Touch:

A Planned Nursing Intervention for Postoperative Pain Relief

by

© Monica A. Redekopp

A thesis submitted in partial fulfillment
of the requirements for the degree of
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MONICA A. REDEKOPP

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

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To Daryl,

whose support and love made this all possible.

ABSTRACT

The purpose of this study was to determine the effectiveness of touch as a nursing intervention for the relief of postoperative pain. Theories of pain and King's Theory of Goal Attainment directed this pilot project to study two hypotheses. The first hypothesis used a quantitative approach to study the bivariate relationship between the independent variable: nursing intervention of touch, and the dependent variable: relief of postoperative pain. The measurement tool used for the comparative clinical trial was a spirometer. The second hypothesis was studied by a qualitative approach utilizing an interview format. For the second hypothesis the independent variable differed: perception of relief of postoperative pain. The research sample was composed of fourteen subjects between the ages of 23 and 59 undergoing cholecystectomies. There were six females and one male in each of the experimental and control groups. The procedure had three components: preoperative, immediate postoperative, and twenty-four hours postoperative periods. During the preoperative phase the participation of the subjects was elicited and preoperative teaching given. During the immediate postoperative phase the experimental and control groups were given the usual nursing care with the intervention of a one minute slow stroke back rub

administered to the experimental group only. Inspiratory capacity readings were obtained from both groups using a spirometer. During the twenty-four hour postoperative period, the experimental group was asked four questions and the control group was asked three questions about their immediate recovery period. T-test results showed no significant differences between the experimental and control groups with respect to the preoperative, preintervention or postintervention respiratory function readings and with respect to the mean differences and the percent changes between the respiratory function values. Perception of relief of postoperative pain was not identified in the responses given by the experimental and control group subjects to what was remembered the most during the the immediate recovery period and whether the subjects remembered being touched. Whereas none of the experimental group subjects were able to describe their pain during that period, six of the seven control group subjects were able to describe their pain. These pain descriptions were categorized by referring to a spatial scale of pain descriptors developed by Melzack and Torgerson. The responses given by the experimental group categorized the planned nursing intervention of touch (the back rub) as a form of therapy. Thus, the planned nursing intervention of a one minute slow stroke back rub did not appear to significantly affect the relief of postoperative pain but would seem to have affected the perception of relief of

postoperative pain for patients in the initial recovery period following upper abdominal surgery. It would appear that within this sample, the use of touch was supported as a planned nursing intervention for relief of postoperative pain. It was felt that the differences between the quantitative and qualitative data underline the complexity of the pain experience. It is recommended that nurses need to be an integral part of the multidisciplinary approach to pain research. It was also felt that the results of this investigation have given some impetus toward viewing touch as a nursing intervention to be valued. It is further recommended that more research will be needed to determine the role of touch in nursing practice and how it can best be used to ensure it continues to be a vital part of nursing's unique contribution to those it serves.

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INTRODUCTION

Nursing has been viewed historically as a "laying on of hands" profession. The nursing literature is replete with statements that encourage the use of touch and emphasize its value in caring for those in need of nursing's services (Dossey, 1983; Fanslow, 1983; GoodyKoontz, 1979; Iveson-Iveson, 1983; Leung, 1981; Tobiason, 1981; Ujhely, 1979). Statements such as, "those in physical pain are soothed by the nurse's ministrations" (Fanslow, 1983, p. 74) appear to give some credence to nursing's use of touch as a restorative ministration.

However, other nursing authors lament that nurses are no longer touching their patients. Pluckhan (1968) states,"It seems that years ago nurses were more inclined to communicate with their patients through touch than they are today" (pp.394-395). Sweeney (1977) feels that back rubs which were once a familiar aspect of nursing care are now a rare commodity. She suggests that they be reinstituted on a regular schedule.

Is nursing losing a valuable tool of nursing care through disuse? Perhaps modern day nurses are not using touch because advanced technology and/or burdensome paperwork keep them physically apart from their patients.

Or could it be that nurses are not aware or not convinced about the value of touch in their care? "Therapeutic touch" is becoming very popular today. However it does not involve actually touching the skin. Is actual touching seen as old fashioned or obsolescent?

Sweeney (1977) advocates the return of the back rub because of its physiological and psychological benefits. However, does touch have these benefits? Hardy (1974) states that although nurses are expected to evaluate their care to patients on an ongoing basis there is often little thought given to the evaluation of the theory and knowledge guiding their care. She emphasizes that as health professionals, nurses need to make sound judgments about the rationale for their nursing actions. The literature appears to support this since little was found by the investigator in the way of research that could be seen as an evaluation of the benefits of "hands on" touch.

This investigation looked at some of these questions about the use of touch in nursing practice and in particular in the postoperative clinical area. It was this nurse's observation that patients were not always adequately relieved of their pain postoperatively by analgesics and touch was seen as a measure that might be used to relieve this suffering. Further, persons receiving a back rub seemed to be very appreciative and more willing to participate in their postoperative recovery care. Sweeney

(1977) states, "The identification of techniques to minimize and control pain experienced postoperatively could have a major impact on the care of the thousands of people who undergo surgery each year"(p.344). It is this nurse's experience that touch is a valuable tool that is a vital part of nursing's unique contribution to those it serves.

In this chapter a brief understanding of the problem of postoperative pain relief and some of the most common methods of treating it are presented. Touch as a noninvasive pain relief measure is placed within this context and discussed. Included are the advantages of using touch, and the purpose of this study. The hypotheses are stated and their terms defined. Finally, the assumptions of the study are stated.

Statement of the Problem

Postoperative Pain

Incidence and severity.

Although postoperative pain is a normal response to tissue trauma inflicted during surgery, it remains a source of much discomfort and anxiety for the majority of postoperative patients. In one group of patients undergoing general surgery, over a third found pain to be the worst feature about their operation and 42 percent described their pain as "very unpleasant indeed; I would be very upset if I

had to go through this again" (Cronin,Redfern & Utting, 1973). Nayman (1979) reported that 23 percent of a group of patients undergoing cholecystectomy experienced severe postoperative pain. Severe or moderate pain was indicated by 75 percent of another group of postoperative patients (Cohen, 1980). Tammisto and Tigerstedt (1982) found that following upper abdominal operations, 45 percent of patients complained of severe pain and 50 percent complained of moderate pain. After superficial operations about 10 percent of patients reported severe pain and 50 percent moderate pain. Personal accounts of postoperative pain following cardiac surgery graphically depict suffering endured. Donald (1976) wrote, "I would be a liar if I did not straight away admit that this defies description. For the first week after operation the sensory system is presumably swamped by the sheer magnitude of the pain"(pp. 52,53). Goldsmith (1981) also wrote that, "The postoperative pain was severe, much more so than anticipated" (p.1141).

Complications of Pain.

If postoperative pain is not promptly and effectively relieved, progressively serious pathophysiologic responses can compound the existing discomfort and misery (Bonica, 1982; "Postoperative pain," 1976). Neural responses due to unrelieved postoperative pain may result in increased adrenergic activity, vagal inhibition and skeletal muscle

spasm (Bonica, 1982). These responses combined with increased central sympathetic stimulation induced by anxiety cause pulmonary complications, increased workload of the heart, and excessive increase in the metabolism and oxygen consumption. Gastrointestinal and genitourinary activity is inhibited with resulting ileus and oliguria. Immobility and a reluctance to deep breathe and cough due to fear of pain upon movement increases the potential for deep vein thrombosis, atelectasis, pneumonia, pulmonary emboli, skin breakdown, muscle wasting, urinary retention and constipation (Bonica, 1982; Editorial, 1976; Fry, 1977; Stimmel, 1983).

Inadequate Pain Relief.

Despite a recognition of the importance of pain relief for optimal postoperative recovery (notwithstanding humane and moral reasons) and a wide variety of measures available for pain relief, a significant number of patients continue to complain about inadequate pain relief. Incomplete analgesia was reported to be clinically significant in approximately 20 percent of a baseline series of postoperative patients (Keeri-Szanto & Heaman, 1972). In another group of postoperative patients 21 percent stated that pain relief was not adequate (Cohen, 1980). Tammisto and Tigerstedt (1982) reported that depending upon the type of surgery and the emphasis given to analgesia in the daily routine, 5 to 20 percent of patients complained strongly about lack of pain relief.

Considering the number of persons undergoing surgery annually, the number of patients receiving inadequate postoperative pain relief is sobering. The medical literature ascribes this problem to a lack of improvement in the management and methods of postoperative pain relief in the past 25 years or more (Andrews, 1983; Fry, 1977; Keeri-Szanto & Heaman, 1972; Nayman, 1979; Utting & Smith, 1979; Wallace & Norris, 1975).

Methods of Pain Relief

Pharmacological agents.

Although a large number of therapeutic agents and methods are available for the relief of postoperative pain, narcotic analgesics and in particular morphine and meperidine provide the mainstay of treatment (Andrews, 1983; Dodson, 1982; "Postoperative pain," 1978; McCaffery, 1979; Utting & Smith, 1979; Wallace & Norris, 1975). Other analgesics used for postoperative pain relief are the nonnarcotic synthetics or agonists-antagonists which were developed in hopes of providing analgesia without respiratory depression and less potential for addiction and central nervous system depression (Andrews, 1983). Anti-anxiety drugs such as the phenothiazine derivatives and the benzodiazepines are commonly used in combination with narcotic analgesics for increased pain control and reduction of anxiety (Andrews, 1983; Wallace & Norris, 1975).

Since oral analgesics cannot be absorbed in the initial postoperative period after many surgical procedures, the method of choice has been intramuscular injections (Cundy, 1983). To maintain a reasonable duration of action, a large dose must be given which often results in side effects (Cundy, 1983). Continuous intravenous analgesia overcomes the problem of widely fluctuating blood levels of analgesics and reduces the side effects and discomfort of several injections (Cundy, 1983; Hartvig, Tamsen, Fagerlun & Dahlstrom,1982; Tamsen, Hartvig, Fagerlund, Dahlstrom & Bondesson, 1982). The patient is able to receive analgesia as required and high levels of pain relief have been reported (Keeri-Szanto & Heaman, 1972; Slattery, Harmer, Rosen & Vickers, 1983; Tamsen et al, 1982). Close observation needs to be made to ensure that over-dosage does not result (Cundy, 1983; Dodson, 1982). Reliance on apparatuses of varying complexity and cost are other disadvantages (Dodson, 1982; Gibbs, 1983).

Conduction blockade, nerve stimulation and inhalation therapy are methods of postoperative pain relief used less frequently. Conduction blockade or sensory nerve blockade includes blockade of the intercostal nerves and of the nerves in the epidural space by local anaesthetics; and the injection of opiates into the extradural space or directly into the cerebrospinal fluid (Dodson, 1982; Wallace & Norris, 1975). Transcutaneous nerve stimulation involves

the attachment of two sterile disposable electrodes either to the skin adjoining the wound or adjacent to a major nerve (Dodson, 1982). Inhalation therapy has been used continuously for patients on ventilators for up to 24 hours and intermittently by physiotherapists to reduce painful coughing (Dodson, 1982).

It is interesting to note that a small group of postoperative patients has been identified who require no analgesic (McQuay, Moore, Lloyd, Bullingham & Evans, 1982). It is not known whether this group does not experience postoperative pain to the same extent as other patients or if they use their own techniques for pain relief.

Side effects.

Despite the efficacy of pharmacological agents for providing postoperative pain relief, they all have side effects, some minor, some life threatening. The major side effects of narcotics include respiratory depression, bronchiolar constriction, cough suppression, nausea and vomiting, over-sedation, release of histamine, constipation, antidiuresis and addiction (Andrews, 1983; Dodson, 1982; Drakontides, 1974; Fry, 1977; Masson, 1971; McCaffery, 1980; McCaffery & Hart, 1976). Although the agonists-antagonists cause less respiratory depression and central nervous system disturbances, they produce sedation, nausea, dizziness, nightmares and hallucinations (Andrews, 1983; Editorial,

1976; Fry, 1977). In the presence of moderate to severe pain, paradoxical excitement frequently occurs with the anti-anxiety agents resulting in delirium, agitation, apprehension and increased reflex excitability(Andrews, 1983). They also block peripheral vasoconstriction and produce circulatory depression and orthostatic hypotension (Andrews, 1983).

Disadvantages of conduction or sensory nerve blockade include the dangers of infection, dural puncture, total spinal analgesia, intravascular injection, pneumothorax, hypotension, and decreased respiratory functioning as well as the need for skilled personnel and close supervision (Andrews, 1983; Dodson, 1982; Gibbs, 1983; Masson, 1971; Utting & Smith, 1979; Wallace and Norris, 1975). Adverse side effects to transcutaneous electrical nerve stimulation consist primarily of skin reactions (McCaffery, 1979).

Other Methods of Pain Relief

Despite their usefulness, analgesics should be viewed as only one part of a program of pain relief for the individual patient (McCaffery, 1979). Combining two or more methods at the same time may have an additive effect of increasing pain relief. Other methods of postoperative pain relief include preoperative preparation, minimization of environmental stresses, relief of personal discomforts and noninvasive pain relief techniques.

Preoperative preparation.

Guidance and support given preoperatively may reduce the need for postoperative analgesic (Masson, 1971). After careful preoperative instruction, Roe (1963) noted a much reduced requirement for analgesic drugs, improved pulmonary ventilation, earlier mobility and less postoperative fear. Thus the patient may be aided considerably in minimizing the pain (Andrews, 1983; Wallace & Norris, 1975).

Environmental stresses.

Minor environmental stresses can focus the patient's attention on the pain (Andrews, 1983; Masson, 1971; Wallace & Norris, 1975). The strange environment, unfamiliar bed, noise of other patients or staff members and the bustle of routine activity are not conducive to restful sleep. Efforts can be made to minimize some of these distractions.

Personal discomforts.

Many personal discomforts can further aggravate the patient's pain (Andrews, 1983; Masson, 1971; Wallace & Norris, 1975). Some discomforts such as tubes, catheters and frequent blood pressure recordings are unavoidable. However other discomforts such as nausea and vomiting, flatulence or a distended bladder can be treated (Masson, 1971).

Noninvasive pain relief measures.

Noninvasive pain relief methods refer to those measures that can be used without physically invading or penetrating the body (McCaffery, 1979). These methods include distraction strategies, guided imagery, relaxation and cutaneous stimulations (McCaffery, 1979, 1980). At times there is considerable overlap among methods. Sometimes invasive or intrusive techniques such as medications or acupuncture are involved.

With distraction the patient's attention is focused on stimuli other than the pain sensation (McCaffery, 1979). This stimulus is either present or easy to devise and requires no imagination. Guided imagery, on the other hand, uses one's imagination to develop sensory images that decrease the intensity of pain or that become a pleasant or nonpainful substitute for pain.

Relaxation has both physical and mental components since it can affect visceral functions and skeletal muscle activity as well as cerebral activities such as thoughts, perceptions and emotional states (McCaffery, 1979). As a pain relief method relaxation may reduce stress and acute anxiety, act as a distraction from pain, alleviate skeletal muscle tension, promote sleep or enhance other pain relief measures. There are a wide variety of relaxation techniques including meditation, autogenic training, biofeedback,

biogenics, progressive relaxation exercises, Zen, transcendental meditation, self-hypnosis, imagery yoga, systems of religious faith, art and music.

Cutaneous stimulation is simply the stimulation of the patient's skin for the purpose of relieving pain (McCaffery, 1979). Techniques include pressure, massage, vibration, heat, cold, ointments and transcutaneous electrical nerve stimulation.

Touch

The majority of the pain relief methods discussed involve the use of touch whether for a brief moment when administering a parenteral analgesic or for longer periods of time such as a massage. For this investigation, touch as a nursing intervention was considered as a noninvasive pain relief measure. It was believed by the author that as a nursing intervention for pain relief, touch was more than a therapy technique of cutaneous stimulation. Not only was therapy involved but also a host of other factors such as nonverbal communication and developmental needs. These will be discussed later.

The laying on of hands with the intent to help or heal has been very much a part of all history (Fanslow, 1983). Before the scientific era of health care, helping persons relied on their own presence as a source of helping and/or

healing (Heidt, 1981). The concept of touch as a nurturing and therapeutic tool to assist, comfort, help and care for others is found in many ancient and historical writings and works of art (Fanslow, 1983; Leung, 1981; Zefron, 1975).

Touch has been important in the evolution of the nursing profession (Fanslow, 1983). Touch has been nursing's way of making its presence felt by those in need of comfort and care. Nursing is one of the few professions that carries out a major portion of its functions through touching patients (Johnson, 1965). Hands are the extension and action of nurses to carry out their science and art of practice (Iveson-Iveson, 1983).

However, with the increase in technological advances in health care, nurses are becoming less cognizant of the effect of human contact and more dependent on the effect of drugs, instrumentation and technological advances to aid recovery (Fanslow, 1983; Heidt, 1981). Cultural and social taboos in our society further discourage the touching of others (Fanslow, 1983). Others argue there is no time for such measures (Temple, 1967).

When used with care and sensitivity by the nurse, touch can communicate caring, promote well-being and perhaps even facilitate the patient's recovery (Goodykoontz, 1979). Nurses touch patients to let them know they care and to bring them relief from discomfort or pain (Ujhely, 1979).

As a noninvasive technique touch does not have the adverse side effects of analgesics whether oral, parenteral or intravenous. It does not have the potential dangers and side effects of conduction blockade, nerve stimulation and inhalation therapy. No costly equipment is necessary.

Touch need not be as time consuming as are many of the pain relief methods whether administering or closely supervising them. Temple (1967) discovered that it took her 6 to 7 minutes to administer an oral analgesic and 10 to 13 minutes to administer a parenteral one. This included checking the last time the patient had the medication, signing out the narcotic, administering the medication, charting and then checking to see the effect of the medication. She argues the time nurses could save by giving back rubs would cut down on the time spent giving analgesics and dosage of analgesics since for many patients the back rub is a distinct comfort measure.

Although touch does not require the skill and close supervision required of continuous intravenous analgesia, conduction blockade, inhalation therapy and transcutaneous electric nerve stimulation, it does require the expertise similar to that of other noninvasive pain relief methods such as distraction, guided imagery and relaxation techniques. However, touch has been and is taught in the form of back massage to nurses in their basic preparation. It was felt important to explore the effect of a back rub as a noninvasive pain relieving measure.

Purpose

If by using touch nurses are able to promote patient comfort and well-being then it must not be ignored (Durr, 1971). Nurses need to know when, how, with whom and under what circumstances touch is therapeutic. The purpose of this study was to determine the effectiveness of touch as a nursing intervention for the relief of postoperative pain.

Hypotheses

This investigation was planned as a pilot project that combined quantitative and qualitative approaches. The quantitative part was a bivariate comparative clinical trial. The qualitative part was a fieldwork method utilizing an interview format. The quantitative approach was used to study the first hypothesis:

> There are significant differences in the relief of postoperative pain in the initial recovery period following upper abdominal surgery between patients receiving the prescribed medical intervention of intravenous morphine and patients receiving the prescribed medical intervention of intravenous morphine and a planned nursing intervention of a one minute slow stroke back rub.

The qualitative approach was used to study the second hypothesis:

> There are differences in perception of relief of postoperative pain in the initial recovery period following upper abdominal surgery between patients receiving the prescribed medical intervention of intravenous morphine and patients receiving the prescribed medical intervention of intravenous morphine and a planned nursing intervention of a one minute slow stroke back rub.

Definitions

1. Pain: "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" ("Pain terms", 1979, p.250).
2. Postoperative pain: An unpleasant sensory and emotional experience associated with actual tissue damage inflicted by the surgical procedure.
3. Relief of postoperative pain: A decrease in sensation of postoperative pain, i.e. decreased pain intensity or a decrease in suffering from postoperative pain, i.e. increased pain tolerance (McCaffery, 1979). Relief of postoperative pain was operationally defined for the quantitative hypothesis as an increase in inspiratory capacity following the intervention as measured by a spirometer.
4. Pain intensity: "Combination of the sensation experienced and the distress caused by the sensory component" (Johnson, 1977, p.146).
5. Pain tolerance: "Duration or intensity of pain the patient is willing to endure" (McCaffery, 1979, p.18).
6. Initial recovery period: Immediate time frame (less than two hours) following surgery, occurring in a postanaesthetic care unit during which time patients are closely monitored to ensure that their physical status is stable.

7. Medical intervention: An action or activity within the domain of medicine which includes diagnosis and treatment.
8. Prescribed medical intervention: A medical intervention decided upon by a physician for the relief of a patient's postoperative pain. It is in the form of a written prescription that may be carried out by a physician or a nurse.
9. Nursing intervention: An action or activity within the domain of nursing which includes "promotion of health, maintenance and restoration of health, care of the sick and injured, and care of the dying" (King, 1981, p.4). The terms "nursing activity" and "nursing action" are used to denote "nursing intervention" in the written descriptions of the study for the subjects. The terms were substituted to make them more understandable by the lay person.
10. Planned nursing intervention: A nursing intervention for the relief of postoperative pain transacted between nurse and patient within the overall plan of nursing care.
11. Slow stroke back rub: A nursing intervention whereby the nurse applies lubricant to the patient's back using both hands starting from the coccyx and with smooth long strokes (effleurage) moving to the neck and then returning to the coccyx.

12. Perception: "A process of organizing, interpreting and transforming information from sense data and memory. It is a process of human transactions with environment. It gives meaning to one's experience, represents one's image of reality and influences one's behavior" (King, 1981, p.24). No operational definition was given for perception of relief of postoperative pain since it was the purpose of this aspect of the investigation to make observations in an exploratory effort to determine the nature of future operational definitions.

13. Interactions: "Interactions are the acts of two or more persons in mutual presence" (King, 1981, p.85).
14. Transactions: A "process of interaction in which human beings communicate with environment to achieve goals that are valued. Transactions are goal-directed human behaviors" (King, 1981, p.82).
15. Communication: A "process whereby information is given from one person to another" (King, 1981, p.146).
16. Stress: An "energy response of an individual to persons, objects and events called stressors" (King, 1981, p.147).
17. Space: A "physical area called territory, and is defined by the behavior of individuals occupying space, such as gestures, postures, and visible

boundaries erected to mark off personal space" (King, 1981, p.148).

Assumptions

It was assumed that all subjects would experience pain following surgery and that they would not use their own techniques for pain relief. No significant differences among surgical techniques was also assumed. Although this investigator had not seen patients use spirometers in the postanaesthetic care unit, experience during this time period supported the belief that patients would be able to use a spirometer appropriately. The final assumption was that patients would be able to answer questions appropriately twenty-four hours following surgery.

In summary, this chapter began with the significance of studying touch in order to enhance nursing practice. Since this investigator looked at one possible area that touch may be use effectively, for postoperative pain relief, the problems of postoperative pain relief were briefly discussed. Some of the most common methods of treating postoperative pain were presented. A discussion of touch as a noninvasive pain relief measure was placed within this statement of the problem, and the advantages of using touch were included. The purpose of this study was given. Two hypotheses were stated and their terms defined. Finally, the assumptions of the study were discussed.

A review of the literature clarifies how touch may be considered a nursing intervention for postoperative pain relief. Pain is classified according to type. Postoperative pain is studied in relation to stress, physiological aspects, perception and cultural influence. Touch is also considered in terms of stress and cultural influence as well as meaning and personal space. Categories of touch are presented.

REVIEW OF THE LITERATURE

In order to facilitate understanding of touch as a nursing intervention for the relief of postoperative pain, this review of the literature begins with a discussion about postoperative pain and then proceeds to touch. Postoperative pain is considered in the global aspect of pain according to the traditional classification of acute, chronic and psychogenic pain. Postoperative pain is then considered as a response to stress. The physiological aspects of postoperative pain are discussed. However, it is shown that postoperative pain is not a direct result of these physiological aspects but rather is dependent upon how the patient perceives the stimulus (perception of postoperative pain). Culture, a variable intervening between stimulus and perception, is further elaborated on.

The section dealing with touch begins by discussing the role of touch in dealing with the stress of postoperative pain. The meanings of touch are presented. Touch is considered as primarily a mode of communication, specifically a nonverbal one. It is further considered within the categories of touch as necessary for growth and development, as a means of perception, procedural touch, touch as therapy and therapeutic touch. Factors influencing

touch are mentioned and one factor, culture, is elaborated on. Finally, personal space is presented due to its close association with touch. Included is the cultural influence on personal space.

Pain

Types of Pain

Pain may be classified in many different ways. One useful classification is according to cause and duration (McCaffery, 1979). This includes acute, chronic and psychogenic pain.

Acute pain refers to discomfort of a short duration ranging from a second to less than six months (McCaffery, 1979; Armstrong, 1980). It serves a useful purpose by providing information about the site and severity of the injury or pathology (Armstrong, 1980). Acute pain is frequently a part of the surgical patient's preoperative experience and is almost always present postoperatively.

Chronic pain usually refers to pain lasting for six months or longer (McCaffery, 1979). It can be further classified as limited pain in which the physical pathology is known, intermittent pain marked by periods free of pain and in which the physical pathology may or may not be known or persistent pain in which the pathology is not life threatening and may be unknown or resistant to treatment.

Chronic pain may have been endured by the surgical patient preoperatively and may or may not be a part of the condition requiring surgery (Armstrong, 1980).

A significant number of patients who have chronic pain have what is traditionally termed as "psychogenic" pain, that is, pain due to psychological causes. Bonica (1977) stresses that these patients are not imagining this pain but that it is real and felt and described the same way as somatogenic pain is, even though it is less adequately explained in physical terms. This pain may lead to a surgical decision. Merskey (1977) quotes a number of studies reporting a significant percentage of unnecessary appendectomies occurring in patients with abdominal pain in association with neurotic illness.

Postoperative Pain As Stress

The components of postoperative pain may be viewed from several different perspectives. One such perspective useful for understanding its complex nature is within the concept of stress. Selye (1976) defines stress as "the nonspecific response of the body to any demand" (p.15). All endogenous or exogenous agents that make demands upon vital activity, particularly adaptation to new situations, are called stressors. Stress is closely linked to, though not identical with, energy utilization. Selye emphasized that stress is a normal and useful response.

Marcinek (1977) states that although surgery is considered controlled trauma it nevertheless threatens homeostasis and elicits the stress response. Surgery places heavy physiological and psychological demands on the patient which are frequently complicated by previous pathology (Sweeney, 1977). The net effect of the biochemical, physiological and psychological responses to these demands results in acute pain (Bonica, 1977). Acute pain has the biological function of warning the individual that something is wrong and frequently enforces immobility for healing to occur (Bonica, 1982). The physiological reflex responses and the usual psychological reactions prepare the person for an emergency response and help to cope with the injury (Bonica, 1982).

Physiological Aspects of Postoperative Pain

Postoperative pain follows all but the most trivial operations (Fry, 1977). It is largely due to the direct trauma caused to the tissues by the surgical procedure (Wallace & Norris, 1975). The location of the surgery, the extent to which the body is subjected to surgical trauma, the kind and amount of manipulation received by the internal organs and the duration of the surgery all influence the degree of postoperative pain (Sweeney, 1977).

Postoperative pain may be further aggravated by associated reflex muscular spasm or visceral distension

(Wallace & Norris, 1975). Abdominal operations in particular are frequently followed by pain that is more severe, more prolonged and less amenable to relief due to retraction, respiration and muscle spasms (Fry, 1977). The retraction that is necessary during abdominal procedures often tears and bruises the tissues. Respirations that are encouraged to be deep and promote coughing pull on healing incisions. Muscle spasms may persist for hours or days. They not only pull on the incision but add the pain of cramp to the incisional pain. The spasms are a fundamental reflex that attempts to close the wound.

Three types of pain most frequently experienced by postoperative patients include incisional, somatic and visceral pain (Sweeney, 1977). Incisional pain arises primarily from the skin and mucous membranes. It is due to the trauma inflicted on the cellular components of the skin, subcutaneous tissue, muscle fascia and viscera by the surgeon's scalpel. Incisional pain is described as sharp, bright, prickling, cutting, tearing, stabbing, burning and full of pressure. It is further affected by normal healing processes such as edema, inflammation and contraction as well as abnormal complications such as infection, hematomas, abscesses and other inflammatory responses.

Somatic pain is associated with muscles, tendons, ligaments, periosteum, cancellous bone, joints and arteries (Sweeney, 1977). Words used by patients to describe somatic

pain include dull and aching. Somatic pain is caused by abdominal distention, edema of tissues traumatized during the operation or while healing, traction or contraction due to the surgical procedure or wound healing, muscle spasms due to trauma or movement postsurgery, and inflammatory changes both normal and abnormal. Hormonal changes may lower the threshold of pain receptors.

Visceral pain refers to visceral organs and parietal peritoneum or pleura (Sweeney, 1977). Initially visceral pain is vague, poorly localized, diffuse and a dull aching type of pain. Later the pain becomes longer and more intense and is described as sharp, stabbing and more localized to the injured area. Visceral pain is due to the stretching or tearing of internal tissues during surgery and to abdominal distention due to reflex inhibition of gastrointestinal function.

Therapeutic management following surgery may also cause postoperative pain or discomfort (Sweeney, 1977). The presence of tubes for intravenous administration, urinary catheters, drainage tubes and nasogastric suction, as well as other discomforts such as the presence of large, bulky dressings, thirst, nausea, hunger, backache and fatigue aggravate the patient's experience of pain. Nursing activities designed to prevent complications and promote recovery which include the encouragement of deep breathing and coughing, changing position and movement out of bed produce complaints of further incisional or cutaneous pain.

Fortunately, postoperative pain is usually a self-limiting phenomenon (Wallace & Norris, 1975). Although it fluctuates, its intensity tends to decrease with time (Tammisto & Tigerstedt, 1982). Postoperative pain is usually most severe during the first day following surgery, diminishing over the next 24 hours and minimal after three or four days (Wallace & Norris, 1975).

Perception of Postoperative Pain

Wolf and Goodell (1968) state that the stress accruing from a situation is based, in large part, on the way the affected subject perceives it. "'It is not so much what happens to you but the way you take it' that matters in producing stress"(Selye, 1977,p.40). The same stimulus can affect different people differently or even the same person at different times (Melzack & Wall, 1982). Melzack and Wall further state that the literature refutes the idea that the intensity of the pain stimulus is directly related to the intensity of the perceived pain. Pain perception, therefore, cannot be defined simply in terms of particular kinds of stimuli.

Except for autonomic or reflexive responses the individual's response to a pain experience is a result of a processing of the stressor by the central nervous system (Johnson, 1977). It is this process that is modified and influenced by the cultural, psychological and social

background of the individual. As well, this process determines the significance and intensity of the pain. Thus psychological variables intervening between stimulus and pain perception appear to affect the actual patterns of nerve impulses ascending from the body to the brain and within the brain itself to produce a high degree of variability in the response (Melzack & Wall, 1982). Therefore, how a person experiences pain is not only dependent on physiological function but on sociocultural and psychological variables and the interrelationship of these variables with the physiological function (Jacox, 1977).

Specific variables affecting perception include genetic equipment, cultural and religious influences and a lifetime of experiences including earlier conditioning influences and learned responses to pain (Bonica, 1977; Melzack & Wall, 1982; Sweeney, 1977; Wolf and Goodell, 1968). Perceptual factors, personality, resources for coping with life, meaning of the situation, attention, anxiety and distraction, feeling of control over the pain and pain threshold are additional factors. Specific psychological concerns created by the surgical experience may include the location of the operation and its meaning, whether surgery was elective or exploratory, possible cosmetic effects and loss of body part or organ (Sweeney, 1977).

The Influence of Culture on Postoperative Pain

The sociocultural influence on perception of pain is quite distinct from the physiological and psychological dimensions of the pain experience (Zborowski, 1969). Human societies differ greatly in their attitudes towards pain experiences and symbols. The passing on of cultural traditions pertaining to symbols of pain is part of the socialization process and accordingly is associated with value judgments and attitudes. Cultural traditions enhance survival of the group by eliminating individual experience as the only source of knowledge.

The cultural significance attributed to pain, symbols of pain and situations associated with pain makes them acceptable or avoidable regardless of the actual intensity of the sensation (Zborowski, 1969). Cultural traditions dictate not only whether pain should be expected and tolerated in given situations but also the correct conduct during the pain experience or when faced with symbols of pain. These dictates may vary according to age, sex, status or other social criterion. Compliance to cultural patterns of conduct is insured by the process of internalization of social and cultural values as a child. Various cultural institutions such as religious, social, legal, economic and educational serve to enforce these norms. Variance from these patterns may be due to the complexity and diversity found in societies.

Zborowski (1969) found distinct differences in the pain experience among four groups of male patients in a veterans hospital: Old American, Irish, Jewish and Italian. The patients were divided into two groups: in the first group were patients with identical diagnoses of herniated discs, in the other group were patients with differing diagnoses including headaches, cancer, heart diseases, various disabilities and amputees with phantom pains. The behavioral responses of the patients of Old American background were nonexpressive and directed towards alleviating the condition. The Jewish patients displayed uninhibited, expressive behavior which they felt helped relieve the pain. The Italian patients were also uninhibited and felt that although the behavior did not relieve the pain it was a natural part of the pain experience. The Irish patients were nonexpressive and noncommunicative and preferred to suffer alone.

A test of pain tolerance (mechanical pressure on the Achilles tendon) by Woodrow, Friedman, Siegelaub and Collen (1972) showed differences according to age, sex and race. The subjects were classified as "Whites, Blacks and Orientals". Whites showed the highest average pain tolerance, Blacks were second and Orientals were lowest. It appears, however, that no attempts were made to match the racial background of the tester to that of the subject. Thus the tester for each subject was a Caucasian.

Conflicting results to those found by Woodrow et al. (1972) were obtained from a study conducted by Streltzer and Wade (1981) who examined the contribution of culture to variation in treatment of postoperative pain. The amounts of pain medications received by five major racial groups were significantly different. Caucasians and Hawaiians received more analgesics than Chinese, Japanese and Filipinos. They query whether the latter group was undertreated or more stoic and compliant.

Touch

Touch and Stress

Selye (1977) emphasizes that whether the stressor is pleasant or unpleasant is of less concern than the intensity of the stressor's demand made upon the adaptive work of the body. When the body is exposed to continuous stress for long periods it goes through the three phases of the 'General Adaptation Syndrome' (Selye, 1965, 1977). In the first phase, the "alarm reaction", the defensive forces are mobilized. The second phase, the "stage of resistance",reflects full adaptation to the stressor. Finally, the third stage or "stage of exhaustion", follows if the stressor is severe and/or long enough since the adaptability or adaptation energy of the living being is always finite.

Touch could be viewed as a nursing intervention whereby the nurse interacts with the patient to regulate and control the stress of postoperative pain. Touch as a nursing intervention would have both physiological and psychological aspects. Touch may act directly to reduce the stressor (pain) itself or it may act indirectly to affect the perception of the pain. Touch may assist the patient to adapt to the stressor more easily and maintain a balance to prevent the stage of exhaustion.

The Meanings of Touch

Ujhely (1979) discusses eight meanings of the word touch. (1) Touch can be defined as active striving to connect with another. One touches another for the purpose of reaching or meeting the other. (2) Touch can be a means of purposeful expression. Traditionally, nurses touch patients to let them know they care. They touch them by massaging to bring them relief. The need to touch may be heightened for patients who are upset, perhaps from suffering physical pain which cannot be alleviated by medication, or from emotional pain caused by reality of a terminal disease or the need for a disfiguring operation. (3) Touch can be connected to quality of behavior. This involves not only skill but the quality or timbre of touch. Different nurses have a different touch, both physically and emotionally to relate to their patients. A few have just

the right touch for a given patient. (4) Touch can be a means of perception. This requires making space within for the purpose of receiving. (5) Touch as experience requires that nurses can become true professionals only when they allow themselves to be touched without interpreting the experience in too personal a manner. (6) As a means of defining oneself and differentiating oneself from the other, touch has both physical and psychological applications. (7) Touch as taking advantage of another or of being taken advantage of has a negative connotation. (8) The relation of subject to object in touch can be explained as the reaction to touch being highly dependent on how subjects being touched perceive themselves in relation to those they touch or by those that touch them.

Categories of Touch

Cashar and Dixson (1967) categorized touch into three major therapeutic guidelines for nursing psychiatric patients: reality orienting, support and physical protection. Reality orienting was defined as promoting an awareness of the existing situation with reference to time, place and identity of persons, including the self. Support was defined as meeting the patient's unmet needs while allowing the patient to remain as independent as possible. Physical protection involved defending one's self or others from injury or destruction by the use of manual restraint.

However, these categories appear to be of limited value for application to patients in other health settings. From the literature a much broader picture of touch as a nursing intervention appears to emerge. Primarily, touch is a form of communication, specifically nonverbal communication. Touch can be further considered as touch necessary for growth and development, touch as a means of perception, procedural touch, touch as therapy and therapeutic touch. However, whether consciously or not, all of these categories of touch involve communication. Communication may also be the sole purpose of touch.

These categories of touch are not to be considered as mutually exclusive. Nursing interventions of touch can involve considerable overlap. For instance, massage can be considered as therapy, nonverbal communication and a means of perception. However, these categories will be considered separately for better understanding. The three guidelines proposed by Cashar and Dixson (1967) can be easily incorporated into these areas.

Nonverbal Communication.

Touch as a way of conveying meaning has been used since the beginning of mankind (Barnett, 1972). Touch is the most significant of all the different forms of nonverbal communication (Johnson, 1965). Six tactile symbols create the language of touch: duration, location, action,

intensity, frequency and sensation (Weiss,1979). A "theoretical construct" of the concepts of touch was developed by Barnett (1972) which included five broad categories:mechanics of communication; touch as a means of communication; touch as a basis for establishing communication; touch as a means of communicating emotions and touch as a means of communicating ideas.

The skin is an important vehicle through which a nurse and patient can talk due to its complex interrelations with the internal and external environments (Dossey, 1983). For patients with compromised vision, speech or hearing the skin is the major organ of communication. Although touch is not itself an emotion, its sensory elements induce the neural, glandular, muscular and mental responses which make up emotion (Montagu, 1978).

Physical contact as a means of communication between nurse and patient was seen by patients on acute medical and surgical units as having several dimensions: giving direction, providing reinforcement of verbal encouragement, reducing fear, transmitting feelings of interest and concern and demonstrating commitment to individuals in their recovery effort (Durr, 1971). McCorkle (1974) found that touch could indicate to seriously ill patients that the nurse cares about the patient. Patients in an Emergency Department who were touched were more likely to view the nurse as someone concerned for them as a person rather than

as interested only in getting the job done (McCoy,1977). Through touch, a nurse can indicate concern, interest and caring for a patient (Leung, 1981). Temple (1967) suggests that although a back rub is a physical measure it can have a great emotional effect.

Touch enables a nurse to establish rapport with patients quickly (McCorkle, 1974; McCoy, 1977). Temple (1967) asserts that a back rub can often be helpful in developing an interpersonal relationship with a patient. Through touch a nurse can draw out a patient's cooperation and willingness to learn (McCoy, 1977). Joachim (1983) suggests that in a relaxed state following a foot massage patients feel greater ease in expressing themselves and are more receptive to teaching.

Growth and Development.

Touch, the sense most closely associated with the skin, is the earliest sense to develop in the human embryo (Montagu, 1978). Even at birth the other senses continue to be underdeveloped (Rubin, 1963). Maternal touch is vital for the growth and learning of the infant and young child (Rubin, 1963). Through touch infants establish their first communication links with their mothers (McCoy, 1977). The manner in which children are touched influences their unique emotional, social and psychological growth and development as well as a respect for their own sense of self (Fanslow,

1983). In an extensive review of the literature, Montagu (1978) points out evidence supporting the vital importance of touch for the physical survival of the child and subsequent healthy behavioral development. Research findings on animals and humans show that tactile deprivation in infancy usually results in behavioral disturbances in later life.

Rubin (1963) states that as adults the need for contact with another person - intimate personal touch - in situations of intense personal stress is the most effective modality at this time. It is not to be considered as regression. When people are anxious, as patients frequently are, they often respond better to this earliest mode of communication (McCoy, 1977). When a person is isolated from human contact as is sometimes necessary in hospital, psychiatric disturbances result (Barnett, 1972).

Older people must deal with such developmental tasks as loss of significant others, loss of physical ability and mental acuity as well as loss of income and status (Tobiason, 1981). Touch is not only helpful in dealing with such losses but helps compensate sensory losses such as vision or hearing.

Iveson-Iveson (1983) stresses the necessity of touching the elderly. Without human touch, elderly patients begin to lose reality between themselves as persons and their

external environment. Montagu (1978) argues that tactile stimulation is the most important and neglected need of the aged and may greatly influence the course and outcome of an illness.

Thus touch is necessary during all stages of growth and development. The need for touch does not diminish with age. All age groups in various developmental stages require consideration for the need for touch.

Means of Perception.

Prior to modern technology nurses had to use their hands to determine a patient's health status (Ujhely, 1979). They ascertained by touch whether a patient was feverish, the abdomen distended or the hands clammy. Nurses continue to use touch to assess or to collect data such as feeling a lump under the skin or determining the temperature of an extremity (Goodykoontz, 1979; Leung, 1981). In addition to these basic skills nurses are now learning new skills of touch such as palpation, percussion and auscultation (Ujhely, 1979).

Touch as a means of perception is an important part of massage. Touch can determine which muscles are tight and which are relaxed or whether small spasms are present (Breakey, 1982; Joachim, 1983). These areas can be concentrated on to bring relief of discomfort (Joachim, 1983).

Rubin (1963) states that the first contacts made by the mother with her baby are exploratory. The mother uses her fingertips to explore her new baby and obtain information. Rubin asserts that a similar process is seen in new nurses. However with experience the nurse learns not only to gather information but to be able to discriminate this information for diagnosis.

Procedural Touch.

As was pointed out earlier, nursing is one of the few professions that carries out a major portion of its functions through touching patients (Johnson, 1965). Nurses use touch when they carry out procedures in clinical practice (Leung, 1981). Nurses are close to patients in many situations, for example changing surgical dressings and taking vital signs (Goodykoontz, 1979). More extensive touching is necessary for procedures such as range of motion exercises. Intimate touching occurs with the procedures of bathing, performing a catheterization or giving an enema.

Therapy.

Numerous biochemical responses are generated in the body when the skin is touched (Dossey, 1983). Touching the skin in various ways with fingers or hands can generate hypalgesia or analgesia through complex neuroendocrinological pathways. Bonica (1977) states that some of the older methods of pain relief such as massage may

stimulate sensitive, low threshold mechanoreceptors that are part of the large-fibre system and cause an increase in their activity. Impulses are then sent distally to impede the discharge of the small fiber terminals and to the spinal cord where presynaptic and postsynaptic inhibition prevents pain or at least diminishes it.

Massage is an ancient art that manipulates soft tissues for therapeutic purposes (Longworth, 1982). Both physiological and psychological benefits may result. Benefits of properly accomplished massage maneuvers include increased circulation, promotion of lymphatic drainage, benefits in connective tissue, healthier skin, increased flexibility of muscles, promotion of healing by increasing the blood flow and decreasing postoperative blood pooling, improvement in gastrointestinal motility, stimulation of the nervous system and a decrease in edema (Breakey, 1982; Joachim, 1983).

Massage promotes relaxation and the need for pain and sleeping medications may be reduced (Joachim, 1983). Michelsen (1978) points out that the back is an ideal area for massage because it is easily accessible and because of the number of stressed or tired muscles in the back. She maintains that for many people a back massage relieves tension in the entire body. Longworth (1982) found that effects of slow stroke back massage (SSBM) on thirty-two normotensive adult females for approximately three minutes

produced increased autonomic arousal and nonsignificant lowering of heart rate and generalized muscle tension. Prolonged effects of the SSBM showed decreased psycho-emotional arousal and significant lowered generalized muscle tension. SSBM in hospital settings is suggested as a cost-effective, nonpharmacological intervention to induce sleep.

Therapeutic Touch.

Touch as the actual physical stimulation of the skin needs to be differentiated from the area of touch which is rapidly gaining interest and study known as therapeutic touch. Fanslow (1983) states that therapeutic touch is hypothesized to be an energy transfer in which the nurse channels energy through herself to assist the patient to become whole again (i.e. healthy). The therapeutic touch practitioner does not have to actually physically touch the skin to be effective.

Krieger (1975,1976) found a highly significant increase in haemoglobin values of patients treated with therapeutic touch. Heidt (1981) discovered that cardiac patients who received therapeutic touch experienced a highly significant reduction in state anxiety.

Therapeutic touch is based on the premise that a human being is a highly complex field or continuum of various life energies (Macrae, 1979). These energies are in dynamic balance or harmony in health but are blocked, decreased or

in disequilibrium in illness. Therapeutic touch practitioners attempt to repattern these energies. The hands are used to scan the body of the patient and then are placed over areas of tension to redirect the energies (Krieger, Peper & Ancoli, 1979). Practitioners must be careful to transmit environmental energy and not their own energy (Quinn, 1979). Krieger (1975) states that in order to be effective therapeutic touch practitioners must be healthy and have a strong motivation to help or heal.

Culture As a Factor Influencing Touch

Several factors influence the nurse's use of touch and the patient's response to this touch. These factors include cultural practices, family relationships, previous experiences and institutional policies (GoodyKoontz, 1979). These factors determine how the nurse and the patient have been socialized to view and react to touch.

Although the need is universal, different cultures vary in how they express and satisfy the need for tactile stimulation (Montagu, 1978). National and cultural differences range from no touching at all to almost full expression among other groups. The differences in the quality, frequency and timing of touch of all age groups from newborns to elderly in different cultures display all possible variations. Cultural differences in early tactile experience play a role in the development of personality and

behavior. While the culture prescribes certain customs and experiences of touching for children, differences within particular families may deviate substantially with varying consequences.

Within different cultures and nationalities there are further differences in touching due to class status and sex (Montagu, 1978). Montagu states that since touching is considered an act of intimacy, the privilege is usually granted only to those allowed to pass social barriers of class or status which exclude the underprivileged. Cultural differences also affect the development of different tactual responsiveness between males and females.

Touch and Personal Space

Montagu (1978) states that touch reduces social distance. As such it may be regarded as an intrusion upon one's privacy and may be found annoying or unacceptable. GoodyKoontz (1979) stresses that nurses should proceed with caution with impulsive touching since it may overwhelm or bombard the patient. She believes that individuals have thresholds of intimacy similar to pain thresholds. A person reacts differently to personal space intrusion when ill than when well. MacMillan (1981) states that the nurse has to learn not to invade the space of others. Durr (1971) points out that touch and closeness may be threatening or anxiety producing to the psychiatric patient but very useful for patients in other health settings.

Hall (1969) coined the term "proxemics" to refer to observations and theories of man's use of space. Hall emphasizes that everything that man is and does is associated with the experience of space. Like birds and mammals, man has territories which he occupies and defends against others. This is known as territoriality. Allekian (1973) found that patients experienced feelings of anxiety when territorial intrusions occurred.

Man has a uniform way of maintaining distance as well (Hall, 1969). How people feel about each other at the time is a decisive factor in distance use. Hall grouped personal distances into four zones: intimate (contact to 1 1/2 feet), personal (1 1/2 to 4 feet), social (4 to 12 feet), and public (12 to 25 feet). Specific activities and types of relationships appropriately occur in each zone.

Pluckhan (1968) refers to space in terms of communication. Space as a message source serves as sensory data that is perceived by the person and constructed into a message. The attitudes toward space may vary with time and general conditions. Space as a nonverbal message takes into account Hall's four zones. It is also related to touch as intimate distance. The nonverbal message given by the use of space may be in conflict with the verbal message.

Hall (1969) states that man's sense of space is a synthesis of many sensory inputs: visual, auditory,

kinesthetic, olfactory and thermal. People from different cultures display different uses of their senses and thus have very different needs regarding space. Hall emphasizes that proxemics is a part of man's cultural dimension and is a specialized elaboration of culture. Proxemic patterns unite groups and isolate them from others.

In this chapter the literature was reviewed for both postoperative pain and touch since this investigation was concerned with the effect of touch as a nursing intervention for the relief of postoperative pain. Postoperative pain was considered within the global aspect of pain according to the traditional classifications of acute, chronic and psychogenic types of pain. Postoperative pain was also viewed as a stress response which includes the physiological aspects of postoperative pain, the perception of postoperative pain and the influence of culture.

A review of the nursing literature on touch revealed a growing trend in the nursing literature dealing with therapeutic touch and its evaluation but a paucity in relation to literature dealing with actual touch. The few writings that did deal with touch discuss its importance to nursing but have not attempted to evaluate its use. Of the handful of studies that did attempt evaluation, many suffer from lack of rigor in their methodology. A further review during and following this investigation affirmed the need

for attention to be given to the evaluation of the use of touch in nursing.

Reviewing the available literature on touch revealed various meanings of the word and the emergence of categories within which the acts of touching in nursing belong. Primarily, touch is a form of nonverbal communication. It is also necessary for growth and development, as a means of perception, as procedural touch, as therapy and as therapeutic touch. Culture is an important factor influencing touch. Due to the intimate nature of the act of touching, it is necessary to be aware of its effect on personal space. If personal space is invaded, touch may become an additional stressor rather than a relief measure.

An interrelatedness between the concepts of postoperative pain and touch emerges when both are thus viewed from the perspective of stress. Touch can be used as a nursing intervention to reduce the stress of postoperative pain. This may be accomplished physiologically and/or psychologically by the use of touch. Touch as a mode of communication may alter the perception of postoperative pain. However, this perception may also be altered by the presence of a nurse within the intimate personal space of the patient.

The concepts of stress, communication, perception and space in relation to postoperative pain and touch were

studied from a nursing approach to care guided by a theoretical framework and in particular, a nursing theory. Attention was also given to past and present pain theories in an attempt to understand some of the physiological and psychological aspects of pain.

THEORETICAL FRAMEWORK

Theory and practice are two related components in a unified nursing discipline (Stevens, 1979). Theory arises out of practice and once validated, returns to direct or explain that practice. Thus theory and practice interact to improve the other.

This chapter brings together theory and practice by presenting the theory that provided the organizing framework for this investigation. It begins by briefly discussing nursing theory and the steps leading to the development of nursing theory, the particular nursing theory being used in this study, and a brief review of some common pain theories both historical and current. Although the pain theories are medically oriented, their use in nursing can be supported. Hardy (1978) and Stevens (1979) emphasize that theories from other disciplines such as medicine must be validated by nursing research before they can be applied to nursing and be of use.

Nursing Theory

Chinn and Jacobs (1983) define theory as a "systematic abstraction of reality that serves some purpose" (p.2). In nursing, the purpose of theory includes describing, explaining. predicting and controlling to achieve desired outcomes. Studying theory or using approaches to formulate theory challenges thinking, develops analytic skills and assists practitioners to become more purposeful in their nursing interventions.

Hardy (1978) states that the term theory refers to "a set of verified, interrelated concepts and statements that are testable" (p.40). Concepts are "labels, categories or selected properties of objects to be studied; they are the bricks from which theories are constructed" (Hardy, 1974, p.100).Concepts indicate the subject matter of a theory (Jacox, 1974). A constant relationship between two or more concepts is stated as a proposition. A theory develops when concepts have been well defined and related by propositions.

Hardy (1974) defines a model as a "simplified representation of a theory or of certain complex events, structures or systems" (p. 104). Models simplify the area of concern and promote understanding of key elements and relationships between these key elements. A model is used to help visualize and understand something that cannot be directly observed or about which little is known (Jacox, 1974).

Jacox (1974) differentiates a conceptual framework from a model. A model "is a heuristic scientific device used to guide research and exploration into new areas of inquiry" (p.9). A model describes the relationships among concepts that may exist in the theory being developed. A conceptual framework, on the other hand, "refers to identification of the concepts with which the research is concerned. It is a way of indicating that the concepts and propositions that relate them are not yet systematically organized into a theory" (p.9).

A nursing theory, King's Theory of Goal Attainment, was selected to guide this investigation. As will be seen, this theory was developed initially from a frame of reference composed of five concepts. Other concepts were added and a conceptual framework involving three levels of dynamic interacting systems presented. The Theory of Goal Attainment was later proposed based on this conceptual framework.

Although King does not use the term "model" this investigator supports Fawcett's (1980) view that the term conceptual model is synonymous with the term conceptual framework. Fawcett points out that existing nursing models define and describe person and environment and their interrelations. Definitions of health and goal of nursing are also provided. Each model presents its version of the nursing process, often in great detail.

While the terms "models", "conceptual frameworks", "theoretical frameworks" and "theories" are seen frequently in the nursing literature, their meanings do not appear to be consistent and confusion frequently results. It is useful to look at a paradigm proposed by Chance (1982) for the evolution of nursing science that relates models, conceptual frameworks, theoretical frameworks, theory and science. Models provide focus for nursing from which concepts can emerge. Conceptual frameworks develop from careful defining and relating of these concepts. With research, theoretical frameworks and interrelated constructs can emerge. Nursing theories can then be tested from these theoretical frameworks. Theories provide the basis for nursing science.

Development of King's Conceptual Framework

In 1968, King presented a "conceptual frame of reference for nursing". Nursing was defined as "a process of action, reaction, interaction and transaction whereby nurses assist individuals of any age group to meet their basic human needs in coping with their health status at some particular point in their life cycle" (King, 1968, p.27). Nurses interacted with individuals and groups and performed within social institutions.

Within the above frame of reference, King selected five concepts as a basis for organizing knowledge for nursing

practice, research and education. The concepts included perception, communication, interpersonal relationships, health and social institutions. However, they were not well defined or described.

In 1971 King identified the levels of individuals, groups and society to be dynamic interacting systems: personal systems, interpersonal systems and social systems respectively. A visual model of the dynamic interacting systems was presented. Four "universal ideas" were selected as the conceptual base for nursing: social systems, health, perception and interpersonal relations. These represented the fundamental concepts in King's frame of reference for nursing. Each concept was defined and discussed.

Although the four concepts were more fully defined and described in King's 1971 writings, the definition of nursing changed very little. Communication, which was identified as a separate concept in 1968, was now considered to be a facet of interpersonal relations. The concepts of perception and interpersonal relations were stated as dynamic interactions of the nursing process. Verbal and nonverbal communications were an aspect of this process.

King's Conceptual Framework for Nursing

King (1981) summarized her conceptual framework for nursing as follows:

> Individuals comprise one type of system in the environment called personal systems. Individuals interact to form dyads, triads and small and large groups, which comprise another type of system called interpersonal systems. Groups with special interests and needs form organizations, which make up communities and societies and are called social systems. (p.141)

King's conceptual framework incorporates basic assumptions about the focus of nursing, the goal of nursing and the premise that human beings are open systems interacting with environment. Nursing is defined as "a process of action, reaction and interaction whereby nurse and client share information about their perceptions in the nursing situation" (p.2). The goal of nursing is to "help individuals maintain their health so they can function in their roles" (p.3,4). The domain of nursing includes "promotion of health, maintenance and restoration of health, care of the sick and injured and care of the dying" (p.4). Health is defined as "dynamic life experiences of a human being, which implies continuous adjustment to stressors in the internal and external environment through optimum use of one's resources to achieve maximum potential for daily living" (p.5).

Within each of the three dynamic interacting open systems are identified selected concepts. Perception, self,

body image, growth and development, time and space were identified as relevant concepts for understanding human beings as persons. Role, interaction, communication, transaction, and stress were selected as concepts to understand interpersonal systems. Organizations, decision making, role, and power, authority, status were concepts selected to study social systems. King identified and discussed the characteristics of each concept. An operational definition of each concept was formulated and applications to nursing or implications for nursing presented.

A Theory of Goal Attainment

A theory of goal attainment was derived from the conceptual framework. Although personal systems and social systems influence nursing care the major elements of this theory are discovered in interpersonal systems. The theory provides basic knowledge of nursing as a process of interactions that leads to transactions in nursing situations. Nursing is defined as "a process of human interactions between nurse and client whereby each perceives the other and the situation; and through communication, they set goals, explore means and agree on means to achieve goals" (p.144).

The theory of goal attainment describes the nature of the nurse-patient interactions that lead to achievement of

goals. Goal attainment results in outcomes that are measurable events in nursing situations. The theory utilizes the concepts of interaction, perception, communication, transaction, role, stress, growth and development, time and space.

For this investigation the concepts of interaction, perception, communication, transaction, stress and space were selected to provide the theoretical framework. Perception, communication, stress, and space guided the manner in which postoperative pain and touch were viewed and interrelated. The concepts of interaction and transaction were selected to guide the study design. Each concept is defined and the characteristics identified. It is necessary to use the characteristics discussed in the conceptual framework for each concept as well as some of the definitions given in the conceptual framework. Although it was the theory of goal attainment that provided the structure for this investigation and not the conceptual framework it was felt that defining and characterizing the concepts from the conceptual framework would clarify the theory since it is derived from this framework and provides a basis from which this investigation could build.

Interaction

The concept of interaction has been defined within the theory of goal attainment as "a process of perception and communication between person and environment and between person and person, represented by verbal and nonverbal behaviors that are goal directed. In person-to-person interactions, each individual brings different knowledge, needs, goals, past experiences, and perceptions which influence the interactions" (King, 1981, p.145). A concept of interaction enters into all nursing situations. The interaction process focuses on problems or concerns about the health of the patient. The interpersonal relationship is initiated by the nurse who identifies the needs of the patient through communication, observation and interpretation of the information. When the theory of goal attainment is used, the nurse and patient participate in mutual goal setting following problem identification. A positive interpersonal relationship is begun when the interactions are focused on the goals set by the nurse and patient. The quality of the interactions between nurse and patient may positively or negatively influence the outcome.

King describes perception, communication and transactions as basic concepts to explain interactions. Perceptions determine behaviors within the interactions and are infuenced by past experiences, present needs, expectations and goals of the individuals. Communication,

both verbal and nonverbal, is the informational component of interactions. Communication is goal-directed. Transactions are the value components of interactions. Goals are valued and the means to achieve them are identified with subsequent actions taken to achieve them.

Perception.

Perception is defined in King's conceptual framework as "a process of organizing, interpreting and transforming information from sense data and memory. It is a process of human transactions with environment. It gives meaning to one's experience, represents one's image of reality and influences one's behavior" (p. 24). The characteristics of perception include:

1. Perception is universal. Although each person is unique, all human beings have similar equipment, such as the senses, to perceive other persons and objects in the environment. These experiences provide information about the world.
2. Perception is subjective, personal and selective for each person. Each person permits some stimuli to enter from the environment. Experiences within each person vary in spatial-temporal relationships, integrity and/or disturbance of the nervous system, level of the person's development and in the context or situations in which perceptions are experienced.

Perceptions are based on each person's background of experiences which make them personal until communicated to others.

3. Perception is action oriented in the present. Perceptions are influenced by current interest, needs and future goals. Perceptions are organized by past events, values and needs.
4. Perception is transactions. Accurate perception is a first step toward mutual goal setting and exploring means to meet these goals. Nurses and patients need to verify perceptions as they plan to achieve their goals.

Communication.

Communication is defined in the theory of goal attainment as "a process whereby information is given from one person to another either directly in face-to-face meetings or indirectly through telephone, television, or the written word" (p.146). Some of the characteristics of communication are verbal, nonverbal, situational, perceptual, transactional and irreversible. It is only the verbal and nonverbal characteristics that are discussed in the framework.

Communication between persons includes both verbal and nonverbal behaviors. Nonverbal cues are considered more accurate than verbal pronouncements. Touch is a form of

nonverbal communication. Touch is defined as skin-to-skin contact of two or more persons.

Transactions.

Transaction is defined within the theory of goal attainment as "observable behavior of human beings interacting with their environment" (p.147). The unit of analysis in transactions is the dyadic interactions of nurse and patient. A transaction in the hospital setting is defined as:

1. One member of the nurse-patient dyad initiates behavior.
2. Opposite member of the nurse-patient dyad responds with behavior.
3. Disturbance (or problem) is noted in the dyadic situation if a state or condition is identified.
4. Some goal is mutually agreed upon by members of dyad.
5. Exploration of means to achieve goal is initiated by one member of dyad or behavior is exhibited by member of dyad that moves toward goal.
6. Other member agrees with means to achieve goal; both move toward goal.
7. Transactions are made; goal is attained.

Space

Space is described in the conceptual framework as "existing in all directions and is the same everywhere. In geometry, space is defined as an area made up of length times width. Space is defined as the physical area called territory and by the behavior of individuals occupying space" (p. 37,38). The characteristics of space are:

1. Space is universal. All persons have some concept of space.
2. Space is personal. Each person is unique in the perception of space. Perception of space is influenced by culture, needs and past experiences.
3. Space is situational. Each situation changes the need for and the way one uses space.
4. Space is dimensional. Space is a function of area, volume, distance and time.
5. Space is transactional. Space communicates messages with different meanings in different cultures. Perception of space influences behavior.

Stress

Stress is defined within the theory of goal attainment as:

> a dynamic state whereby a human being interacts with the environment to maintain balance for growth, development, and performance. This involves an exchange of energy and information between the person and the environment for regulation and control of stressors. Stress is an energy response of an individual to persons, objects and events called stressors.(p.147)

The characteristics of stress are:

1. Stress is dynamic. "Open systems are in continuous change and characterized by energy exchange within and external to human beings" (p.98).
2. Stress has a temporal-spatial dimension. Stress occurs at specific times and in particular situations.
3. Stress is individual, personal and subjective. "People respond to life events based on their unique perceptions and their interpretations of the events" (p.98).

Theories of Pain

In order to understand how touch could be considered a postoperative pain relief measure it is useful to study current pain theories. Armstrong (1980) states,

> A perspective on the dynamics of pain, or a theoretical framework, is helpful in developing an awareness of the overall pain experience. Through the centuries, theories have been developed to explain pain, and this process continues today. Although there are still many important unanswered questions, it is helpful to review the theories of the recent past and present. (p. 386)

Dating back to Aristotle, the Affect Theory considers pain to be an emotion rather than a sensation (Melzack & Wall, 1982). "Aristotle believed that pain experience was a negative passion, a quality of the soul and a state of feeling opposite to pleasure" (Bonica, 1977, p.750). The

Pattern or Summation Theory proposed by Goldscheider in 1894 considers pain to result from particular patterns of nerve impulses produced by the summation of the skin sensory input at the dorsal horn cells (Melzack & Wall, 1982). The Specificity Theory which has endured as the traditional one since advocated by Descartes in 1664 proposes that pain receptors in the skin carry messages to a pain centre in the brain (Melzack & Wall, 1982). Descartes "conceived of the pain system as a straight-through channel from the skin to the brain" (Melzack & Wall, 1982, p.196).

In 1965, Melzack and Wall presented the Gate Control Theory of pain. This theory integrated the concepts of physiological specialization, central summation and input control of the specificity and pattern theories with new physiological evidence (Melzack & Wall, 1965). The gate control theory proposes that neural mechanisms in the dorsal horns in the spinal cord act like a gate which is influenced by large (A-beta) and small (A-delta and C) diameter fibres as well as descending influences from the brain (Melzack & Wall, 1982).

The concept of multiple influences on the transmission cells is considered to have important therapeutic implications (Melzack & Wall, 1982). Pain can be treated not only by trying to manipulate the sensory input but by influencing motivational and cognitive factors as well. It is emphasized that the psychological contribution to pain

must be recognized since psychological factors not only contribute to pain but may help relieve pain. Since the same injury can invoke different responses in different people or even in the same person at different times it is argued that psychological variables intervene between stimulus and perception.

In the time since it was first proposed, the Gate Control Theory has been criticized for deficiencies (Bonica, 1977; Nathan, 1976). However, it has also been applauded for stimulating much new research on pain (Bonica, 1977; Melzack & Wall, 1982).

In 1979 Le Bars, Dickenson and Besson postulated that responses of certain neurons in the central nervous system to noxious stimulation may be inhibited by another noxious stimulus. They found that:

> in the intact animal, dorsal horn convergent neurones responding to both noxious and innocuous stimuli and correspondingly receiving both C and A-alpha fibre inputs can be strongly inhibited by peripheral noxious stimuli applied to areas of the body remote from the peripheral excitatory receptive field. (p.299)

They termed this concept diffuse noxious inhibitory controls (DNIC). Innocuous stimuli were found to be ineffective when applied to these same areas.

In 1982 Le Bars, Dickenson and Besson found that in the dorsal horn, DNIC act essentially upon convergent units i.e. those cells receiving inputs from both low-threshold

cutaneous mechano-receptors and nociceptors. These convergent units can be activated by cutaneous, muscular and visceral stimuli. Cutaneous convergent neurons were found to respond to natural tactile stimulation such as stroking, hair movement or light pressure. DNIC was found to inhibit 50 to 70% of such stimuli.

Given these findings it could be concluded that a back rub would be an ineffective pain relief measure since a back rub stimulates cutaneous convergent neurons which are inhibited by DNIC. However, it can be argued that DNIC does not consider the influences of psychological and cognitive mechanisms. Melzack and Wall (1982) have convincingly argued the significant effects of these descending brain influences on physiological mechanisms.

Wolstencroft and West (1982) have studied the role of the brain stem raphe nuclei and found that stimulation of the nucleus raphe magnus produces activity in the raphespinal and raphe-trigeminal fibres which inhibit the responses of nociceptive neurons in the spinal cord and trigeminal sensory nuclei resulting in analgesia. The nucleus raphe magnus stimulation appears to inhibit the responses of spinal sensory neurons to noxious inputs. It is suggested that the nucleus raphe magnus has a greater action on the spino-reticulo-thalamic pathway in producing analgesia. This pathway appears more responsible for the aversive and emotionally unbearable aspects of pain as

opposed to the sensory discriminative aspects of pain of the direct spinothalamic pathway.

Basbaum (1982) suggests that descending 5-HT axons from the raphe magnus contact enkephalin neurons of the spinal cord. Enkephalin synaptic connections of the inner substantia gelatinosa may mediate the inhibition of nociceptive neurons by non-nociceptive primary afferent inputs. It is pointed out, however, that raphe spinal axons also appear to modulate spinal nociceptors by mechanisms that bypass enkephalin interneurons.

Research into endorphins such as Basbaum's study of the interconnections between descending control systems and the enkephalin neurons of the spinal dorsal horn was virtually unknown ten years ago (Terenius & Tamsen, 1982). Endorphins, peptides with morphine-like properties, are formed in a variety of tissues and have the potential to alter pain perception, mood, respiration, and the release of pituitary hormones (Wilson & Elmassian, 1981). The enkephalin system is found predominantly in the spinal and lower brain stem areas, with its fibres mostly interneuronal and in the outer laminae of the dorsal horn of the spinal cord (Terenius & Tamsen, 1982). The fibres terminate in areas receiving input from pain conducting fibres. Endorphins appear to affect mainly the slow-diameter pain fibre and its affective components. They are unable to counteract severe clinical pain elicited via large-diameter

fibres and are therefore considered modulators of pain. Research into endorphins appears to be optimistic for future pain control (Terenius & Tamsen, 1982; Wilson & Elmassian, 1981).

Although the Gate Control Theory of pain has been criticized for its deficiencies, it continues to be useful due to its emphasis on the integration of psychological factors such as past experience, attention, and emotion with physiological mechanisms to produce pain perception and response. This integration is congruent with the belief that the individual is a total system and that health is the dynamic life experiences of the person adjusting to stressors in the internal and external environment. It is useful to be aware of advances in physiological mechanisms of pain such as the DNIC proposal and endorphin research. However, it must be emphasized that only by including the influences of psychological, cognitive and other factors will a true understanding of pain develop.

By integrating the understanding of postoperative pain provided by the theories of pain with King's Theory of Goal Attainment utilizing the concepts of perception, communication, stress and space, the relationship between touch and postoperative pain may be better understood. The above mentioned theoretical frameworks directed this investigation into touch as a pain relief measure as

investigator and patient agreed upon the use of touch during the recovery period to reduce the stress of postoperative pain. Thus not only was the understanding of touch and postoperative pain and their relationship elucidated but a guidance was given to investigate this relationship through interaction and transaction by mutual goal setting and achievement.

METHOD

This investigation was planned as a pilot project that combined a quantitative and a qualitative approach. The quantitative component was a bivariate comparative clinical trial. The measurement tool was a spirometer. The qualitative component was a fieldwork method utilizing an interview format. The intervention was a one minute slow stroke back rub. The subjects included fourteen patients undergoing upper abdominal surgery. There were seven subjects in each of the experimental and control groups.

This chapter presents the method used to study the two stated hypotheses. It includes: subject selection, statement of independent and dependent variables, selection of measurement tools, procedures including data collection, limitations, and finally, ethical considerations.

Subjects

The subjects were selected based on the following criteria:

1. elective upper abdominal surgery: cholecystectomy, vagotomy and pyloroplasty, or ventral hernia repair;
2. 18 to 60 years old;

3. male or female;
4. communicates understandably in the English language;
5. neither deaf nor mute;
6. able to see and read written descriptions;
7. not an inmate of a penal institution;
8. Caucasian;
9. no major pre-existing health problems (ASA 1 or ASA 2);
10. general anaesthetic.

It was decided to select patients undergoing upper abdominal surgery due to the severity of the pain which results and the need to improve existing pain relief measures for them (as discussed in the literature review). To ensure that the patients understood the nature of the study and would be able to respond appropriately postoperatively, the criteria of age, English language, hearing, speech, vision, and ability to read written descriptions were included. Due to the frequency of admissions of prisoners to this particular hospital, the criteria of no inmates of penal institutions was included due to the possibility of extraneous influences resulting from the presence of one or more guards and concern that these patients would feel compelled to participate due to their incarceration. Recognizing the effect of culture on pain perception and response, it was attempted to control for this somewhat with the criteria of Caucasians only since

the investigator is Caucasian. At a later time other nationalities could be included and this influence studied. The final criterion regarding major pre-existing health problems was necessary to prevent extraneous factors being introduced postoperatively such as the need for cardiac monitors, transfers to an Intensive Care Unit, critical nursing care requiring more than one nurse etc. This criterion was determined by the anaesthetist's coding of health status preoperatively, with the first two levels acceptable: American Society of Anaesthesiologists (ASA) 1 or 2. This coding was written by the particular anaesthetist in the patient's chart. A discussion of this classification of physical status may be found in Dripps, Eckenhoff and Vandam (1977). The criteria of general anaesthetic was included since there is loss of sensation in the lower back area when spinal anaesthesia is induced.

Prior to approaching possible subjects, descriptions of the study were given to the surgeons and their written consents were obtained for participation of their patients in this study. Copies of the description of the study and the consent form given to the surgeons are presented in Appendices A and B.

The research sample for this pilot project was a convenience sample of fourteen subjects admitted to the selected hospital who met the subject criteria, consented to the study, and had the consent of their surgeon to

participate in the study. The number of subjects was dependent upon the number of patients meeting the subject criteria admitted to the selected hospital in the three month period between September 23, 1985 and December 31, 1985. All subjects underwent cholecystectomy procedures. There were no patients admitted to this hospital during this time period who underwent vagotomy and pyloroplasty procedures or ventral hernia repairs and met the remaining criteria. Twenty patients were approached preoperatively following admission to the surgical unit for their participation in this study. Eighteen patients consented. One patient gave no reason for the refusal. The other patient who refused stated that recent involvement of the patient's child in a research project in another institution had resulted in the patient's decision not to participate in other research studies. It was necessary to eliminate from the research sample four of the subjects who had consented to the study. One subject was eliminated just prior to surgery when it was learned there was concern regarding cardiac status. Three other subjects were eliminated just prior to the intervention to be given due to functional reasons that will be discussed in the procedure.

Independent and Dependent Variables

For the first stated hypothesis a quantitative approach was used to study the bivariate relationship between the independent variable: nursing intervention of touch, and the dependent variable: relief of postoperative pain. For the second stated hypothesis, studied by a qualitative approach, the independent variable remained the same: nursing intervention of touch. However, the dependent variable differed: perception of relief of postoperative pain. These variables have already been defined following the statement of the hypotheses.

Measurement Tools

Quantitative data

Before measuring pain it is imperative to be aware of the subjectivity of the pain experience (Stewart, 1977). The quality as well as the intensity of the pain is personal and can never be fully assessed by an observer (Stewart, 1977). Due to this complexity all single measures of clinical pain suffer from problems of validity (Kim,1980). However, although methods of measurement cannot tell what is experienced when pain is felt, they can give information representing the person's interpretation of the experience modified by what he or she wishes the observer to know (Bond, 1984).

The most widely used method of pain measurement has been to directly elicit the person's subjective report of pain (Macrae, 1977; Stewart, 1977). These measures are often preferred since they use the patient's own estimate of pain (Bond, 1984). Subjective measures include various types of scales and analogues such as the simple descriptive scale (Lasagna, 1960; Stewart, 1977), the 0 to 100 numerical scale (Stewart, 1977), Johnson's two-component scale (Stewart, 1977), the visual analogue scale (Houde, 1982; Huskisson, 1974; Ohnhaus & Adler, 1975; Seymour, 1982; Stewart, 1977; Wallenstein, Heidrich III, Kaiko & Houde, 1980) and a colour coded light analogue recorder (Nayman, 1979). Sensory matching such as the Stewart pain-color scale and pain circles are additional subjective measurements of pain (Stewart, 1977).

These scales and analogues measure pain intensity (Bond, 1984). However since they indicate what the person wants the observer to know about the severity of the pain they can be influenced by personality, the effects of the observer's expectations and a host of other factors in the immediate surroundings. As well, they are not suitable for use in the immediate postoperative period since they are difficult for the patient to use alone (Hosking, 1982). Responses may be influenced if assistance from the nurse or researcher is given.

Other methods of pain measurement are indirect ones. They include measuring demands for analgesics; observing a person's behavior such as restlessness, agitation, grimacing or crying; using instruments to measure vital capacity or autonomic signs of pain such as increase in blood pressure and pulse or excessive perspiration (Macrae, 1977; Stewart, 1977). For this investigation it was decided to use inspiratory capacity as an indirect pain measure.

Parkhouse and Holmes (1963) point out that other pain measures usually measure pain at rest. However avoidance of chest complications and venous thrombosis depends on movement, deep breathing, and coughing which aggravate the pain. Respiratory function, particularly following upper abdominal surgery, more closely represents this aspect of postoperative pain. Good pain control will show better respiratory function postoperatively than when pain is inadequately relieved (Hosking, 1982; Rosen, 1977). "Nevertheless even perfect pain relief does not restore pre-operative respiratory function, so that the maximum effect of pain relief is limited" (Rosen, 1977,p.16). This measure also reflects the amount of effort the patient is willing to expend.

Hosking (1982) discusses monitoring respiratory function preoperatively and at intervals in the postoperative period by recording vital capacity using a spirometer. The recordings measure forced expiratory volume

(FEV) at one second and the forced vital capacity (FVC). Comparisons would be made between pre- and postoperative recordings.

Rosen(1977) supports vital capacity measures as more discriminating than functional residual capacity (FRC) measures due to the large changes in FRC following upper abdominal operations. He further states that 95 percent confidence limits with 16 percent might be expected.

Parkhouse and Holmes (1963) found that vital capacity and peak expiratory flow were objective measures of postoperative pain, especially after upper abdominal surgeries. However, measurements of vital capacity were significantly different from peak expiratory flow rate measurements between two groups of postoperative patients, one receiving morphine and the other saline. The vital capacity measurements were found to be more sensitive. There were no significant differences found between vital capacity measurements and the investigators' assessment of pain relief. They also found that due to the discomfort caused by the peak expiratory flows, patients refused to do the exercise more than once. This was less of a problem with vital capacity measurements since they require comparatively slow inspiratory efforts.

For this investigation, respiratory function was monitored by measuring inspiratory capacity. The instrument

used was a respiratory exerciser. By requiring that the subject exhale normally, place the lips around the mouthpiece and inhale slowly to maximum ability, inspiratory capacity from functional residual capacity (FRC) was measured. A copy of the product monograph of the particular respiratory exerciser used by the subjects in this investigation is contained in Appendix C.

Although the instrument used was not a diagnostic spirometer, in this particular hospital the respiratory exerciser is referred to as a "spirometer" by nurses, surgeons and respiratory therapists. Therefore to avoid confusion the term "spirometer" was used in the descriptions of the study and the consent forms given to the subjects and surgeons. The respiratory exerciser is also referred to as a "spirometer" in this paper, again to avoid confusion.

The spirometer used in the postanaesthetic care unit was the same one given to the patient preoperatively. Since the increments on the spirometer were too large, a strip of white adhesive tape (1/2 inch) was placed vertically along the gradations of the cylinder. The tape was then marked in 125 ml increments using a ruler. The reading was determined by the number corresponding to the top of the cup in the cylinder when viewed at eye level. If the top of the cup was between readings the upper reading was recorded. The minimal value was 125 ml and the maximum value was 4000 ml.

Interrater reliability was determined between the investigator and the research assistant since the investigator was responsible for the preoperative readings and the research assistant responsible for the postoperative readings. Each recorded spirometer readings while a third person (a male) demonstrated proper use of the instrument ten times. The readings were determined as described above. The readings were not compared until the ten trials were recorded. Both investigator and research assistant recorded identical results for ten out of ten simulated trials.

It was decided to use this measure of inspiratory capacity for two reasons. Firstly, the patients were familiar with the instrument. Every patient undergoing upper abdominal surgery is taught how to use the spirometer by the respiratory department prior to admission to the surgical unit. Patients are encouraged to use the spirometer postoperatively. Using the spirometer in the recovery room was an extension of its use rather than an additional instrument to learn to use. Secondly, the particular instrument used did not require the expiratory effort needed for a diagnostic spirometer. Only inspiratory efforts were needed, not unlike those required of other patients in the recovery period who are encouraged to take deep breaths.

Following a review and critical examination of pain measurement, Chapman, Casey, Dubner, Foley, Gracely, and

Reading (1985) concluded that the development of a valid, reliable and flexible pain measurement technology has been slow. An integrated overview of pain assessment technology and critical evaluation of methods in use are lacking in the literature. Progress has been retarded due to the complexity of the pain experience which can be quantified only indirectly. Syryala & Chapman (1984) further state that "No matter how elegant and sophisticated the methods used, quantification of subjective states is problematic. The data obtained are always subject to affective influence and cognitive mediation" (p. 85).

Qualitative data

In attempting to clarify the nature of qualitative research, Knafl and Howard (1984) state, "Qualitative research is equated with those methods or data gathering techniques which generate narrative as opposed to numerical data. Qualitative data take the form of verbatim interview and/or field note transcripts" (p. 17,18). The purpose of qualitative methods is further delineated into instrument development, illustration, sensitization or conceptualization. The purpose of choosing a qualitative approach for this study was to illustrate or clarify the meaning of the quantitative data, as well as to use it as a sensitizing device to promote understanding of the subjects' perceptions.

Schatzman and Strauss (1973) discuss six options the researcher may choose to obtain qualitative data: watching from outside, passive presence, limited interaction, active control, observer as participant and participation with hidden identity. The method of active control was chosen for this study whereby, "the researcher actively controls interaction along lines designed to provide particular information bearing upon the research. The archetype of this option is the formal interview" (p.60).

Subjects in both the control and experimental groups were interviewed on the surgical unit by the investigator twenty-four hours following arrival at the postanaesthetic care unit. The interview questions were formulated by the investigator and were designed to study the second stated hypothesis. The control group was asked three questions and the experimental group was asked four questions.

All subjects were told the following: "I would like to ask you some questions about your experience after surgery in the recovery room before you came up to this room". They were then asked the following questions:

1. After your surgery, in the recovery room, what do you remember the most?
2. After your surgery, in the recovery room, do you remember being touched? In what way?

3. In the recovery room, what was your discomfort or pain like?

   The experimental group was asked the following additional question:

4. In the recovery room, you received a short back rub. Do you remember it? What do you remember about it?

The questions were pretested with postoperative patients and nurse colleagues prior to the investigation. The original formulation of the questions were pretested on three postoperative surgical patients meeting the subject criteria. Feedback was elicited. The questions were then reformulated and their order rearranged. The questions were again pretested on three other postoperative surgical patients meeting the subject criteria. The patients responded promptly and appropriately. It was not necessary to reformulate the questions for the patients. Each question resulted in sufficient data for analysis. These questions were exposed to three nurse colleagues completing graduate studies. No substantive changes were suggested. The three nurse colleagues indicated that they felt the questions could be easily answered by a patient 24 hours postoperatively. As well, it was indicated that the questions did not appear to be biased toward a particular response but should result in data related to the hypothesis.

Procedure

Preoperative period

Following completion of admission procedures and orientation to the surgical unit, suitable candidates were approached at the bedside for their participation in this study. The investigator introduced herself and the study. The subjects were told the qualifications of the investigator and the research assistant as stated in the consent form (Appendix F). A written description of the study (Appendices D and E) and a consent form (Appendix F) were provided to each subject. Questions were answered.

It was initially planned for subjects to view two filmstrips immediately following consent to the study. The filmstrips, "Before Your Operation" and "After Your Operation" (Vision Multimedia Communications Inc., Orlando, Florida), total 25 minutes and are shown with accompanying audiotapes using a Dukane. However, the same month this investigation began, the hospital initiated a trial period for the same two filmstrips. Each evening at a regularly scheduled time preoperative patients were shown the filmstrips by the unit clerks. Due to the time of showing (8 p.m.) the investigator decided to provide the preoperative teaching prior to the two filmstrips being viewed. Follow up indicated that all of the research subjects viewed the filmstrips with the exception of one experimental group subject who viewed it only partially due to a malfunction of the equipment.

After providing written consent to the study, the subjects were given two instruction sheets: one discussing points of emphasis and differences from the filmstrips to be shown (Appendix G) and the other prepared by the Physiotherapy Department of Seven Oaks General Hospital to teach deep breathing and leg exercises (Appendix H). The investigator read the sheets aloud, demonstrated the exercises and requested the subjects to demonstrate them in return in order to ensure understanding. Any questions were answered. Each subject was asked to use the spirometer three times and the readings were recorded by the investigator. All subjects were taught how to use the spirometer by the respiratory department prior to admission to the surgical unit. There was no plan to disrupt this aspect of the admission procedure. The investigator planned that the provision of comprehensive preoperative teaching by the same person to all subjects would bring a measure of control to the presentation of knowledge each subject received about surgery during the preoperative period in hospital. It was hoped this would reduce any extraneous influence that may have affected the results had the subjects received preoperative information from different people.

It was thought that the preoperative teaching given by the investigator would take approximately twenty minutes. However, in practice it was found to take a longer period of

time, frequently 30 to 45 minutes. This extended time period was taken up by answering questions and listening to preoperative concerns. The investigator was concerned initially regarding the amount of information presented to the subjects. However, it soon became apparent that the subjects appreciated the amount of information given and usually requested more.

Immediate postoperative period

Upon arrival at the postanaesthetic care unit, the usual postoperative nursing care was initiated by the investigator and another staff nurse, usually the charge nurse. The research assistant recorded time of arrival. Following the initial nursing activities usually carried out by two nurses and an aide, the investigator assumed total care of the subject. The investigator checked the operative record to ensure that no anaesthetics were injected into the wound and none were found.

Upon regaining consciousness, the subject was asked, "Are you having some discomfort or pain?" If the subject denied discomfort or pain the investigator continued with the usual nursing care. When the subject stated "yes" or otherwise indicated an affirmative response the intervention began. The subject was also asked, "Do you remember who I am?" This question was used as a recognition signal to determine any memory loss due to narcotic agents used during

anaesthesia. The subject's answer was recorded. The intervention continued even if recognition was not given.

The subject was assisted to the sidelying position if not already in this position. The assistant gave the spirometer to the subject to use three times and recorded the three readings. The investigator administered the analgesic as prescribed by the anaesthetist. The time and dosage were recorded by the assistant. The investigator gave the following additional intervention to the experimental group:

> Applying a small amount of lotion (one teaspoon) to the palm of the hand, the lotion was warmed by holding the palms together. When warm, the lotion was applied to the back starting from the coccyx and in a smooth long stroke moving both hands up on either side of the spine to the neck and then lightly down the sides to the coccyx. This stroke (from coccyx to neck and back to coccyx) was repeated 20 times taking one minute to do so (three seconds per stroke). The amount of pressure applied would depend on the subject, with more pressure exerted on a muscular patient and less on a thin one.

Since the analgesic was given intravenously, the patient may have been unaware that it was given despite expressing the need for pain relief. Therefore, following the intervention the control group was told, "You have been given medication for your discomfort and pain". The experimental group was told, "You have been given medication and a back rub for your discomfort and pain".

Twenty minutes after the intervention the assistant again gave the the spirometer to the subject to use three times. The three readings and time of the first reading were recorded by the assistant. This terminated the intervention. The data collection sheet is shown in Appendix I. The investigator continued the usual nursing care of the subject until transfer to the surgical floor.

The influence of environmental stresses, such as the noise of other patients or staff members, the bustle of routine activity, and personal discomforts, such as tubes, frequent blood pressure recordings, and nausea, were controlled by having the same caregiver who was aware of these influences (the investigator) provide the intervention for all subjects. In addition, the research assistant monitored any unusual environmental stresses and personal discomforts that may have affected the results. No unusual environmental stresses occurred. No unusual personal discomforts were noted.

There were no changes made in the usual nursing care given to patients during this period other than the experimental intervention of a back rub and pain measurements using a spirometer. Using such criteria as untoward deviations or alterations in the normal course of recovery from a general anaesthetic and this type of surgical intervention, each patient was carefully observed and given a total systems assessment including the central

nervous system (temperature, level of consciousness or seizure activity), cardiovascular system (heart rate or rhythm as assessed by pulse or apical heart sound, blood pressure), respiratory system (rate, rhythm, depth, breath sounds), gastrointestinal system (excess drainage on the dressing, nausea and vomiting of bright sanguinous emesis) and the genitourinary system (sanguinous urine). The nurse in charge and the anaesthetist were consulted if any untoward alterations or deviations were noted. However, none of any consequence occurred.

All of the fourteen research subjects remained in stable condition during their period in the postanaesthetic care unit and were able to be transferred to the surgical units after the usual immediate recovery time frame. Three subjects who had consented to the study were eliminated when it became evident inspiratory capacity readings could not be obtained. All three subjects were quite agitated during their time in the postanaesthetic care unit: crying out, moving around restlessly, attempting to pull out tubings and having difficulty awakening fully. It was noted that when one particularly agitated patient was given a back rub as a therapeutic measure, the agitation ceased although the patient would not awaken fully. When the patient's back was no longer being massaged, the patient became very agitated. The investigator continued to massage the patient's back until the patient was oriented.

Later postoperative period

Twenty-four hours after the arrival of the subject to the postanaesthetic care unit, the investigator approached the subject at the bedside. The investigator reintroduced herself and the purpose of the visit. If the subject was in a room with other patients the curtains were drawn around the bed to ensure privacy. The chair next to the bed was placed with the front edge parallel to the bed, at approximately the middle of the bed, and approximately two feet away. If the patient was sitting in a chair, another chair was placed at a convenient position near the patient and approximately two feet away.

The investigator turned on the tape recorder and began to ask the formulated questions in order. Following the responses, the investigator terminated the interview, thanked the subject and left. The time the subjects spent answering the questions varied depending upon length of response. However no longer than ten minutes was taken by any subject.

For the first two subjects, the tape recorder was placed on the bedside table very near to the subject's head. However, due to environmental noise some difficulty was encountered transcribing the tape. It was found necessary to hold the microphone of the tape recorder next to the subject's face. In some instances very loud environmental

noise necessitated that the investigator wait a few minutes before asking the questions. As can be anticipated, environmental noise was more of a problem in a four bed room than in a semi-private or private room.

Limitations

The placebo effect

A significant limitation for studies evaluating interventions for the relief of postoperative pain is the placebo effect. Beecher (1975) has documented the very high average degree of effectiveness of placebos in treating postoperative pain. The effectiveness of a placebo was found to increase with stress. The average effectiveness of placebos when dealing with pathological pain was 35 percent, the average effectiveness of placebos with experimentally induced pain only 3.2 percent. Bond (1984) further states, "studies of pre-operative anxiety and pain have shown that the more intense these experiences are for the patient the greater will be his or her response to a placebo" (p.177).

The placebo effect may also involve neurophysiological mechanisms (Bond, 1984). Psychological stimuli may be responsible for the release of endogenous opioid peptides within the central nervous system. "The assurance given with administration of a placebo is accompanied by measurable changes in body functions effected through the autonomic nervous system and neuronal mechanisms; for

example alterations in blood pressure and pulse are commonly produced" (Bond, 1984, p.178).

In attempting to evaluate whether "hidden" as well as open infusion of vehicle can elicit a placebo response, Levine and Gordon (1984) found that hidden infusion elicits a placebo response as well. The open vehicle placebo was found to equate to approximately 8 mgms of morphine. Differences were found between a naloxone-antagonizable component of placebo analgesia and naloxone antagonism of endorphin-mediated analgesia induced by surgical stress. It was concluded that placebo-induced analgesia for postoperative pain is potent and can be antagonized by naloxone, a relatively specific opiate antagonist.

The placebo effect was very carefully considered due to the significant effect it may have had on the results. However it is possible that in this study it may have been a limited factor. The experimental group was told that the purpose of the study was to determine the helpfulness of a nursing activity using touch to relieve postoperative pain. The control group was told that the purpose of the study was to determine the helpfulness of nursing actions used to relieve postoperative pain. Both groups may have had the expectation of pain relief. Whether this expectation was the same for both groups would be difficult to determine.

Other limitations

It was not known how well patients in the immediate postoperative period would be able to use a spirometer. It was also not known how much recall of the initial recovery period patients would have 24 hours later. It was the task of this pilot project to evaluate these factors. As discussed previously, three subjects were eliminated due to inability to use the spirometer. Recall by the subjects of the initial recovery period is discussed with presentation of the qualitative results. Since this was a pilot project the limitation in subject numbers was recognized.

Although the use of respiratory function as a measurement tool has been supported in the literature, measurements would be influenced by the administrations of medications. However, the investigator accepted this limitation due to ethical concerns. It was planned to reduce this limitation statistically.

Ethical Considerations

Study design

The criteria for subject selection were formulated to ensure that subjects would be capable of understanding the written description of the study and the consent form. Other criteria were included to control for extraneous influences. Subjects to be selected were those likely to

experience severe postoperative pain who could benefit from participation in this study. It was planned the intervention would provide some measure of pain relief. For both control and experimental groups comprehensive preoperative teaching was given. An extensive review of published and unpublished literature by Devine and Cook (1983) revealed that psycho-educational interventions significantly decrease length of hospital stay.

The use of a spirometer as a measurement tool causes no additional discomfort to subjects since they are routinely encouraged to deep breathe and cough as soon as they regain consciousness. This spirometer requires only comparatively slow inspiratory efforts from patients as opposed to the more uncomfortable forced expiratory efforts required of a diagnostic spirometer. The use of this measure, i.e. respiratory function has been supported in the literature (Hosking, 1982; Parkhouse and Holmes, 1963; Rosen, 1977).

The questions involved in the qualitative aspect of the study were pretested and found to be easily answered. Since the interviews were short (less than ten minutes) no undue expenditure of energy was required by the recovering subjects. Subjects appeared to enjoy talking about their recovery experience.

The data collection methods were carefully designed to prevent undue energy expenditure by the patient yielding

data not appropriate to the hypotheses. Several controls were included in the procedures in an attempt to reduce extraneous influences on this data. Limitations such as the placebo effect on data results were recognized.

Information and consent

The written descriptions of the study for the subjects (Appendices D and E) included the nature and purpose of the study, the participation expected of the subjects, why their participation was elicited, questions to be asked, and description of the intervention. The differences between the usual nursing care and participation in this study were given, including the need to use a spirometer in the recovery room as well as the benefit of comprehensive preoperative teaching. The subjects were informed that they were free not to participate in the study or to withdraw at any time during the study without fear of recrimination. Prisoners were excluded due to concern that consent may be jeopardized by the expectation of benefits or fear of recrimination by the penal institution. Subjects were informed that they could ask questions and were told how to contact the investigator. The subjects were informed how their anonymity and confidentiality would be ensured. The data collected is stored in computer files accessible by the investigator only and will be destroyed upon completion of this paper.

The method of consent is described in the study. Subjects were required to give written consent (Appendix F) and were informed that their signature indicated willingness to participate in the study. Subjects were asked to sign two identical consent forms: one for the investigator and one for their own record. The subjects were given copies of the written description as well. Copies of the preoperative teaching were given to subjects to review at their leisure.

Approval and authorization

The study received the approval of the Ethical Review Committee of the School of Nursing, University of Manitoba. The appropriate procedures for access to patients and records were carried out according to the policy statement and instructions of the Director of Nursing and Executive Director of the hospital where the study was conducted. This included presentation of a copy of the approval received from the Ethical Review Committee. Notification about this study was given to the nursing departments involved and the head of anaesthesiology who is responsible for the postanaesthetic care unit. The surgeons of each of the subjects were approached prior to selection of subjects. They were given a written description of the study (Appendix A) similar to that of the subjects and their written consent (Appendix B) was elicited for the participation of their patients in this study. A copy of the study results will be

forwarded to the hospital and to those subjects requesting the results. The surgeons have been made aware that data results are available upon request. It is planned to publish the results in the hospital newsletter.

In summary, the method used in this investigation studied the two stated hypotheses incorporating both quantitative and qualitative approaches. The research sample was composed of fourteen subjects undergoing cholecystectomies. The independent and dependent variables were stated. The measurement tools included the quantitative measure of respiratory function using a spirometer as well as a qualitative measure utilizing an interview format. The procedure was described for the three time periods: preoperative, immediate postoperative and later postoperative periods. Limitations including the placebo effect were discussed. Finally, ethical considerations were dealt with.

A description of the analysis of the data collected includes statistical analysis of the quantitative data and the coding and categorizing of the qualitative data. Following these analyses of the data the results are presented. Interpretation of the results has been reserved for the discussion section.

RESULTS

The results of the data collected are presented according to the approach used. The two approaches, quantitative and qualitative, correspond with the two stated hypotheses. Firstly, the description of how the quantitative data were analyzed is given and the results of the analysis reported. Secondly, the analysis of the qualitative data is described. The grouping of the data into categories or types reflecting the subjects' perceptions is presented.

Quantitative Data

There were fourteen subjects with six females and one male in each of experimental and control groups. The ages ranged from 23 to 59 years. The mean ages for the experimental and control groups were 40.7 and 38.3 years respectively. T-test results showed no significant differences between the experimental and control groups with respect to age. All subjects underwent cholecystectomies. Thirteen subjects recognized the investigator upon regaining consciousness, one experimental group subject did not.

The study design is given in figure 1. This design uses the Student's t-test strategy for ratios and was developed from Egger and Miller (1984, p. 306-307).

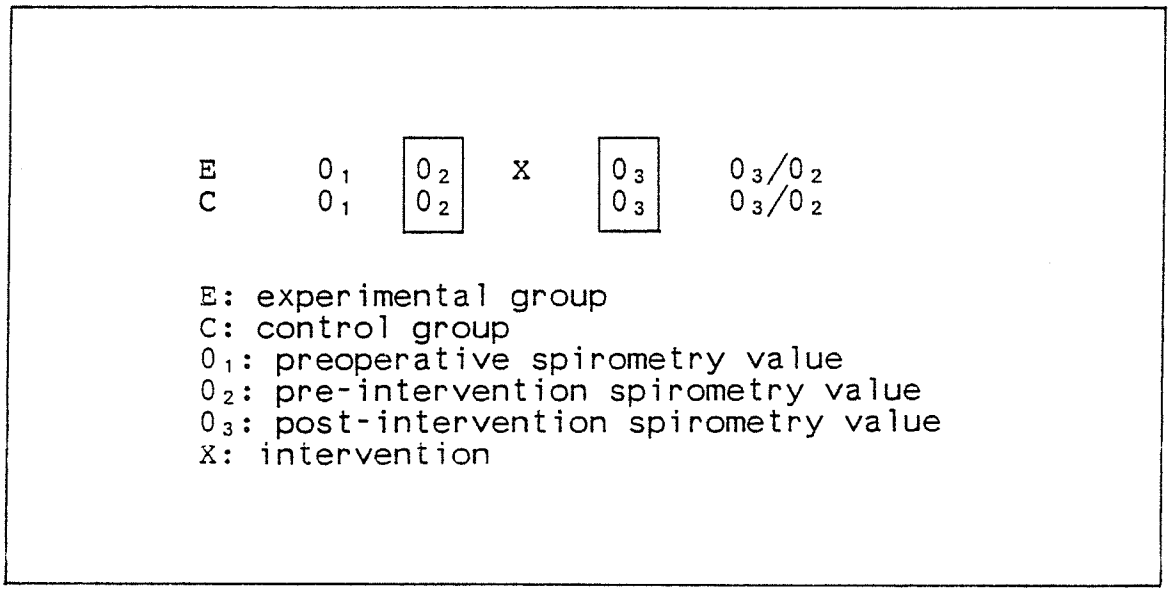

Figure 1. Study design using Student's t-test strategy for ratios

In order to demonstrate initial equivalence of the control and experimental groups, i.e. whether there were significant differences between groups at baseline, the means, standard deviations, and Student's t-tests of the respiratory function values between the control and experimental groups, preoperatively and immediately preceeding the intervention, were determined. These results are given in Table 1. The respiratory function values for each subject were based on the average of three readings for each of the times they were recorded: preoperative, preintervention, and postintervention. The readings measured inspiratory capacity in millilitres. Table 1 also presents the means, standard deviations, and t-test results of the postintervention respiratory function values for both

experimental and control groups. T-test results showed no significant differences between the experimental and control groups with respect to the preoperative, preintervention and postintervention respiratory function readings.

TABLE 1

Means, Standard Deviations and Results of t-tests of Respiratory Function Values

	Experimental Group		Control Group		Prob>t
	Mean	S.D.	Mean	S.D.	
Pre-operative	1970.24	946.7	2142.86	931.96	0.74
Preinter-vention	553.57	565.56	416.67	312.73	0.59
Postinter-vention	476.19	358.32	482.14	258.93	0.97

The mean differences and percent change of respiratory function values for the experimental and control groups are given in Table 2. The mean difference between the preoperative and the preintervention respiratory function values is labelled 'Preop-Pre'. The mean difference between the postintervention and preintervention respiratory function values is labelled 'Post-Pre'. The percent change was determined by dividing the mean difference between the postintervention and preintervention respiratory function

values by the mean difference between the preoperative and the preintervention respiratory function values. The large variance seen in the experimental group for the mean difference between the postintervention and preintervention respiratory function values was due to the values of two subjects: one showing a large increase and the other a large decrease in the postintervention respiratory function values. T-test results did not show significant differences between the experimental and control groups with respect to the mean difference between the preoperative and the preintervention respiratory function values, the mean difference between the postintervention and preintervention respiratory function values, and the percent change between the two mean differences. Thus, there were no significant differences between the groups at baseline: preoperatively or immediately following their operations. Further, there were no significant differences between the groups postintervention.

TABLE 2

Mean Differences, Percent Changes and t-test Results of Preoperative, Preintervention and Postintervention Respiratory Function Values

	Experimental Group		Control Group		Prob>t
	Mean	S.D.	Mean	S.D.	
Mean Difference Preop-Pre	1416.67	518.19	1726.2	692.25	0.37
Mean Difference Post-Pre	-77.38	522.87	65.48	79.27	0.49
Percent Change	17.33	85.32	37.2	50.51	0.61

A Student's t-test showed no significant differences between the experimental and control groups with respect to the time interval between arrival to the PACU and administration of the first analgesic. The means for the experimental and control groups were 22.4 and 19.0 minutes respectively.

T-test results showed no significant differences between the experimental and control groups with respect to height, weight, surface area and equivalent analgesic dosages. An analysis of covariance (ANCOVA) was used to control the confounding variable, the analgesic given to both groups. The variate was the ratio of the postintervention average divided by the immediate

preintervention average. The covariate, the equivalent analgesic dosage, was determined by dividing the equivalent dosage of analgesic received by each subject during the time interval between the pre- and postintervention values by his or her surface area. It was necessary to determine equivalent dosages since three different analgesics were given: ten subjects received morphine, three subjects received meperidine HCl and one subject received fentanyl citrate. The equivalent dosages were calculated by comparing the meperidine HCl and fentanyl citrate dosages to morphine 10 mgm (American Society of Hospital Pharmacists, 1985, p. 775). Since a range was given for the meperidine HCl, the data were analyzed twice, first with the lower and then with the upper range. The surface area was determined by using a nomogram for determination of body surface area from height and weight values (See-Lasley & Ignoffo, 1981, p.420). The analysis of covariance showed no significant effect of the analgesic given on the postintervention respiratory function values for the experimental and control groups.

Qualitative Data

Schatzman and Strauss (1973) outline the steps of qualitative research into recording of experiences, converting these experiences into data, analysis of this data and validation of the new understanding. The lack of

distinct boundaries in this process is pointed out by Glaser and Strauss (1966):

> In short, in qualitative work, just as there is no clear-cut line between data collection and analysis (except during periods of systematic reflection), there is no sharp division between implicit coding and either data collection or data analysis. There tends to be a continual blurring and intertwining of all three operations from the beginning of the investigation until its near end.(p.57)

Schatzman and Strauss (1973) state that the primary operation in the analysis of qualitative data involves discovering significant classes of things, persons and events whether common classes, special classes or theoretical classes. These classes are then linked and eventually formed into sets. Stern (1980) discusses this process in terms of data collection, coding and categorizing. As data is collected it is coded, i.e., examined line by line to identify the processes in the data. Data is then compared to other data and assigned to clusters or categories based on similarities.

The analysis of the qualitative data collected by this investigation involved three steps: preparation of data files, identification of meaningful segments with code words assigned; and sorting of coded segments. Both traditional and computer assisted methods were utilized for this analysis. The capabilities of the computer were employed when possible. Otherwise, traditional manual efforts were employed.

The data files were firstly prepared by a word processing program. The tapes were transcribed as soon as possible after the interview. Names and other identifying information were removed to ensure confidentiality. The data were stored in columns with wide margins available for codes and other notes. The finished notes were checked for completeness and accuracy.

The word processing abilities of the computer were further employed to separate the experimental group data from the control group data. These two sets of data were organized according to the questions asked. For the experimental group data, each of the four questions was followed by seven responses. For the control group data, each of the three questions was followed by seven responses.

The data were then coded. Meaningful segments were marked out and named on the printed copy with a pencil. Siedel and Clark (1984) term this "code mapping". Each item of data was tagged to indicate which category or categories it was relevant to. The data were coded by taking each question in turn and coding the responses for that question only for both the experimental and control group data. Following coding of the first three questions, the fourth question posed to the experimental group only was coded.

The hypothesis guided the coding of the responses. Each response was examined line by line to identify whether

the statements corresponded or not with perception of relief of postoperative pain. If not, they were categorized according to type of response. Responses relating to descriptions of pain were further categorized according to intensity. Responses related to touch were further categorized into those categories identified in the literature review: nonverbal communication, growth and development, means of perception, procedural touch, therapy and therapeutic touch.

Following the coding, each question was considered again in turn for sorting of the coded segments for that question only for both experimental and control group data. The categories of the data were sorted by pencil markings. The segments belonging to a particular category were indicated by a number and a category name. Each unit of data was reviewed to see if it belonged to that category. Categories were compared to see if they could be combined under a new category heading. If so, each unit of data was again reviewed to see if it belonged to this new category. This process continued until categories could no longer be feasibly combined. The segments of each category were counted thus determining frequency of response. By analyzing the data from the experimental and control group for each question in turn, the data could be compared between the two groups. Similarities and differences were examined. Illustrative examples were selected.

Analyzing the responses of the first two questions for the experimental and control groups revealed few differences between the groups in terms of type of response and in particular, perception of relief of postoperative pain. For the first question, "After your surgery, in the recovery room, what do you remember the most?", there were no statements given by the experimental group related to perception of relief of postoperative pain. One member of the control group stated "pain" as the most vivid memory. There were no further statements related to perception of relief of postoperative pain given by the control group.

Three subjects in the experimental group and one subject in the control group stated no recall of the recovery room period. The most frequent response to this first question related to postoperative nursing activities: one experimental subject and three control subjects remembered being awakened and/or oriented to the recovery room; two experimental subjects and three control subjects remembered deep breathing or spirometer instructions and/or spirometer use; one experimental subject remembered vital signs being taken.

The second most frequent response to the first question was that of seeing the recovery room personnel. This was reported by one subject from each group. The control group subject expressed relief in recognizing the nurse upon regaining consciousness. No other type of response was identified.

For the second question, "After your surgery, in the recovery room, do you remember being touched? In what way?", six experimental group subjects and five control group subjects did not recall being touched. None of the remaining responses related to perception of relief of postoperature pain. As in the previous question, the most frequent response related to postoperative nursing activities: one subject from each group remembered being touched to be awakened. One control group subject remembered a glycerine mouth swab. No other responses were given.

Unlike the first two questions, the third question: "In the recovery room, what was your discomfort or pain like?" yielded much different responses between the two groups. Within the experimental group three subjects reported no recall of the recovery room period; one subject reported no recall of the pain; two subjects denied having pain in the recovery room and one subject stated, "I don't know".

In the control group one subject reported no recall of the pain. The other six subjects were able to describe their pain. Various pain descriptions were given.

In order to categorize the pain descriptions it was decided to refer to a spatial scale of pain descriptors developed by Melzack and Torgerson (cited by Melzack & Wall, 1982). This scale was formulated from intensity ratings

given by patients to various pain descriptors classified into one of three classes: sensory qualities, affective qualities and evaluative words that describe the subjective overall intensity of the pain experience. The intensity scale values range from 1 to 5: 1, mild; 2, discomforting; 3, distressing; 4, horrible; 5, excruciating.

Two of the subjects stated their pain "was sore" or "a soreness". The scale rates this sensory descriptor as a '2': discomforting. This was further supported by statements by the two subjects that the pain "wasn't bad" but made it "hard to maneuver" and "didn't seem to be that bad" but "when you breathe then it's sore". A third subject also stated the pain was inhibiting deep breathing. This subject described the pain in affective terms as a "yuchy feeling", in sensory terms as "constant", and in evaluative terms as "very uncomfortable". Although these descriptions were not listed in the scale, "very uncomfortable" could be considered similar to "discomforting" with a rating of '2'.

One of the subjects stated the pain was "very painful". This was perhaps a more intense pain experience. However, since no other pain description was given by this subject the pain experience is difficult to rate. The pain experiences of the remaining two subjects were definitely of greater intensity. Both of them reported the sensory descriptor "sharp pain" which is rated as a '3': distressing. This was further substantiated by one subject

as "burning" which is also a '3' sensory quality and as "raw". The other subject stated, "Nothing like I ever imagined it would be. Never for a minute did I think it would be that awful. I never would have gone down there". Given this further description, the pain experienced could possibly be rated even more intensely.

The experimental group was asked the additional question: "In the recovery room, you received a short back rub. Do you remember it?" Four of the subjects reported no recall of the back rub. The responses of the three subjects who could recall the back rub to the further question "What do you remember about it?", were compared to the categories of touch discussed earlier: nonverbal communication, growth and development, means of perception, procedural touch, therapy and therapeutic touch. The responses given categorize the touch as a form of therapy. One subject stated, "It felt so good. It definitely helped me to relax. It helped me because my back is very sore." Another subject also stated that "it helped to relax" and that it was "cool". The third subject described it as, "It felt good. Actually kind of soothing." No statements referring to nonverbal communication were given. Of the three subjects who recalled the back rub only one had indicated earlier recall of being touched (to be awakened).

The results of the interview were coded first by the researcher and then were independently coded by a nurse

colleague completing graduate studies. The results of the two codings were compared. Perception of relief of postoperative pain was not identified by either the investigator or the nurse colleague in the responses given by the experimental and control group subjects related to what was remembered the most by the subjects, whether the subjects remembered being touched, and the subjects' descriptions of their pain. Both investigator and nurse colleague had identical ratings for the pain descriptors. All descriptions of the back rub were categorized as therapy by both investigator and nurse colleague.

In this chapter the results of the quantitative and qualitative approaches to data collection were given. The description of how the quantitative data were analyzed and the results of this analysis were presented. The analysis of the qualitative data was then described and the results presented. The final chapter presents the discussion of these results. Some conclusions were able to be drawn. The discussion of the results and the conclusions drawn lead to a number of implications for nursing practice and for further nursing research.

DISCUSSION

Summary

This investigation looked at some of the questions about the use of touch in nursing practice and in particular in the postoperative clinical area for the relief of postoperative pain. Despite the recognition of the importance of pain relief for optimal postoperative recovery and a wide variety of measures available for pain relief, a significant number of patients continue to complain about inadequate pain relief. The purpose of this study was to determine the effectiveness of touch as a nursing intervention for the relief of postoperative pain.

Primarily, touch was viewed as a form of nonverbal communication. Additionally, touch could be viewed as necessary for growth and development, as a means of perception, as procedural touch, as therapy and as therapeutic touch. Culture and personal space were considered important factors influencing touch.

Postoperative pain was viewed as a stress response which included the physiological aspect of postoperative pain, the perception of postoperative pain, and the influence of culture. It was perceived that touch could be

used as a nursing intervention to reduce the stress of postoperative pain.

The relationship between touch and postoperative pain was clarified by integrating the understanding of postoperative pain provided by theories of pain with nursing theory. The theories of pain included the Gate Control Theory, the diffuse noxious inhibitory control (DNIC) proposal, and endorphin research. King's Theory of Goal Attainment with the selected concepts of interaction, perception, communication, transaction, stress, and space was chosen as the nursing theory. These theoretical frameworks directed this investigation into touch as a pain relief measure as investigator and patient agreed upon the use of touch during the recovery period to reduce the stress of postoperative pain.

This investigation was planned as a pilot project that combined a quantitative and a qualitative approach to study two hypotheses. The first hypothesis used the quantitative approach to study the bivariate relationship between the independent variable: nursing intervention of touch, and the dependent variable: relief of postoperative pain. The measurement tool used for the comparative clinical trial was a spirometer. The second hypothesis was studied by the qualitative approach that was a fieldwork method utilizing an interview format. For the second hypothesis the independent variable remained the same but the dependent

variable differed: perception of relief of postoperative pain.

The research sample was composed of fourteen subjects between the ages of 23 and 59 undergoing cholecystectomies. There were six females and one male in each of the experimental and control groups. The procedure had three components: preoperative, immediate postoperative, and twenty-four hours postoperative periods. During the preoperative phase the participation of the subjects was elicited and preoperative teaching given. During the immediate postoperative phase the intervention was administered. Both experimental and control groups were given the usual nursing care with the exceptions of a one minute back rub given to the experimental group and inspiratory capacity readings obtained from both groups using a spirometer. During the twenty-four hour postoperative period, the experimental group was asked four questions and the control group was asked three questions about their immediate recovery period.

Means, standard deviations and t-test results were determined for respiratory function values recorded preoperatively, prior to the intervention and twenty minutes following the intervention. T-test results showed no significant differences between the experimental and control groups with respect to the preoperative, preintervention or postintervention respiratory function readings. The mean

differences between the preoperative and preintervention respiratory function values and between the preintervention and postintervention respiratory function values, and percent changes of respiratory function values were also determined. T-test results did not show significant differences between the experimental and control groups with respect to the mean differences and the percent changes determined. An analysis of covariance (ANCOVA) showed no significant effect of the analgesic given on the postintervention respiratory function values for the experimental and control groups.

The analysis of the qualitative data collected by this investigation involved three steps: preparation of data files, identification of meaningful segments with code words assigned; and sorting of coded segments. The most frequent responses given by the experimental and control group subjects about what was remembered the most during the immediate recovery period related to postoperative nursing activities, followed by memories of the recovery room personnel. Perception of relief of postoperative pain was not identified. The majority of the subjects, both experimental and control, did not remember being touched. The responses of those that did remember being touched were again related to postoperative nursing activities. Perception of relief of postoperative pain was not identified. None of the experimental group subjects were

able to describe their pain experienced during the immediate recovery period. In the control group, six of the seven subjects were able to describe the pain experienced during this period. Various pain descriptors were given and were categorized by referring to a spatial scale of pain descriptors developed by Melzack and Torgerson (cited by Melzack & Wall, 1982).

Three of the seven experimental subjects were able to describe their back rub. These responses were compared to the categories of touch discussed earlier and categorize the touch as a form of therapy. No statements referring to nonverbal communication were identified.

The analysis of the quantitative data resulted in no significant differences shown between the experimental and control groups following the intervention of a nursing measure for postoperative pain relief. The results of the qualitative data analysis appear to argue that the nursing intervention of touch affected the perception of relief of postoperative pain. These results give rise to a number of interpretations, conclusions, implications for practice and recommendations for further research.

Discussion

The quantitative results appear to show that the planned nursing intervention of touch did not influence the relief of postoperative pain. The quantitative approach utilized a tool to measure pain relief on the basis that improved pain control should show better respiratory function. Improved postoperative pain relief would allow subjects to deep breathe more effectively, a maneuver that aggravates the pain. There were no significant differences found between the experimental and control groups in relation to respiratory functioning. However, as discussed earlier, the maximum effect of pain relief may have been limited due to the influence of anaesthetics on respiratory function.

Stewart (1977) describes measurement of demands for analgesics as one other method of pain measurement. After this investigation began, it was decided to determine whether there was a significant difference between the groups in terms of the time interval between the first analgesic and the second analgesic given. The back rub was given to the experimental group immediately following the first analgesic. The time between the first and second analgesic was then recorded for all subsequent subjects. It was necessary to collect some of the data for the previous subjects from the subjects' health records obtained through the health records department of the hospital. One

experimental group subject did not receive the second analgesic until several hours later on the surgical unit. This subject was eliminated from the analysis. T-test results showed no significant difference between the experimental and control groups in relation to the time interval between the first and second analgesic. Analysis of covariance (ANCOVA) showed no significant effect of the analgesic given on the time interval between the first and second analgesics for the experimental and control groups.

Since pain scales were not realistic alternatives, the choice of a quantitative measurement tool was limited. The reliability and validity of the measure used, respiratory function, like many other indirect methods of pain assessment has not been reported to any great extent in the literature. This investigator would not recommend further use of the particular instrument used, a respiratory exerciser (spirometer), as a pain measurement tool. The criticisms of the measurement tool used underline the need for critical evaluation of pain assessment methods in use. The difficulties that evaluation of present methods and development of new pain assessment technology present is further affirmed.

Although the quantitative results showed no significant differences between the groups, the results are useful when compared with the qualitative results. Comparison of the responses between the experimental and control groups

appeared to show differences in perception of relief of postoperative pain. The responses of the experimental and control group to the first two questions did not result in data related to perception of relief of postoperative pain. There were few differences between the groups for the responses given. Although three of the experimental group subjects were able to describe the back rub received, they could not earlier recall being touched. Aside from the one response of "pain", no reference was made to the pain experience or to the relief of the pain. Certainly one factor influencing the responses was the lingering effects of the anaesthetics given. Many of the subjects were not able to recall the time period spent in the postanaesthetic care unit. This limitation had been considered prior to the investigation but accepted due to the advantage of this setting for controlling other variables that may have easily influenced the results. It was difficult to anticipate the lack of relevant data since back rubs are not routinely given in the immediate recovery period. It was the purpose of this pilot project to determine whether differences between the groups would result. Should this investigation continue, the first question: "After your surgery, in the recovery room, what do you remember the most?" and the second question: "After your surgery, in the recovery room, do you remember being touched? In what way?" would not be used.

Differences were shown between the experimental and control groups in relation to the third question asked, "In the recovery room, what was your pain or discomfort like?" Whereas none of the experimental group could describe their pain, 6 out of 7 control group subjects were able to do so. It was interesting to note the contrast between the descriptions of pain given by the control group and the descriptions of the back rub given by the experimental group. The descriptions of the back rub were in response to the fourth question posed to the experimental group to which 3 of the 7 experimental group subjects remembered the back rub and were able to describe it. In contrast to the descriptions of the pain as "raw", "burning", and "sharp", the back rub was described as "soothing", "cool", and "helped to relax". Since there were no descriptions of the pain provided by the experimental group it is difficult to infer relief of pain due to the back rub administration. It may have been useful to have asked the subjects preoperatively about their levels of pain tolerance. These responses could then have been compared to the descriptions of the postoperative pain.

Since statistical analysis showed no significant differences between the groups on a number of demographic variables as well as the respiratory function values and time intervals between analgesics, the qualitative results are not only made more apparent but the complexity of the

pain experience is demonstrated. It is helpful to compare these results with the theory that provided the framework for this investigation.

The Gate Control Theory argues that psychological variables intervene between pain stimulus and perception. The theory proposes that neural mechanisms in the dorsal horns in the spinal cord act like a gate which is influenced by large (A-beta) and small (A-delta and C) diameter fibres as well as descending influences from the brain (Melzack & Wall, 1982). Although there were no significant differences between the experimental and control groups in terms of the analgesics given, there were differences noted in perception of pain relief. The back rub, as a form of therapy, could be considered a psychological variable influencing the perception of the postoperative pain. This interpretation appears in agreement with endorphin research reporting that by altering pain perception and mood, endorphins are being considered modulators of pain.

The diffuse noxious inhibitory control (DNIC) proposal appears not to be supported. The proposal states that dorsal horn convergent neurones responding to both noxious and innocuous stimuli can be strongly inhibited by peripheral noxious stimuli applied to areas of the body remote from the peripheral excitatory receptive field. Since a back rub would stimulate cutaneous convergent neurons which are inhibited by DNIC, a back rub would be an

ineffective pain relief measure. However, not only were three subjects able to describe the back rub but the difference between the groups in relation to their perception of the pain seems to refute the argument that most of the neurons stimulated by the back rub were inhibited. Again it is argued that psychological mechanisms must be considered in conjunction with physiological mechanisms.

The results of the qualitative data analysis appear to provide support for the nursing theory that formed the basis of this investigation. However, not all of the concepts believed to be involved were corroborated. The nursing theory used, King's Theory of Goal Attainment proposes that

> nurse and client interactions are characterized by verbal and nonverbal communication, in which values, needs, and wants of each member of the dyad are shared; by perceptions of nurse and client and the situation; by self in role of client and self in role of nurse; and by stressors influencing each person and the situation in time and space. (King, 1981, p.144)

For this investigation the concepts interaction, communication, perception, transaction, stress, and space were selected.

The concepts of stress and perception promoted the understanding of pain as a complex experience. Stress is stated within the Theory of Goal Attainment as "an energy response of an individual to persons, objects and events called stressors" (King, 1981, p.147). Perception is

defined within King's conceptual framework as "a process of organizing, interpreting and transforming information from sensory data and memory. It is a process of human transaction with environment" (King, 1981, p.24). The stress of postoperative pain results from physiological and psychological stressors associated with the surgery and recovery process. The perception of the stress, i.e. the significance and intensity of the postoperative pain, is influenced by physiological, psychological and sociocultural factors. The planned nursing intervention of touch became one of the factors influencing the perception of the postoperative pain.

The concepts of interaction and transaction guided the study design. The concept of interaction is defined within the Theory of Goal Attainment as "a process of perception and communication between person and environment and between person and person, represented by verbal and nonverbal behaviors that are goal directed" (King, 1981, p.145). In the interactive process two individuals mutually identify goals and the means to achieve them. In this investigation the nurse (the investigator) interacted with the patient (the subject) during the preoperative period to agree to the use of touch as a pain relief intervention. The nurse again interacted with the patient during the immediate postoperative period to administer the touch for postoperative pain relief.

When nurse and patient agree to the means to implement the goals, they move toward transactions. Transactions are defined within King's conceptual framework as "a process of interaction in which human beings communicate with environment to achieve goals that are valued. Transactions are goal-directed human behaviors" (King, 1981, p.82). In this investigation touch became the planned nursing intervention transacted by nurse and patient to regulate and control the stress of postoperative pain.

The results of the data did not corroborate the remaining two concepts, space and communication. Space is defined within the Theory of Goal Attainment as "a physical area called territory, and is defined by the behavior of individuals occupying space, such as gestures, postures, and visible boundaries erected to mark off personal space" (King, 1981, p.148). Space was chosen as a concept due to the belief that touch is related to personal space. As an intrusion upon one's privacy, touch was considered a potential stressor. Thus the presence of a nurse within the intimate personal space of the patient may also alter perception of postoperative pain. However, it was noted that in this setting it is imperative that the nurse be present within the patient's personal space at all times due to the critical nature of the care required. In addition, it was noted that patients appeared to want the nurse close by. This was indicated by such gestures as grabbing for her

hand, calling out, or asking questions. The relationship of this concept to touch would need to be explored under other circumstances and in other settings.

Communication is defined within the Theory of Goal Attainment as "a process whereby information is given from one person to another" (King, 1981, p.146). Communication may be verbal or nonverbal. The nursing intervention of touch was considered primarily as nonverbal communication. Touch was secondarily considered as necessary for growth and development, as a means of perception, procedural touch, therapy, and therapeutic touch. The results did not appear to support the planned nursing intervention of touch as nonverbal communication since no responses were identified as pertaining to communication. The descriptions of the back rub given by the experimental group were categorized as therapy only. Others might have categorized differently. However, this categorization was supported by another nurse colleague. Given the emphasis found within the nursing literature that touch is primarily nonverbal communication, this concept needs to be pursued further under new circumstances and settings.

Conclusions

The planned nursing intervention of a one minute slow stroke back rub did not significantly affect the relief of postoperative pain for patients in the initial recovery period following upper abdominal surgery. However, it would seem that the planned nursing intervention of a one minute slow stroke back rub affected the perception of relief of postoperative pain for patients in the initial recovery period following upper abdominal surgery. It would appear that the planned intervention of touch was effective as a therapy promoting psychological comfort within this sample.

Implications for Practice

This investigation looked at some of the questions about the use of touch in nursing practice and in particular in the postoperative clinical area. It would appear that the use of touch was supported as a planned nursing intervention for relief of postoperative pain in this sample. As a result of the qualitative analysis, touch was viewed as a form of therapy. It was described by two patients as relaxing. McCaffery (1979) describes relaxation as having both physical and mental components since it can affect visceral functions and skeletal muscle activity as well as psychological activities such as thoughts, perceptions and emotional states. As a pain relief method relaxation could reduce stress and acute anxiety, act as a

distraction from pain, alleviate skeletal muscle tension, or enhance other pain relief measures. It would seem that touch was a pain relief measure for postoperative pain by promoting relaxation. Although specific to the immediate postoperative period, the effectiveness of touch could probably be seen in the later postoperative period as well. Although it would need to be supported by research findings, touch as a relaxation therapy promoting pain relief probably has implications for many other types of pain. Relaxation therapies using touch have not been promoted to any great extent by the nursing profession. Given the magnitude of the numbers of people suffering from pain in various forms, touch needs to be further pursued if it can be shown to provide a certain amount of pain relief.

In 1971 Durr wrote that nurses needed to know when, how, with whom and under what circumstances touch is therapeutic. Fifteen years later these questions are still largely unanswered. However, it would appear that the results of this investigation have given some impetus toward viewing touch as a nursing intervention to be valued. As such, nursing will need to actively promote the use of touch to ensure it does not become a lost art due to dependency on medications and instrumentation. Measures will need to be taken to prevent advanced technology from keeping nurses physically apart from their patients. Instead, technology will need to be used in those ways which free nurses from

burdensome procedures and paperwork and allow more time with patients. Nursing administrators will need to be made aware of how increasing paperwork is not allowing nurses time to touch their patients. Nursing educators will need to meet the challenge of convincing new nurses about the value of touch and its proper use. Unless these concerns are addressed, nursing will lose a valuable caring tool that is an integral part of nursing service.

There were three observations made during the investigation that were not related to the area of study but were considered noteworthy due to their implications for nursing practice. The first observation dealt with the preoperative teaching given. While benefits of preoperative preparation have been documented in the literature (Devine & Cook, 1983), the investigator did not expect the enthusiastic reception the preoperative teaching was given. Concern that too much material was being presented in too short a time period was soon alleviated when most of the subjects, including those with a previous history of surgery, detained the investigator with further questions and concerns. Questions were answered but no attempt was made to advise the subjects regarding their concerns other than listen to them. From these observations it became apparent that preoperative education is an important component of the surgical experience that needs to be given careful consideration and allowed adequate time.

The second observation was made following examination into possible factors contributing to the elimination of subjects. Three subjects were unable to use the spirometer in the postanaesthetic care unit due to agitation and difficulty becoming fully oriented. Analysis of notes taken about the preoperative period revealed possible explanations. One eliminated subject, a young woman, revealed that she just had a baby a few weeks before and was very tired. She felt that the surgery would contribute further to her fatigue. Another subject, again a young woman, cried preoperatively because she was concerned about scarring. She revealed further that she did not want children due to possible disfigurement. The third subject, a middle aged man, appeared very hostile when first approached. However, he appeared intrigued with the study and consented to it. He asked several questions and appeared to appreciate the thorough preoperative teaching given stating he received little preoperative teaching prior to a previous surgery.

Whereas most of the research subjects displayed anxiety regarding their impending surgeries, none expressed regret about deciding to have the surgery as was evident with the two young female subjects subsequently eliminated. This regret was not expressed by the male subject eliminated but it soon became apparent from his statements and behavior that he needed to be in total control of the situation at

hand. It would seem that preoperative teaching allowed him more control over that of which he was unsure. The surgery possibly represented a situation in which he felt he was not in total control. It is postulated that these three subjects were not adequately prepared psychologically for their surgeries. Perhaps nursing needs to examine this further and propose ways to assist such patients to come to terms with their impending surgeries.

The third observation was that of the environmental noise on the surgical unit. Due to the familiarity of this clinical area for the investigator, this factor was not examined until difficulty was encountered transcribing the tapes. With this heightened awareness, the investigator became more sensitive to the amount of noise on the unit that not only needed to be considered for the taped interviews but possibly could be generalized to influence the recovery of the postoperative patients. Nurses not only need to be made aware of the problem but need to know how to reduce it. Some research has been done, however nursing will need to study this area more fully to determine the extent of the problem and its effect on patient health and recovery. Possible ways to deal with the problem will need to be developed and evaluated so that effective action may be taken to reduce environmental noise.

Recommendations for Further Research

Much can be found in the nursing literature regarding therapeutic touch but little can be found evaluating the use of actual touch. As well, the nursing literature appears to place emphasis upon touch as a modality of nonverbal communication. Further need of descriptive studies is necessary for an indepth understanding of touch in nursing practice. The categories of touch identified in the review of the literature for this investigation could form the basis from which to begin. These categories could then be refined, changed or eliminated as necessary. Following identification of categories, each category in turn would need to be studied further in order to verify it and to explore its use in nursing practice. Study designs would need to incorporate different settings, not only institutional settings but various community settings as well. Different demographic variables could be looked at such as different age groups, cultures, and socioeconomic levels. Following further exploration and evaluation of touch in nursing practice, touch could conceivably become a planned nursing intervention in many settings.

In retrospect, it was felt that the one minute back rub given as described was an effective choice for an intervention. The literature suggests other interventions of touch, for example holding the patient's hand (McCorkle, 1974; McCoy, 1977). However, such interventions would have

been difficult to implement in this setting. Since the investigator needed to touch the patient's hand frequently when taking a pulse, and given that several patients grabbed the nurse's hand, it would have been difficult to provide this intervention for the experimental group only. However, in other settings and under other circumstances other types of touch such as holding the patient's hand could be selected as the choice of intervention.

This investigation appeared to support touch as a pain relief method that served to supplement the effect of the analgesics given. McCaffery (1979) advocates combining two or more methods at the same time for an additive effect. Further exploration of touch as a noninvasive therapy for pain relief may lead to its development as an effective additive to pain control. Given that a small group of postoperative patients has been identified who require no analgesics (McQuay, Moore, Lloyd, Bullingham & Evans, 1982), possibly by utilizing their own pain techniques, it is conceivable that touch could be developed as the sole method of pain relief in some circumstances.

Considering the widespread concern of health professionals for effective pain control for those requiring it, touch needs to be included with other pain relief methods for further study. Nurses need to be an integral part of the multidisciplinary approach to pain research. Chapman, Casey, Dubner, Foley, Gracely, and Reading (1985)

advocate a multidisciplinary team approach to integrate the overview of pain assessment technology and critical evaluation of methods in use. Not only could nurses make valuable contributions based on a nursing perspective towards methods of pain assessment but to methods of pain relief as well. Certainly nursing is in an excellent position to be aware of the problems associated with relief of pain as well as to be able to evaluate methods for its relief.

This investigation appeared to support touch as an effective nursing intervention, at least within this sample. Much more research will be needed to determine the role of touch in nursing practice and how it can best be used. Throughout nursing's history, touch has been an integral part of nursing practice. Through research, education, and promotion of its use in nursing, touch can continue to be a vital part of nursing's unique contribution to those it serves.

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Appendix A

DESCRIPTION OF STUDY FOR SURGEONS

The purpose of this investigation is to determine the effectiveness of a nursing measure using touch to relieve postoperative pain. This investigation is planned as a pilot project that will combine a quantitative and a qualitative approach. The quantitative part is a bivariate comparative clinical trial. The qualitative part is a fieldwork method utilizing an interview format. It is planned to conduct this investigation over a three month period.

It is planned to have twelve to twenty subjects between the ages of 18 and 60 undergoing elective upper abdominal surgery. The measurement tool to be used will be a spirometer. The subjects' participation will involve:

1. comprehensive preoperative teaching the evening prior to their surgery at which time three spirometry readings will be obtained;
2. the immediate postoperative period in the post-anaesthetic care unit involving three spirometry readings prior to the first dosage of analgesic, a one minute back rub to be given to the experimental group following the first dosage of analgesic, and

three spirometry readings 15 minutes after the first dosage of analgesic;

3. a 10 - 15 minute interview to all subjects 24 hours following arrival to the post-anaesthetic care unit.

The investigator will be responsible for the preoperative teaching, all nursing care while the subject is in the post-anaesthetic care unit and the interview the following day. A research assistant will be responsible for data collection in the immediate postoperative period.

This investigation has been approved by the Ethical Review Board, Faculty of Nursing, University of Manitoba. The policy statement regarding human subjects in research authorized by Seven Oaks General Hospital Board of Trustees has been followed in full and approval received for access to patients and records necessary for this investigation. Results of this investigation will be provided upon request.

Appendix B

CONSENT FORM FOR SURGEONS

This is to certify that I, _____ authorize the participation of designated surgical patients in the postoperative pain study conducted by Monica Redekopp, R.N., B.N..

Signature of Surgeon: _____

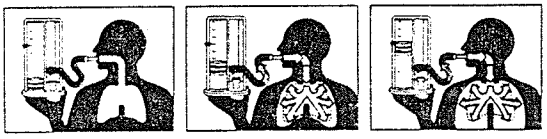
Signature of Witness: _____

Date: _____

Appendix C

PRODUCT MONOGRAPH OF SPIROMETER USED

VOLDYNE®
Volumetric Exerciser for Single Patient Use



VOLDYNE® Volumetric Exerciser when used according to your physician's instructions, helps develop, improve and maintain respiratory fitness.

Your Voldyne® Volumetric Exerciser has been scientifically designed to encourage you to perform the exercises prescribed by your physician. It allows both of you to see your progress toward improving your inspiratory volume.

Deep breathing exercise has been shown to be vitally important to your respiratory fitness. Deep breaths are necessary to reach and expand the small air sacs of your lungs. Your Voldyne® Volumetric Exerciser measures the volume of air you inspire and shows you how effectively you are filling your lungs with each inhalation.

In addition, your Voldyne® Exerciser has an indicator window to show you and your physician whether you are inhaling at a fast or slow flow rate. Slower inhalations help provide for the most efficient distribution of inspired air to all parts of your lungs.

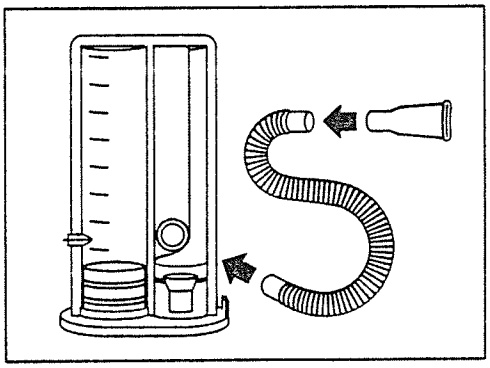
Normally, you take many deep breaths each hour — usually without being aware of it. They are spontaneous and automatic and occur in the form of sighs and yawns.

In certain instances, however, your normal breathing pattern can change. When you are experiencing pain following chest or abdominal surgery, for example, breathing tends to become shallow and deep breaths are suppressed in an effort to minimize pain.

In these instances, it is important that you strive to resume your normal breathing pattern — despite any discomfort you may have. Taking the deep breaths you might ordinarily suppress will help prevent the possibility of respiratory complications.

By carefully following your physician's instructions and the directions provided with your Voldyne® Respiratory Exerciser, you will begin receiving the benefits of slow, deep breathing exercise. With the help of this program, you can hasten your recovery and you should be well on your way toward better breathing.

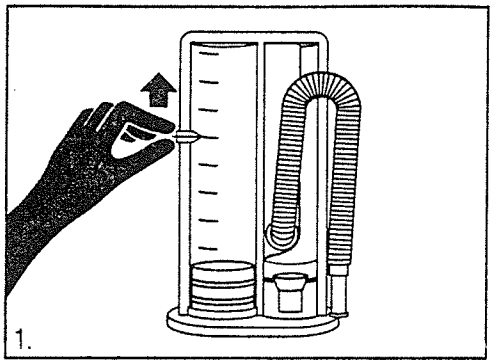
How to assemble your VOLDYNE® Volumetric Incentive Deep Breathing Exerciser



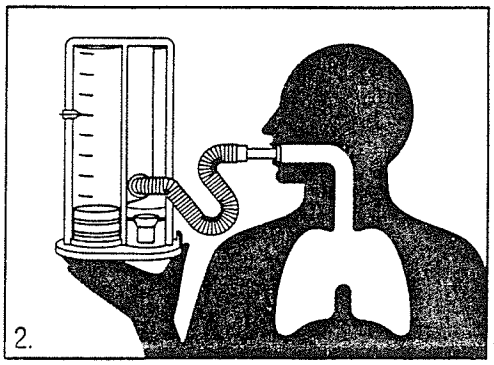
1. Remove components from package and attach mouthpiece to one end of tubing.
2. Attach remaining free end of tubing to stem on front side of exerciser.

Note: For care of unit, rinse mouthpiece after each use and shake dry. Replace unit in the bag when not in use. When the Voldyne® Exerciser is placed on table between uses, mouthpiece can be placed on post at base of device.

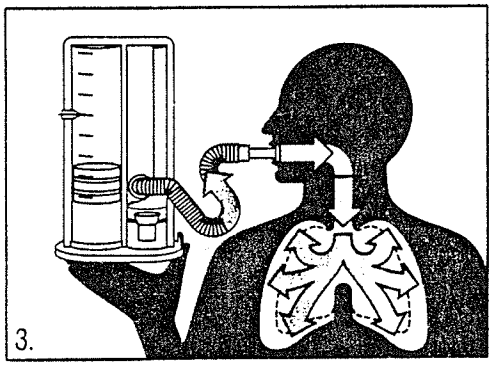
How to use your VOLDYNE™ Volumetric Incentive Deep Breathing Exerciser



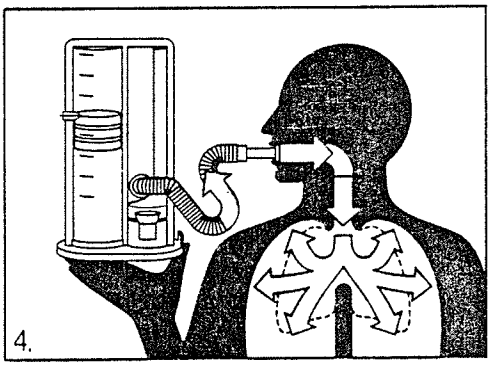
Slide the pointer of unit to prescribed volume level. Hold or stand exerciser in an upright position.



Exhale normally. Then place lips tightly around mouthpiece.

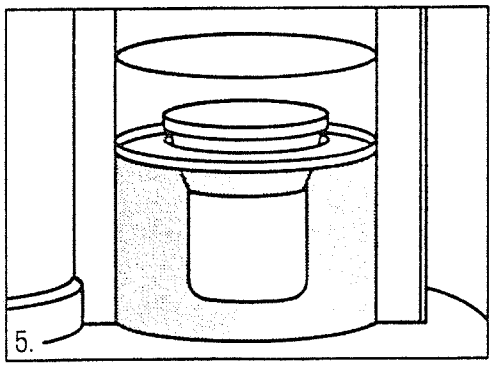


Inhale slowly, to raise the piston in the chamber.



Continue inhaling and try to raise piston to prescribed volume level.* When inhalation is complete remove mouthpiece and exhale normally. Allow piston to return to bottom of chamber.
Rest and repeat exercise. Frequency of use and recommended inspiratory volumes should be performed at the direction of your physician

*(Top of piston indicates level.)



NOTE TO THERAPIST: When slow, deep inspiration is prescribed, the cup in the flow-rate indicator window should rise slightly, the top of the cup remaining visible in the window. The window is located under the tubing connector, and appears on both the rear and front of the device.

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Appendix D

DESCRIPTION OF STUDY FOR EXPERIMENTAL GROUP

The purpose of this study is to determine the helpfulness of a nursing activity using touch to ease pain and discomfort following surgery. All patients between the ages of 18 and 60 undergoing upper abdominal surgery at Seven Oaks General Hospital are being approached for their participation in this study. The study is being conducted over a three month period. There are three parts to this study:

1. Preoperative teaching the evening prior to your surgery. This teaching follows the guidelines given by this hospital. You will be asked to use your spirometer once for three readings.
2. The hour in the recovery room immediately following your surgery. You will again be asked to use your spirometer at two different times for three readings each time.
3. A short (10 - 15 minute) interview 24 hours after your surgery.

During the hour immediately following your surgery you will receive the usual nursing care given during this time. When you indicate that you are having some pain or

discomfort you will be asked by a research assistant to use your spirometer. You will then be repositioned on your side if not already in this position and receive medication as prescribed by your anaesthetist. You will also be given a nursing activity (a one minute back rub) for your pain or discomfort. Fifteen minutes later you will be asked again by a research assistant to use your spirometer. Each time that you use your spirometer you will need to take three breaths. The investigator will be with you during the entire time you are in the recovery room (usually an hour). Twenty-four hours following your surgery you will be asked a few questions about your recovery period. This interview will be taped.

Your answers will be referred to as a code number, eg. .01. Your name will not be used. All of the information collected will be confidential. You are requested not to discuss this study with other patients since this may affect the results of the study.

Your surgeon and your anaesthetist are aware of this study and have given their consent to it. The hospital has given its approval as well. However, it is emphasized that this is an independent study and is not connected with the hospital. You are free not to take part in this study. If you decide to participate in this study, you will be asked to sign a consent form. Your signature indicates your willingess to participate in this study. However, you are

free to withdraw from this study at any time even after giving written consent. Your care while in hospital will in no way be affected by your refusal to participate in this study or withdrawal from this study.

Please feel free to ask any questions you may have. You may have the nurse contact me at any time. You will be given a copy of this description of the study and the consent form.

The differences in care between participation in this study and the usual care are:

1. specially designed preoperative teaching and use of a spirometer at this time;
2. use of the spirometer in the recovery room instead of taking deep breaths on your own;
3. a one minute backrub;
4. a 10 - 15 minute taped interview 24 hours after your surgery.

There is no difference in discomfort between using a spirometer and taking deep breaths on your own following surgery. Using a spirometer takes no additional effort. The purpose of a spirometer is to measure how deep you are breathing.

Appendix E

DESCRIPTION OF STUDY FOR CONTROL GROUP

The purpose of this study is to determine the helpfulness of nursing actions used to ease pain and discomfort following surgery. All patients between the ages of 18 and 60 undergoing upper abdominal surgery at Seven Oaks General Hospital are being approached for their participation in this study. The study is being conducted over a three month period. There are three parts to this study:

1. Preoperative teaching the evening prior to your surgery. This teaching follows the guidelines given by this hospital. You will be asked to use your spirometer once for three readings.
2. The hour in the recovery room immediately following your surgery. You will again be asked to use your spirometer at two different times for three readings each time.
3. A short (10 - 15 minute) interview 24 hours after your surgery.

During the hour immediately following your surgery you will receive the usual nursing care given during this time. When you indicate that you are having some pain or

discomfort you will be asked by a research assistant to use your spirometer. You will then be repositioned on your side if you are not already in this position and receive medication as prescribed by your anesthetist for your pain or discomfort. Fifteen minutes later you will be asked again by a research assistant to use your spirometer. Each time that you use your spirometer you will need to take three breaths. The investigator will be with you during the entire time you are in the recovery room (usually an hour). Twenty-four hours following your surgery you will be asked a few questions about your recovery period. This interview will be taped.

Your answers will be referred to as a code number, eg. .01. Your name will not be used. All of the information collected will be confidential. You are requested not to discuss this study with other patients since this may affect the results of the study.

Your surgeon and your anaesthetist are aware of this study and have given their consent to it. The hospital has given its approval as well. However, it is emphasized that this is an independent study and is not connected with the hospital. Your are free not to take part in this study. If you decide to participate in this study, you will be asked to sign a consent form. Your signature indicates your willingness to participate in this study. However, you are free to withdraw from this study at any time even after

giving written consent. Your care while in hospital will in no way be affected by your refusal to participate in this study or withdrawal from this study. You will be given a copy of this description of the study and the consent form.

Please feel free to ask any questions you may have. You may have the nurse contact me at any time.

The differences in care between participation in this study and the usual care are:

1. specially designed preoperative teaching and use of a spirometer at this time;
2. use of the spirometer in the recovery room instead of taking deep breaths on your own;
3. a 10 - 15 minute taped interview 24 hours after your surgery.

There is no difference in discomfort between using a spirometer and taking deep breaths on your own following surgery. Using a spirometer takes no additional effort. The purpose of a spirometer is to measure how deep you are breathing.

Appendix F

CONSENT FORM FOR SUBJECTS

This is to certify that I, _____ (print full name), agree to participate in the postoperative pain study conducted by Monica Redekopp. I have been told that Mrs. Redekopp is a graduate of a basic university degree program in nursing and is a practicing registered nurse with several years experience on the surgical units at Seven Oaks General Hospital. She is further studying to receive her Master of Nursing degree at the University of Manitoba specializing in restorative nursing. I have also been told that her research assistant, Mrs. Kathy Schellenberg, is a graduate of a basic university degree program in nursing and is a practicing registered nurse with several years experience in medical and surgical nursing. I have heard the explanation of the study and have read the attached description. My participation is voluntary and I understand that I may withdraw at any time without affecting the care I receive during my hospital stay.

I have had the opportunity to ask questions and have received satisfactory answers. I understand I may ask Monica Redekopp further questions should they arise, at any time.

I agree not to discuss this study with other patients. I am aware that my surgeon and anaesthetist have consented to this study.

I understand that all data pertaining to my participation will be identified by code number and that the data and my identity will remain confidential.

I agree to have the interview the following day with Monica Redekopp taped. I understand that this tape will be used by Monica Redekopp only and will be destroyed at the completion of this study. I understand that I may receive a copy of the results of this study upon request.

Signature of patient:_____

Signature of witness:_____

Date:_____

Please print your name and address if you wish to receive a copy of the results of this study:

NAME:_____

ADDRESS:_____

_____

Appendix G

PREOPERATIVE TEACHING

As stated in the filmstrips there are some differences from the filmstrips that need to be pointed out to you and some points that need to be emphasized.

1. It is very important to remember not to have anything to eat or drink (including water) after midnight tonight. If you should forget and have something to eat or drink be sure to tell the nurse.
2. You will need to have a bath or shower this evening (or tomorrow morning if you wish and if your surgery is after 9 o'clock).
3. The medication given before your surgery is a pill and not a needle.
4. Before your operation an intravenous will be started, usually in your left hand or arm. This provides fluids and nourishment.
5. There is no holding area before your surgery. You will be taken directly to the operating room.
6. After your surgery you may or may not have a tube in your nose to your stomach. This will be in place until your stomach is active again. If you have a tube in you will not eat or drink anything. Your

intravenous fluid will provide sufficient nourishment. The day following your surgery (or after your tube is removed) you may have clear fluids. When you are drinking well your intravenous will be removed. Your diet will then increase based on your tolerance for different foods.

7. The evening of the day of your surgery you will be helped to sit on the edge of the bed. The easiest way to get up is to roll on your side and then raise your body at the same time as you swing your feet out of bed. You may even sit in the chair for a few minutes. The following day you will be able to have a walk and will be encouraged to take walks with the help of your nurse. Walks are very important because they prevent problems with your lungs and your circulation.
8. You will only have sponge baths following your surgery to prevent your incision and dressing from getting wet. Your doctor will advise you when you can resume baths and showers.
9. You can expect some discomfort or pain following your surgery especially when you move about or deep breath and cough. Be reassured that your incision is securely closed and cannot be opened by movement or deep breathing and coughing. The discomfort and pain will be much less after the first 24 hours following your surgery. Be sure and tell your nurse when you

are having some discomfort or pain and medication will be given to you as ordered by your surgeon.

Appendix H

PHYSIOTHERAPY DEPARTMENT POSTOPERATIVE ROUTINE

Rationale

During and after a general anaesthetic, a number of your body functions are altered. This includes an alteration in the production and removal of mucous secretions, and the circulation in your legs. There is an increase in the amount of secretion produced, due to the mechanical and chemical irritation of your airways. This is coupled with a decrease in the effectiveness of secretion removal. As well, due to the lessened activity of bed rest and the discomfort after surgery, your lung expansions are diminished. For these reasons it is imperative to do the following exercises to prevent postoperative respiratory and circulatory complications. Those who smoke should be extra diligent in doing their exercises to prevent problems.

1. Deep Breathing Exercises:

   a) Lateral Costal Expansion:

      Place your hands on your sides against the lower margins of your ribs. Take a breath in your nose, and fill out against your hands. Blow out through pursed lips as though you were whistling. Repeat

this slowly five times and follow with a supported cough.

b) Supported Coughing:

Place your right hand on your left side and your left hand on your right side, on either side of your incision; gently pull your hands together and pull your elbows into your sides. Take a deep breath in and cough. The tighter you hold your arms the less discomfort will be felt on coughing.

c) Diaphragmatic Expansion:

Place your hands along the angle of your ribs, under your breast bone. Take a breath in and concentrate on increasing this rib angle. You will find that when doing this exercise correctly, the rib angle increases and the abdominal wall moves forward. Repeat this slowly five times, and follow up with a strong supported cough.

2. Leg Exercises:

a) Foot and Ankle:

i) Move feet and ankles up and down as if you were pumping a treadle sewing machine. Repeat 10 times.

ii) Rotate ankles first to the right and then to the left. Repeat 10 times each direction.

b) Hip and Knee Flexion:

Alternately, first with one leg and then the other, bend your knee up, sliding your foot along the bed. Repeat 10 times with each leg.

ALL exercises should be repeated as directed, at least every hour for the first four days, then at least 5 times daily for the first 2 weeks. If you are having any difficulties relating to these exercises, please contact the Physiotherapy Department.

Appendix I

DATA COLLECTION SHEET

1. Subject number _____

   Type of operation _____

   Age _____

   Sex _____

   Height _____

   Surface Area _____

   Weight _____

2. Preoperative Spirometry Readings

   first _____

   second _____

   third _____

   Average _____

3. Time of arrival to PACU _____

4. Recognition signal (YES/NO) _____

5. Pre-intervention Spirometry Readings

   first _____

   second _____

   third _____

   Average _____

6. Analgesic administration

   Time _____

   Dosage _____

7. Post-intervention spirometry readings

   Time _____

   first _____

   second _____

   third _____

   Average _____

8. Unusual occurrences: