theory has physiological and psychological dimensions. The physiological dimension is testable through histological and other physiological investigations. But the psychological dimension, which suggests that the higher brain centers are incorporated in pain perception, fails to explain what and how psychological variables affect which activity with what results. There is some fragmented evidence that psychological variables affect pain perception. Motivation, personality, and

state anxiety are psychological variables which have been shown to have a role in the pain experience (Kim, 1980).

The gate control theory has contributed to the understanding of the pain phenomena. It gives a detailed description of the anatomy and physiology of pain mechanisms. The gate control theory provides an explanation for induced pain, as well as acute and chronic pain. The theory provides an understanding of spontaneous pain, referred pain, prolonged pain, and hyperalgesia pain states. Even though the theory has broadened the foundation of understanding pain, it is still vague about the psychological processes that affect pain. It does not explicitly explain the direction of psychological influencing factors (Kim, 1980).

The gate control theory met pragmatic adequacy in that it provided the basis of effective pain control. The main weakness lay in the unspecificity of how and when to use nursing measures to affect psychological processes. According to Kim (1980), this was the critical weakness of the theory which needs further testing through clinical observation and research.

Psychoprophylactic Childbirth Methods of Pain Control

The distraction technique used in this study was a controlled breathing technique adapted from the Lamaze method of psychoprophylaxis. Psychoprophylaxis has been used in childbirth to prepare women to actively participate in labor and delivery. Through education and training in breathing and relaxation techniques, women in labor were able to relax and focus on distracting activities to reduce pain.

In the area of psychoprophylactic childbirth, Beck and Hall (1978) did an extensive review and analysis. It was found that past research in this area lacked appropriate control groups, random assignment to groups, and failed to report statistical analysis of data. Not one adequately controlled study was found that led to cause and effect statements regarding treatment and outcome.

Stevens (1977) used six groups to study psychological strategies such as those used in prepared childbirth. A total of 52 subjects was divided into six groups: Group 1 was the placebo group; Group 2 was trained in basic relaxation; Group 3 was trained in feedback relaxation; Group 4 was trained in attention focusing; Group 5

was trained in attention focusing plus basic relaxation; and Group 6 was trained in attention focusing plus feedback relaxation. The training session for each group lasted 15-25 minutes. Each subject was seated comfortably and asked to place one hand in ice water and to endure the pain as long as possible. Pain intensity was rated at intervals during the ice water immersion. A baseline pain level was established for each subject prior to the training session. After training, each subject was again exposed to the ice water treatment. Although Stevens stated that the attention focusing and feedback relaxation group significantly improved pain endurance and pain perception, no statistical tests were noted. Group 6 increased their ability to withstand pain while Group 1 worsened in their ability to withstand pain. Group 6 was the one that most closely resembled prepared childbirth training. Groups 4 and 5 experienced increased tolerance to pain stimulus and decreased pain perception as compared to the placebo group. This did indicate that mental strategies reduced pain perception during exposure to pain stimuli.

Cogan (1977) studied three groups of women who were taught fast panting, slow panting, and "he" breathing for

use during delivery. Cogan compared the groups on the extent of hyperventilation and pain experienced during labor. There was no statistical difference in the amount of hyperventilation experienced but the fast panting group experienced a statistically significant difference in pain from 0-4 cm. dilation during labor than the other two groups.

In a study conducted by Mulcahy and Janz (1973) two groups were tested on their reactions to short-term pain. A modified Wright method of childbirth preparation which consisted of concentration, controlled breathing, active relaxation, and cognitive and motor activity was taught to the experimental group while the control group spent equal time learning isometric exercises. The pain stimulus used was an inflated blood pressure cuff. Pain perception was established for all subjects initially with a blood pressure cuff inflated until each subject felt discomfort. A second test of pain perception was conducted which again used an inflated cuff to the point of discomfort. This second test was performed after the experimental and control groups attended their respective classes. There was a significant difference between the two groups for the second test ($\underline{t} = 3.54$, $\underline{p} = .001$).

The results were also significant between the first test and the second test in the experimental group (t = 6.44, p = .000004). The hypothesis that psychoprophylactic childbirth could raise pain perception threshold was supported.

Huttel, Mitchell, Fischer, and Meyer (1972) studied several factors in analyzing the effects of psychoprophylaxis in childbirth. Two groups of pregnant women were selected at random from clinic patients who were expected to deliver within an 8-week period. A total of 31 patients, who participated in prepared childbirth classes, comprised the experimental group. The control group consisted of 41 patients who did not attend any special classes, but they did visit the delivery room prior to labor and delivery. The two groups were compared on the following criteria: personality changes during pregnancy, duration of labor, obstetrical complications, medication during labor, Apgar scores, behavioral reactions during labor and delivery, impact of delivery experience, and mood scores during the postpartum period. The results indicated a difference in duration of labor which averaged 1 hour shorter for the experimental group. The experimental group required significantly less medication than

the control group, and had fewer complaints during labor and delivery.

Several benefits have been established that are directly attributable to psychoprophylactic childbirth methods. Tanzer and Block (1972) noted that the psychoprophylactic method utilized the concept of inhibition in that the breathing techniques learned produced such a strong stimulus to the cerebral cortex that pain impulses were inhibited. Subjects who took part in natural childbirth classes reported less pain and significantly less use of analgesics than subjects who did not take part in natural childbirth classes. The women who participated in prepared childbirth also experienced less anxiety about labor and delivery than women who did not participate in prepared childbirth.

Chabon (1966) indicated that childbirth was associated with some degree of discomfort but the use of psychoprophylaxis reduced the discomfort to a manageable level in most women and eliminated it totally for some women. The Lamaze method distracted women from the perception of a uterine contraction as pain (Banasiak & Corcoran, 1973). Women who participated in the Lamaze method referred more to the experience of childbirth as

satisfactory than to the presence or absence of pain (Banasiak & Corcoran, 1973). Smith, Priore, and Stern (1973) stated that the transition phase of labor presents the most difficult phase. The use of a psychoprophylactic method of childbirth reduced the amount of discomfort and enabled the patient to cope with it.

Davenport-Slack and Boylan (1974) studied 75 patients regarding psychological factors related to childbirth experiences. Psychoprophylactic childbirth training was available to all subjects but only 15 took the training. All subjects were rated on length of labor, amounts of medication, and tenseness of body as well as subjective responses which included the subjects' ratings of their labor and delivery pain and anxiety, a description of childbirth, and an experiential testimony. The subjects who participated in prepared childbirth did not differ from the subjects who did not participate in prepared childbirth in the areas of length of labor, self-report of pain, or childbirth description. The childbirth training did contribute to calmer behavior during labor and delivery, a decreased amount of medication, and positive and rewarding childbirth experiences related to the childbirth testimonies.

In a review of related research, Stevens (1977) discussed psychological strategies which related to pain management that are taught in childbirth education. Systematic relaxation has been found to decrease anxiety and increase pain tolerance. Subjects are taught to relax all of the muscles of the body when given a specific cue. Cognitive control required the subject to be engaged in mental activities other than an awareness of incoming pain signals. The two types of cognitive control utilized in prepared childbirth are dissociation and interference. Dissociation involved concentrating on a nonpainful characteristic of the pain stimulus such as concentrating on the coolness of water when subjected to ice water as pain stimulus. Dissociation is applied to labor contractions when they are considered as muscular contractions instead of labor pains. Interference is accomplished by distraction and attention focusing. Distraction and attention focusing are utilized in breathing techniques and focusing on a specific picture or area of the labor room during labor. Cognitive rehearsal is based on providing the subject with accurate explanations of the upcoming experience. Cognitive rehearsal is utilized in prepared childbirth when the instructor

supplied subjective and objective data regarding the birth experience. A combination of these strategies, which are taught in prepared childbirth classes, contributed to the effective management of pain during childbirth.

If distraction in the form of breathing techniques could reduce pain for women during labor and delivery, could it not also decrease other short term acute pain conditions? After reviewing the literature, it was decided to test the effectiveness of a controlled breathing technique in reducing the acute pain in postoperative hysterectomy patients.

Distraction Techniques

Many studies have been conducted in the area of relaxation or distraction. In a landmark study, Nisbett and Schacter (1966) reported on cognitive manipulation of pain and fear by attributing symptoms to something other than the pain stimulus. Subjects were divided into high and low fear attributes as well as shock and pill (placebo) attributes. Subjects in the high fear group were told the shock would be quite painful. Subjects in the low fear group were told to expect a mild sensation such as a

"tickling" sensation. The subjects in the shock group were told to expect sensations that were irrelevant to the shock while those in the pill group were told to expect symptoms that were actually caused by the shock. The subjects in the low fear pill attribute group reported significantly less pain than the other groups, in spite of the fact that they tolerated as much shock as subjects in any other group. The findings indicated that by attributing painful symptoms to something other than the pain stimulus; through cognitive manipulation the subjects tolerated more shock while reporting less pain.

Another study which utilized attention focusing to cold stimulus reported statistical significance (Blitz & Dinnerstein, 1971). A group of 36 pain volunteers was randomly assigned to one of three groups. All subjects were initially exposed to three trials of putting their right hand into ice water. The hand remained in ice water until each subject reported pain or 4 minutes of exposure had elapsed. The control group repeated the ice water immersion for two more trials. The second group was told to focus their attention on the cold and ignore the pain. The third group was told to focus on the cool quality of the water and to think of it as

pleasant. The instructions were given to the second and third groups prior to the next two ice water trials. Both the second and third groups reported significantly higher pain thresholds than the control group. An interesting finding in this study indicated that the males in the two experimental groups showed less pain than the females.

French and Tupin (1974) used attention focusing in several case studies. Five cases were presented and discussed. One subject was hospitalized for severe chest pain, and one was hospitalized following bullet wounds and had experienced severe pain. The third case reported a patient with cancer who was having difficulty sleeping. Another subject had suffered a myocardial infarction a year before the study and had made repeated trips to the hospital for treatment of chest pains. The fifth subject was hospitalized for chronic back pain. All subjects were directed to relax, let their minds drift, and focus their attention on a pleasant memory. By focusing attention on a pleasant memory, moderately severe pain perception was decreased. The subject in the third case experienced relief of sleep disturbance. The fifth subject was the only one that reported no response at all.

Barber and Cooper (1972) studied the effects of three distractors on pain: listening to a tape recorded story, adding aloud, and counting aloud. The Forgione-Barber pain stimulator applied to the index finger served as the pain stimulus. A pretreatment pain level was established for each subject. Subjects were then assigned to 1 of 4 treatment groups, with 14 subjects in each group. The listening to a story and adding aloud groups reduced pain ratings during the first minute of pain stimulation but not during the second minute. In post-experimental interviews, subjects indicated they had their own methods of distraction which meant there were no pure controls for this study. Not all subjects assigned to a particular distractor used that to alleviate pain. Some of the subjects, including some of those in the control group, used techniques they had developed with past pain experiences to reduce or alleviate pain. This may have accounted for the lack of significance during the total time pain was experienced in this study.

Flaherty and Fitzpatrick (1978) used a relaxation technique to increase the comfort level of postoperative patients. A total of 42 subjects, 21 in the study group and 21 in the control group, consented to participate in

the study. Each subject was interviewed the night before surgery. The study group was taught the relaxation technique, which consisted of letting the lower jaw drop slightly and keeping the tongue quiet. All subjects ambulated in the room and returned to bed approximately 6 to 8 hours postoperatively. The study group subjects were reminded to use the relaxation technique prior to getting out of bed. Narcotic usage was monitored during the first 24 hours after surgery. Significance was reported in the areas of incisional pain, body distress, and narcotic intake. The distraction measure improved the comfort level of the patients in the study group.

Bafford (1977) conducted a study on the effects of progressive relaxation for controlling pain. Thirty patients admitted for cardiac surgery were divided into three groups: the first group was taught progressive relaxation, the second group was visited daily but given no special instructions, and the third group was the control group and received no special treatment. On the 9th postoperative day, subjects rated their pain experience and direct pain response was measured by counting the number of medications each subject received for pain or tension. Although no statistical significance was found,

the trend was toward less pain and less medication for the progressive relaxation group.

Several studies have been conducted using cognitive strategies in experimentally induced pain (Bobey & Davidson, 1970; Chaves & Barber, 1974; Scott & Barber, 1977). Bobey and Davidson (1970) found that relaxation "anxiety," and cognitive rehearsal were all effective in increasing the subject's pain tolerance scores. "Anxiety" was used in the sense that one group of subjects listened to a tape of screams and cries of women in labor. This anxiety tape could have functioned as cognitive rehearsal or simple distraction from the actual pain stimulus. Relaxation was the most effective method of increasing pain tolerance. Scott and Barber (1977) indicated that a combination of cognitive strategies was effective in increasing pain tolerance but they did not significantly reduce pain perception of distress associated with pain. One possible explanation of the results could be that subjects were faced with two tasks: to tolerate pain and to experience less pain. It may be that subjects can respond to one task but not to two tasks simultaneously. The cognitive strategies used were concentrating on other things, dissociating from the pain, attempting not to be

bothered by the pain, interpreting the sensations as not painful, and imagining that the stimulated area was numb. Two types of pain stimulus were used: placing one hand in an ice water bath, and placing the index finger in the Forgione-Barber pain stimulator. Half of the subjects were tested using ice water and the other half were tested using pressure. The subjects did not differ significantly in response to cold or pressure pain. Chaves and Barber (1974) found that pain was significantly reduced by cognitive strategies when pain tolerance was constant. The index finger of all subjects was placed in the Forgione-Barber pain stimulator for 2 minutes. Subjects who used either one of two cognitive strategies, imagining pleasant events or imagining that the finger was insensitive, experienced significantly reduced pain as compared to the control group.

Spanos, Radtke-Bodorik, Ferguson, and Jones (1979) studied the effects of hypnotic induction, suggestions for analgesia, and the use of cognitive strategies on the reduction of pain. Subjects were rated as catastrophizers, one who worries and becomes anxious about pain, or noncatastrophizers; as well as divided into one of four treatment groups. The first group consisted of

hypnotic induction, the second group was hypnotic induction plus analgesia suggestion, the third group was analgesia suggestion only, and the fourth group was the control group. Noncatastrophizers who used more than one cognitive strategy reported a significant drop in pain during an ice water trial. Pain reduction was not effected by hypnotic induction.

Voshall (1980) approached pain relief from the preoperative teaching aspect. The study group was taught how to increase incisional discomfort and "gas pains" as well as information about the surgery and postoperative care. Although there was no significant difference in the way the two groups ranked their pain, there was statistical significance in the number of postoperative analgesics for the combined days. An important weakness of this research was that the statistical method of analysis was not reported.

Distraction has been effective in reducing pain in several experimental studies (Blitz & Dinnerstein, 1971; Chaves & Barber, 1974; Nisbett & Schacter, 1966; Spanos et al., 1979). It has also been effective in a clinical study (Flaherty & Fitzpatrick, 1978). This study, which used a controlled breathing technique as a form of

distraction, would also validate distraction as a pain-relieving measure for clinical pain.

Summary

With the gate control theory of pain as a basis, pain relief has been studied from many perspectives. Research has been conducted in the psychoprophylactic method of childbirth as a pain relieving mechanism as well as several forms of distraction and relaxation. Copp (1974) described patients' responses to pain, including coping methods and strategies they used to reduce pain. The majority of patients saw value in the pain experience as it created an opportunity for self-testing, fostered an appreciation of former good health, and permitted identification with others who had suffered. Strategies used to alleviate or reduce pain included applications of heat and cold, prescription and nonprescription drugs, breathing exercises, and purposeful diversion. Certain body positions and ritualistic behavior such as rocking, pacing, and rubbing can also reduce pain.

McCaffery (1980) elaborated on noninvasive techniques that are effective in relieving pain. Distraction consisted of many techniques and is most effective for acute pain. A patient can give a detailed account of an exciting

game or book, actively listen to music by increasing or decreasing the volume in response to pain, tap out the rhythm and sing aloud, and use slow rhythmic breathing. An effective technique in relieving ongoing pain is relaxation. Cutaneous stimulation such as cold packs and menthol ointments can relieve pain from sore joints and muscles. Contralateral stimulation, such as rubbing the right leg when the left leg hurts, can also be used to relieve pain. McCaffery (1979) stated that many distraction techniques are modifications of methods used in childbirth training. To be effective, distraction must not be too simple or too difficult. The patient must also like the distractor activity for it to be effective.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

In the quest for human knowledge, the scientific approach offers an orderly, disciplined method of acquiring dependable and useful information (Polit & Hungler, 1978). The investigative approach used to acquire knowledge regarding controlled breathing and its relationship to perception of pain and narcotics usage was the quasi-experimental design. According to Polit and Hungler (1978) a quasi-experiment lacks one of the three criteria which characterize a true experiment. A true experiment is characterized by manipulation, control, and randomization (Polit & Hungler, 1978). In this research the missing criteria was randomization. This study qualified as a quasi-experiment because the elements of manipulation and control were met. The independent variable that was manipulated was teaching controlled breathing to a group of subjects. The element of control was maintained by the utilization of a control group, that is a group of subjects that was not subjected to controlled breathing like the experimental group. No attempt

to manipulate the nursing care given by the hospital staff was made.

The present study was a two group field experiment in that it was conducted in the hospital setting. The subjects were not randomly selected but were randomly assigned to either the experimental or the control group.

Setting

The setting was a 381-bed private hospital located in a Central Texas town with a population of approximately 100,000 persons. The chosen hospital has a larger number of gynecological surgery patients than the other hospitals which constituted the basis for selecting this institution. An average of 918 surgeries and 36 hysterectomies are performed in the hospital each month. The study was conducted on several medical-surgical units in the hospital. One unit which was used consisted of all private rooms. The other units were 95% private and 5% semi-private, which meant there were 2 beds in those rooms and the possibility of having a roommate existed.

Population and Sample

The population consisted of women under the care of a particular group of obstetrical/gynecological doctors

and who were candidates for elective hysterectomy at the designated hospital. The subjects were all able to read, write, and speak the English language. All of the subjects had a home telephone. Thirty women were contacted to participate in the study. The subjects were selected on the basis of availability and were randomly assigned to either the experimental or control group using the table of random numbers.

Of the 30 potential subjects, 2 subjects decided not to participate in the study during the initial telephone contact. Six others were dropped from the study for various reasons. Two patients had complications either prior to or after surgery. One patient had a less complicated procedure done than abdominal hysterectomy. One subject refused to answer the pain questionnaire within the designated time after surgery. Two subjects decided not to have surgery at this time. Therefore, the sample included 10 subjects in the experimental group and 12 subjects in the control group.

Protection of Human Subjects

This study complied with the rules and regulations of Texas Woman's University regarding the protection of human subjects in research. Permission was obtained from the

Human Subjects Review Committee at Texas Woman's University (Appendix A) and from the graduate school (Appendix B) before the study was implemented. Agency permission (Appendix C) and physician permission (Appendix D) for conducting the study were obtained. The subjects were chosen from patients of obstetrical/gynecological doctors who had given their permission for the study. Each subject was contacted between 5 and 7 days prior to hospitalization, was told about the study of pain control, and asked if she would be willing to participate. The oral presentation of the initial contact is shown in Appendix E. A home visit was made and the written informed consent forms were presented for the subjects in both the experimental and the control groups to sign (Appendix F). Any questions the subjects might have had were answered at this time. Each subject was assured that no names would be mentioned in the writing of this study. The subjects were informed that they may withdraw from the study at any time. Also, there was nothing invasive done to the subjects. The subjects were informed that they should ask for pain relief medication whenever they felt they needed it, as the purpose of this study was not to deny them any medication. Each subject was informed

that her physician was aware of the study and was cooperating in it. The subjects were assured that their decision not to participate in this study would in no way affect the health care they would receive. All data were coded by number to assure anonymity of the subjects.

Instruments

Two instruments were used in this study: one for pain perception, the Pain Perception Questionnaire (Appendix G), and one for narcotic use, the Narcotic Usage Tool (Appendix H). The instrument used to measure pain was designed by the researcher. The instrument is a modification of an instrument used to measure chronic pain and was changed to more appropriately assess acute pain. The Pain Perception Questionnaire consisted of three questions for the control and the experimental groups. The numbers corresponding to the responses were added together for a total measure of pain. The data provided by the Pain Perception Questionnaire had a possible total score of 14, with 4 or more indicating pain and 14 being the worst possible pain. An additional question was used with the experimental group to check the number of times the controlled breathing technique was used. The data in Question 4 provided an index of

how frequently the controlled breathing technique was used postoperatively.

The Narcotic Usage Tool provided data regarding the total milligram amount of narcotics that the subjects required. It indicated the physical measure of pain relief during the first 24 hours postoperatively.

Both instruments were evaluated by a panel of experts for their applicability to this study. One member of the panel had a doctor of philosophy degree in clinical psychology with expertise in the area of pain management. The other two members of the panel were nurse educators. One nurse educator had a master's degree with experience in the area of psychiatric nursing and was an instructor in an associate degree nursing program. The other nurse educator had a doctor of philosophy degree in maternal-child health nursing and was an assistant professor of nursing in a baccalaureate program. The instruments were evaluated regarding ease of administration, clarity, and appropriateness to this study (Appendix I). If two of the three panel members indicated that changes were needed, these changes were made. One panel member suggested that the total milligram amount of narcotics be separated into the first 12 hours postoperatively and the second 12 hours

postoperatively because there may be a difference there that would not be found in the total milligram usage. This suggestion was followed although it did not require a change in the Narcotic Usage Tool. No other changes were suggested or made as a result of the panel's evaluation.

A pilot study was performed to test the instruments for ease of administration and appropriateness for this type of research. Three women were contacted preoperatively for their willingness to participate in the pilot study and an informed consent form was signed (Appendix J). The Pain Perception Questionnaire was administered between 24 and 30 hours postoperatively. The Narcotic Usage Tool was also utilized at this time. The data were analyzed by a panel of experts who determined the instruments were more valid than invalid based on previous criteria used to evaluate the instruments. As a result of the pilot study, no changes were made in the instruments.

Data Collection

During the data collection period, the researcher contacted the consenting physician's offices twice a week for the names and telephone numbers of potential subjects. The date each subject was to have surgery was also

ascertained. Each subject was telephoned and given a brief description of the study. If oral consent was given, the subjects were then met by the researcher between 5 and 7 days prior to hospitalization, and written informed consent was obtained. The subjects in the experimental group were instructed on the use of the controlled breathing. The script for teaching controlled breathing is shown in Appendix K. The subjects were encouraged to use this controlled breathing technique during painful postoperative procedures such as turning in bed, getting out of bed, and ambulating as well as any time pain was felt. A cassette tape of the controlled breathing technique was left with the subject to use at home prior to hospitalization. The researcher checked on the subjects' progress in using the technique by telephoning the subject approximately 2 days before each subject entered the hospital. Any questions the subject had regarding the information on the tape were answered at this time. Also, any problems the subject had experienced in practicing the breathing technique were corrected. The subject was encouraged to continue practicing the controlled breathing technique with the cassette tape until she was admitted to the hospital. On the evening

prior to surgery, the researcher met with the subject in the hospital and reviewed the controlled breathing technique and picked up the cassette tape. At the same time, routine preoperative teaching was conducted by the researcher, including teaching the subject regarding turning, coughing, deep-breathing, and splinting the incision when appropriate postoperatively. Any questions the subject had regarding the surgery, postoperative procedures, or breathing technique were answered at this time.

The subjects in the control group were initially contacted by telephone and were met by the researcher between 3 and 7 days prior to hospitalization and written informed consent was obtained. Three of the subjects in the control group were met in this hospital room the evening prior to surgery and written informed consent was obtained. The control group subjects were visited the evening prior to surgery to conduct routine preoperative teaching and to answer any questions they may have had.

The subjects in the experimental and control groups did not occupy the same room. This avoided contaminating the control group. The majority of subjects had private rooms. Those in semi-private rooms had roommates with different surgeries or had physicians who had not

consented to the study and were not included in the present study.

All of the subjects were visited postoperatively between 24 and 30 hours after arrival on the nursing unit. The Pain Perception Questionnaire was then administered. The data for the Narcotic Usage Tool was obtained at this time through a chart review.

Treatment of Data

Hypothesis 1 stated that between 24 and 30 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing have a lower score on the Pain Perception Questionnaire compared with posthysterectomy patients who have not been taught controlled breathing. To test Hypothesis 1, the Pain Perception Questionnaire produced a score that was indicative of the amount of pain each subject perceived. The scores of the experimental and control groups were compared using a *t*-test for independent samples at the .05 level of significance. The *t*-test is used for testing differences in group means (Polit & Hungler, 1978)

Hypothesis 2 stated that at 24 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing receive fewer milligrams

of narcotics compared with posthysterectomy patients who have not been taught controlled breathing. To test Hypothesis 2, the Narcotic Usage Tool provided data on the total milligram amount of narcotics utilized during the first 24 hours postoperatively. The total milligram usage of the experimental and control groups was also compared using the *t*-test for independent samples at the .05 level of significance.

CHAPTER 4

ANALYSIS OF DATA

The study determined whether a controlled breathing technique could reduce pain perception in hysterectomy patients and whether a controlled breathing technique could reduce the total milligram amount of narcotics required postoperatively in hysterectomy patients. A description of the sample, as well as the results of the study, are reported in this chapter.

Description of Sample

A total of 22 subjects participated in this study, 10 in the experimental group and 12 in the control group. The 10 subjects in the experimental group ranged in age from 26 to 50 years. Of the 10 subjects in the experimental group, one subject was Chinese (10%), 3 were Black (30%), and the remaining 6 were White (60%). Table 1 shows the composition of the experimental group according to age and race. The modal experimental group subject was White and 40 years of age.

Of the 12 control group subjects, 1 was Spanish American (9%), 4 were Black (33%), and 7 were White (58%).

Table 1

Distribution of Experimental Subjects According to Age and Race

Race	Age in Years									Total
	26	27	30	34	39	40	46	48	50	
Chinese (n = 1)								1		1
Black (n = 3)					1		1		1	3
White (n = 6)	1	1	1	1		2				6
Totals (n = 10)	1	1	1	1		2	1	1	1	10

The age range for the control group was 26 to 64 years of age. The modal control group subject was White and 28 years old. The composition of the control group is in Table 2.

Findings

Hypothesis 1 stated that between 24 and 30 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing have a lower score on the Pain Perception Questionnaire as compared to posthysterectomy patients who were not taught controlled breathing. Hypothesis 1 was tested by using the scores on the Pain Perception Questionnaire (PPQ) which indicated the patient's subjective response to pain. A total score of 14 was possible, with 4 indicating a low level of pain and 14 being the worst possible pain.

Hypothesis 1 predicted that posthysterectomy patients who had been taught controlled breathing would have lower scores on the PPQ as compared to posthysterectomy patients who had not been taught controlled breathing. A t-test for independent samples was performed and the difference between the two groups was not found to be significant ($t = .96$ (20), $p > .05$). Therefore, the research hypothesis was not accepted and at 24-30 hours after arrival on

Table 2

Distribution of Control Subjects According to Age and Race

Race	Age in Years									Total
	26	28	29	31	33	37	43	48	64	
Spanish American (n = 1)	1									1
Black (n = 4)				1	1	1			1	4
White (n = 7)		3	1	1			1	1		7
Total (n = 12)	1	3	1	2	1	1	1	1	1	12

the nursing unit, posthysterectomy patients who were taught controlled breathing did not have lower scores on the Pain Perception Questionnaire than posthysterectomy patients who were not taught controlled breathing. However, a comparison of the mean of the Pain Perception Questionnaire scores of the experimental ($\bar{X}$ = 7.3, sd = 1.85) and control groups ($\bar{X}$ = 8.25, sd = 2.17) showed that the experimental group subjects did perceive less pain, though not significantly less.

Hypothesis 2 stated that at 24 hours after arrival on the nursing unit, posthysterectomy patients who have been taught controlled breathing received less milligrams of narcotics as compared to posthysterectomy patients who have not been taught controlled breathing. Hypothesis 2 was tested by using a chart review and adding the total milligram amount of narcotics which the subjects received during the first 24 hours postoperatively. Hypothesis 2 predicted that at 24 hours after arrival on the nursing unit, posthysterectomy patients who had been taught controlled breathing would receive less milligrams of narcotics than posthysterectomy patients who had not been taught controlled breathing. A t-test for independent samples was performed and the difference between the two

groups was not significant (t = .0224 (20), $p > .05$). Therefore, the research hypothesis was not accepted and at 24 hours after arrival on the nursing unit, post-hysterectomy patients who had been taught controlled breathing did not receive less milligrams of narcotics as compared to posthysterectomy patients who had not been taught controlled breathing. The experimental group ($\bar{X}$ = 345) actually received more milligrams of narcotics than the control group ($\bar{X}$ = 343.75); however, the difference was not enough to be significant.

Additional Findings

The data were further analyzed to determine if there was a difference in the number of times the technique was used by the experimental group. The experimental group was divided into two groups, subjects who used the technique 4-6 times and subjects who used the technique 7 or more times. A t-test for independent samples was computed; the .05 level of significance was used. A t-test for independent samples on pain perception scores related to number of times controlled breathing was used showed that the difference between the two groups was significant (t = 4.664 (8), $p < .01$). There was a significant difference in pain perception of those who used the

controlled breathing technique 4-6 times and those who used it 7 or more times. Those who used the technique 7 or more times experienced significantly less pain perception ($\bar{X}$ = 9, 4-6 times; $\bar{X}$ = 6.57, 7 or more times).

Since there may have been a difference in narcotic usage between the first 12 hours and the second 12 hours postoperatively, further analyses were made between the experimental and control groups for these time differences. A *t*-test for independent samples at the .05 level of significance was computed for the first 12 hours postoperatively and was not found to be significant (t = .411 (20), $p > .05$). The experimental group ($\bar{X}$ = 187.5, *sd* = 67.96) used less milligrams of narcotics during the first 12 hours postoperatively as compared to the control group ($\bar{X}$ = 200, *sd* = 62.15), but the difference in the means was not significant.

The data for the experimental and control groups were also analyzed for the second 12 hours of narcotic usage postoperatively. A *t*-test for independent samples at the .05 level of significance was computed and was not found to be significant (t = .371 (20), $p > .05$). The experimental group ($\bar{X}$ = 157.5, *sd* = 76.42) actually received more milligrams of narcotics than the control

group ($\bar{X}$ = 143.75, sd = 81.27), but the difference was not significant.

Summary of Findings

Research Hypothesis 1 which predicted that between 24 and 30 hours after arrival on the nursing unit, post-hysterectomy patients who had been taught controlled breathing would have lower scores on the Pain Perception Questionnaire compared with posthysterectomy patients who had not been taught controlled breathing was not supported. Research Hypothesis 2 which predicted that at 24 hours after arrival on the nursing unit, posthysterectomy patients who had been taught controlled breathing would receive fewer milligrams of narcotics as compared to posthysterectomy patients who had not been taught controlled breathing was not supported.

Additional findings were made with further analysis of the data. Within the experimental group, further analysis was made with reference to the number of times the controlled breathing technique was utilized. Subjects who used the controlled breathing technique 7 or more times reported significantly less pain perception as compared to subjects who used the controlled breathing technique 4-6 times.

Additional analyses were made using the first 12 hours postoperatively and the second 12 1/2 to 24 hours postoperatively to compare narcotic usage between the experimental and control groups. The experimental groups received fewer milligrams of narcotics during the first 12 hours postoperatively compared with the control group, but the amount was not significant. The control group received fewer milligrams of narcotics during 12 1/2 to 24 hours after arrival on the nursing unit compared with the experimental group, but this amount was not significant.

CHAPTER 5

SUMMARY OF THE STUDY

The pain phenomenon is encountered by nurses every day. Postoperative pain management can be a challenge to the nurse and patient experiencing pain. This study investigated the use of a controlled breathing technique as a distraction measure to decrease pain perception and to decrease the amount of narcotics received postoperatively. The controlled breathing technique is one aspect of natural childbirth techniques. This chapter will present a summary of the study, a discussion of findings, conclusions and implications, and recommendations for further study.

Summary

The theoretical framework for this study was based on the gate control theory of pain by Melzack and Wall (1970). Pain can be mediated, increased or decreased, by several factors. Physically, pain is mediated by a preponderance of large or small afferent nerve impulses. If stimulation from small afferent nerves is greater than stimulation of large diameter afferent nerves, pain is

perceived as it is allowed through the open gate in the substantia gelatinosa of the spinal cord. If a greater number of large diameter afferent impulses is received the gate is closed to the fewer number of small diameter pain impulses, and pain is not perceived. Pain perception can be mediated by mental activities which send descending impulses to close the gate. Engaging in activities such as adding a series of numbers, actively listening to music, focusing on a pleasant memory, and counting inhalations and exhalations in a regular pattern can distract attention away from pain stimuli and close the gate to pain perception. Therefore, it was predicted that postoperative patients who had been taught a controlled technique would have lower scores on the Pain Perception Questionnaire than postoperative patients who had not been taught controlled breathing. With a decreased pain perception, it was also predicted that less milligrams of narcotics would be required.

The data for this study were collected in a private hospital in a Central Texas town with a population of approximately 100,000 persons. The decision to use this hospital was based on the fact that a larger number of surgeries was performed in this hospital than other

hospitals in this area. Subjects selected for the study were patients of a group of obstetrical/gynecological doctors who had given their consent for the study. All subjects were able to read, write, and understand the English language and all had home telephones. All subjects were candidates for elective hysterectomy. Twenty-two women, 10 in the experimental group who were taught controlled breathing technique preoperatively, and 12 in the control group, completed the study.

Between 24 and 30 hours after arrival on the nursing unit, the Pain Perception Questionnaire was administered to all subjects postoperatively. The Pain Perception Questionnaire consisted of three questions which indicated an individual's perception of pain. The numbers corresponding to the responses were added together for a possible total score of 14 points. A score of 4 was indicative of pain and a score of 14 indicated the worst possible pain. The experimental group was asked an additional question which indicated the number of times the controlled breathing technique was utilized.

The total milligram amount of narcotics at 24 hours postoperatively was also compared using a chart review and adding the amount of narcotics received for each

subject. The total milligram amount of narcotics was compared between the experimental and control groups. The experimental and control groups were also compared on total milligram amount of narcotics received during the first 12 hours postoperatively and 12 1/2 to 24 hours postoperatively.

Neither research Hypothesis 1 or Hypothesis 2 was supported by the data. These findings indicated that the controlled breathing technique used in this study was not effective in lowering scores on the Pain Perception Questionnaire nor was it effective in reducing the total milligram amount of narcotics used during the first 24 hours postoperatively. Subjects in the experimental group who used the controlled breathing technique 7 or more times perceived less pain as compared to experimental group subjects who used the controlled breathing technique 4 to 6 times.

The experimental group received fewer milligrams of narcotics during the first 12 hours postoperatively as compared to the control group, but the amount was not significant. The control group received fewer milligrams of narcotics during 12 1/2 to 24 hours after arrival on the nursing unit as compared to the experimental group, but this amount was not significant.

Discussion of Findings

The prediction that postoperative patients who had been taught controlled breathing would have lower scores on the Pain Perception Questionnaire as compared to postoperative patients who had not been taught controlled breathing was not confirmed. This finding is inconsistent with the results of several studies reported in the review of literature (Blitz & Dinnerstein, 1971; Chaves & Barber, 1974; Flaherty & Fitzpatrick, 1978; Mulcahy & Janz, 1973; Nisbett & Schacter, 1966; Spanos et al., 1979; Stevens, 1977). Since most studies have been conducted in a laboratory setting, it is difficult to equate experimentally induced pain with clinical pain. Because experimentally induced pain may not be comparable to clinical pain, no pretest level of pain perception was identified in the present study.

Flaherty and Fitzpatrick (1978) used a relaxation technique to increase the comfort level of postoperative patients. The results were significant and comfort level was defined as a lessened perception of discomfort or pain. The present study used a different technique and different measuring instruments to assess clinical pain, which could account for the difference in the results.

Another factor which could have contributed to the nonsignificant findings in the present study was the small sample size. Also, the instruments used in this study had not been previously validated and no reliability had been established for either instrument. The Pain Perception Questionnaire may not have been a valid measurement of pain perception.

Possibly the subjects in the experimental group were more aware that they should request pain medication when they needed it. During the preoperative instructions, the researcher explained to the experimental and control groups that they should request pain medication when they felt they needed it. This may have made more of an impression on the experimental group since they were prepared to reduce pain with a distraction technique. When the Pain Perception Questionnaire was administered to one control group subject postoperatively, she told the researcher that she had experienced pain during the night. This control group subject thought the nursing staff at the hospital would bring the pain relief medication periodically instead of waiting for the subject to request it.

The additional finding that within the experimental group subjects who used the controlled breathing technique

7 or more times reported significantly less pain than experimental group subjects who used the controlled breathing technique 4 to 6 times is supported by the literature (Chaves & Barber, 1974; Mulcahy & Janz, 1973). Chaves and Barber (1974) indicated that subjects who used more strategies to reduce pain experienced a greater reduction in pain. It may be that subjects need to use distraction techniques frequently to significantly decrease pain. McCaffery (1980) stated that pain relief from distraction lasted only as long as the distraction lasted.

The expectation that patients who had been taught controlled breathing would receive fewer milligrams of narcotics than patients who had not been taught controlled breathing was not met. The experimental group used fewer milligrams of narcotics during the first 12 hours postoperatively than the control group, but the results were not significant. In the area of psychoprophylactic childbirth, the psychoprophylactic techniques did reduce the amount of medication required for the experimental group (Davenport-Slack & Boylan, 1974; Huttel et al., 1972; Tanzer & Block, 1972). Again, the discrepancy between the findings of the present study and the previous studies may be related to small sample size as other

studies used larger samples than the present one. Labor and delivery are considered a short-term pain condition and could parallel the first 12 hours of postoperative care rather than a full 24 hours. Although no significance in the use of narcotics for the first 12 hours postoperatively was found, the trend was in the expected direction.

Distraction techniques reduced narcotic intake in three other studies (Bafford, 1977; Flaherty & Fitzpatrick, 1978; Voshall, 1980). Several factors could account for the difference in the present study. No distinction was made for subjects who may have had previous training in certain controlled breathing techniques such as those they may have learned in previous childbirth education classes. Since the researcher was not present throughout the 24 hour postoperative period, the subjects in the experimental group may not have used the controlled breathing technique correctly. The distraction techniques used in previous studies are not the same as the distraction technique used in this study. It may be that certain distractors are more powerful than others in decreasing pain perception. The manner in which narcotics were offered or withheld may be significant. As one

control group subject reported that she expected the nursing staff to just bring the pain relief medication rather than the patient having to ask for it, other subjects may not have requested medication as often as it was needed. In some cases, the nursing staff may have encouraged or urged subjects to take medication when it actually was not needed.

Distraction techniques may be effective in reducing pain and narcotic usage over the first 72 hours postoperatively rather than the initial 24 hours postoperatively. It may be that the first 24 hours involve rapidly rising pain that cannot be treated effectively with cognitive techniques such as the controlled breathing technique used in this study. The effects of general anesthesia during the initial postoperative period may make it difficult for subject to be alert to the onset of pain and effectively use cognitive methods of control.

Conclusions and Implications

Due to small sample size and other intervening variables, no conclusions can be drawn from the results of this study. The implication is that more research is needed in the area of using distraction techniques to reduce clinical pain in postoperative patients.

Recommendations for Further Study

Based upon the findings and implications, the following recommendations for further study are made:

1. A research study using a valid and reliable pain perception measurement is needed to investigate the use of the controlled breathing technique to relieve postoperative pain with a larger sample size.

2. A research study designed to allow the researcher to be present during the use of the controlled breathing technique postoperatively could reduce the error of incorrectly using the technique.

3. Research which includes a pretest pain perception level and the use of the controlled breathing technique to reduce postoperative pain in hysterectomy patients may aid in the evaluation of the effectiveness of the controlled breathing technique.

4. A comparative research study using various distraction techniques to reduce postoperative pain in hysterectomy patients.

5. A replication of the present study including a support person in the experimental and control groups could indicate the effectiveness of the controlled breathing technique. The support person in the experimental

group would be the controlled breathing coach and the one in the control group would serve as a control.

APPENDIX A

TEXAS WOMAN'S UNIVERSITY
Box 23717, TWU Station
Denton, Texas 76204

1610 Inwood Road
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Rebecca Griffin Center: Dallas

Address: 733 Castleman Creek Date: 8/15/80

Hewitt, Texas 76643

Dear Ms. Griffin:

Your study entitled Perception of Pain and Use of Breath Control to Believe Postoperative Pain

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

____ Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

____ Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

_____The filing of signatures of subjects with the Human Subjects Review Committee is not required.

_____Other:

__xx__No special provisions apply.

Sincerely,

Estelle Kurz

Chairman, Human Subjects
Review Committee

at Dallas

PK/smu/3/7/80

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS 76204

THE GRADUATE SCHOOL

September 17, 1980

Ms. Rebecca B. Griffin
733 Castleman Creek
Hewitt, Texas 76643

Dear Ms. Griffin:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

Robert S. Pawlowski
Provost

RP:dl

cc Dr. Beth Vaughn-Wrobel
Dr. Anne Gudmundsen
Graduate Office

APPENDIX C

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE [redacted]

GRANTS TO Rebecca Griffin, R.N.
a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem.

PERCEPTION OF PAIN AND USE OF BREATH CONTROL

TO RELIEVE POSTOPERATIVE PAIN

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (may not) be identified in the final report.
3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date: August 26, 1982

[redacted]
Signature of Agency Personnel

Rebecca Griffin
Signature of Student

Signature of Faculty Advisor

*Fill out & sign three copies to be distributed as follows: Original - Student; First copy - Agency; Second copy - TWU College of Nursing.

APPENDIX D

Physician's Permission

I give Rebecca Griffin, RN, permission to approach patients under my care regarding their participation in a research study. This research study is undertaken as a requirement to complete a Master's Degree at Texas Woman's University. This study is about using breath control to reduce postoperative pain in hysterectomy patients.

Nothing invasive will be done as a part of this study. It will involve teaching breath control to an experimental group as well as general pre-operative teaching. A control group will be used who will be given general pre-operative teaching. A 3 or 4 question questionnaire regarding postoperative pain will be given to each subject 24-30 hours postoperatively.

The subject's participation is completely voluntary and they may withdraw from the study at any time.

_____ _____

Signature Date

APPENDIX E

Written Explanation of Human Subjects

Oral Presentation

Experimental Group

The researcher will call the subject on the telephone and say, "Hello, I'm Rebecca Griffin, a registered nurse who is doing graduate work at Texas Woman's University. I'm conducting a research study which deals with a controlled breathing technique to relieve postoperative pain in hysterectomy patients. Dr. _____has informed me that you are going to have a hysterectomy. Do you think you might be interested in participating in this study?" At this time, the researcher will give the subject the opportunity to say whether she will participate in the study or not. If she consents, the researcher will continue.

"This study will not invade your privacy as no names will be used in the research paper. You can ask for medication whenever you need it after surgery. There is nothing invasive being done as a part of this study. There is a consent form I need you to sign to participate in this research. When would it be convenient for me to visit you and further explain the study and consent form?" The researcher will give the subject the opportunity to set

up an appointment that is mutually convenient. "Okay, I'll see you at _____."

The following explanation will be given when the researcher visits the subject in her home. "Hello, I'm Rebecca Griffin. I talked to you on the telephone about participating in a research study. This study deals with a controlled breathing technique to relieve short term pain in hysterectomy patients. I will teach you the controlled breathing technique and leave a tape of the technique for you to use this week at home. The evening before your surgery, I will come to the hospital and review this technique with you and instruct you in the general postoperative care which includes turning, coughing, deep-breathing, and splinting the incision postoperatively. Between 24-30 hours after you come back to your hospital room I will give you a questionnaire to fill out about the pain you have experienced since surgery. I will also look at your medical records to see how much medication you took during this time. As I mentioned over the telphone your privacy will be protected in that no names will be used in the researcher's paper. Also, you should ask for pain relief medication whenever you need it after surgery. There is nothing invasive that will be done as a part of this study.

You may be concerned that a decision to withdraw or not to participate in the study will affect the care you receive at the hospital. I want to assure you this will not happen as the hospital staff will not be given this information. The benefits that may be derived from this study include: 1. giving an individual an independent method to use to relieve short term pain, 2. reducing the discomfort level of the postoperative period, and 3. reducing the amount of narcotics needed to relieve pain postoperatively. If you want to withdraw from the study at this time you may. I will try to answer any questions you have at this time." Time will now be allowed for discussion. "If you would like to be given the results of the study or more information about it I will share that with you after the study is completed. Here is the written informed consent for you to read and sign."

Control Group

The researcher will call the subject on the telephone and say, "Hello, I'm Rebecca Griffin, a registered nurse who is doing graduate work at Texas Woman's University. I'm conducting a research study which deals with the amount of pain hysterectomy patients have after surgery. Dr._____ has informed me that you are going to

have a hysterectomy. Do you think you might be interested in participating in this study?" At this time, the researcher will give the subject the opportunity to say whether she will participate in the study or not. If she consents, the researcher will continue.

"This study will not invade your privacy as no names will be used in the research paper. You can ask for medication whenever you need it after surgery. There is nothing invasive being done as a part of this study. There is a consent form I need you to sign to participate in this research. When would it be convenient for me to visit you and further explain the study and the consent form?" The researcher will give the subject the opportunity to set up an appointment that is mutually convenient. "Okay, I'll see you at _____.

The following explanation will be given when the researcher visits the subject in her home. "Hello, I'm Rebecca Griffin. I talked to you on the telephone about participating in a research study. This study deals with the amount of pain hysterectomy patients have after surgery. The evening before your surgery, I will come to the hospital and instruct you in the general postoperative care which includes turning, coughing, deep-breathing, and splinting the incision postoperatively. Between

24 and 30 hours after you come back to your hospital room I will give you a questionnaire to fill out about the pain you have experienced since surgery. I will also look at your medical records to see how much medication you took during this time. As I mentioned over the telephone your privacy will be protected in that no names will be used in this research paper. Also, you should ask for pain relief medication whenever you need it after surgery. There is nothing invasive that will be done as a part of this study. You may be concerned that a decision to withdraw or not participate in this study will affect the care you receive at the hospital. I want to assure you this will not happen as the hospital staff will not be given this information. The benefits that may be derived from this study include: 1. giving an individual an independent method to use to relieve short term pain, 2. reducing the discomfort level of the postoperative period, and 3. reducing the amount of narcotics needed to relieve pain postoperatively. If you want to withdraw from the study at any time you may. I will try to answer any questions you have at this time." Time will now be allowed for discussion. "If you would like to be given the results of the study or more information about it I will share that with you

after the study is completed. Here is the written informed consent for you to read and sign."

APPENDIX F

Consent Form
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

Experimental Group

Informed Consent to Act as a Subject for Research and Investigation:

1. I hereby authorize Rebecca Griffin to perform the following investigation: To teach me the controlled breathing technique using personal contact and a cassette tape. To check on my progress in learning the technique mid-week. To review the controlled breathing technique and to instruct me in the general postoperative care the evening prior to surgery. To administer the pain perception questionnaire between 24 and 30 hours after surgery. To review medical records for narcotic usage at Hillcrest Hospital.
2. The procedure or investigation listed in Paragraph 1 has been explained to me by Rebecca Griffin.
3. (a) I understand that the procedure or investigations described in Paragraph 1 involves the following possible risks or discomforts:

1. The subject may be concerned that a decision not to participate in the study would affect the health care she will receive in the hospital. Each subject will be contacted at home before beginning the study to prevent any hospital personnel from knowing about a decision to participate or not to participate.

2. There may be improper release of data. To prevent this a separate list of patients' names will be kept by the researcher and this list will be destroyed after the study is completed.

3. The subject may fear that her name would be mentioned in the study. No names will be used in the study to assure anonymity and prevent this risk.

4. The subject may be reluctant to ask for pain relief medication postoperatively. The researcher wants the subject to ask for medication whenever she needs it after surgery to prevent this risk.

3. (b) I understand that procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others: 1. giving an individual an independent method to use to relieve short term pain, 2. reducing the discomfort level of the postoperative period, and 3. reducing the amount of narcotics needed to relieve pain postoperatively.

3. (c) I understand that--No medical service or compensation is provided to the subjects by the University as a result of injury from participation in the research.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

_____ _____

Subject's Signature Date

Consent Form
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

Control Group

Informed Consent to Act as a Subject for Research and Investigation:

1. I hereby authorize Rebecca Griffin to perform the following investigation: To instruct me in the general postoperative care the evening prior to surgery. To administer the pain perception questionnaire between 24-30 hours after surgery. To review medical records for narcotics usage at Hillcrest Hospital.
2. The procedure or investigation listed in Paragraph 1 has been explained to me by Rebecca Griffin.
3. (a) I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts:

   1. The subject may be concerned that a decision not to participate in the study would affect the health care she will receive in the hospital. Each subject will be contacted at home before beginning the study to prevent any hospital personnel from knowing about a decision to participate or not to participate.

2. There may be improper release of data. To prevent this a separate list of the patients' names will be kept by the researcher and this list will be destroyed after the study is completed.

3. The subject may fear that her name would be mentioned in the study. No names will be used in the study to assure anonymity and prevent this risk.

4. The subject may be reluctant to ask for pain relief medication postoperatively. The researcher wants the subject to ask for medication whenever she needs it after surgery to prevent this risk.

3. (b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others: (1) giving an individual an independent method to use to relieve short term pain, (2) reducing the discomfort level of the postoperative period, and (3) reducing the amount of narcotics needed to relieve pain postoperatively.

3. (c) I understand that--No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are

more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

_____ _____

Subject's Signature Date

Permission Form

I _____ give Rebecca Griffin permission to obtain data about the amount of narcotics required postoperatively from my hospital record at _____. This information will be kept confidential and will be used as a part of this research study.

APPENDIX G

Pain Perception Questionnaire

Experimental Group

1. How much of the time today were you in pain?
    1. _____ 0 - 6 hours
    2. _____ 7 - 12 hours
    3. _____ 13 - 18 hours
    4. _____ 19 - 24 hours
2. How severe was the pain?
    1. _____ mild
    2. _____ discomforting
    3. _____ distressing
    4. _____ horrible
    5. _____ excrutiating
3. What effect did the pain have on your behavior?
    1. _____ made no difference in my behavior
    2. _____ made me a little bit unhappy
    3. _____ made me somewhat irritable and difficult
    4. _____ made me quite irritable and difficult
    5. _____ made me panicked and not able to do anything

4. How many times did you use the controlled breathing technique?

   1. _____ 0 times
   2. _____ 1 - 3 times
   3. _____ 4 - 6 times
   4. _____ 7 - more times

Pain Perception Questionnaire

Control Group

1. How much of the time today were you in pain?
   1. _____ 0 - 6 hours
   2. _____ 7 - 12 hours
   3. _____ 13 - 18 hours
   4. _____ 19 - 24 hours
2. How severe was the pain?
   1. _____ mild
   2. _____ discomforting
   3. _____ distressing
   4. _____ horrible
   5. _____ excrutiating
3. What effect did the pain have on your behavior?
   1. _____ made no difference in my behavior
   2. _____ made me a little bit unhappy
   3. _____ made me somewhat irritable and difficult
   4. _____ made me quite irritable and difficult
   5. _____ made me panicked and not able to do anything

APPENDIX H

Narcotic Usage Tool

Type of Narcotic	Total Amount Mg. Used

APPENDIX I

Evaluation of the Study's Tools

I. Format

A. Is the Pain Perception Questionnaire organized for ease of administration? ___Yes ___No

B. Are there any changes you would make in the format? ___Yes ___No

II. Consent

A. Are any of the items vague, ambiguous or difficult to understand? ___Yes ___No

B. What would you change to make it more clear?

C. Reliability--no degree of consistency of results has been established as the Pain Perception Questionnaire has never been operationalized. Comment?

D. Validity

1. Content

a. Does the Pain Perception Questionnaire adequately measure an individual's pain perception as presented in the theoretical framework of the concept pain?

___Yes ___No

b. Would other questions measure pain better?

___Yes ___No

2. Criterion-related

a. Does the Pain Perception Questionnaire present an objective indicator of individual pain perception? ___Yes ___No

b. Are there other objective measures of pain perception that would better indicate pain?

___Yes ___No

c. Does the Narcotic Usage Tool adequately measure pain perception based on criteria that medication is given when a patient requests it?

___Yes ___No

d. Does any relationship exist between the PPQ and the NUT? ___Yes ___No If yes, what?

III. Summary

A. The Pain Perception Questionnaire is

_____more valid than invalid

_____more invalid than valid

B. The Narcotic Usage Tool is

_____more valid than invalid

_____more invalid than valid

C. Other Comments?

APPENDIX J

Consent Form
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

Informed Consent to Act as a Subject for Research and Investigation:

I hereby authorize Rebecca Griffin, RN to administer the pain perception questionnaire between 24-30 hours after surgery. This information will be kept confidential and will be used as a pilot project in a research study about postoperative pain in hysterectomy patients.

I give Rebecca Griffin permission to obtain data about the amount of narcotics required postoperatively from my hospital record at _____. This information will be kept confidential and will be used in the pilot project of the research study about postoperative pain in hysterectomy patients.

_____ _____

Subject's Signature Date

APPENDIX K

Script for Teaching Controlled Breathing

The researcher will introduce herself, explain her interest in methods of reducing or alleviating post-operative pain, and obtain informed consent.

The patient will be instructed to take a deep breath and exhale completely. Inhale through the nose and exhale through the mouth. Then the patient will be instructed to inhale through the nose to the count of two and exhale through the mouth to the count of four. This 2-4 inhale, exhale respiration rate is to be continued during potentially painful turning in bed or getting out of bed, as well as other short term pain experiences. The rate can be modified to what is most comfortable for the patient. When the pain subsides, the patient again takes a deep breath and exhales completely.

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