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OREM'S SELF-CARE THEORY IN EVALUATING THE EFFECTIVENESS OF PATIENT CONTROLLED ANALGESIA VERSUS PRN NARCOTICS IN CONTROLLING POSTOPERATIVE PAIN IN ADULTS

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ABSTRACT

A nonexperimental, correlational, prospective study was conducted to determine if the acute postoperative pain of patients who have hysterectomies is more effectively controlled by PCA or by p.r.n. narcotic injections. The purpose of the study was to determine within the conceptual framework of Orem's self-care theory whether specific relationships exist between the method of narcotic administration and satisfaction with (a) pain relief obtained, (b) amounts of narcotics, (c) mental alertness and physical mobility, and (d) health locus of control. Of the 40 patients chosen for the study, 30 utilized PCA and 10 received IM p.r.n. narcotic injections.

The researcher used graphic rating scales, Dartmouth Pain Questionnaires, Health Locus of Control Scales, and demographic information forms to collect the data. PCA patients reported significantly greater satisfaction with their pain control than PRN patients. They also reported spending more time in activities which require mental alertness than did the PRN patients. Another finding was that PCA patients began taking pain medications by mouth a whole day earlier than PRN patients.

Differences between PCA and PRN patients' total narcotic usages for the first 72 hours after surgery were not statistically significant. No significant relationship existed between PCA patients' health loci of control and their satisfaction with PCA therapy. The researcher concluded that more research is needed to

determine if patients' motivation to engage in and control self-care activities influence their reports of satisfaction with pain control provided by PCA.

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CHAPTER I

STATEMENT OF THE PROBLEM

Pain control is often the most pressing issue for postoperative, acutely ill patients. According to Cousins and Phillips (1984), postoperative pain may have negative effects on patients which hinder or delay their recovery. They identified several negative effects including: (a) sleep deprivation, (b) muscle splinting, (c) increased cardiac workload and peripheral resistance, (d) decreased intestinal mobility, (e) immobilization, and (f) prolonged hormonal responses. White (1985) maintained that postoperative pain increased patients' anxiety which then intensified their perceptions of pain. Further, patients with uncontrolled pain cannot maximize the positive effects of deep breathing, ambulation, and resumption of the activities of daily living.

Literature indicates inadequate use of analgesia postoperatively and poor pain control in 30-50% of postoperative patients studied (Angell, 1982; Austin, Stapleton, & Mather, 1980; Hug, 1980; Utting & Smith, 1979). In the studies cited, patients received intramuscular (IM) narcotic injections on a p.r.n. schedule. Bennett and Griffen (1983) and Stanley (1983) cite inadequate pain control results when patients receive IM narcotic drugs on a p.r.n. basis.

Besides the unsatisfactory results reported on the use of IM p.r.n. narcotic injections, other factors contribute to the inadequacy of postoperative pain control. For example:

1. Lack of communication among health professionals regarding patients' pain control therapy (Grady, 1986).

2. Fear that the use of IM p.r.n. narcotic injections may result in patient addiction (Marks & Sachar, 1973; McCaffery, 1980a).

3. Nurses' failure to perceive total pain relief as an obligation to their patients (Cohen, 1980; Rankin & Snider, 1984).

4. Nurses' flawed perceptions and biases concerning patients' pain and the treatment thereof (Beyerman, 1982; Sanford & Schlicher, 1986).

Need for the Study

In recent years, health professionals have given significant consideration to the issue of patient control in various therapies (Dennis, 1987; Krantz, Baum, & Wideman, 1980). Bullingham (1984) reported that increased patient control over health care decreased his patients' perceptions of postoperative pain. Wallston et al. (1983), however, concluded that patients may not desire increased control in certain health care situations. An earlier study by Wallston, Wallston, Kaplan, and Maides (1976) indicated that patients differ in their receptiveness to increased control based on their health loci of control. Lewis, Morisky, and Flynn (1978) noted that patients expressed greater satisfaction with treatment methods that corresponded with their health loci of control.

Anderson and Poole (1983) along with Warfield and Warfield (1984) claimed that allowing patients control over their medication (as with PCA) diminished both patients' anxiety and discomfort. Other studies

concluded that PCA constituted a better pain control method than IM p.r.n. injections because patients (a) controlled their own pain management (Auxer, 1984; Bollish, Collins, Kirkling, & Bartlett, 1985), (b) reported feeling "in control" (Bast & Hayes, 1986; Ward, Pauli, & Serafin, 1987), and (c) appreciated being treated as responsible adults (Anderson & Poole, 1983). Many researchers maintain that PCA is a more satisfying method of pain control because it provides patients with a greater degree of control in regulating the constancy of medication received (Bennett et al., 1982; White, 1985). This study was needed to determine (a) if PCA provides greater patient satisfaction with postoperative pain control than IM p.r.n. narcotic injection therapy and (b) if patients' health loci of control relates to their satisfaction with PCA therapy.

Purpose of the Study

The purpose of this study was to determine within the conceptual framework of Orem's self-care theory whether specific relationships exist between the method of narcotic administration and satisfaction with (a) pain relief obtained, (b) amounts of narcotics, (c) mental alertness and physical mobility, and (d) health locus of control.

Research Question

Is the acute postoperative pain of patients who have hysterectomies more effectively controlled by PCA or by p.r.n. narcotic injections?

Subsidiary Questions

1. Will hysterectomy patients report greater satisfaction with the pain control obtained through PCA use than that provided by IM p.r.n. narcotic administrations?

2. Will the average amount of narcotic analgesic taken postoperatively be less for patients on PCA pumps than for those receiving p.r.n. narcotic injections?

3. Will patients using PCA perceive a different intensity of pain than those receiving p.r.n. injections?

4. Will patients on PCA report a greater degree of mental alertness and physical mobility than those on p.r.n. therapy?

5. Will PCA patients with internal health loci of control report greater satisfaction with pain management than those using PCA with mixed and external health loci of control?

Delimitations

1. This study did not evaluate the teaching given to patients prior to instituting PCA pump usage.

2. This study did not attempt to predict if (a) hospital stays are shorter for PCA patients and (b) postoperative complications are fewer for PCA patients.

3. This study did not examine the levels of formal education of patients sampled.

4. This study did not evaluate patients' preoperative anxiety nor determine the relationship of anxiety to patients' perceptions of postoperative pain.

5. This study sampled postoperative hysterectomy patients at one local hospital within 72 hours of their surgical procedure.

Assumptions

1. Nurses administered p.r.n. narcotics as prescribed by the physicians.

2. Postoperative pain can be relieved by either PCA or p.r.n. therapy.

3. Patients answered the questionnaires honestly and to the best of their knowledge and experience.

4. The questionnaires were unbiased and understood.

5. Patients knew how to operate the PCA pumps.

6. Patients used the pain control methods available to them (either PCA or p.r.n.).

7. The investigator's presence did not confound the reports of pain.

Definitions of Terms

Health locus of control (HLC). People's expectations regarding the extent to which they believe they determine their health.

Internal health locus of control. The extent to which people believe their behavior controls their health or lack thereof.

External health locus of control. The extent to which people believe external factors control their health or lack thereof.

Mixed health locus of control. The extent to which people believe their health is controlled by a combination of external factors and their own behavior.

Narcotics. Drugs such as morphine sulfate and meperidine which depress the central nervous system and numb patients' sensations of pain.

Pain. A perceived discomfort caused by mild to severe stimuli resulting from surgical intervention and/or other therapeutic procedures. Physiological, psychological, behavioral, and intellectual components influence the perception of pain.

Pain control. An achievable state of feeling at ease with any sensations of pain experienced after the institution of pain therapy as evidenced by relaxation, decreased anxiety, stable vital signs, and statements of comfort.

Patient controlled analgesia (PCA). Refers to self-administered preset doses of intravenous (IV) morphine sulfate or meperidine via a LifeCare® PCA pump.

PCA patients. Refers to patients utilizing PCA pumps.

P.R.N. An "as needed" method to relieve pain through IM narcotics administered by a nurse. This method stipulates a time interval between doses of medication. A dose may be given upon patients' requests or according to nurses' assessment of the presence of pain.

P.R.N. patients. Refers to patients receiving IM p.r.n. narcotic injections.

Summary

Chapter I identifies and discusses the purpose, need, subsidiary questions, delimitations, and assumptions of the study. Chapter II introduces the review of related literature published from 1966 to 1987. The review concentrates on four general topics beginning with an overview of several definitions and theories of pain. The second section discusses the characteristics and advantages of PCA. The third section deals with Orem's self-care theory and describes the health locus of control construct. Chapter III will describe the subjects, instruments, procedures, and data analysis of the study. Chapter IV will report the results of the data analysis and relate the findings to the main research question and its five subsidiary components. Chapter V will state the conclusions and implications and suggest areas for future research.

CHAPTER II

LITERATURE REVIEW

Pain Defined

According to Latham (1789-1875), "Not only degrees of pain, but its existence, in any degree, must be taken upon the testimony of the patient" (Bean, 1962, p. 72). Pain, described as a subjective and personal experience (Cohen, 1980; Crocker, 1986; McGuire, 1984; Melzack, 1975) is open to a host of interpretations and definitions. Sofaer (1983) described pain as "a complex phenomenon known to many but defying definition" (p. 38). Scientists, undaunted by the difficulty of their task, searched for a definition of pain. They concluded that several components influenced the pain experience and that a definition of pain must refer to these components (Bond & Pilowsky, 1966; Melzack, 1975).

The components which influence the pain experience include numerous physiological factors (Drain & Cain, 1981; Taylor, Skelton, & Butcher, 1984), various psychological or emotional reactions (Bond & Pilowsky, 1966; Corson & Schneider, 1984), and intellectual abilities including the expectancy and meaning of pain (Crocker, 1986; Kremer, Atkinson, & Ignelizi, 1981). Other components of the pain experience include behavioral modes, cultural influences, and an evaluative dimension (Grady, 1986; Melzack, 1975; Sofaer, 1983). Any of the components listed may increase or diminish the perception of and

reaction to painful stimuli. Auxer (1984) described the pain experience as dynamic with "peaks and valleys" of intensity (p. 6).

Clinicians have adopted a simple pain definition: "Pain is whatever the experiencing person says it is, existing whenever he says it does" (McCaffery, 1980b, p. 26). McCaffery's definition implies that nurses believe their patients' reports of pain (Hoyt & Sparger, 1984). For the purpose of this study, pain is defined as the discomfort perceived by women who had surgical intervention and/or therapeutic procedures.

Pain Theories

At present five major pain theories describe the origin, interpretations, and perception of pain: the traditional affect, specificity, and pattern theories and the contemporary gate control and endogenous opiate mediated theories. These theories, although not mutually exclusive nor singularly comprehensive, help health professionals to better understand what causes people to perceive pain following a specific stimulus. The affect theory is the earliest recorded theory and dates back to Aristotle. It describes pain as the emotion occurring whenever stimuli becomes excessive. This theory defines pain as the opposite of pleasure. Although simplistic, the affect theory takes into account the affective dimension of pain (Kim, 1980; Peric-Knowlton, 1984).

Descartes (1596-1650), a French philosopher and mathematician, hypothesized what later became the specificity theory of pain. This theory maintains that specific cutaneous receptors receive pain

impulses which then travel distinct pathways up the spinal cord to the brain. The specificity theory, however, cannot explain phantom limb pain or referred pain (Armstrong, 1980).

The pattern theory proposes that the nervous system has rapidly conducting and slowly conducting fibers. The slowly conducting fibers carry the pain signals. The brain's ability to interpret stimuli as painful depends on the intensity of stimulation and the interaction between the rapidly and slowly conducting fiber systems (Armstrong, 1980; Kim, 1980; Peric-Knowlton, 1984).

The gate control theory, developed by Melzack and Wall (1965), combines aspects of both the specificity and pattern theories. The theory proposes that stimulation to nerve receptors is transmitted via large and small fibers to the substantia gelatinosa (SG) which serves as the "gate keeper" located in the dorsal horn of the spinal cord. Stimulation also travels via the large and small nerve fibers to the dorsal column fibers and to the central transmission cells (T cells). The dorsal column fibers activate the central control system which contributes the cognitive and evaluative components of pain perception.

When the SG receives more stimulation from the small nerve fibers than from the large fibers, it opens the gate allowing the stimuli to activate the T cells. When the stimulation brought by the larger fibers exceeds that brought by the small fibers the gate closes and inhibits T cell activation. Cognitive and evaluative components from the central control system can influence the SG to open or close the gate. Triggering the T cells begins a chain reaction that involves all the components influencing the pain experience.

The endogenous mediated theory developed over 10 years ago with the discovery of two types of endogenous opiate neuropeptides--the enkephalins and the endorphins. These endogenous opiates, thought to act on neuron synapses, modify and inhibit transmission of noxious stimulation. The analgesic effect of these opiates resembles that of narcotics but without the side effects such as respiratory depression and nausea (Oyama, Jin, & Yamaya, 1980). The anticipation or experience of pain causes the release of endogenous opiates (West, 1981). Tamsen, Sakurada, Wahlstrom, Terenius, and Hartvig (1982) reported that the variations in their patients' demands for narcotic analgesia corresponded to the existing concentration of endogenous opiates found in their cerebral spinal fluid. This means that patients having large amounts of endogenous opiates in their spinal fluid required less narcotic mediation than those with a low amount of endogenous opiates.

Function of Pain

Pain, resulting from actual or potential tissue damage (McGuire, 1984), serves to alert its perceiver of danger such as a hot stove top or of an abnormality or sickness within the body. In this sense, pain is a warning signal. Several authors such as Graves, Foster, Batenhorst, Bennett, and Baumann (1983), Gurrie (1984), Hoyt and Sparger (1984), and Peric-Knowlton (1984), reported pain as one of the most common symptoms for which people seek medical care. When health professionals cannot identify the source of pain producing stimuli they may disregard patients' reports of the presence and/or the intensity of the pain. This particularly occurs in the presence of phantom limb

pain, headaches, and neuritis. Health professionals often ignore reports of pain intensity if these reports do not correlate with the size of the injury sustained. McGuire and Wright (1984) admonish health professionals to focus on treating the experience of pain even if the reports do not correlate with the underlying pathology or therapy.

Pain Assessment

"Pain, itself a thing of life, can only be tested by its effects upon life, and the functions of life" (Bean, 1962, p. 72). According to Corson and Schneider (1984) and Revill, Robinson, Rosen, and Hogg (1976), the assessment of pain can be a difficult task. Pain assessment is difficult because numerous components influence the pain experience. To date, researchers have not developed a comprehensive tool to evaluate the impact each component has on pain. However, they have provided clinicians with a variety of pain assessment tools that focus on one or two components (Corson & Schneider, 1984; Gurrie, 1984; McGuire, 1981; Melzack, 1975; Reading, 1980). Health professionals may utilize pain assessment tools to: (a) validate patients' complaints, (b) determine specific treatments, and (c) evaluate a treatment's effectiveness. In providing quality pain relief, health professionals need to assess the pain, implement treatment, and then evaluate the results of the treatment provided.

Pain Control

Throughout its history, mankind has sought relief from pain (Rogers, 1978). Today researchers continue to search for the ideal

pain therapy. Therapeutic modalities and equipment developed in an effort to control pain include: mental imagery, various analgesic agents, music and diversional activities, TENS units, hot/cold therapies, comic relief, epidural analgesic pumps, continuous narcotic infusions, PCA pumps, and relaxation techniques. In spite of all the pain control methods available, research studies report that a "large" proportion of patients continue to suffer severe pain even after receiving analgesia (Freed, 1975; Fry, 1976; Marks & Sachar, 1973; Smith & Utting, 1976). Recent studies, confirming previous reports, indicate that 30-50% of patients evaluated received inadequate pain control (Angell, 1982; Austin et al., 1980; Bennett & Griffen, 1983; Sriwatanakul et al., 1983; Utting & Smith, 1979). Inadequate pain relief, in and of itself disturbing, may have other negative side-effects on patients and their care. Pain interferes with ambulation, deep breathing, and other patient activities which facilitate recovery (Bennett et al., 1982; Sriwatanakul et al., 1983). In addition, the experience of pain decreases the patients' trust in the health professionals and makes them more reluctant to follow instructions (Perry & Rogers, 1984).

Factors Causing Inadequate Pain Control

Bennett and Griffen (1983) and Stanley (1983) established that IM p.r.n. narcotic injections provided insufficient relief for postoperative patients. Two factors contribute to the unsatisfactory relief obtained from IM p.r.n. narcotic injections. The first factor is the IM injection itself. The amount and rate of narcotic absorbed into the bloodstream from an IM injection varies with the injection

site. The variability in absorption of medication offers the clinician poor control over the results obtained (Austin et al., 1980; Bivens & Baumann, 1984). Secondly, the p.r.n. schedule of administration contributes to insufficient pain control. Medication given on a p.r.n. basis produces a "roller coaster" effect (Fitzgerald & Shamy, 1987). At the highest level of narcotic concentration in the bloodstream patients experience sedation or extreme drowsiness; at the lowest patients experience pain which often awakens them (Auxer, 1984; Bast & Hayes, 1986). As a result, patients with an IM p.r.n. prescription experience cycles of pain followed by sedation.

Angell (1982), Rogers (1978), and Sanford and Schlicher (1986) maintain that IM injections could afford satisfactory pain relief if given on a routine versus p.r.n. basis. Routine injections would prevent patients from experiencing such severe fluctuations in narcotic concentrations and eliminate or decrease the levels of the pain-sedation cycles. Although most of the research supports the hypothesis that IM p.r.n. injections provide insufficient pain relief, the prevailing prescription tendencies remain just that--IM and p.r.n. (Edwards, Burney, & Kupferberg, 1985).

Other factors contributing to the inadequacy of pain control include using standardized rather than individualized therapies (Levi & Osborne, 1986), inconsistently assessing the pain relief obtained from therapy (Grady, 1986), and fear of addicting patients to narcotics (Cohen, 1980; Marks & Sachar, 1973; Porter & Jick, 1980). Still other factors include extreme concern for potential side-effects (Angell, 1982; Cohen, 1980), lack of a comprehensive pain measuring instrument

to assess clinical pain (Lock, 1978), biases such as "men should tolerate pain more than women" which dictate subjective and emotional responses to requests made for pain relief (Akinsanya, 1985; Beyerman, 1982; Sanford & Schlicher, 1986), and beliefs that patients must accept pain (Lock, 1978). According to Grady (1986), Rankin and Snider (1984), Somerville (1982), and Vaché (1982), health professionals do not consider pain free hospitalization a high priority. Other authors maintain that health professionals need formal education in the pharmacokinetics of narcotics and effective narcotic use to provide patients with effective pain relief (Perry & Rogers, 1984; Sofaer, 1983).

Patient Controlled Analgesia (PCA)

In their quest to find a method of narcotic administration superior to IM p.r.n. injections, researchers developed a computerized narcotic infusion pump (Chakravarty, Tucker, Rosen, & Vickers, 1979; Forrest, Smethurst, & Kienitz, 1970; White, Pearce, & Norman, 1979). The pump enables patients to receive a preset dose of narcotic whenever they feel the need for pain relief. Many researchers consider PCA to be the ideal mechanism for pain control (Bennett et al., 1982; Bollish et al., 1985; Rosen, 1984) and claim its effectiveness exceeds that obtained from IM p.r.n. injections (Atwell et al., 1984; Auxer, 1984; Check, 1982).

Atwell et al. (1984) stated that, compared to IM injections, PCA provides more effective narcotic titration. With effective titration, the narcotic concentration in the blood remains steady. The steady

dose of analgesia eliminates the cyclical sedation/pain effect on IM p.r.n. dosing (Auxer, 1984).

Several researchers who studied the effectiveness of PCA reported using PCA with several types of patients. Evans et al. (1976) reported satisfactory PCA utilization with 40 women in labor. Bennett et al. (1982) along with Graves et al. (1983) reported satisfactory use of PCA by 65 morbidly obese patients following gastric bypass surgery. Tamsen, Hartvig, Fagerlund, Dahlstrom, and Bondesson's (1982) study of PCA's effectiveness with 56 patients who underwent major intraabdominal surgery and Atwell's et al. (1984) study of 13 patients having flank incisions reported adequate pain control with PCA use.

Other researchers report similar results. Bollish et al. (1985) and Levi and Osborne (1986) reported that a collective total of 70 patients effectively used PCA after abdominal surgery. Bivens and Baumann (1984) investigated PCA pain control in 12 post surgical and 6 post trauma patients and found adequate pain control. According to Wujcik (1986) and Baumann, Batenhorst, Graves, Foster, and Bennett (1986), PCA provides effective pain control for cancer patients.

How PCA Works

The Abbott LifeCare® PCA pump infuses either morphine sulfate 1 mg/cc or meperidine 10 mg/cc at preset doses and time intervals prescribed by the physician. The Abbott prefilled syringe, locked into the pump, has tubing extending to and luer-locking into patients' existing intravenous (IV) catheters. Patency of the catheter must be maintained by a "keep open" IV solution.

Patients activate the pump to deliver the preset dose of narcotic by pressing a button at the end of a 5-foot cord. They may depress the button but will not receive a dose of medication during the lockout interval. The lockout interval, usually 6 to 10 minutes, is the preset time interval between injections. The lockout interval and the 4-hour maximum dose prevent patients from overdosing. A key, kept by the nurses, locks the PCA pump to the IV pole and locks the medication syringe into place.

Advantages of PCA

According to a report prepared by Auxer (1984) PCA effectively reduces cost by decreasing the time required by nurses to assess patients and prepare and administer IM injections. A study done by Levi and Osborne (1986) confirmed the validity of Auxer's report. However, in the latter study, the cost of PCA exceeded that of traditional injections due to pump rental and supply costs. Levi and Osborne's study also supported a claim, made by Bennett et al. (1982), that PCA patients experienced less discomfort and ambulated earlier than IM patients. Their study did not, however, show less narcotic use with PCA as claimed by Bennett et al. (1982), Graves et al. (1983), and Auxer (1984).

White et al. (1979) reported no incidents of respiratory depression and abnormal arterial blood gas reports among patients using PCA. Tamsen et al. (1982) reported 2 patients in their sample of 56 postoperative patients developed respiratory distress as a result of underlying hypovolemia. After correcting the hypovolemia, signs of

respiratory distress disappeared and the patients continued using PCA without further complications.

Munro (1980) and Auxer (1984) claimed patients using PCA achieved maximal levels of pain relief without oversedating themselves. Graves et al. (1983) cited several advantages of PCA over IM injections. From a patient perspective these advantages included: (a) better pain relief using less medication, (b) decreased delay between request for relief and relief itself, (c) fewer postoperative pulmonary complications, (d) lower potential for overdosage or addiction, (e) less sedation during the day time, and (f) greater control over the pain experienced. Austin, Cody, Eyres, Hefferlin, and Krasnow (1986) along with Ward et al. (1987) regarded increased patient control in management as a major advantage of PCA.

Orem's Self-Care Theory

Orem's theory recognizes the existence of biological, psychological, and social systems within each individual. Therefore, her theory incorporates a concept of wholeness. Orem (1980) defined self-care as those activities which individuals carry out in sustaining their own health and well-being. She also stated that adults accept responsibility for their health and are motivated to achieve self-care. Individuals maintain their health and well-being by (a) utilizing already learned self-care activities, (b) modifying old and/or adopting new activities, and (c) enlisting the health professional's assistance. As individuals engage in activities which promote health, they develop

a repertoire of self-care activities. This researcher interpreted this to mean that individuals retain behaviors or activities which promote health and discard or revise behaviors which do not promote health. According to social learning theory (Rotter, 1982), individuals begin to expect certain outcomes when they use behaviors from their self-care repertoire.

Patients unable to perform all or parts of their self-care activities due to disease, injury, or disability rely on others to assist them. Nurses, as facilitators, aid patients to maintain existing self-care abilities and to regain lost abilities. Orem (1980) emphasized that patients by engaging in self-care activities preserve their integrity and functioning, and further their personal development. Therefore, any professional intervention or assistance should engage patients in self-care activities and not usurp patient control (Mullin, 1980). Nurses, when individualizing interventions to meet the specific needs of each patient, should select therapies which maximize patient involvement in self-care activities (Aggleton & Chalmers, 1985).

A study by Kearney and Fleisher (1979) examined individuals' ability to executive self-care activities based on their locus of control. They hypothesized that "self-care requires internalization of motivation and internally induced activities to control behavior" (p. 28). Their hypothesis was not supported statistically and they concluded that individuals practice self-care activities according to personal preferences and in compliance to external authorities.

Health Locus of Control

Self-care repertoires contain activities which use both personal behaviors and behaviors from external sources. Individuals vary in their beliefs regarding the extent to which these behaviors influence health outcomes. The extent to which individuals believe their personal behavior or circumstances influences their state of health determines their health locus of control (Wallston et al., 1976). Individuals have an internal locus of control when the extent to which they expect their personal behaviors to influence health outcomes exceeds the extent to which they attribute health outcomes to circumstances, fate, or luck (Wallston et al., 1976). According to Kirscht (1972) these expectations determine future behaviors. Wallston et al. (1976) developed the HLC scale, based on Rotter's (1982) locus of control construct, hoping that the scale would predict a relationship between internal locus of control and health behaviors. The HLC scale classifies individuals as having internal, external, or mixed loci of control.

Wallston et al. (1983), reporting on their health locus of control scale, stated that persons with external loci of control were less likely to agree with statements advocating self-care or with patient involvement in health care. Persons with internal loci of control showed more interest in being involved in their care. Wallston and associates (1983) also acknowledged that a person's locus of control does not necessarily relate to how that person desires control over the health care.

A study by King, Norsen, Robertson, and Hicks (1987) indicated patients expressed more concern about the effectiveness of pain relief than personal control over pain therapy. Other studies suggest that greater personal control in pain therapy corresponded with perceptions of well-being and decreased perceptions of discomfort (Anderson & Poole, 1983; Bullingham, 1984; Warfield & Warfield, 1984). Anderson and Poole, Bullingham, and Warfield and Warfield all conducted their studies on the premise that anxiety, caused by the fear of discomfort and a perceived loss of control, intensified the sensations of pain. According to these researchers, allowing patients control over their medications aided in relieving both their discomfort and anxiety.

Auxer (1984) and Bollish et al. (1985) claimed PCA fosters independence by allowing patients to determine when and how often they receive pain medication. Bast and Hayes (1986) maintained PCA increased the users' sense of control and decreased their reliance on the nursing staff. Researchers in general agree that patients utilizing PCA are satisfied with their pain therapy.

Summary

Chapter II reviews the literature on four general topics: postoperative pain, patient controlled analgesia, Orem's self-care theory, and the health locus of control construct. This researcher views PCA as a therapeutic method which allows for patient involvement in self-care and assumes that patients with internal HLC will report greater satisfaction with their use of PCA than will those with mixed and external HLC.

CHAPTER III

METHODS AND PROCEDURES

Subjects

The 40 subjects participating in the study met the following criteria: females, age between 30-60, English as their native language, no history of drug abuse or chronic pain, good prognosis for full recovery, mentally alert, able to follow instructions, and within 72 hours post-hysterectomy (partial or total abdominal). The subjects were patients at a local 500 bed hospital on the same gynecological floor.

The 40 subjects were divided into two groups according to the prescribed pain therapy (PCA or p.r.n.). On the morning of surgery, prior to receiving sedation, the researcher described the study to potential subjects and requested their participation. Each patient who agreed to participate signed the consent form (see Appendix A). Only three potential subjects refused to participate in the study when contacted by the researcher. Code numbers on the consent forms and questionnaires corresponded with patient names listed in a notebook. No names appeared on the questionnaires. All data continue to be stored in a locked filing cabinet in the researcher's home. The researcher obtained the subjects from a nonprobability, convenience population.

Instruments

The researcher used graphic rating scales, Dartmouth Pain Questionnaires, Health Locus of Control Scales, and demographic information forms to collect data for the study.

Graphic Rating Scale (GRS)

The 10 cm graphic rating scales (see Appendixes B and C) are horizontal lines representing pain intensity from "No pain" at the left point of the line to "Pain as bad as it could be" at the right end of the line. Other word descriptors, equally spaced beneath each line, are (from left to right) "mild," "moderate," and "severe." These word descriptors assist patients to determine the points which best describe their pain intensity (Huskisson, 1974; Kremer et al., 1981). Subjects, utilizing these scales, mark on the line with an "X" indicating the perceived intensity of their pain.

Clarke and Spear (cited in Huskisson, 1974) reported the graphic rating scale as reliable and sensitive. Huskisson (1974), however, asserted that establishing reliability for these scales would be difficult because of pain's dynamic nature. This means that researchers cannot expect pain perceptions to remain constant from one testing to another. Studies by Reading (1980) and Scott and Huskisson (1976) determined content validity for the scales but did not report a validity coefficient.

Dartmouth Pain Questionnaire (DPQ)

The DPQ complements the McGill Pain Questionnaire (MPQ) by adding assessment of daily activities and self-esteem. The DPQ (see Appendix

D) includes five parts, namely "where is your pain," "what does you pain feel like," "self perception," "pain record," and "activities" (Corson & Schneider, 1984). The DPQ requires individuals to (a) mark the location of their pain on a drawing, (b) select from a list words describing their pain, (c) circle their responses to questions regarding self-perception, (d) indicate hourly pain intensities on a 24-hour graph, and (e) estimate minutes and hours spent, during a 24-hour period, from a list of activities.

Corson and Schneider (1984) and Melzack (1975) suggested that their questionnaires be verbally administered by the researcher. The researcher verbally administered the DPQ in this study, and it required only 10-20 minutes to complete. Corson and Schneider (1984) determined the DPQ's reliability by measuring stability in test-retesting on the same patient sample (ages 19-57) and reported content validity for the sample studied.

The McGill Pain Questionnaire has been standardized in studies of 297 patients suffering from various disorders and 92 terminally ill cancer patients (Melzack, 1975). Various researchers, examining the MPQ's reliability, concluded that the MPQ consistently evaluated the emotional and physical responses to pain therapies (Graham, Bond, Gerkovich, & Cook, 1980; Reading, 1979). Other investigators reported evidence of construct validity (Kremer & Atkinson, 1981). McGuire (1984) recommended the MPQ as the most adequate pain assessing tool available.

Health Locus of Control Scale (HLC)

The HLC scale contains 11 statements of expectancy regarding health locus of control (Wallston et al., 1976). Individuals indicate the extent to which they agree or disagree with each statement by circling their response on a scale ranging from "Strongly Agree" to "Strongly Disagree" (see Appendix E). According to selections made, each individual is classified as having an internal, external, or mixed locus of control. Wallston et al. (1986) reported an alpha reliability for the 11 items and Wallston and Wallston (1981) reported construct validity for the scale. Wallston et al. (1976) standardized this scale in studies of 279 college students, 101 community residents, and 38 hypertensive outpatients.

Demographic Information Form

The Demographic Information Form designed by the researcher identified pertinent information regarding the patients, their pain therapy and their level of satisfaction with it (see Appendix F). The researcher summarized all demographic information obtained into group means and percentages.

Data Collection

This study, conducted over a 90-day period, determined with the conceptual framework of Orem's self-care theory whether specific relationships exist between the method of narcotic administration and satisfaction with (a) pain relief obtained, (b) amounts of narcotics, (c) mental alertness and physical mobility, and (d) health locus of control. A week before data collection began, the researcher

introduced herself to the nursing personnel and explained the study to them to elicit their cooperation in allowing her access to the patients.

On the morning of surgery the researcher distributed consent forms to potential subjects who met the criteria for selection. The consent forms described the study and requested voluntary participation. The researcher taught each patient who signed the consent form the use of the GRS forms and requested that each patient complete a GRS form on three separate occasions within the first 24 hours after surgery. Since the patients rated their pain intensities before and after receiving pain medication, specific times for these ratings were not stipulated. This means that patients rated their pain intensities on three convenient occasions.

During their first postoperative day, the patients rated their pain intensities before and after receiving medication on three separate occasions. Patients receiving p.r.n. injections rated their pain when the nurse arrived with the injection (not when they requested the medication). Those on PCA reported their second rating 5-10 minutes after self-medicating whereas those receiving injections reported the second ratings of their pain intensities 30-40 minutes after obtaining medication. These second ratings occurred at specified times because, according to Coyle and McCaffery (1985), the peak effect of morphine sulfate and meperidine occurs anywhere from 5-20 minutes after IV administration and from 30-60 minutes after IM administration.

The researcher visited each patient 2-6 hours after surgery to obtain a baseline assessment including pain intensity, level of

sedation, and ability to use the PCA pump. The researcher revisited patients approximately 16 hours after surgery to assess current pain intensity and level of sedation and reminded them to complete the GRSs. Approximately 23 hours post surgery the researcher reassessed their pain intensity and mental alertness and recorded the amounts of narcotics they had taken since surgery.

On the patients' second postoperative day, approximately 40 hours after surgery, the researcher collected the GRS forms, filled out demographic worksheets (see Appendix F), and verbally administered the DPQ. Forty-seven hours after surgery the researcher obtained pain intensity ratings and recorded the amount of narcotics they had taken during the past 24 hours. On the patients' third postoperative day, the researcher obtained patient reports regarding their satisfaction with pain therapy, recorded their pain intensity and the amount of narcotics they had taken in the last 24 hours, and verbally administered the HLC scale to those on PCA. The researcher analyzed the data by computing Student's t tests and Spearman's rho and Pearson product-moment correlation coefficients with a SAS Statistical Software Package on a VT220 Video Terminal.

Data Analysis

Subsidiary Question One: Satisfaction with Pain Control

The first subsidiary question investigates whether PCA patients report greater satisfaction with their pain control than PRN patients. The documented reports of patient satisfaction noted in the demographic sheet answers this question. Patients reported their

satisfaction with pain control therapy on a scale from 1-10 with 1 indicating "very satisfied" and 10 indicating "unsatisfied." The researcher calculated a group mean from individual satisfaction reports. The Student's t test was applied to determine significant differences between the PCA and PRN groups with $p < .05$. Spearman's rho and Pearson product-moment correlation coefficients were used to examine the relationship between patients' ages and their reports of satisfaction with pain control.

Subsidiary Question Two: Narcotic Dosages

The second subsidiary question asks whether the average amount of narcotic analgesic taken postoperatively is less for patients on PCA than for those receiving p.r.n. injections. The total milligrams of narcotic taken by each patient 24, 48, and 72 hours after surgery answers the question. The researcher calculated a group mean from individual data of the amount of narcotic they received the first 72 hours after surgery. The researcher considered 10 mg of meperidine equipotent to 1 mg of morphine sulfate (Bollish et al., 1975). To determine any significant differences in the means, the Student's t was applied with the significance level at $p < .05$. The researcher examined correlations among patients' ages, weights, total narcotics and narcotic types (morphine sulfate or meperidine) using Spearman's rho and Pearson product-moment correlation coefficient analysis.

Subsidiary Question Three: Pain Intensity

The third subsidiary question inquires whether a difference in the perceived pain intensities between the two groups exists. The GRSs

indicating pain intensities before and after medication received address the question. Each mark on the 10 cm scale was assigned a numerical value by measuring the distance from zero to the mark (zero being the furtherest end point to the left). Each patient completed six such scales--three indicating pain intensity before and three indicating pain intensity after receiving medication. The numerical difference between "before" and "after" ratings was calculated as a gain score. For example, if Patient Y indicated her "before" pain intensity was 8 and her "after" pain intensity was 2, her gain score was recorded as 6. Another patient may rate her "before" pain intensity as 10 and her "after" intensity as 4 thus obtaining 6 units of pain relief. Gain scores reflect the degree of pain relief obtained from therapy. Each group's mean gain score was calculated and analyzed by the Student's t test with $p < .05$. Spearman's rho and Pearson product-moment correlation coefficients were used to examine the relationships among patients' pain intensity ratings, ages, satisfaction ratings, and health loci of control.

Subsidiary Question Four: Physical Mobility and Mental Alertness

The fourth question asks if patients on PCA report a greater degree of physical mobility and mental alertness than those on p.r.n. therapy. In part 5 of the DPQ, patients estimated the time (minutes and hours) which they spent in certain activities. Activities listed which involve physical exertion included walking, standing, sitting, and time out of the patient room. Activities associated with mental alertness included watching TV, reading or writing, conversing or

socializing, and talking about or answering questions about pain experiences.

For each hour patients reportedly engaged in the above activities the researcher assigned 1 unit. Time periods less than one hour were assigned proportional units. The researcher calculated total physical mobility (PM) and mental alertness (MA) units for each patient and then analyzed group PM and MA means using the Student's t test with the significance level at $p < .05$. The researcher examined correlations among patients' ages, satisfaction ratings, total narcotics, physical mobility, and mental alertness using Spearman's rho and Pearson product-moment correlation coefficient analysis.

Subsidiary Question Five: Satisfaction and HLC

The fifth question asks whether patients on PCA with internal health loci of control report greater satisfaction with pain management than those on PCA with mixed and external health loci of control. The data needed to answer this question included HLC scores and the reports of patient satisfaction noted on the demographic sheet. Scores for the HLC scales classify patients as "internals, externals, or mixed." In this study patients with scores greater than +9, indicating moderate and strong internal health loci of control were classified in this study as "internals"; those with scores of less than +9 were classified as "mixed and externals." The researcher calculated separate group satisfaction means for those with internal health loci and those with external health loci. The Student's t test was utilized to determine significant differences with $p < .05$. Spearman's rho and Pearson product-moment correlation coefficients were

used to examine the relationships among patients' health loci of control, satisfaction ratings, ages, pain intensity ratings, and amounts of narcotics taken.

Summary

The 40 subjects of this study were divided into two groups according to their prescribed pain therapies (PCA or IM). The researcher used graphic rating scales, Dartmouth Pain questionnaires, Health Locus of Control Scales, and demographic information forms to collect the data. Procedures used protected subjects' identities and allowed them to terminate their participation at any time. The researcher analyzed the data using a SAS Statistical Software Package.

CHAPTER IV

FINDINGS

Demographics

Forty female abdominal hysterectomy patients participated in the study. Thirty of them used PCA and 10 received IM p.r.n. injections. Patients ranged in age from 30-60 with a mean of 41 years. They ranged in weight from 109 to 198 pounds with a mean of 143.5 pounds (see Table 1). The majority of patients were married (82%) and employed (65%). Fifty percent had no drug allergies while 15% were allergic to codeine, 12% to sulfa, and 10% to penicillin.

The most frequent admitting diagnoses were endometriosis (33%) and dysmenorrhea (28%). Twenty-four patients (60%) had known their diagnosis one year or more (see Table 1). The average length of surgery for the 40 patients was 2.3 hours. None of the patients had diagnoses related to malignant disease.

Thirteen of the 30 PCA patients received meperidine and 17 received morphine sulfate. Of the 10 p.r.n. patients, 4 received meperidine and 6 received morphine sulfate. The most frequently experienced side effect for all 40 patients was nausea/vomiting (52%) while euphoria (5%) was least experienced. The reader should note that not all postoperative nausea and vomiting results as a side effect of narcotic therapy but may be related to the surgical procedure and/or the anesthetic agent (Bollish et al., 1985). According to patient

Table 1. Sociodemographic Data of Respondents (N = 40)

	No.	%
Age		
30-40	23	58
41-50	7	17
51-60	10	25
Marital status		
Single	1	3
Married	33	82
Separated	1	3
Divorced	2	5
Widowed	3	7
Employed		
Yes	26	65
No	14	35
Diagnosis		
Dysmenorrhea	11	28
Endometriosis	13	32
Menopausal bleed	2	5
Ovarian cysts	4	10
Pelvic adhesions	8	20
Pelvis mass	2	5
Length of time with diagnosis		
Less than 1 year	16	40
1-5 years	16	40
6-10 years	8	20
Allergies		
No known allergies	20	50
Codeine	6	15
Penicillin	4	10
Sulfa	5	12.5
Other	5	12.5

progress notes, none of the patients experienced respiratory distress. Nineteen patients (48%) reported experiencing two or more side effects (see Table 2). Half of the patients had a relative or friend stay with them the first 72 hours after surgery. During the study, none of the patients received pain relieving interventions administered by health professionals in addition to PCA or p.r.n. therapy. None of the patients had used PCA before.

Table 2. Frequency of Reported Side Effects (N = 40)

Side Effects	No.	%
Constipation	9	23
Dizziness	13	32
Dry mouth	8	20
Euphoria	2	5
Nausea/vomiting	21	52
None reported	10	25

Note: Numbers do not total because some subjects reported more than one side effect.

Results

Subsidiary Question One: Satisfaction with Pain Control

The first subsidiary question inquired whether hysterectomy patients report greater satisfaction with the pain control obtained through the use of PCA than that provided by the administration of p.r.n. narcotic injections. To answer this question, all subjects rated their satisfaction with pain control on a scale from 1 to 10. PCA patients' satisfaction ranged from 1 to 6 with a mean of 3 and PRN patients' satisfaction ranged from 3 to 7 with a mean of 5.8 (see Table 3). These means are statistically significant with $p < .05$. The researcher asked PCA patients if they would request to use PCA in the future. Seventy-five percent answered "yes," 25% answered "maybe," and none of them answered "no." No significant relationship existed between patients' ages and their reports of satisfaction with pain control (see Table 4).

Table 3. PCA and PRN Patients' Satisfaction with Pain Control ($N = 40$)

	Mean	SD	Range	t	p
PCA ($n = 30$)	3.0	1.36	1-6	-5.58	0.0001*
PRN ($n = 10$)	5.8	1.39	3-7		

* $p < .05$

Table 4. PCA and PRN Group Means and Ranges for Variables According to Specified Ages (N = 40)

	30-40 Years	41-50 Years	51-60 Years
Patients			
PCA	17	6	7
PRN	6	1	3
Average satisfaction			
PCA	3.2	2.8	2.6
Range	2-6	2-4	1-5
PRN	6.0	7.0	5.0
Range	4-7		1-1.5
Mental alertness			
PCA	4.8	4.6	3.9
Range	2-9	3-7.5	1.5-9.5
PRN	3.2	5.0	2.2
Range	2-4		2-2.5
Physical mobility			
PCA	3.06	3.8	2.9
Range	1-6.5	1-7.5	1-4.5
PRN	2.9	3.5	1.2
Range	2-4		1-1.5
Weight			
PCA	136.7	159.8	137.1
Range	117-155	140-188	122-155
PRN	150	109	161
Range	130-198		144-175
Narcotic use over 72 hours (mg)			
PCA	59.8	52.4	47.3
Range	7-96.5	21-125.5	24-68
PRN	79.6	40	88.8
Range	22.5-130		68-116

Subsidiary Question Two: Narcotic Dosages

The second subsidiary question asked whether the average amount of narcotic analgesic taken postoperatively is less for patients on PCA than for those receiving p.r.n. injections. To answer this question, the researcher analyzed the differences in narcotic usage between PCA and PRN patients. During their first 72 hours after surgery, PCA patients used 28 to 167 mg of morphine sulfate and 70 to 680 mg of meperidine. The researcher considered 10 mg of meperidine equipotent to 1 mg morphine sulfate (Bollish et al., 1985). Patients receiving p.r.n. injections used 225 to 975 mg of meperidine and 28 to 116 mg of morphine sulfate their first 72 hours after surgery. The average morphine sulfate equivalent of the PCA patients was calculated to be 19.2 mg/day compared to 25.2 mg/day for the PRN patients. According to the "Student's t" test, these results were not significantly different with $p < .05$ (see Table 5). Although not statistically significant, PCA patients used the equivalent of 5 mg more morphine sulfate their first postoperative day than did PRN patients. On their second postoperative day, however, PCA patients used approximately the equivalent of 6 mg less morphine than PCA patients and the equivalent of 10 mg less their third postoperative day.

According to data collected from patients' medicine records, 5 original PCA patients received IM p.r.n. injections their second postoperative day because their IVs were discontinued and they experienced too much nausea to take pain medications orally. By their third postoperative day, only 2 PCA patients continued to receive p.r.n. injections while all other PCA patients took oral pain

Table 5. Differences in Daily Narcotic Usage between PCA and PRN Patients (N = 40)

	Mean	SD	Range	t	p
PCA (n = 30)	19.1	10.4	7-55.6	-1.54	0.13
PRN (n = 10)	25.2	11.3	7.5-38.6		

medication. PCA patients began taking pain medications orally one day earlier than PRN patients. During the study, none of the patients received pain relieving interventions administered by health professionals in addition to the PCA or p.r.n. narcotics. One woman, however, used a TENs unit after her third postoperative day. No significant correlations existed among the patients' ages, their weights, and the narcotic types (morphine sulfate or meperidine) according to Spearman's rho and Pearson product-moment correlation coefficient analysis.

Subsidiary Question Three: Pain Intensity

The third subsidiary question investigated whether a difference in the perceived pain intensities between the groups existed. The researcher used the Student's t test to detect a significant difference between the group mean gain scores. Although PCA patients perceived less pain before receiving narcotics (18.1 vs. 21.1 for PRN patients) and reported greater pain relief after receiving narcotics

(11.9 vs. 105. for PRN patients) these differences were not statistically significant with $p < .05$ (see Table 6). The patients' ages, satisfaction ratings, and health loci of control had no main effects on their pain intensity reports according to Spearman's rho and Pearson product-moment correlation coefficient analysis.

Table 6. Differences in Perception of Pain Intensity between PCA and PRN Patients ($N = 40$)

	Mean	SD	Range	t	p
PCA ($n = 30$)	11.9	2.09	7-16	1.71	0.095
PRN ($n = 10$)	10.5	3.02	7-15		

Subsidiary Question Four: Physical Mobility and Mental Alertness

The fourth question asked whether patients on PCA report a greater degree of physical mobility and mental alertness than those on p.r.n. therapy. The researcher analyzed physical mobility and mental alertness separately. PCA patients reported they engaged in physical activity 1 to 7.5 hours per day with a mean of 3.2 hours while PRN patients reported only 1 to 4 hours with a mean of 2.5 hours. The Student's t test did not indicate a significance different with $p < .05$ (see Tables 4 and 7). For mental alertness, PCA patients

Table 7. Differences with Respect to Physical Mobility between PCA and PRN Patients (N = 40)

	Mean	SD	Range	t	p
PCA (n = 30)	3.16	1.49	1-7.5	1.39	0.171
PRN (n = 10)	2.45	1.06			

reported 4.6 hours (ranging from 1.5 to 9.5) reading, conversing, and watching favorite TV shows, and PRN patients reported only 3.1 hours (see Table 4). The mean scores were significantly different with $p < .05$ (see Table 8). On further analysis, a global pain status ratio derived from the DPQ was calculated by dividing negative pain scores by the positive functioning scores. Higher ratio value indicate a greater impact on pain on physical, mental, and psychological functioning. PCA patients' pain ratios ranged from 0.68 to 1.88 with a mean of 1.28 whereas PRN patients' pain ratios ranged from 0.99 to 2.2 with a mean

Table 8. Differences with Respect to Mental Alertness between PCA and PRN Patients (N = 40)

	Mean	SD	Range	t	p
PCA (n = 30)	4.56	2.13	1.5-9.5	21.5	0.038*
PRN (n = 10)	3.05	1.04	2-5		

*$p < .05$

of 1.43. These differences were not statistically significant using the Student's t test. No significant relationships existed among patients' ages, satisfaction ratings, total narcotics, physical mobility, and mental alertness.

Subsidiary Question Five: Satisfaction and HLC

The fifth question investigated whether patients on PCA with internal HLC report greater satisfaction with pain control compared to those on PCA with external and mixed HLC. The researcher calculated group satisfaction means for those with internal HLC and those with mixed and external HLC. Those with internal HLC reported a satisfaction mean of 3.1 (ranging from 1-6) while those with mixed and external HLC reported a mean of 2.9 (ranging from 1 to 5). According to the Student's test, these results were not significantly different with $p < .05$ (see Table 9). Of the PCA patients, 18 had moderate to

Table 9. Differences in Satisfaction with Pain Control between PCA Patients with Internal HLC and PCA Patients with Mixed and External HLC ($N = 30$)

	Mean	SD	Range	t	p
PCA internals ($n = 18$)	3.05	1.43	1-6	-0.268	0.79
PCA mixed and externals ($n = 12$)	2.91	1.31	1-5		

strong internal HLC while 12 had mixed or external HLC. One PCA patient had a moderately external HLC, 4 had slightly external HLC, 1

had a mixed HLC, 6 had slightly internal HLC, 7 had moderately internal HLC, and 11 had strongly internal HLC. The PCA patients most satisfied with their pain control therapy were those with moderately external and slightly internal HLC (see Table 10). The Spearman's rho and Pearson

Table 10. PCA Patients' Mean Satisfaction Ratings According to HLC Scale Classifications (N = 30)

	External HLC (n = 5)		Mixed HLC (n = 1)			Internal HLC (n = 24)	
	Strong -33 to -20	Moderate -19 to -10	Slight -9 to -2	Mixed -1 to +1	Slight +2 to +9	Moderate +10 to +19	Strong +20 to +33
No. of PCA patients in each category	0	1	4	1	6	7	11
Mean satisfaction rating for each category	0	1.0	3.6	4.0	2.5	3.2	3.0

product-moment correlation coefficient indicated that no significant relationship existed between patients' HLC and their age, satisfaction with therapy, pain intensity ratings, and total amount of narcotic taken.

Summary

In conclusion, Chapter IV reports the results of the data analyzed in relation to the research and subsidiary questions stated. PCA

patients reports significantly greater satisfaction with their pain control and, according to DPQ results, engaged in more physical and mental activities than PRN patients. PCA patients also began taking oral pain medication a day earlier than PRN patients. Patients' ratings of their pain intensities were not significantly different although PCA patients reported consistently lower pain intensities both before and after obtaining pain medication.

CHAPTER V

DISCUSSION

The research question asks whether PCA or IM p.r.n. narcotic injections more effectively controls acute postoperative pain of hysterectomy patients. To answer this question, the researcher resolved to determine within the conceptual framework of Orem's self-care theory whether specific relationships exist between the method of narcotic administration and satisfaction with (a) pain relief obtained, (b) amounts of narcotics, (c) mental alertness and physical mobility, and (d) health locus of control.

Conclusions

This study indicates that PCA patients report greater satisfaction with pain control than patients receiving p.r.n. narcotic injections and thereby affirms work done by Bollish et al. (1985). PCA patients, however, did not report significantly different pain intensities than the pain intensities reported by PRN patients. This finding differs from Bennett et al. (1982) who claimed that PCA patients experienced less pain than IM PRN patients but supports Welchew's (1983) study which found virtually identical mean pain scores for patients receiving PCA or IM p.r.n. narcotics.

PCA patients used more narcotics than PRN patients during the first 24 hours after surgery, but they used less narcotics during the first 72 postoperative hours. These findings correspond to those

reported by Bennett et al. (1982) and Graves et al. (1983). The fact that no significant difference existed between PCA and PRN patients' narcotic usage may be a Type II error related to the small sample size. Individual narcotic usage did not correspond significantly with patients' weights or ages which supports the findings reported by Atwell et al. (1984), Graves et al. (1983), Levi and Osborne (1986), and Tamsen et al. (1982). This study also found that PCA patients began taking oral pain medication a day earlier than PRN patients. Other researchers did not report transitions from parenteral or oral analgesia.

Atwell et al. (1984) reported that PCA patients engaged in more spontaneous activity than PRN patients. This researcher's study affirms Atwell's findings. Although PCA patients reported engaging in physical activity 3.2 hours versus the 2.5 hours reported by PRN patients, these differences were not statistically significant. Differences in the hours spent engaging in activities requiring mental alertness were statistically significant with PCA patients reporting 1.5 hours more than p.r.n. patients. Many researchers claim that patients using PCA are less sedated and therefore more alert than PRN patients (Bennett & Griffen, 1983; Check, 1982; White, 1985). The level of patient sedation in this study however was not directly analyzed.

Implications

According to Orem's self-care theory discussed earlier, patients desire a degree of personal involvement in caring for their health.

Joseph (1980) stated that the ability to perform self-care activities included knowledge, skill, and a desire to perform and control health care practices. The desire for control relates to patients' expectations (HLC) for control (Wallston et al., 1983).

Since PCA is a therapeutic method which allows for patient involvement, this researcher assumed that patients with internal HLC would report greater satisfaction with their use of PCA than would those with mixed and external HLC. However, the data collected indicates that the patients in this study who have an internal HLC did not report significantly greater satisfaction with their use of PCA than did the others. Wallston and Wallston (1978) emphasized that HLC constitutes only one of several factors influencing health-related behaviors. They cited motivation, previous behaviors, social supports, and the value of health as other influencing factors. Joseph (1980) claimed that motivation is the greatest determinant of self-care.

The study is limited by the small sample size, by the fact that most patients used PCA for only the first 24 hours after surgery, and because the results cannot be generalized to other settings. Other variables which may have influenced patients' pain experiences and satisfaction with pain control include the surgical techniques of four different surgeons, the length of abdominal incisions, and the extent of the hysterectomy (partial or total). The researcher also acknowledges a potential for reporting error by PRN patients when marking their pain intensities 30-40 minutes after receiving pain medication. Errors may have occurred if patients forgot to report

their pain intensities at 30-40 minutes and reported them later "ex post facto."

This study did not investigate the emotional impact surgery had on patients. Patients disappointed that they could not have any more children may have reported significantly different pain intensities than those reported by patients who viewed surgery as ending their monthly menstrual pain and suffering. None of the subjects had a diagnosis of malignant disease, but for those having hysterectomies to remove "suspicious" cysts or growths, the suspense of waiting for the pathology reports may have increased their anxiety and altered their perceptions of pain.

Recommendations for Future Research

The researcher suggests that future studies comparing PCA and p.r.n. therapies investigate factors influencing patients' reports of satisfaction. For example, do patients report greater satisfaction with PCA pain control because they (a) do not like to "bother" nurses, (b) fear the discomfort of IM injections, (c) experience less pain than expected, (d) appreciate being "in control," or (e) because they want to "please" the researcher by giving positive reports? Another area for future research involves the following question: "What influence does the presence of family and friends have on patients' perceptions and reports of pain?" A third suggestion for future research involves: Does a relationship exist between individuals' motivation to engage in and control self-care activities and their reports of satisfaction with pain control provided by PCA? Another suggestion for future

researchers is to investigate the cost-benefit ratios of PCA. Since PCA is more expensive than IM injection therapy, does the fact that PCA patients report greater satisfaction and more hours of physical and mental activities than PRN patients justify this cost? Also, is the difference in cost minimized because PCA enables patients to take oral pain medication earlier?

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APPENDICES

APPENDIX A

CONSENT FORM

CONSENT FORM

Please Read

Dear Patient,

You are invited to participate in a research study designed to determine the amount of pain relief you experience from the medication you receive.

Your participation will involve the completion of two questionnaires and marking 8 sets of scales indicating the intensity of your pain throughout the day. The researcher will review your record and collect data such as age, sex, diagnosis, date of surgery, marital status, and the type and amount of medication taken after surgery.

No negative effects are expected from your participation in the project. All data will be kept confidential and stored in a locked filing cabinet in the researcher's home. All findings will be presented in summary form only and no individual will be identified by name.

Participation in this project is voluntary and your consent to participate may be withdrawn at any time by notifying the researcher in person or by phone. There is no penalty for withdrawal from the project.

If you have any questions about your participation in the study, please feel free to contact the researcher below. Should you want results of the study, mention this to the researcher.

Thank you,

Vivian E. Ott
MSN Student at UTK
Home Phone: 573-2359

I have read and understand the above statements. I freely consent to participate in this project under the above conditions.

Signed_____

Date_____

APPENDIX B

GRAPHIC RATING SCALE FOR PCA PATIENTS

GRAPHIC RATING SCALE FOR PCA PATIENTS

To be completed within the first 24 hours after surgery

Please mark on the line below the intensity of your pain before you press the button for medication.

No Pain|_____|Pain as bad as it could be

Mild Moderate Severe

Please mark on the line below the intensity of your pain 5-10 minutes after you pressed the button for medication.

No Pain|_____|Pain as bad as it could be

Mild Moderate Severe

Please mark on the line below how sedated you think you are 5-10 minutes after receiving medication.

|_____|

Wide awake Drowsy Dozing once in awhile Mostly sleeping Awake only when aroused

APPENDIX C

GRAPHIC RATING SCALE FOR PRN PATIENTS

GRAPHIC RATING SCALE FOR PRN PATIENTS

To be completed within the first 24 hours after surgery.

Please mark on the line below the intensity of your pain <u>when the nurse arrives</u> with your pain shot.

No Pain|_____|Pain as bad as it could be

Mild Moderate Severe

Please mark on the line below the intensity of your pain 30-40 minutes <u>after</u> you received your pain shot.

No Pain|_____|Pain as bad as it could be

Mild Moderate Severe

Please mark on the line below how sedated you think you are <u>30-40 minutes after</u> receiving medication.

|_____|

Wide awake Drowsy Dozing once in awhile Mostly sleeping Awake only when aroused

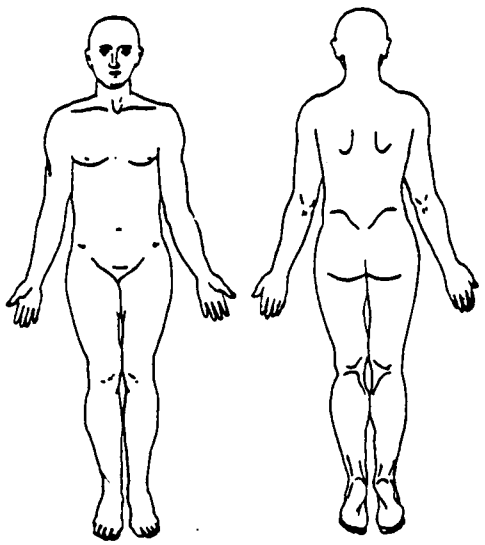
APPENDIX D

DARTMOUTH PAIN QUESTIONNAIRE

Dartmouth Pain Questionnaire *

Part 1. Where is your Pain?

Please mark on the drawing below, the areas where you feel pain. Put E if external, or I if internal, near the areas which you mark. Put EI if both external and internal.



Part 2. What does your pain feel like?

Some of the words below describe your present pain. Circle only those words that best describe it. Leave out any category that is not suitable.

1 Flickering Quivering Pulsing Throbbing Beating Pounding	2 Jumping Flashing Shooting	3 Pricking Boring Drilling Stabbing Lancinating	4 Sharp Cutting Lacerating
5 Pinching Pressing Gnawing Cramping Crushing	6 Tugging Pulling Wrenching	7 Hot Burning Scalding Searing	8 Tingling Itchy Smarting Stinging
9 Dull Sore Hurting Aching Heavy	10 Tender Taut Rasping Splitting	11 Tiring Exhausting	12 Sickening Suffocating
13 Fearful Frightful Terrifying	14 Punishing Gruelling Cruel Vicious Killing	15 Wretched Blinding	16 Annoying Troublesome Miserable Intense Unbearable
17 Spreading Radiating Penetrating Piercing	18 Tight Numb Drawing Squeezing Tearing	19 Cool Cold Freezing	20 Nagging Nauseating Agonizing Dreadful Torturing

* Completed 48 hours after surgery.

Corson, J.A., & Schneider, M.J. (1984). The Dartmouth pain questionnaire: An adjunct to the McGill pain questionnaire. Pain, 19, 59-69. Used by permission from John Corson.

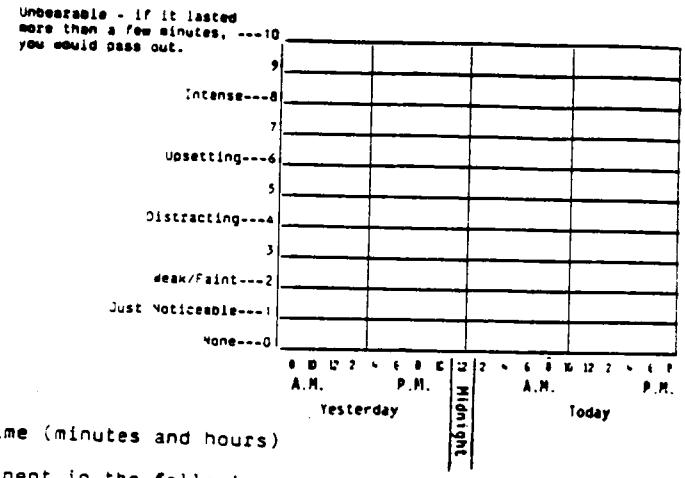
Part 3. Self Perception

Please circle the number on each scale which best describes the way you feel now - compared to the way you felt before you had the pain.

	Much worse	Slightly worse	Same	Slightly better	Much better
1. Tense or anxious	1	2	3	4	5
2. Able to concentrate	1	2	3	4	5
3. Satisfied with myself	1	2	3	4	5
4. I am in control of my life situation	1	2	3	4	5
5. Depressed	1	2	3	4	5
6. Irritable	1	2	3	4	5
7. Fatigued	1	2	3	4	5

Part 4. Pain Record

Please enter a point (or draw a line) for each hour of the past 24 hours to show how much pain you felt during each hour. Use only the part of the graph that covers the past 24 hours.



Part 5. Activities

Estimate the amount of time (minutes and hours) in the last 24 hours - which you spent in the following activities (many of these overlap and can be done together - so don't try to make the hours add to 24).

Walking
Standing
Sitting
Time out of your room

Watching TV
Lying down (awake)
Sleeping

Working physically
Working mentally
Pursuing a hobby (or puttering)
Reading or writing
Conversing or socializing
Answering questions about pain

APPENDIX E

HEALTH LOCUS OF CONTROL SCALE

Health Locus of Control Scale *

Each item in this questionnaire is a statement of belief about health and illness. Beside each statement is a scale that ranges from Strongly Agree (a) to Strongly Disagree (f). For each item, circle the letter that represents the extent to which you agree or disagree with the statement as it relates to your present state of health and illness. Circle only one letter for each item. There are no right or wrong answers.

	Strongly Agree	Moderately Agree	Slightly Agree	Slightly Disagree	Moderately Disagree	Strongly Disagree
1. If I take care of myself, I can avoid illness.	a	b	c	d	e	f
2. Whenever I get sick, it is because of something I've done or not done.	a	b	c	d	e	f
3. Good health is largely a matter of good fortune.	a	b	c	d	e	f
4. No matter what I do, if I am going to get sick I will get sick	a	b	c	d	e	f
5. Most people do not realize the extent to which their illnesses are controlled by accidental happenings.	a	b	c	d	e	f

* Completed 72 hours after surgery.

Wallston, B.S., Wallston, K.A., Kaplan, G.D., & Maides, S.A. (1976). Development and validation of the health locus of control (HLC) scale. Journal of Consulting and Clinical Psychology, 44, 580-585. Used with permission of Kenneth Wallston.

		Strongly Agree	Moderately Agree	Slightly Agree	Slightly Disagree	Moderately Disagree	Strongly Disagree
6.	I can only do what my doctor tells me to do.	a	b	c	d	e	f
7.	There are so many strange diseases around that you can never know how or when you might pick one up.	a	b	c	d	e	f
8.	When I feel ill, I know it is because I have not been getting the right exercise or eating well.	a	b	c	d	e	f
9.	People who never get sick are just plain lucky.	a	b	c	d	e	f
10.	People's ill health results from their own carelessness.	a	b	c	d	e	f
11.	I am directly responsible for my health.	a	b	c	d	e	f

APPENDIX F

DEMOGRAPHIC INFORMATION FORM

Demographic Information Form *

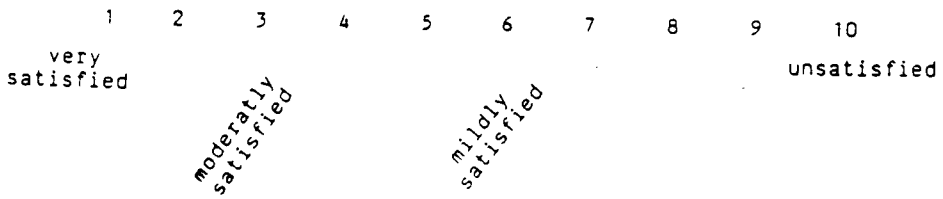
1. Code number used on questionnaires:
2. Age: 3. Weight:
4. Occupation: 5. Marital status:
6. Diagnosis: 7. Allergies:
8. Length of time with known diagnosis:
9. Date of surgery: 10. Length of surgery:
11. Prognosis: 12. Surgeon:
13. Type of pain medication: (PCA/PRN) (MS/Meperidine)
14. Ordered for how long:
15. PO meds begun: 16. Ever used PCA before:
17. Other pain alleviating measures used:
18. Has someone in the room with her most of the time:
19. Amount of narcotics taken per 24 hrs x 3 days:

    1._____2._____3._____

20. Which of the following did she experience:

    N/V, euphoria, constip., dizziness, dry mouth, N/A

21. For those on PCA: if given a choice, would she elect to use PCA again? Yes Maybe No
22. On a scale from 1-10, how would this woman rate her satisfaction with her pain therapy?



* Completed 48 hours after surgery.

VITA

Vivian Ethelyn Ott was born in Niteroi, Brazil on December 2, 1963. She attended elementary schools in Denver, Colorado, Berrien Springs, Michigan and Collegedale, Tennessee and graduated from Collegedale Academy in May 1981. The following September she attended school in Braunau, Austria for a year.

In May 1983 she received an Associate Degree in Nursing from Southern College in Collegedale and began working at Memorial Hospital in Chattanooga, Tennessee. In December 1985 she received a Bachelor of Science in Nursing and a Bachelor of Arts degree in German from Southern College. She is listed in the 1985-86 "Who's Who Among Students in American Colleges and Universities."

In June 1986 she began graduate studies toward a Master's degree in Nursing at The University of Tennessee, Knoxville. This degree will be awarded in March 1988. Vivian has worked in cardiac stepdown units, an emergency room, an oncology unit, and surgical/medical intensive care units. She currently works at Baptist Hospital in Knoxville.