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Post-operative Pain Intensity Reported by Patients, Family Members, and Nurses

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Post-operative Pain Intensity Reported by Patients, Family Members, and Nurses" submitted by Janice Marie Rae in partial fulfilment of the requirements of the degree of Master of Nursing.

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Abstract

It is well recognized that assessing and treating pain minimizes its harmful effects. Although nurses have become more skilled at pain assessment, many still do not use all available sources of information when making treatment decisions. It is unclear if nurses are accurate in their assessment of patients' pain or if the family's evaluation of pain is incorporated into the plan. This study explored whether there are differences in the perception and rating of a post-surgical patient's pain intensity among patients, family members and nurses, using a verbal analogue scale. Perceptions of the patient's pain were not significantly different between patients and family, nor between patients and nurses. However, perceptions were different between the family and the nurses, suggesting that family members overestimate and nurses underestimate pain. This may perpetuate pain control issues in the hospital and post-discharge, and have implications for the content of pain education programs.

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Dedication

To my parents, Elinor and Don Rae, who have taught me the definition of unconditional love.

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CHAPTER 1: STATEMENT OF THE PROBLEM AND ITS SIGNIFICANCE

For the past seven years I have been practising as a Clinical Nurse Specialist in pain management. Two of those years were in Los Angeles with the pain management team and five in Calgary with the Acute Pain Service. In my practice I have become very interested in how nurses assess their patients' pain and whether their perceptions are similar to how the patients experience their pain. As well, I am interested in how family members are assessing patients' pain, and how or if I should incorporate the family's assessments into the pain treatment plan. It has been my experience that family members assess pain differently than patients and this discrepancy may provide a potential for unsatisfactory management of the patients' pain.

Pain management has been an integral part of nursing practice for many years, yet only in the last decade or so have researchers focused on how nurses make decisions related to pain assessment and management (Cleelan et al., 1994; SUPPORT, 1995; Ward & Gordon, 1994; Ward & Gordon, 1996). Studies have shown that although nurses have become more informed over the years, there are still too many who lack the basic knowledge necessary to manage pain appropriately (McCaffery & Ferrell, 1999). It is well documented, for example, that nurses underestimate and therefore under-treat pain in a variety of health care settings (Bowman, 1994; Field, 1996; Lieb-Zalon, 1993; Loprinzi, Dhodapkar, Nelson, Novotny, Hammack & O'Fallon, 1994; McCaffery, Rolling-Ferrell & Pasero, 2000; Puntillo et al., 1997; Stephenson, 1994). One possible reason for this is the limited use of available sources of information in the assessment of pain.

What do we know about pain? Unrelieved pain can be harmful to the patient. Pain has been shown to adversely affect the pulmonary, gastrointestinal and circulatory systems (Lui, Carpenter & Neal, 1995), inhibit the immune system, enhance tumour growth (Herzberg, Murtaugh & Beitz, 1994), and increase peri-operative morbidity (Yeager, Glass, Neff & Brinck-Johnson, 1987). Further, unrelieved acute pain can affect such quality of life indicators as anxiety and depression. Unrelieved acute pain can also progress to chronic pain. (Pasero, Paice & McCaffery, 1999; White, LeFort, Amsel & Jeans, 1997). There is enough evidence to suggest that assessing, documenting, and treating pain appropriately minimizes the harmful effects of unrelieved pain.

There is also data to suggest that nurses consistently underestimate adult patients' post-operative pain severity (Bowman, 1994; Field, 1996; Lieb-Zalon, 1993; Puntillo et al., 1997; Stephenson, 1994); however, it is not known whether such findings can be generalized to the Canadian scene. It has been my experience that pain services in the United States and in Canada practice similarly and provide similar education programs for nursing staff. The above studies were not all conducted in North America, nor did all of the hospitals have acute pain services. The question that cannot be answered is whether the lack of formal education sessions and pain standards contribute to the nurses underestimating postoperative pain severity.

The impact of post-operative pain on the family, and how the family's assessment of the pain impacts the patient has been almost entirely overlooked. Is it possible that family's perception of pain influences the patients' post-operative pain severity or pain management? No studies have compared the families' assessment of adult post-operative patients' pain with that of the patient and the nurse. This study was designed, therefore,

to explore the perception and rating of post-surgical patients' pain intensity among patients, family members, and nurses in an acute care setting. For this study, perception is defined as the estimation of the intensity of the patient's pain by the patient, the family member, and the nurse. Rating of the pain was done using a verbal analogue scale that measures the intensity of pain.

Purpose of the Study

This study was designed to determine whether there is a difference in the perception and rating of post-surgical patients' pain intensity among patients, family members, and nurses in an acute care setting. A secondary purpose of this study was to explore the relationship between perception of the patients' pain ratings and the various demographic variables. These variables included: age, gender, type of surgery, relationship of family member to the patient, years of nursing experience, type of nursing education, and nursing attendance at pain management education sessions in the last year.

Research Questions

The primary research question investigated was:

1) Is there a difference in the perception and reporting of postoperative pain intensity among patients, family members, and nurses in an acute care setting?

Secondary research questions were:

1) Is there a relationship between the perception and reporting of the patients' pain ratings and any of the demographic variables? The demographic variables studied were age, gender and years of nursing experience.

2) Is there a difference in perception and reporting of pain scores by patients having different types of surgery?

3) Is there a difference in how the four types of family members perceive and report the patients' pain scores?

4) Is there a difference in the way that nurses report patients' pain scores due to nursing education or attendance at a pain management workshop?

Significance of the Study

Previous studies have shown that the tendency for nurses to underestimate pain intensity of their patients may lead to the under-treatment of pain in the hospital setting (Bowman, 1994; Field, 1996; Lieb-Zalon, 1993; Loprinzi, Dhodapkar, Nelson, Novotny, Hammack & O'Fallon, 1994; McCaffery, Rolling-Ferrell & Pasero, 2000; Puntillo et al., 1997; Stephenson, 1994). Other studies have shown that families tend to over-estimate the patients' pain (Elliot, Elliot, Murray, Braun & Johnson, 1996; Ferrell, Rhiner, Shapiro & Strause, 1994; Yeager, Miaskowski, Dibble & Wallhagen, 1995). The relationship between family members and the health care team may become strained when family members perceive that the patient's pain is not treated appropriately.

As a member of the Acute Pain Service (APS) in Calgary, I wanted to determine whether nurses' underestimation and family members' overestimation of the patients'

pain score holds. As well, I was curious about how to incorporate the assessments of the nurse and the family member into the APS treatment plan. If there were discrepancies in the assessment of the patient's pain between family members and nurses, could this cause a strained relationship between the two, and how could this strain or stress affect the patient in terms of healing and correct management of pain? These questions may be the subject of another study.

The family's perception of the patient's pain being under-treated may also lead to over-treatment of pain after discharge. Family members have been asked to assume increasing responsibility for care at home due to the trend toward earlier discharge after surgery. Families may not be well informed and may not feel prepared to take on the responsibilities of post-operative recovery at home, including the effective management of pain. Differences in pain perception between patients and family members may lead to family members experiencing undue stress, which in turn may impact the patient's psychological well being and restful healing time. In addition, the problem of over-treating patients' pain at home may result in overuse of pain medication and having undesirable side effects such as sedation or respiratory depression.

Differences that may or may not exist in the perception of pain intensity reported by nurses, patients and families have direct implications for the pain education that nurses, as well as patients and families receive. Currently in Calgary, pre-operative educational programs tend to include only the patients. Should family education be included as part of the standard pre-operative preparation for the patient? Would including the family in the pre-operative teaching mean they would have less worry and/or more skills to assess the patient's pain either at the hospital or at home? Further,

would the findings of this study indicate a need for family members to be included in pre-operative and discharge teaching around pain management? Do the current pain education programs adequately prepare the nurses to assess pain? Do the education programs make a difference in the way a patient's pain is assessed? As a result of this study, pain education programs for nurses, as well as pre-operative education programs for patients in Calgary may be revised.

CHAPTER 2: BACKGROUND TO THE STUDY

History of the Acute Pain Service (APS) in Calgary

The APS consists of a multidisciplinary team of health care providers committed to the adequate assessment and management of postoperative pain. The APS team is comprised primarily of a designated anesthesiologist and one or two clinical nurse specialists; together they provide optimum postoperative pain control for patients by using a variety of modalities. Patients are referred to the APS by anesthesiologists and by consultation requests by surgeons/physicians for assistance with pain control issues. All of the acute pain services in Calgary practice according to the guidelines set by the Calgary Health Region. These guidelines are based on those of the United States Agency for Health Care Policy and Research (Acute Pain Management Guideline Panel, 1992) as well as the Canadian guidelines for palliative care (Librach & Squires, 1997). These guidelines will be discussed in greater detail later.

The first APS started in Calgary at the Alberta Children's Hospital in 1989. Interestingly, when the Anesthesiology Department was trying to initiate the APS, nursing administration did not feel that they could provide any resources to support the idea, as they were short staffed. As a result, an operating room technician helped Anesthesia begin the service and still continues to work with them. The APS's at the adult hospitals in Calgary were started with the Department of Anesthesia and a Clinical Nurse Specialist. The APS commenced at the Peter Lougheed Centre in 1992 and at the Foothills Medical Centre in 1993. The APS did not start officially at the Rockyview General Hospital until 1999, however patient controlled analgesia started in 1997 and I was hired in 1998 as the Clinical Nurse Specialist to start the pain management education

needed for an epidural analgesia program. In early1999, Rockyview Hospital managed its first epidural on a post-operative unit. I transferred to the Foothills Medical Centre (FMC) in fall of 2000 as the APS Clinical Nurse Specialist.

One of the mandates of the clinical nurse specialist on the APS is the responsibility for all education of nursing and allied health team members in accordance with our standards of practice. Another mandate is to monitor APS education and practice via quality assurance data. When I transferred to the FMC, I observed that additional pain management education was needed on the postoperative units. I set up a more comprehensive education program similar to the one I taught in the United States, and at Rockyview General Hospital. Although I did not conduct a baseline study to assess nursing knowledge about pain management when I instituted the new program, I am observing better pain assessment skills by nurses, have had positive verbal feedback on the content of the pain workshops, and have received many requests for additional workshops.

Many studies show the effectiveness of acute pain services in terms of improved pain relief for patients and changes and attitudes of medical and nursing staff as a result of pain management education programs (Lanigan & Luffingham, 1998; Mackintosh & Bowles, 1997; McLeod, Davies & Colvin, 1995; Stratton, 1999). The verbal analogue scale (to be described later) for assessing pain has been in use in the Calgary Health Region since the inception of the APS in the early 1990's. Content of the APS pain workshop includes a large section on pain assessment using the verbal analogue scale and verbal descriptors of pain, biases that may influence pain assessment, addiction issues, and how to treat pain effectively. One of the reasons for conducting this study is that I

wanted to assess whether attendance at the new pain management workshops initiated in October 2000 has made a difference in how patient pain scores are assessed by the nurses on the surgical units. Unfortunately, due to lack of baseline data and to the question asked of the nurse subjects in this study, this could not be determined with any accuracy.

Literature Review

The following review of the literature focuses on pain perception by nurses, pain perceptions of health care providers and patients; pain perceptions of family members, and pain perceptions among nurses, patients and family. No known studies have compared the perception of pain scores rated at one point in time by patients, family members, and nurses in the post-operative adult population.

Pain Perception by Nurses.

Although studies have shown that pain education programs increase nurses' knowledge and attitudes regarding pain management (Dalton, Carlson, Blau, Lindley, Greer & Youngblood, 2001; de Rond, de Wit, van Dam, van Campen, den Hartog & Klievink, 2000; Erkes, Parker, Carr & Mayo, 2001; Howell, Butler, Vincent, Watt-Watson & Stearns, 2000; McCaffery & Ferrell, 1995; McCaffery & Ferrell, 1997; Stratton, 1999), post-operative pain management by nurses remains a problem. Pain is often not assessed adequately, causing patients to suffer moderate to severe post-operative pain (Brunier, Carson & Harrison, 1995; Mackintosh, 1994; McCaffery & Ferrell, 1997; Paice, Mahon & Faut-Callahan, 1991; Watt-Watson, Garfinkel, Stevens & Streiner, 2000). Some studies have found that nurses with baccalaureate education or who had attended a recent pain management education session tended to rate pain scores

more similarly to the patients' rating of pain (Brunier et al., 1995; Dalton et al., 1996; Erkes et al., 2001; Howell et al., 2000; Lieb-Zalon, 1993; McCaffery & Rolling-Ferrell, 1995; Stratton, 1999). Many nurses, however, are still relying on their personal opinions about patients' pain, rather than using their recorded assessments to help them choose appropriate opioid doses. Nurses tend to underestimate patients' pain and under-treat the pain as a consequence (McCaffery, Rolling-Ferrell & Pasero, 2000; Schafheutle, Cantrill & Noyce, 2001). Many studies have found that formal pain assessment tools are not utilized on a regular basis in acute care settings and this also contributes to the under-treatment of pain (Au, Loprinzi, Dhodapkar, Nelson, Hammack & O'Fallon, 1994; Carey, Turpin, Smith, Whatley & Haddox, 1997; Clarke et al., 1996; de Rond, de Wit, van Dam & Muller, 2000; Field, 1996; Gaston-Johansson, 1996; Huber, Feser & Hughes, 1999; Hunt, 1995; Lieb-Zalon, 1993; Mackintosh, 1994; Schafheutle, Cantrill & Noyce, 2001; Scott, 1994).

In the post-operative area, several studies have found that nurses underestimate patients' pain scores (Bowman, 1994; Field, 1996; Lieb-Zalon, 1993; Puntillo et al., 1997; Stephenson, 1994). All of these studies used non-experimental comparative designs. All used a visual or verbal analogue scale to measure pain intensity. Three studies used relatively small samples; $N = 39$, 25, and 16 respectively (Field, 1996; Stephenson, 1994; Bowman, 1994). One study ($N = 119$) found that nurses' assessments were related to the intensity of pain the patients experienced; nurses under-estimated more severe pain in 45.4% of patients and over-estimated mild pain in 20.2% of patients (Lieb-Zalon, 1993). This finding shows that inaccurate assessment can lead to inadequate pain management and this creates a potential for patient suffering.

Puntillo et al. (1997), found that out of 114 pain assessments performed by nurses, the amount of opioid administered by the nurse correlated more frequently with nurses' lower pain ratings than with patients' ratings, suggesting a trend toward under-treatment of pain. Although nurses' perceptions of patients' pain ratings were consistently lower than patients' pain ratings, the differences were not significant. Pain was assessed using used a verbal analogue scale as well as a "pain assessment and intervention notation algorithm". The algorithm assessed potential pain related behaviours (i.e. movements, facial indicators and guarding), as well as physiological pain indicators (i.e. changes in heart rate, blood pressure, respiratory rate, perspiration or pallor) and is useful for assessing patients who cannot give a subjective verbal report of pain severity (Puntillo et al., 1997). This finding suggests that using a pain algorithm would help nurses be more objective in their assessments of patients' pain and this data may help them manage pain more effectively.

McCaffery & Rolling-Ferrell (1997) found that nurses ($N = 607$) had different perceptions of a patient's pain when they were placed experimentally into different roles. Nurses were more likely to accept the patient's rating of pain when they played the role of the patient's sibling as opposed to their nurse role. Recommendations for improving pain management practices included encouraging nurses to be empathetic during the assessment phase by having them place themselves in the role of the family member for at least a brief moment (McCaffery & Rolling-Ferrell, 1997). This may have some implications for the content of nursing education workshops or in-services around pain management.

Pain Perceptions of Health Care Providers and Patients.

The pain scores of nurses, house officers and oncology fellows have been compared with patient ratings of cancer pain ($N = 103$) (Grossman, Sheidler, Swedeen, Mucenski & Piantadosi, 1991). Health care providers and patients rated pain scores very similarly when the pain score was minimal (0-2 on a 10 point visual numeric rating scale), or when the pain score was moderate (3-6). When patients rated their pain from 7-10 on the numeric rating scale, nurses, house officers and oncology fellows placed their rating of the patients' pain in this severe range 7%, 20%, and 27% of the time, respectively. This finding suggests that nurses are less accurate in their assessment of patients' pain than their colleagues. As pain increased the discrepancy between pain scores increased.

The literature discussed in this section shows that nurses tend to underestimate patients' post-operative pain, and may not be as accurate in assessing pain as their medical colleagues. Also, pain assessment tools were not always used consistently which leads to inaccurate assessments of pain and poor pain management. One study showed that using a pain algorithm of pain related behaviours and pain indicators was useful in assessing patients who cannot give a subjective report of pain. Accurate pain assessments may be conducted if the nurses place themselves in the role of the family member when assessing the patient.

Pain Perceptions of Family Members.

The perception of pain intensity has been studied with family members of patients with cancer pain. It has only been studied very minimally with post-operative pain. This

section will discuss the findings of family members and cancer pain first and then discuss the findings of family members and post-operative pain.

Cancer Pain. One study ($N = 40$) suggests that spouses estimated patients' cancer pain levels accurately using a visual analogue tool to measure pain intensity, indicating spouses can be used as proxies in pain assessment (Dar, Beach, Barden & Cleeland, 1992). Most patients understood that their pain was distressing to their spouses, but underestimated the amount of distress that their pain caused. Patients (64%) admitted to hiding their pain so their spouses would not get too distressed and spouses (45%) believed that patients were minimizing their pain (Dar et al., 1992).

Other studies found that family members overestimated patients' cancer pain, however, the results were not significant and family members had reasonable proxy ratings of patients' pain (Elliott, Elliott, Murray, Braun & Johnson, 1996; Kristjanson, Nikoletti, Porock, Smith, Lobchuk & Pedler, 1998; Lobchuk, Kristjanson, Degner, Blood & Sloan, 1997). Although all three of these studies found that the pain scores of family and patients were more or less congruent (congruence is defined as the similar reporting of pain scores between patients and family members), family members consistently reported more pain and disability than patients reported (Elliott et al., 1996; Kristjanson et al., 1998; Lobchuk et al., 1997). Elliott et al. (1996), particularly found that family members' knowledge was significantly related to their reports of pain; that is their perceptions of patients' pain scores were closer to the patients' report when they demonstrated appropriate knowledge about cancer pain and its management. Two of the studies used a thirteen item Likert-type symptom distress scale to measure pain and their sample sizes were $N = 78$ and $N = 37$, respectively (Kristjanson et al., 1998; Lobchuk et

al., 1997). Elliott et al. (1996) used a visual analogue scale to measure pain in their sample of 122.

Two studies reported that family members under-estimate as well as over-estimate patient's cancer pain (Lin, 2001; Miaskowski, Zimmer, Barrett, Dibble & Wallhagen, 1997). Pain was rated on a visual analogue scale in both studies. Miaskowski et al. (1997) found that 25% of family members under-estimate and 75% of family members over-estimate patients' cancer pain ($N = 78$). Lin (2001) found that 45% of family members under-estimate and 55% of family members over-estimate patients' cancer pain ($N = 89$). Compared with patients in the congruent dyads, patients in the non-congruent dyads had significantly more mood disturbances, a poorer quality of life (Miaskowski et al., 1997) and greater concerns about reporting pain and using analgesics (Lin, 2001). Family members in the non-congruent dyads had significantly higher caregiver strain than those in the congruent dyads (Miaskowski et al., 1997). These findings suggest that congruency of pain perception leads to better pain management and caregiver stress levels than the non-congruent dyads (Lin, 2001; Miaskowski et al., 1997).

Several studies found family members consistently over-estimated patients' cancer pain (Clipp & George, 1992; Ferrell, Ferrell, Rhiner & Grant, 1991; Redinbaugh, Baum, DeMoss, Fello & Arnold, 2002; Yeager, Miaskowski, Dibble & Wallhagen, 1995). These studies all used a visual analogue scale to measure pain intensity and had sample sizes $N = 30$, 85, 31 and 86, respectively (Clipp & George, 1992; Ferrell et al., 1991; Redinbaugh et al., 2002; Yeager et al., 1995). In each of these studies patients reported greater distress from their pain than family members reported and family members experienced greater distress from patients' pain than the patients reported for

their family member (Clipp & George, 1992; Ferrell et al., 1991; Redinbaugh et al., 2002; Yeager et al., 1995). This suggests that although pain is over-estimated by the family member, the pain assessment is probably correct due to the under-reporting of pain by the patient. These studies also suggest that both the patient and the family member experience significant distress because of the patients' pain, but each of the groups are not aware of the degree of distress that the other experiences.

In a pediatric study, parents perceive pain intensity as being worse than their child with cancer pain perceives. When children reported no pain, family caregivers were more likely to report pain as excruciating ($N = 39$) (Ferrell, Rhiner, Shapiro & Strause, 1994). A verbal analogue word descriptor scale or a faces visual analogue scale was used to measure pain intensity. As well as the finding that parents overestimate their child's cancer pain, this study also identified areas where parents lacked knowledge to manage pain optimally and identified the sense of helplessness the families experienced watching a family member in pain (Ferrell et al., 1994).

Post-operative pain. No studies compare family members' perceptions of the patients' post-operative pain in the adult population. One study compared pain scores of the family member and the pediatric patient within 24 hours after discharge following a tonsillectomy ($N = 84$) (Sutters & Miaskowski, 1997). Parents were asked to rate their child's pain on a 4-point verbal rating scale, where 0 = no pain, 1 = mild pain, 2 = moderate pain and 3 = severe pain. Forty-three percent of the parents reported their child's overall pain intensity to be either moderate or severe, and 56.9% of the parents administered less than 50% of the maximum 24 hour analgesic ordered, despite indicators of pain such as sleep disturbances, poor oral intake and behavioural changes the child

portrayed (Sutters & Miaskowski, 1997). These findings showed family members under-estimate and under-treat tonsillectomy pain post-discharge from the hospital, and require education to properly assess and treat pain.

The findings discussed in this section suggest that some family members consistently over-estimate, some underestimate, and some report patients' pain and distress levels similarly to those levels reported by the patient. This inconsistency of pain reporting suggests that family members would not be good proxy assessors of pain if the patient were unable to give a verbal report. When family members were knowledgeable about pain management they reported pain scores more similarly to the patient. Many studies reported that congruent pain scores between patients and family members leads to better pain management, less caregiver stress and better quality of life.

Pain Perceptions among Nurses, Patients, and Family.

The simultaneous pain ratings of post-operative patients, family members and nurses have only been compared in the pediatric population. Miller (1996) found that there was a significant correlation between the mother's and the child's assessment of the child's postoperative pain at observation one ($r = 0.71, p = 0.0005$) and two ($r = 0.83, p = 0.0001$), but not at observation three ($r = 0.46, p = 0.07$) which was up to 48 hours after surgery ($N = 20$). This suggests that mothers may be a valuable source of information about the child's pain in the early post-operative period. Observations were made at random intervals 3 times in the first 48 hours following surgery and pain was measured on a visual analogue scale. Miller (1996) found the child's and the nurse's perception of the child's pain were correlated at observation one ($r = 0.50, p = 0.02$) and two ($r = 0.54, p = 0.01$), indicating nurses are accurately assessing the child's pain. Miller (1996) also

found a strong correlation between nurses' and mothers' perceptions of the child's pain at observation one ($r = 0.55, p = 0.01$) but not at times two ($r = 0.36, p = 0.12$) or three ($r = 0.47, p = 0.07$). This finding suggests that frequent communication between nurses and mothers was occurring in the initial postoperative phase and needs to continue in order for correct pain assessment to occur.

Schneider and Lobiondo-Wood (1992) found nurses underestimated children's rating of procedural pain in a pediatric clinic (N=40). Pain was measured on a pediatric visual analogue scale. No significant differences were found between the parents' ratings and the children's ratings of pain, suggesting the parental rating of the pain would be the best indicator of the child's pain if the child is unable to give a pain rating.

Summary

The studies discussed in this review compared the rating of pain scores between patients and nurses, between patients and family members, and between the 3 groups of patients, nurses and family members. The summary of the findings will be presented here.

Nurses tend to underestimate patients' post-operative pain, and may not be as accurate in assessing pain as their medical colleagues. Also, pain assessment tools were not always used consistently which leads to inaccurate assessments of pain and poor pain management. One study showed that using a pain algorithm of pain related behaviours and pain indicators was useful in assessing patients who cannot give a subjective report of pain. Accurate pain assessments may be conducted if the nurses place themselves in the role of the family member when assessing the patient.

Family members commonly over-estimate, some underestimate, and some report patients' cancer pain and distress levels similarly to those levels reported by the patient. This inconsistency of pain reporting suggests that family members would not be good proxy assessors of pain if the patient were unable to give a verbal report. When family members were knowledgeable about pain management they reported pain scores more similarly to the patient. Many studies reported that congruent pain scores between patients and family members lead to better pain management, less caregiver stress and better quality of life.

Only two pediatric studies compared the post-operative pain ratings of patients, nurses and family members. The findings suggest parents rate pain similarly to the child and that the parental rating of the pain would be the best indicator of the child's pain if the child were unable to give a pain rating. These studies were done in a pediatric setting and generalization to the adult population is limited. No studies have been conducted on the perceptions of pain ratings by patients, nurses and family members in the post-operative adult population. To improve pain management for patients, and design appropriate education programs for patients, their family members and nurses, it is crucial to understand the differences that may exist in the perception of pain reported by these groups.

Guiding Framework

The framework for this study is the based on the guidelines for post-operative pain management created by the United States Agency for Health Care Policy and Research (Acute Pain Management Guideline Panel, 1992), as well as the Canadian

guidelines for palliative care (Librach & Squires, 1997). The two sets of guidelines were developed as a corrective effort in response to the widespread recognition of the inadequacy of pain management (Acute Pain Management Guideline Panel, 1992). An interdisciplinary panel for each publication reviewed the current needs, therapeutic practices and principles, and emerging technologies for pain control. An exhaustive literature review was conducted to define the knowledge base and critically evaluate the assumptions and common wisdom of the field. The guidelines are based on various premises. First they acknowledge that not all pain can be eliminated but that various approaches can prevent or relieve pain. Second, they offer various approaches to management of pain based on the premise that patients have different responses to pain and interventions, as well as different responses to medical conditions or surgical procedures.

The guideline emphasizes: (a) a collaborative, interdisciplinary approach to pain control, including all members of the health care team and input from the patient and the patient's family, when appropriate; (b) an individualized pro-active pain control plan developed pre-operatively by patients and practitioners (since pain is easier to prevent than to bring under control if at a severe level); (c) assessment and frequent re-assessment of the patient's pain; (d) use of both drug and non-drug therapies to control and/or prevent pain; and, (e) a formal, institutional approach to management of pain, with clear lines of responsibility (Acute Pain Management Guideline Panel, 1992; Librach & Squires, 1997).

Assumptions

The assumptions underpinning the study include: (a) nurses, patients and family members will respond to the research question truthfully and thoughtfully; b) post surgical nurses have had experience dealing with post-operative pain assessment and treatment; (c) pain severity reporting is influenced by each individual's personal beliefs as well as their experience with pain, surgery or suffering; d) pain management by nurses is influenced by their pain knowledge, gender, age, years of nursing experience, and nursing attendance at pain management education sessions in the last year; e) since nurses may be influenced by the investigator's position as the acute pain service nurse, research assistants will be used to collect the data; f) the verbal analogue scale is a valid way to determine pain intensity and all subjects can understand how to respond to such scale.

CHAPTER 3: METHOD

Research Design

This quantitative study used a non-experimental, comparative descriptive design. This type of design allows the non-invasive collection of data about a certain problem area and can be "a starting point for hypothesis generation or theory development" (Polit & Hungler, 1999, p. 196). Two limitations to this design however, are: pre-existing differences may be a plausible alternative explanation for any observed differences between the three groups (patients, nurses and family members) and that it will not distinguish causal relationships (Polit & Hungler, 1999). The reasons for any reported differences may be the focus of a future study. The study was designed to both build on previous literature that suggested that nurses rate pain severity lower than their patients, and to generate new knowledge on differences in the way pain is perceived between family members and nurses.

Method

Sample and Setting. A power analysis could not be used to determine a sample size due to the lack of pilot data. Although a large sample size was desirable in this case, due to practicality issues it was not be possible to obtain the number of triads of subjects required in the time line proposed for the study. A sample large enough to strengthen generalizability was therefore desired. A convenience sample of 40 patient, family member and nurse triads was obtained from the post-surgical units at the Foothills Medical Centre (FMC) in Calgary. Patients were excluded from the study if a family

member was not available at the time of data collection. Inclusion criteria for patients included having had surgery, being able to speak English, and being 18 years or over. Inclusion criteria for family members included being able to speak English and being 18 years or over. For the purposes of this study the family member was defined as a spouse, significant other, close sibling, adult child or parent of the patient. Inclusion criteria for the nurse included having the patient as part of his/her daily patient assignment and being able to speak English.

Using a sample from Calgary limits the generalizability of the findings to other post-surgical units in Alberta and in Canada, however one might be relatively confident that the populations of interest are somewhat similar.

Procedure. Potential subjects were identified by the researcher from the daily operating room list of patients and their surgical procedures, to which the researcher normally has access as part of her job. Patients were identified for inclusion if they were having a major surgical procedure. The patients were contacted and recruited prior to surgery by a nursing student(s) hired to assist with the data collection. Potential patient subjects were approached in the preoperative clinic or other preoperative area, and the patient was asked if their family member was likely to visit during the time of data collection. If the family member was likely to visit, the research project was explained, and a signed consent to participate in the study was obtained (Appendix A). If a family member agreed to participate, then he or she was asked to sign the informed consent either in the preoperative area with the patient or on the post-surgical floor before they were asked about their perception of the patient's pain score (Appendix B).

The nurse managers on the post-surgical units at the Foothills Medical Centre were approached to inform them of the study and obtain permission to sample the nurses, patients and family members on their unit. Nurses on the participating nursing units were contacted by the investigator through posted notices and group forums (unit meetings, following shift report or in-services).

Data was collected from nurses, patients, and a family member on the post-surgical floors 24-48 hours after surgery. The research assistant asked the patient his or her pain rating, then asked the family member their perception of the patient's pain rating outside the hearing range of the patient. The nurse caring for the patient was contacted within 15 minutes to ask his or her perception of the patient's pain rating. The nurse was consented at this time (Appendix C). Each nurse was not used as a nurse/subject more than three times in order to maximize the number of nurses who participated in the assessments and minimize the number of assessments from the same nurse.

Instrument and Data Collection.

Data was collected verbally from the subjects using a numeric ten-point pain intensity scale (called the verbal analogue scale), where 0 is "no pain" and 10 is the "worst pain you have ever experienced". Patients, family members, and nurses were asked to rate their perception of the patient's pain at some point between the extremes on this scale. Reliability and validity of the tool have been confirmed (Banos, Bosch, Canellas, Bassols, Ortega & Bigorra, 1989; Bodian, Freedman, Hossain, Eisenkraft & Beilin, 2001; Katz & Melzack, 1999).

Demographic data were collected from patients, nurses and family members (Appendix D). The patient's age, gender, and type of surgery were obtained from the

patient during a brief interview. Information about age, gender, and relationship to the patient was collected from the family member. Information about age, gender, years of nursing experience, type of nursing education, and attendance at a pain management education session in the last year was collected from the nurses. These variables were collected to explore their possible influences on the perception of the patient's pain ratings.

Data Analysis. The data were coded and entered into a statistical computer program (SPSS) by the author. Descriptive statistics were reported for all demographic variables. A one-way analysis of variance (ANOVA) was used to determine differences between reported pain scores of the three groups. Pairwise t-tests were performed to determine which of the three groups reported pain differently. Correlational analyses between the patients' pain score and the age of the family member, the age of the nurse, and the years of nursing experience were performed. Independent sample t-tests compared the perception of patient's pain scores that male and female participants reported within each of the three groups. A one-way ANOVA was performed to determine if there is a significant difference between the patients' pain scores and the types of surgery and between the pain scores the various family members reported. Student-Newman-Keuls (SNK) test was performed to determine differences in reported pain scores between each of the surgical groups as well as between family members. Independent sample t-tests were performed absolute difference between the pain score the patient reported and the one the nurse reported, in each of the two educational groups, as well as in each group of nurses who did or did not attend the pain management education sessions. The level of significance was set at $p = 0.05$.

Ethical Considerations

Ethical approval for this study was obtained from the Conjoint Medical Ethics Research Committee at the University of Calgary Medical School. Ethical considerations around informed consent (Appendix A, B, and C), the option to withdraw from the study, and the assurance of confidentiality were covered verbally with each potential participant prior to the signing of the consent. Since the researcher is an employee at the Foothills Medical Centre (part of the Calgary Health Region) as the Acute Pain Service Clinical Nurse Specialist, the researcher hired student nurse assistant(s) to collect the data from the patients, family members and nurses. This ensured that the reported pain scores (especially those reported by the nurses) were not influenced by the researcher's professional position.

The research assistant(s) signed a confidentiality agreement to ensure that patient privacy was respected. All data handling identified patients only by an assigned patient, family, and nurse triad number. The computer used for entering statistical data was in a secure area and passwords were required for use. Data was entered into the computer by the site investigator. Data was kept on disks that were stored in a locked filing cabinet. Data will be destroyed (paper forms shredded and electronic files permanently deleted) upon completion of the study.

Communication of Findings

The investigator plans to communicate the findings through inservice presentations with the nurses at the Foothills Medical Centre. The study will also be presented at several local research conferences including the Calgary Pain Interest Group and the Calgary Anesthesia Research Retreat; at the national Canadian Pain Society

conference, and at the American Society of Pain Management Nurses national meeting. An article based on this study will be submitted for publication in a clinical nursing journal or clinical pain management journal.

CHAPTER 4: RESULTS

The purpose of this chapter is to present the results of the quantitative data analysis. To begin, an overview of the demographic variables related to the sample are presented. This section is followed by the findings related to the primary research question.

A sample size of 40 triads was collected. Each triad consisted of a patient, a family member and the nurse taking care of the patient at the time of data collection. The demographic characteristics of the sample are presented in Table 1. This table presents separately, the three groups (of patients, family members, and nurses), in terms of the group means and ranges.

Table 1: Demographic Statistics Reported by Group

	Patients		**Family**		**Nurses**	
Mean Age (SD)	51.58 (16.84)		47.20 (12.56)		35.15 (9.02)	
Age Range	20-88		27-73		24-59	
Gender and # of Participants	Male 17	Female 23	Male 13	Female 27	Male 3	Female 37
Mean Pain Score	4.08		4.53		3.45	

Perceptions of Post-operative Pain

The primary research question investigated was: Is there a difference in the perception and reporting of post-operative pain intensity among patients, family members and nurses in an acute care setting?

Correlation of the patients' pain scores with those of the family and nurses was statistically significant. Reported pain scores were correlated between patients and family members (r= 0.37, p= 0.020), and between patients and nurses (r= 0.41, p= 0.009). No significant correlation was found between the pain scores of family members and nurses (r= 0.25, p= 0.115).

Results of the one-way repeated measure analysis of variance indicated a significant difference among pain scores of the three groups (F (2,78) = 4.18, p= 0.019). Pain scores compared between groups with pairwise t-tests found that there were no significant differences reported between patients and family members ($t(39) = -1.21$, p= 0.235), or between patients and nurses ($t(39) = 1.86$, p=0.071). However, a statistically significant difference was found between the pain score reported by the family member and the nurse ($t(39) = 2.64$, p= 0.012).

Relationship of Demographic Variables on the Perception of Pain

The secondary purpose of this study was to explore the relationship between perception and reporting of the patients' pain ratings and the various demographic variables. These variables included: age, gender, type of surgery, relationship of family member to the patient, years of nursing experience, type of nursing education, and nursing attendance at pain management education sessions in the last year.

Secondary research questions were:

1) Is there a relationship between the perception and reporting of the patients' pain ratings and any of the demographic variables? The demographic variables studied were age, gender, and years of nursing experience.

2) Is there a difference in perception and reporting of pain scores by patients having different types of surgery?

3) Is there a difference in how the four types of family members perceive and report the patients' pain scores?

4) Is there a difference in the way that nurses report patients' pain scores due to nursing education or attendance at a pain management workshop?

Age

There was no correlation between age of the patient, the family member and the nurse, and their reported perception of the patient's pain score. The correlation coefficients between age and pain score reported are (r= -0.0360, p=0.826) for patients, (r=0.0981, p=0.547) for family members, and (r= 0.2575, p=0.109) for nurses, respectively.

Age and gender of nurses in the study were demographically similar to those of Registered Nurses in Alberta (Alberta RN, 2003). The mean age of nurses in the study was 51.6 years and the mean age of the nurses in the province was 43.4 years (Alberta RN, 2003). The Alberta Association of Registered Nurses (AARN) also reported that 52.8% of Alberta nurses are 41 years and above, which is consistent with this study's sample. This study sampled 37 female nurses (92.5%) and 3 male nurses (7.5%). The AARN data reports 97% of nurses are female and 3% are male (Alberta RN, 2003).

Gender

Independent sample *t*-tests compared the perception of patient's pain scores that male and female participants reported within each of the three groups. The results showed that gender of the participants did not have a statistically significant effect on the pain scores reported by patients ($t(39) = -0.13$, $p = 0.900$), family ($t(39) = 1.17$, $p = 0.251$), or nurses ($t(39) = -0.56$, $p = 0.580$).

Type of Surgery

Results of a one-way ANOVA indicated a significant difference in pain scores reported by the patients among the 5 types of surgery ($F(4,35) = 3.569$, $p = 0.0153$) (See Table 2 for pain scores listed by type of surgery). Patients having orthopedic surgery reported the highest level of pain, followed closely by those patients having gynecological surgery. Those patients having abdominal and plastic surgery reported the lowest levels of pain, as did the patients having thoracic surgery. Student-Newman-Keuls (SNK) test indicates that there was a significant difference between the level of pain of patients who had orthopedic surgery compared with the level of pain reported by patients having plastic surgery or abdominal surgery.

Table 2: Pain Score of Patients by Type of Surgery

	Orthopedic	**Gynecological**	**Thoracic**	**Abdominal**	**Plastic**
N	13	2	7	14	4
Mean Pain Score (SD)	5.38* (1.02)	4.75 (1.06)	3.57 (1.97)	3.54 (2.04)	2.25 (2.06)
Range	4-7	4-5.5	0-6	0-8	0-5

* $p = <0.05$

Relationship of Family Member

Results of the one-way ANOVA indicated a significant difference in pain scores among the 4 types of family members (F (3,36) = 3.643, p= 0.0216) (See Table 3 for pain scores listed by family member). SNK revealed that pain scores reported by the adult child were significantly different that those reported by the spouses, the close siblings or the parents of the patient. All of the family members except the adult child reported higher pain scores than the patient reported. The adult child reported significantly lower pain scores than the other family members, and those pain scores reported by the patients.

Table 3: Relationship of Family Member on Pain Scores

	Spouse	**Close Sibling**	**Adult Child**	**Parent**
N	25	7	5	3
Mean Pain Score (SD)	4.80 (2.08)	4.93 (2.11)	1.80* (1.68)	5.83 (1.89)
Range	0-8	3-9	0-4.5	4.5-8

* $p = <0.05$

Demographic Variables of Nurses

The demographic characteristics specific to nurses are presented in Table 4. There was no correlation of the nurses' years of experience (r= 0.2824, p= 0.077) and their perception and reporting of their patients' pain scores.

The demographic statistics for level of nursing education were also similar to those found by the AARN (Alberta RN, 2003). This study sampled 24 diploma nurses (60%) and 16 baccalaureate nurses (40%); the AARN reports 62.8% of nurses are diploma prepared and 34.5% are baccalaureate prepared (Alberta RN, 2003).

Table 4: Demographic Statistics Specific to Nurses

Years of Nursing Experience	Mean: 10.27 Range: 1-37	
Education Level	Diploma 24 (60%)	Baccalaureate 16 (40%)
Pain Workshop	Attended 16 Did Not Attend 24	

There was a significant difference in reported pain scores between the diploma nurses and the baccalaureate prepared nurses (p= 0.042). Independent sample t-tests were performed on the absolute difference between the pain score the patient reported and the one the nurse reported, in each of the two educational groups. Absolute difference was calculated using the nurse's pain score minus the patient's pain score. There were smaller mean differences in the pain scores reported by baccalaureate prepared nurses than diploma prepared nurses. This means baccalaureate prepared nurses reported pain scores closer to those pain scores reported by their patients. (See Table 5 for pain scores reported by the education of nurses).

Table 5: Type of Nursing Education on the Difference between Patients' Report of Pain and the Nurses' Report of Pain

	Diploma	**Baccalaureate**
N	24	16
Mean Difference in Pain Score (SD)	1.96 (1.71)	0.94* (1.11)

* $p = <0.05$

There was no significant difference found when independent sample *t*-tests were run on the absolute differences between pain scores of the nurse and the patient in each group of nurses who did or did not attend the pain workshop ($p= 0.504$). Again, the absolute difference was calculated using the nurse's pain score minus the patient's pain score.

CHAPTER 5: DISCUSSION

The purpose of this chapter is to present a discussion of the findings of the research project and to bring clinical relevance to the results of the data analyses. Significant differences were found between the family and the nurses' reporting of patient pain scores; family members tend to over-estimate and nurses tend to under-estimate patients' pain. Significant differences were found among the pain scores reported by family members as well. Spouses, close siblings and parents tended to overestimate the patients' pain score, whereas the adult child underestimated the patients' pain score. Patients having orthopedic surgery reported higher pain scores than those patients having abdominal or plastic surgery. Baccalaureate nursing education was found to be significant in the way the nurses reported patients' pain; that is they reported pain intensity closer to how the patients reported their pain. Implications for practice, limitations of the study and recommendations for future research will be discussed.

Group Reporting of Pain Scores

Statistical analysis showed no significant differences on pain scores between patients and family members or between patients and nurses. A significant difference was found, however, between the pain score reported by the family member and the nurse. Family members reported higher pain scores than the patients. Nurses reported lower pain scores than the patients.

This difference suggests that the trend of family members overestimating and nurses underestimating patients' pain scores still exists. This trend is supported by the studies of family members of adult patients with cancer pain. Family members consistently reported that the patients' pain and disability, or distress as a result of pain,

was greater than the pain reported by the patient (Clipp & George, 1992; Elliott et al., 1996; Ferrell et al., 1991; Kristjanson et al., 1998; Lin, 2001; Lobchuk et al., 1997; Redinbaugh et al., 2002; Yeager et al., 1995). The findings of this study suggest that the trend of the family members overestimating the patient's pain may also exist in the acute pain population. The reason for overestimating the patient's pain scores may be due to the distress or concerns of family members for their loved one. Suggestions for minimizing this distress or concern experienced by the family will be discussed later.

The results of this study support findings that nurses report lower post-operative pain scores than their adult patients (Bowman, 1994; Field, 1996; Lieb-Zalon, 1993; Puntillo et al., 1997; Stephenson, 1994), as well as their pediatric post-surgical patients (Miller, 1996; Schneider & LoBiondo-Wood; 1992). Although the present study had a relatively small sample size of 40, nurses are reporting patient pain scores closer to the patients' pain scores. Could this be due to intensive pain management education sessions for the post-surgical nurses at the Foothills Hospital, conducted by the Acute Pain Service in the last two years? This question would be a valuable subject of further research.

Type of Family Member and Patient Pain Scores

A statistically significant difference was found among the reported pain scores of the four types of family members. Spouses, close siblings and parents tended to overestimate the patients' pain score, whereas the adult child underestimated the patients' pain scores. The pain scores reported by the spouse were more congruent with the patients' report of their pain than the pain scores reported by the other 3 types of family members. Spousal congruence of pain scores is supported in some of the literature (Dar et al., 1992; Kristjanson et al., 1998; Miaskowski, 1997) and may indicate that spouses

can be used as proxies in pain assessment if the patient is unable to report pain themselves.

Adult children reported pain scores significantly lower than the patient reported and there are no appropriate explanations for this finding. This finding may suggest that adult children cannot be used as proxies in pain assessment but the sample of five in this group makes it impossible to make any generalizations. One possible reason for this underestimation of the patients' pain is that the parents/patients may not want to let their children know they are in pain for fear of burdening them or adding to their stress level. Patients have been known to protect themselves and family members by not disclosing the increased pain intensity, therefore denying progression of cancer (Dar et al., 1992) but this does not apply to the post-operative population as the increase in pain intensity does not usually represent the cancer progression.

Although not significant, the pain scores reported by the parent of the patient were higher than those reported by the spouse or sibling of the patient. This over-estimation of pain scores may be indicative of the suffering a parent experiences when his/her child, (even an adult child) is hospitalized. It may also be indicative of the feeling a parent may have to protect the child from pain and its consequences, and therefore report higher pain scores so that the child receives pain medicine and does not have significant pain as a result. This study suggests that the parent's report of pain may not be as reliable as a spouse or sibling's report and therefore not a valuable source of information. Research with children with cancer supports this finding. Family members report higher pain levels than the child with cancer pain (Ferrell, Rhiner, Shapiro & Strause, 1994). Studies looking at parents' report of their children's post-surgical pain, however, found that

parents were more likely to report pain scores similarly to their children and therefore were a valuable source of information for the nurse during pain assessment (Miller, 1996; Schneider & LoBiondo-Wood, 1992).

This study may be the first one to assess the pain reported between the different types of family members. Some studies have found that older caregivers are less accurate than younger caregivers in their reports of patients' pain (Kristjanson et al., 1998; Lin, 2001). No other literature compares the relationship of the family members on the patients' reported pain score and this would be a suggestion for future research. It would be helpful for the post-operative nurses as well as the APS to know how to include the families' assessment of the patients' pain into the pain treatment plan.

Effect of Type of Surgery on Patient Pain Scores

A significant difference was found between the type of surgery and the pain scores reported. The average pain score (on the 0-10 verbal analogue scale) reported by surgical type is: orthopedic 5.38, gynecological 4.75, thoracic 3.57, abdominal 3.54 and plastic 2.25. The level of pain that patients with orthopedic surgery reported was significantly higher than the level of pain reported by patients having plastic surgery or abdominal surgery. This was an interesting finding and may be due in part to the type of pain management treatment these patients were receiving.

Recent data from Abbott Total Quality Pain Management quality assurance program in the Calgary Health Region suggests that far too many patients are still receiving intramuscular injections (approximately 22% regionally at the three adult hospitals in Calgary, and 7% at the FMC). This data was collected over one year (August 2001 – September 2002) and it represents a small percentage of the post-operative

patients at the FMC. There is no specific data on the correlation of orthopedic surgery and use of intramuscular injection as a pain modality.

Although not part of the study, it has been my observation as the Acute Pain Service Clinical Nurse Specialist that orthopedics patients at the FMC a) receive more intramuscular injections than patients with other surgeries, and b) are referred less often to the Acute Pain Service. It has been well documented that intravenous patient controlled analgesia provides better pain control and has fewer side effects than intramuscular injections (Jackson, 1989; Kenady, Wilson, Schwartz, Bannon & Wermeling, 1992). It is also my observation that patients who have plastic or abdominal surgery at the FMC most commonly have either epidural analgesia or intravenous patient controlled analgesia as their method of pain management. Thoracic patients that were part of this study were all followed by the Acute Pain Service (APS) and would have had epidural analgesia. The gynecological patients in this study are followed by the APS about 50% of the time, as only certain surgeons permit epidural analgesia in their patients. The gynecological patients reported higher pain scores than the patients with thoracic, abdominal or plastic surgery and similar pain scores to those reported by the orthopedic patients. Pain experienced by patients having orthopedic or gynecological surgery and their respective pain treatment plans (including physician prescribing techniques) warrant further study.

Other factors that may explain the higher pain reports of post-surgical orthopedic patients may be the location of the pain, the type of orthopedic surgery and the presence of pre-operative pain. It is generally well accepted within the Department of Anesthesia and the APS, that patients have more pain with bone pain than with soft tissue pain. The

type of orthopedic procedure also may influence the pain. Large spinal fusions as well as total joint procedures tend to be very painful post-operatively because of the extensive surgery completed as well as the need for aggressive mobilization after surgery to avoid joint stiffness. As well, the presence of pre-operative pain due to compressed nerves in the back, or severe osteoarthritis may influence the amount of pain an orthopedic patient experiences post-operatively. These factors of inadequate pain management, type of pain management modality, location of pain, type of surgical procedure, presence of pre-operative pain, and cultural background may influence the pain experienced by the orthopedic patient and would be useful to examine in a further study.

Nursing Education and Patient Pain Scores

There was a significant difference between diploma prepared nurses and baccalaureate prepared nurses in their reports of patients' pain scores. There was a smaller mean difference in the pain scores reported between baccalaureate prepared nurses and their patients than between the diploma prepared nurses and their patients. This finding is supported by research that showed nurses with a baccalaureate education tended to rate pain scores more similarly to the patients' rating of pain (Brunier et al., 1995; Dalton et al., 1996; Erkes et al., 2001; Howell et al., 2000; Lieb-Zalon, 1993; McCaffery & Rolling-Ferrell, 1995; Stratton, 1999).

Could the results of this study suggest that improvements have been made in the last decade in the amount or the content of pain management education in nursing programs? The findings of this study contradict research from a decade ago. Studies have shown there was a lack of pain management education in nursing education programs. For example, Graffam's (1990) survey of baccalaureate nursing programs

revealed that 48% spent four hours or less on pain management education. In another study, Ferrell, McGuire & Donovan (1993) found that nursing faculty had inadequate knowledge about pain management, particularly about analgesics. Other literature suggests that pain education programs do increase nurses' knowledge and attitudes regarding pain management and this increased knowledge helps to decrease the undertreatment of pain (Dalton et al., 2001; de Rond et al., 2000; Erkes et al., 2001; Howell et al., 2000; McCaffery & Ferrell, 1995; McCaffery & Ferrell, 1997; Stratton, 1999). Further study is warranted to determine whether there has been an increase in the amount or the content of pain management in nursing undergraduate programs.

Comparisons of the absolute differences (nurse's pain score minus patient's pain score) in reported pain scores between nurses who attended and did not attend the pain workshop was not statistically significant. However, the wording of the question may have not yielded the desired results. The question "Have you attended a pain management education session in the last year?" does not account for the attendance at previous education sessions. Many of the nurses stated they had been to a workshop more than a year ago and this may partly explain this finding. A suggestion for another study would be to ask nurse participants if they had ever attended a pain management session.

Limitations of the Study

This study was conducted in one tertiary care hospital in Calgary with a sample of 40 participant triads; one must be cautious therefore, about generalizing the results to other surgical settings in Alberta or Canada. The people who chose to participate in this study may not be typical of the general population in regards to the variables that were

measured (LoBiondo-Wood & Haber, 1990), however the sample of nurses was typical of the demographic status of nurses in Alberta (Alberta RN, 2003).

The small cell sizes within the type of surgery and family member groups may render the results of the ANOVA tests to be less dependable. As well, the selection bias of the patients from the operating room list may have inadvertently yielded more non-APS patients and this may help explain why higher levels of pain were experienced by certain surgical groups.

Race or culture was not assessed in this study. This variable may have an influence on the expression of pain and could be the subject of another study. Also, the modality of pain management was not included in the study so it is not possible to explain the finding of inadequate pain control in the orthopedic patient population compared to those patients having abdominal or plastic surgery.

A potential limitation for future study involves working with family members of the post-surgical population. The data collectors found the family members a little unreliable in terms of showing up at the designated meeting times and therefore may be a difficult population to access consistently. It was found that both patients and nurses in this study and in this hospital in Calgary were very approachable and interested in participating.

Implications for Practice

The implications of the findings for nursing practice include education and research and will be discussed in the following sections. These areas will be examined in terms of implications for the family, the post-surgical nurses and the Acute Pain Service.

Pain Management Education

Findings of this study suggest that both family members and post-surgical nurses require pain management education because their reporting of the patients' pain scores was not congruent with patients' pain scores. Family members tend to over-estimate the patients' pain and nurses tend to underestimate the patients' pain. This incongruence may strain the relationship each has with the patient and may prevent the patient from having his or her pain recognized and therefore treated properly. Suggestions for education are made for both family members and nurses in the next sections.

Minimizing Family Apprehension. One way of minimizing the worry the family experiences during an acute surgical hospitalization of a family member is to educate the family about what to expect during the hospitalization. Inviting a family member or members to the pre-operative clinic or surgeon's offices where much of the pre-operative teaching is provided would give the family member a good indication of what to expect. Perhaps videos or hands-on displays of various tubes and machines the patient may have, as well as what unit routines, assessments, exercises and pain medications are common post-operatively may prepare the family members better for the post-operative experience and in turn decrease their worry and anxiety. Assessing family members' beliefs about pain and use of pain medication pre-operatively may decrease the discrepancy of pain scores reported post-operatively. Teaching the patients how to communicate their pain levels and family members how to assess the patients' pain experiences may help to decrease the discrepancies of the pain scores reported and therefore minimize the worry experienced by both parties.

Currently, the APS has created written information sheets about pain management principles and modalities of treatment, and these are provided to all patients who attend the pre-operative assessment clinic. The APS should also create more videos to convey the same information, to offer a different mode of instruction and account for the different adult learning styles. Nurses in the pre-operative areas are doing most of the pain management education with patients, and should be instructed to include family members in the teaching as well as eliciting any concerns or questions they have about the patients' post-operative pain management.

If the APS had more time and personnel, consultations with patients and families would become more common in the pre-operative areas. The APS could then meet with patients and families to assess their beliefs and knowledge about pain management, as well as facilitate communication about these beliefs and knowledge between family members. That way, families would feel less stress about these issues in the post-operative period, and if more consistent reporting of pain occurred between the family members, they could be used as a proxy assessment of a patients' pain should patients not be able to report pain themselves. I would also like to see the APS teach a class in the community about post-operative pain control as part of the basic preparation for anyone having surgery, or to interested groups or associations such as the Crohn's and Colitis support group. This will also provide knowledge and decrease the potential stress related to post-operative pain management in the hospital.

Pain Management Education for Nurses. This study found that nurses are reporting pain scores closer to the pain scores reported by patients, and although not significant, there is still a tendency for nurses to underestimate the patients' pain scores.

If one of the reasons for nurses to report pain scores closer to the patients' pain scores is attendance at intense pain management education programs conducted at the FMC, then this finding supports the importance of continuing such pain education programs for nurses. Programs that teach the use of a proper assessment tool, to ask and believe the patient's report of pain, and to treat pain according to the patient's report of pain are necessary for patients to have their pain recognized and treated appropriately. The pain management program taught by the APS Clinical Nurse Specialist at the FMC currently includes six hours of instruction. Topics such as: pain definitions, types of pain, assessment of pain using a proper tool, biases that influence pain assessment, addiction, non-pharmacological and pharmacological management of pain, routes of pain medications including oral, intravenous patient controlled analgesia and epidural analgesia as well as side effect management of medications are discussed.

The findings of this study suggest that more research is needed with the orthopedic population of patients; however, in the pain workshops orthopedic nurses should be aware that orthopedic patients might experience and therefore report higher levels. They should also be encouraged to advocate on the patients' behalf if they are experiencing poor pain control.

The importance of continuing pain management content in the undergraduate program is also recommended, given the finding that baccalaureate prepared nurses are reporting pain closer to patients' reports. Many studies have supported ongoing pain education at both the undergraduate level of preparation and via pain workshops (Brunier et al., 1995; Dalton et al., 2001; de Rond et al.,2000; Erkes et al., 2001; Howell et al.,

2000; Lieb-Zalon, 1993; McCaffery & Ferrell, 1995; McCaffery & Ferrell, 1997; Stratton, 1999).

Nursing Research

It would be interesting to replicate this study with a larger sample size. A larger study may be required to establish whether nurses are indeed reporting pain more similarly to the patients and it may also help determine whether pain management education sessions may be one of the reasons for this. The study should include more detailed questions about the pain management education sessions attended so that more definitive recommendations can be made as to content and duration of the sessions.

It would also be interesting to examine the amount and content of the pain management education in the nursing undergraduate curriculum to ascertain any differences from the studies conducted a decade ago.

Research should be conducted on the influence of the type of surgery on the post-operative pain scores reported. Further study is warranted on the differences in post-operative pain resulting from different surgical procedures, location of pain, presence of pre-operative pain and post-operative pain modality. This may lead to a change in pain treatment modalities and better pain outcomes for the patients.

Another suggestion for future study would be an examination of the relationship of the family member on the perception and reporting of the patients' pain score. The number of family members in each category of spouse/significant other, close sibling, parent or adult child should be adequate to compare and determine if there is a difference in the pain score reported by the various family members. It would be useful to know whether the family members can be reliable assessors of the patients' pain should the

patient not be able to give a self-report. Qualitative research may also be useful to elicit the reasons why family members report pain differently than patients.

A study with an intervention targeting the reduction of stress/worry of family members would also be useful to health care providers in planning pre and post-operative care. It would be interesting to note whether a reduction in the concern a family member feels would influence his or her perception of the patient's pain score.

Conclusions

This study set out to examine the differences in reporting of post-operative pain by patients, family members and nurses as well as explore any demographic variables that may influence the perception of pain. This study found that perceptions of acute pain were not significantly different between patients and family members or between patients and nurses; however, there was a significant difference between the pain scores reported by the family members and the nurses. These findings suggest that the trend of family members over-estimating and nurses underestimating patients' pain levels may still exist. Replication research is recommended using a larger sample size to determine if these results hold.

Significant differences were found among the pain scores reported by family members. Spouses, close siblings and parents were more congruent with the patients' report of pain, although they were higher than the pain scores the patients reported. Adult children of patients significantly underestimated the patient's pain suggesting that they would not be accurate proxies if a patient could not report pain for him/herself. Further research is recommended to compare the relationship of family members on the

patients' report of pain and would be useful to determine whether the families' pain assessments could be included in the pain treatment plan.

Patients having orthopedic surgery reported significantly higher pain scores than those patients having abdominal or plastic surgery. This suggests that orthopedic pain is not as well controlled as other types of post-surgical pain and warrants further study to investigate the reasons for this inadequate pain management.

Baccalaureate nursing education was found to be significant in the way that nurses reported patients' pain; that is, pain was reported closer to how the patients reported their pain. This finding suggests improvements in the amount of undergraduate pain management education have been made and recommends that this pain education continue.

The findings suggest pain management education is needed for both family members and nurses to ensure adequate knowledge levels about pain assessment and to encourage communication. Adequate knowledge combined with proper communication will help to ensure appropriate pain management for post-operative patients.

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Appendix A

CONSENT FORM – PATIENT

UNIVERSITY OF CALGARY

FACULTY OF NURSING

Telephone: (403) 220-4650
Fax: (403) 284-4803
Email: hughes@ucalgary.ca

CONSENT FORM – Patient

Research Project: **Post-operative Pain Intensity Reported by Patients, Nurses, and Family Members**

Principle Investigator: Dorothy Hughes, RN, Ph.D.

Co-Investigator: Janice M. Rae, RN, BN

Sponsor: N/A

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this study is to explore people's estimation and rating of pain. In this study, we will be asking you, a member of your family, and your nurse, about the severity of your pain. Differences that may or may not exist in the estimation of pain severity between these people may have direct implications for the content of education programs that teach about pain management in hospitals. Educational practices for patients and their family members, as well as nurses in Calgary may be altered as a result of this study.

Description of the Study and Procedures involved: If you agree to participate in the study you will be asked to read and sign this consent form before your surgery. Then about 24 to 48 hours after your surgery the researcher will visit you only once to ask you a simple question about your pain severity. No paperwork will have to be filled out after the surgery. Your family member and the nurse taking care of you will also be asked the

same question about your pain severity. The total time this research project will take to participate will be less than 5 minutes.

Discomforts or Inconveniences: There are no known risks to you for participating in this study. The only potential inconvenience to you may be the time it takes to fill out the consent form.

Benefits: An indirect benefit as a result of your participation in this project may be increased knowledge for nurses about pain management. It will add to the understanding of pain management practices, and may affect the way that nurses prepare patients and their families for surgery or for discharge from the hospital after surgery. Otherwise, there are no known benefits to you for participating in this study.

Enrollment Options for the Study:
You have the option to participate in the study or not to participate in the study. Participation is completely voluntary. Your pain management in the hospital or your doctor's ongoing care of you will not be affected by your participation in the study.

Confidentiality:
Your answer to the pain severity question and any identifying information about you will be completely anonymous and confidential. Each participant will be assigned a subject code and this will be the only identifying feature on the form. The principle and co-investigator, one-two research assistants and the statistician will be the only people to have access to the data. Any data you provide will be treated with professional standards of confidentiality. The data will be kept in a locked filing cabinet until after the study is completed. The data will be shredded at the completion of the data collection and analysis. Results from the study may be published in a health professional journal but names of the participants will not be used. Should you be interested in the results of the study, the results will be provided to you at the completion of the project.

Costs and Reimbursements:
There is no financial cost to you for participating in the study. As well, there is no reimbursement to you for participating in this study.

Injury and Compensation:
In the very unlikely event that you will suffer any injuries as a result of participating in this research, no compensation will be provided for you by the University of Calgary, the Calgary Health Region, or the study investigators. You still have all of your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agrees to participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without

jeopardizing your health care. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have further questions concerning matters related to this research, please contact:

Site Investigator: Janice M. Rae, RN, BN at 670-4709
Principal Investigator: Dorothy Hughes RN, PhD at 220 4650

If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at 220-7990.

Participant's Signature: _____
Date:_____

Site Investigator and /or Delegate's
Signature:_____Date:_____

Witness' Signature:_____Date:_____

A copy of this consent form has been given to you to keep for your records and reference.

Appendix B

CONSENT FORM – FAMILY MEMBER

UNIVERSITY OF CALGARY

FACULTY OF NURSING

Telephone: (403) 220-4650
Fax: (403) 284-4803
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CONSENT FORM – Family Member

Research Project: **Post-operative Pain Intensity Reported by Patients, Nurses, and Family Members**

Principle Investigator: Dorothy Hughes, RN, Ph.D.

Co-Investigator: Janice M. Rae, RN, BN

Sponsor: N/A

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this study is to explore the concept of people's estimation and rating of pain. In this study, we will be asking patients, their family member, and their nurse, about the patient's pain severity. Differences that may or may not exist in the estimation of pain severity between these groups of people may have direct implications on the education programs that teach this information. Educational practices for patients and their family members, as well as nurses in Calgary may be altered as a result of this study.

Description of the Study and Procedures involved: If you agree to participate in the study you will be asked a very simple question only once, about pain severity between 24-48 hours after your family member's surgery. It will take very little of your time. You will be asked to read and sign a consent form. Then the researcher will come to

your family member's room and ask you a couple of questions verbally. No forms will have to be filled out other than the consent form. Your family member who is the patient and the nurse taking care of them post-operatively will also be asked a question about pain severity. The total time this research project will take to participate will be 5-10 minutes.

Discomforts or Inconveniences: There are no known risks to you for participating in this study. The only potential inconvenience to you may be the time it takes to fill out the consent form.

Benefits: An indirect benefit may be increased knowledge for nurses about pain management as a result of participating in the project. It will add to the understanding of pain management practices, and may affect the way that nurses prepare patients and their families for surgery or for discharge from the hospital after surgery. Otherwise, there are no known benefits to you for participating in this study.

Enrollment Options for the Study:
You have the option to participate in the study or not to participate in the study. Participation is completely voluntary. Your family member's pain management in the hospital or their doctor's ongoing care will not be affected by your participation in the study.

Confidentiality:
Your answer to the pain severity question and any identifying information about you will be completely anonymous and confidential. Each participant will be assigned a subject code and this will be the only identifying feature on the form. The principle and co-investigator, one-two research assistants and the statistician will have access to the data but the names of the participants will never be known because they are not required on the forms. Any data you provide will be treated with professional standards of confidentiality by the investigator and statistician. The data will be kept in a locked filing cabinet until after the study is completed. The data will be shredded after the study is completed. Results from the study may be published but names of the participants will not be published. Should you be interested in the results of the study, please contact the researcher and these results will be provided to you at the completion of the project.

Costs and Reimbursements:
There is no cost to you for participating in the study. As well, there is no reimbursement to you for participating in this study.

Injury and Compensation:
In the very unlikely event that you suffer injury as a result of participating in this research, no compensation will be provided for you by the University of Calgary, the Calgary Health Region, or the study investigators. You still have all of your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agrees to participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have further questions concerning matters related to this research, please contact:

Janice M. Rae, RN, BN at 670-4709.

If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at 220-7990.

Participant's Signature: _____
Date:_____

Investigator and /or Delegate's
Signature:_____Date:_____

Witness' Signature:_____Date:_____

A copy of this consent form has been given to you to keep for your records and reference.

Appendix C

CONSENT FORM - NURSES

UNIVERSITY OF CALGARY

FACULTY OF NURSING

Telephone: (403) 220-4650
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CONSENT FORM - Nurses

Research Project: **Post-operative Pain Intensity Reported by Patients, Nurses, and Family Members**

Principle Investigator: Dorothy Hughes, RN, Ph.D.

Co-Investigator: Janice M. Rae, RN, BN

Sponsor: N/A

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this study is to explore people's estimation and rating of pain. In this study, we will be asking patients, their family member, and their nurse, about pain severity. Differences that may or may not exist in the perception of pain severity between these groups of people may have direct implications on the education programs that teach this information. Educational practices for patients and their family members, as well as nurses in Calgary may be altered as a result of this study.

Description of the Study and Procedures involved: If you agree to participate in the study you will be asked a very simple question about your patient's pain severity between 24-48 hours after their surgery. It will take very little of your time. You will be asked to read and sign a consent form. Then the researcher will come to your unit and ask you a couple of questions verbally. No forms will have to be filled out. Your patient and his or

her family member will also be asked a very simple question about pain severity. The total time this research project will take to participate will be 5-10 minutes per patient. If you are caring for more than one patient in this study, you will not be asked to participate more than three times to participate.

Discomforts or Inconveniences: There are no known risks to you for participating in this study. The only potential inconvenience to you may be the time it takes to fill out the consent form.

Benefits: An indirect benefit may be increased knowledge for nurses about pain management as a result of participating in the project. It will add to the understanding of pain management practices, and may affect the way that nurses prepare patients and their families for surgery or for discharge from the hospital after surgery. Otherwise, there are no known benefits to you for participating in this study.

Enrollment Options for the Study:
You have the option to participate in the study or not to participate in the study. Participation is completely voluntary. Your patient's pain management in the hospital or the attending physician's care of your patients will not be affected by your participation in the study.

Confidentiality:
Your answer to the pain severity question and any identifying information about you will be completely anonymous and confidential. Each participant will be assigned a subject code and this will be the only identifying feature on the form. The investigator, co-investigator, one-two research assistants and the statistician will have access to the data but the names of the participants will never be known because they are not required on the forms. Any data you provide will be treated with professional standards of confidentiality by the investigator and statistician. The data will be kept in a locked filing cabinet until after the study is completed. The data will be shredded at the completion of the data collection and analysis. Results from the study may be published but names of the participants will not be published. Should you be interested in the results of the study, please contact the researcher and these results will be provided to you at the completion of the project.

Costs and Reimbursements:
There is no cost to you for participating in the study. As well, there is no reimbursement to you for participating in this study.

Injury and Compensation:
In the unlikely event that you suffer injury as a result of participating in this research, no compensation will be provided for you by the University of Calgary, the Calgary Health Region, or the study investigators. You still have all of your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agrees to participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have further questions concerning matters related to this research, please contact:

Janice M. Rae, RN, BN at 670-4709.

If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at 220-7990.

Participant's Signature: _____
Date:_____

Investigator and /or Delegate's
Signature:_____Date:_____

Witness' Signature:_____Date:_____

A copy of this consent form has been given to you to keep for your records and reference.

Appendix D

DATA COLLECTION FORM

DATA COLLECTION FORM

Triad #: _____

Patient

Age: _____

Gender: M F

Type of Surgery: Orthopedic Gynecological Thoracic Abdominal Plastics

Pain Score: _____

Family Member

Relationship to the patient:

Spouse/Significant Other Close Sibling Adult Child Parent

Age: _____

Gender: M F

Patient's pain score: _____

Nurse

Age: _____

Gender: M F

Years of Nursing Experience: _____

Type of Nursing Education: Diploma Baccalaureate Degree Master's Degree

Attendance at Pain Management Education Session in the last year: Yes No

Patient's Pain Score: _____

Appendix E

LETTER OF APPROVAL: CONJOINT HEALTH RESEARCH ETHICS BOARD

UNIVERSITY OF CALGARY

FACULTY OF MEDICINE

Office of Medical Bioethics
Heritage Medical Research Building/Rm 93
Telephone: (403) 220-7990
Fax: (403) 283-8524

2002-05-02

Dr. D. Hughes
Faculty of Nursing
University of Calgary
PF 2210
Calgary, Alberta.

Dear Dr. Hughes:

Re: **Post-Operative Pain Intensity Reported by Patients, Nurses and Family Members**
Student: Ms. Janice Rae **Degree: MScN**

GRANT ID: 15977

The above-noted thesis proposal and the consent form have been submitted for Committee review and found to be ethically acceptable. Please note that this approval is subject to the following conditions:

(1) a copy of the informed consent form must have been given to each research subject, if required for this study;
(2) a Progress Report must be submitted by 2003-05-02, containing the following information:
    (i) the number of subjects recruited;
    (ii) a description of any protocol modification;
    (iii) any unusual and/or severe complications, adverse events or unanticipated problems involving risks to subjects or others, withdrawal of subjects from the research, or complaints about the research;
    (iv) a summary of any recent literature, finding, or other relevant information, especially information about risks associated with the research;
    (v) a copy of the current informed consent form;
    (vi) the expected date of termination of this project;
(3) a Final Report must be submitted at the termination of the project.

Please note that you have been named as a principal collaborator on this study because students are not permitted to serve as principal investigators. Please accept the Board's best wishes for success in your research.

Yours sincerely,

Christopher J. Doig, MD, MSc, FRCPC
Chair, Conjoint Health Research Ethics Board

c.c. Dr. M. Reimer (information)
Ms. Janice Rae