AN EVALUATION OF A PROGRAM TO MANAGE ACUTE POSTOPERATIVE PAIN IN
THE FRAIL OLDER ADULT FOLLOWING HIP FRACTURE SURGERY

by

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B.S.N. University of British Columbia, 1983

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Date April 12/99
Abstract

The purpose of this study was to evaluate selected outcomes of the Frail Elder Pain Management Program (FEPMP) related to postoperative pain management following hip fracture repair at a community hospital. The FEPMP was based on standards of geriatric and pain management practice and consisted of education sessions for nurses and surgeons, pre-printed analgesic order forms, a pain management flow sheet, written resources, and clinical support. Application of the Logic Model as the conceptual framework to the FEPMP demonstrated the conceptual integrity of the program.

The hypotheses for the study focussed on measuring changes that occurred in:

1) surgeon's analgesic ordering practices, 2) nursing assessment related to pain, 3) nursing pain management practices. Research questions were related to 1) behaviours related to pain and delirium and overall pain control 2) the adverse effects of analgesia and 3) the use of psychoactive medications to control behaviours that may be related to pain.

The charts of 147 patients age 75 and older who had hip fracture repairs were randomly selected and audited from two baseline periods and one period two years after the program was implemented. There were 47 charts in baseline one, (1992-93) 50 charts in baseline two (1994-95), and 50 in the post-program period (1997-98).

There were 124 women and 23 men in the sample with an average age of 83 years. Sixty to 70 percent of the patients had a cognitive impairment and most had at least two chronic conditions. Patients in all three time periods were similar with respect to age, gender, cognitive status and number of pre-existing diseases. The post-program group patients were more likely to have pre-existing pain and a spinal anaesthetic postoperatively.
Pain management was more consistent with the standards of practice and patient outcomes improved post-program compared to the baseline periods. The surgeons’ prescription practices improved significantly as did the overall pain management practices of nurses. Pain assessment practice showed a modest improvement but this was not statistically significant. Behaviours indicative of delirium and pain were less common in the post-program group. The frequency of restlessness was significantly lower. Agitation, confusion and resistance to care were lower as well although these changes were not statistically significant. Despite more frequent analgesic dosing in the post program group, there was no increase in adverse effects of analgesia. Patient assessments for the first 48 hours postoperatively were reviewed and patients’ pain control was described as either good, adequate, poor or unable to be determined. Patients in the post program group were significantly more likely to have good to adequate pain control than the baseline periods where the level of pain control was usually either poor or unable to be determined.

The findings of the study were discussed in relation to the literature and methodological concerns inherent in the design were addressed. Implications for nursing practice, administration, and education were described and recommendations for future research were identified.
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CHAPTER ONE

Background to the Problem

One in three women and one in six men will sustain a hip fracture if they live to age ninety (Harvey, Cardwell, Apsley, Churchward, & Adcock, 1996). Falls that may result in fractures are among the leading causes of admissions to hospitals in British Columbia (Ministry of Health, 1997). People over age 75 who suffer fractures tend to have pre-existing problems with mobility, malnutrition, cognition, and continence. These factors are known to be markers of frailty (Buchner & Wagner, 1992; Rockwood, 1997; Woodhouse & O’Mahoney, 1997). Frail older adults are those who are usually over the age of 75 with diminished adaptive capacities and functional decline that may be due to a combination of age related changes, chronic medical and psychiatric illness, weakness and social losses. Their depleted reserves render the frail older adult susceptible to the stresses of having a hip fracture and subsequent hospitalization.

Hip fractures are most often repaired with a surgical fixation, a procedure that results in moderate to severe pain in the first few days after surgery (Harvey et al., 1994). Pain management is a critical consideration in the care of patients with hip fractures. Unmanaged pain after surgery often impairs mobility and results in an increase in the incidence of thrombosis, pneumonia, urinary retention, constipation and longer hospital stays (Agency for Health Care Policy and Research, [AHCPR] 1992). Unrelieved postoperative pain is a stressor that taxes the diminished reserves of the frail older patient with serious consequences including prolonged morbidity and premature death (AHCPR, 1992; Ferrell, 1996). Acute pain activates the stress response, which increases the cardiac and respiratory workload on systems that are often already compromised. A failing immune system renders the patient susceptible to infection. Delirium is
one of the key manifestations of the stress that accompanies the injury, hospitalization, surgery and anaesthesia in this population. Fifty to sixty percent of older patients with hip fractures will experience a delirium and its attendant cognitive impairment that will place them at high risk for poor pain management post surgery (Harvey et al., 1994).

Pain management is a process of: identifying pain, assessing and measuring the pain and its impact, selecting and implementing interventions to relieve the pain, evaluating the response to the interventions and titrating the interventions to suit the patient (Lamb, 1997). The goals of postoperative pain management are to provide maximum relief with a minimum of adverse or side effects to facilitate recovery.

Management of pain in the frail older person is a complex process. Nurses and physicians tend to underestimate and under treat pain in older patients (AHCPR, 1992; Parmelee, 1996). Patients who are cognitively impaired due to dementia and or delirium may not communicate in ways that are easily understood (Duggleby & Lander, 1994). The nurse who is with the cognitively impaired patient throughout the postoperative period and responsible for pain management is often deprived of verbal reports that help to guide interventions that relieve pain.

Pasero and McCaffery (1996) identify beliefs held by members of the health care team that are barriers to effective pain management in the elderly. These include the notion that lack of pain expression equals lack of pain, that pain is an inevitable part of ageing, and that pain perception diminishes with age. Opioid analgesics are the cornerstone of moderate to severe postoperative pain management (Pasero & McCaffery), yet many health care providers believe that these drugs are too risky to use in the management of pain in elderly patients. While opioids can be safely and effectively used to manage pain in frail older patients, providers have an
exaggerated fear of the side effects of analgesic therapy, especially respiratory depression. (AHCPR, 1992; Forman, 1996; Pasero & McCaffery, 1996). Some caregivers cling to the belief that postoperative pain is inevitable and harmless (AHCPR, 1992) and thus are willing to allow their patients to endure it rather than risk the adverse consequences of analgesic therapy.

The literature on pain management mirrored the observations this investigator was making in clinical practice in 1992. The clinical setting was the orthopaedic unit in a community hospital in an urban centre near Vancouver, British Columbia. The perception that pain is a significant problem and poorly managed in the frail elderly was not widely shared by the nursing staff and physicians who felt that current practice was meeting the patients' needs. To examine the practice of pain control for the older patient on the unit, a chart audit (Hunt & MacDonald, 1992) was conducted on 20 patients who were over age 70 who had hip fracture repairs at the hospital. Documentation related to pain was recorded on the medication administration record (MAR), the nurses' notes, and prescriptions for analgesics were written on the doctors' order sheet. The audit revealed that Demerol PRN via the intramuscular (IM) route was the sole analgesic ordered by the surgeons for 18 of the 20 patients. Three doses of analgesic were the median number received in the first 24 hours postoperatively. Three patients received no analgesic. Of the 20 patients, 12 had evidence of cognitive impairment documented in the nurses' notes. Assessment of pain and the response to analgesia were rarely recorded. The audit clearly revealed that the pain management assessment and intervention did not meet the standards of practice (AHCPR, 1992). Patients were receiving inadequate analgesia, physicians were ordering Demerol, a poor drug of choice due to toxic metabolites, and analgesics were being administered intra-muscularly (IM), again a poor choice for the elderly because of erratic
absorption due to age related changes in connective tissues (Forman, 1996).

The findings of the chart audit and a brief literature review were presented to the surgeons and nursing staff. In general, nurses and surgeons were dismayed at the low frequency of analgesic administration evident in the chart audit. Members from each group suggested that perhaps infrequent dosing was warranted i.e. that older patients were not having much pain or that opioid analgesia was not appropriate due to the patient's delirium. Several members from each group expressed their reluctance to medicate frail older patients with opioids due to the risk of respiratory depression. The surgeons were concerned that the nurses were not using the orders they had written to provide adequate analgesia. The nurses complained that the drugs and doses in the physicians' orders did not allow for individualizing the pain management of these complex patients. Following the discussions, surgeons and nurses in each group conceded that pain management in frail older patients was problematic. They expressed a need for clinical guidelines to aid in assessing pain and prescribing and administering analgesics for frail older patients.

In September of 1995, a program entitled the Frail Elder Pain Management Program (FEPMP) was launched on the nursing unit to improve the management of acute pain in frail older adults following orthopaedic surgery. The program was based on standards of practice extrapolated from the geriatric literature and the AHCPR (1992) guidelines for the management of acute pain. These standards addressed three key areas; assessment, intervention and documentation related to pain. The program activities focussed on reducing the barriers to adoption of the standards by providing education, clinical, and system supports. Education was geared to improving knowledge and attitudes of physicians and nurses. Clinical supports were
implemented to provide ongoing feedback and reinforcement of the standards. System supports
were designed to facilitate the use of the program tools including, readily accessible preprinted
physicians' order forms incorporating the standards, and a flow sheet to expedite timely,
pertinent documentation.

Problem and Purpose

While there was wide spread agreement among orthopaedic surgeons and nurses on the
orthopaedic unit that pain management practices had improved due to the program activities, the
program had never been formally evaluated. To date, there are no reports in the literature of
programs designed and evaluated to improve the management of acute postoperative pain in frail
older adults.

The purpose of this study was to evaluate selected outcomes of the program to manage
acute pain in the frail older patient post hip fracture repair, specifically in terms of changes that
occurred in: 1) surgeon's analgesic ordering practices, 2) patterns of nurses pain assessment and
practice, 3) the patient comfort levels; and 4) the frequency of adverse effects from the
analgesics. The escalating numbers of frail older adults, the serious consequences of unrelieved
pain, and the dearth of published reports of programs and evaluations for this population all
point to the need for research in this area.

Theoretical Framework

The conceptual framework used to guide the FEPMP evaluation is a theory based
evaluation tool known as the Logic Model. Theory based evaluation is a process that begins
with elucidating the theory underlying a program, specifying in detail the assumptions linking the
program activities and goals and providing a view of its conceptual integrity (Patton, 1986).
When the program is deemed conceptually sound, evaluation questions are posed and methods chosen to test the delivery of the service and then the linkages between the program assumptions and goals (Weiss, 1995). Theory based evaluation not only identifies outcomes, it also provides information on the vigour of the design and the appropriateness of the treatment in achieving the program goals. The Logic Model is a tool that assists stakeholders to articulate a program's theory by making explicit assumptions about linkages and activities necessary for the accomplishment of program goals (Julian, Jones & Deyo, 1995). The following section provides an introduction to the Logic Model and demonstrates its application to the pain management program used on the orthopaedic unit.

Introduction to the Logic Model

Wong-Reiger and David (1993) describe the Logic Model as a drawing representing the logical relationships among the program activities, the service delivery outcomes, the intermediate results of the activities and the ultimate outcomes. Lower order objectives such as changes in knowledge and attitude need to occur before higher level objectives such as changes in behaviour can be achieved. More value is ascribed to achieving higher level objectives such as changes in behaviour than to the lower levels such as changes in awareness (Patton, 1986).

Delineating the Logic Model can reveal conceptual flaws in a program that would jeopardize its success (Patton, 1986). The illumination of flaws in conceptualization provides an opportunity to rethink and redraft the program goals and activities in a way that is likely to result in success (Scheirer, 1994). The hierarchical and temporal nature of the model illustrates what is relevant to assess at a given point in time. For example, one is directed to assess the extent to which the program has been delivered, and changes in knowledge and attitudes prior to
assessing desired behaviour (Wong-Reiger & David, 1993). This helps to ensure that outcome evaluations are not conducted prematurely, before the program is fully operationalized. The Logic Model facilitates formal evaluation by directing evaluators to select realistic measures of program effects (Julian, Jones & Deyo, 1995; Weiss, 1995).

The development of the Logic Model (see figure 1), proceeds through seven phases: 1) identifying the ultimate goal and indicators of its achievement, 2) defining the target groups, 3) specifying the long term outcomes and indicators of achievement, 4) identifying the components of the program, 5) identifying short term outcomes and indicators of achievement, 6) defining the program activities and indicators of service delivery and, 7) examining the linkages between the activities and each level of outcome and goal (Dwyer & Makin, 1997).

In the first phase the ultimate goal is identified. The ultimate goal is the reason the program is conceived in the first place and represents an ideal state (Wong-Reiger & David, 1993). The ultimate goal serves as the basis for making comparisons between the ideal and the existing state. Phase two involves defining the target populations, those persons who are to receive the program. In phase three, the components, or groups of program activities that go together, are defined. For example, education and clinical support are program components that would have activities specific to each of them (Dwyer & Makin, 1997). Phase four involves specifying the long term outcomes or behaviours that would lead to the ultimate goal, and the indicators that these behaviours are evident. These behaviours could be formal standards from the literature or codes of behaviour valued by the stakeholders (Hilton, 1997). Phase five identifies the short term outcomes, or the knowledge, skills and attitude changes required before the long term outcomes will be attained.
Phase six identifies the process for achieving the desired outcomes (Dwyer, & Makin, 1997). Program activities are specified that facilitate achieving the objectives. The service delivery outcomes are also specified, describing how the activities will be organized, packaged and delivered, how participants will be recruited and retained, and the channels of communication (Wong-Reiger & David, 1993; Scheirer, 1994). In Phase seven, the linkages between each level of outcome and the program activities are examined to ensure that each objective is addressed by an activity and that there is no unnecessary duplication. Drawing a Logic Model results in a clear conceptualization of the program and a plan for service delivery. The model serves as a guide to program development, implementation and selection of realistic evaluation questions (Weiss, 1995).
Pain Management Program Framework Using the Logic Model

While the FEPMP was not designed with the Logic Model in mind, it has been used retrospectively to assist with the evaluation. Applying the Logic Model framework to the FEPMP provides a clear conceptualization of the program and the plan for service delivery.

There were three target groups for this program; patients age 75 and over who had a hip fracture and were not prescribed patient controlled analgesia (PCA). Patients with PCA pumps were part of another program which focuses on using a preprinted order set and a documentation system specifically designed for PCA. The other two target groups were orthopaedic surgeons who prescribed medications to relieve pain and treat the adverse effects of the analgesics, and nurses who were responsible for assessing patients, providing analgesia and managing the adverse effects of analgesia. Figures 2, 3, and 4 are diagrammatic representations of the Logic Models for these target groups.

In the FEPMP, patient comfort, is defined as the ultimate goal. The indicators of goal achievement include patient self report and identification of pain behaviours. The practice standards for nurses and surgeons are behaviours that lead to the achievement of the ultimate goal of patient comfort and are the long term outcomes of the program. These standards are summarized in Appendix A. They specify assessment of pain, prescription practices, administration of analgesics, evaluation of pain relief and detection and management of adverse effects. Systematic observation of practice and documentation reviews indicate whether these standards were applied consistently. Consistent, clinical application of these standards is the main focus of the FEPMP.
LOGIC MODEL

Goal

Patient Comfort

Target Group

Patients/Families

Long Term Outcome

Recipient of attentive, appropriate, analgesic care

Long Term Outcome Indicators

Patient satisfaction with:
1. Staff response to pain reports.
2. Relief of pain.
   In the first 5 days post-op patient able to:
   i) participate in turning, ambulation without pain >5 on 0-10 scale or pain behaviours indicative of severe pain
   ii) sleep for 4 hour periods.

Short Term Outcomes

Knowledge of:
- right to good pain management, patient role in reporting and managing pain.
- involvement in identifying pain behaviours, selecting interventions, evaluating patient response to interventions.

Short Term Indicators

Patient/family willingness to participate in assessment and choosing interventions

Service Delivery

Nurses will assess and teach patients/families.
**LOGIC MODEL**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Patient Comfort</th>
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<tr>
<td>Target Group</td>
<td>Nurses</td>
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**Barriers:** Belief that: “Pain is harmless and inevitable”  
Lack of pain report = lack of pain  
Frail patients can’t tolerate opioids  
Documentation is not a priority

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<th>Preprinted Orders</th>
<th>Pain Protocol</th>
<th>Clinical Support</th>
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<tr>
<th>Long Term Outcome</th>
<th>Nurses consistently apply the standards to the care of their frail older patients.</th>
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**Long Term Outcome Indicators**  
Application of standards reflected in:  
① Documentation on MAR.  
② Documentation on Pain Flow Sheet.  
③ Observations of nurse behaviours.  
• Nurses reporting a change in practice consistent with standards.  
• Nurses reporting benefits to patient as a result of employing standards.

**Short Term Outcomes**  
Knowledge re:  
• harmful effects of pain in frail elders.  
**Standards**  
• How to assess pain in older adults.  
• How/when to administer and titrate analgesia.  
• How to document - importance of documenting.

**Short Term Indicators**  
• Nurses report an intention to assess pain, administer analgesia and document as specified in the Education Sessions and Pain Protocol (based on the standards).

**Service Delivery**  
• Eight education sessions based on the standards - provided by Orthopaedic Educator.  
• Multidisciplinary pain rounds conducted twice a month (Geriatrician, Pharmacist, Educator, Staff Nurse, Surgeon).  
• Resource nurses available.  
• Physicians ordering according to the protocol.
# LOGIC MODEL

**Goal**
- Patient Comfort

**Target Group**
- Orthopaedic Surgeons

**Barriers:**
- Prefer Demerol
- Lack of trust in RN abilities
- Believe opioids too toxic
- Ordering could be time consuming

## Components

<table>
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<tr>
<th>Education Sessions</th>
<th>Preprinted Physician's Orders</th>
<th>Follow-up Meeting</th>
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<td>Problems with accessing/using orders.</td>
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### Long Term Outcome

- Physicians consistently ordering analgesics per standards.

### Long Term Outcome Indicators

- % of:
  - Preprinted Physician's Orders for acute pain OR all of these in Handwritten orders that include:
    - Range dosing.
    - Appropriate opioid (not demerol).
    - Use of oral, IV, subcut route (not IM).
    - Plain tylenol.
  - Surgeons express satisfaction with orders and willingness to continue using them.

### Short Term Outcomes

- Knowledge re:
  - the importance of managing pain.
  - appropriate analgesics.
  - preparation and monitoring of nursing pain management practice.
  - Development of Preprinted Orders.

### Short Term Indicators

- Physicians approve Preprinted Orders and report a willingness to use the Preprinted Orders for post-operative pain management of frail older patients.

### Service Delivery

- Education sessions content focuses on standards and overcoming barriers.
- Attended by at least 4/5 of the orthopaedic surgeons.
- Preprinted Orders readily available to surgeons.
According to the Logic Model, nurses and surgeons may require changes in knowledge, attitudes and skills prior to adopting desired behaviours and these are the short term outcomes of the program. For example, prerequisites to adopting the standards are knowledge of the harmful effects of pain in elders, and of how to assess, prescribe and administer analgesics. Indicators of achievement of the short term outcomes includes a reported intention among the target group members to enact the desired assessment, prescribing and analgesic administration behaviours.

The three program components, education, clinical support and system supports are logically linked to the short and long term outcomes of the program and focus on reducing the barriers to the adoption of the standards. The education component was geared to improving knowledge and attitudes of physicians and nurses. System supports facilitated clinical application of the standards and clinical supports enabled ready access to human and written resources that educate staff and reinforce desirable practice. Education was directed at improving the knowledge of and attitudes of the nurses and surgeons and consisted of written materials and didactic sessions. A written protocol summarizing the standards and key information related to the pain management program was developed and critiqued by an expert panel (see Appendix B). A preprinted analgesic order form was developed by the pharmacist, the geriatrician, and the orthopaedic nurse educator and ultimately approved by the orthopaedic surgeons. The form offers a range of analgesics, doses and routes as well as specifying drug management options for nausea and over sedation (Appendix C). A reference manual consisting of the protocol, the roles of key persons involved in the process of pain management, the physician’s preprinted orders, and the pain flowsheet were placed at the nurses station for ongoing reference.
Education sessions for the program were provided by the orthopaedic nurse educator and included a two hour workshop for all R.N.s, and a one hour information sessions for the surgeons (conducted during their weekly meetings). While the content for the physician and nurse sessions overlapped, the physician sessions emphasized how to order analgesics using the preprinted order forms. The nursing sessions focused on assessing the older patient, selecting an appropriate analgesic regime, titrating dosages and detecting and managing side effects. An outline of the education session can be found in Appendix D. Eight sessions were conducted by the orthopaedic educator to facilitate attendance of the target group.

System supports were implemented to encourage use of the preprinted orders and to facilitate documentation. Preprinted order forms were made available in locations where the surgeons write their postoperative orders. Nurses were urged to remind the surgeons to use the order forms for frail older patients. The unit clerk on the orthopaedic unit flagged the charts of patients with these orders to facilitate follow up by the resource nurses and the orthopaedic educator.

Traditionally, pain management practice had been recorded on the Medication Administration Record (MAR) and on rare occasions, pain assessments were recorded in the nurses notes. A committee of orthopaedic nurses designed a flowsheet to facilitate documentation according to the standards. The nurses were asked to document all aspects of pain management on the flowsheet and again document medications administered on the MAR. The staff nurses insisted that this redundant charting was necessary to reduce the chance of inadvertent double dosing. Please see Appendix E to view the flowsheet.

In addition to providing ongoing education sessions, additional clinical support was
instituted. The orthopaedic educator made rounds of the frail older patients to assess pain and coached assigned staff in the use of the protocol and the preprinted orders to deliver optimal pain management. Four experienced orthopaedic staff nurses respected by their peers, and with an interest in pain management served as clinical resources under the guidance of the orthopaedic educator. In addition to attending the education sessions, these nurses were expected to complete assigned readings and meet with the orthopaedic educator on a regular basis. The purpose of the meetings was to assist the resource nurses to meet their learning needs, identify and address barriers to the implementation of the program, and to discuss issues and concerns that emerge in enacting the resource nurse role. These nurses were available on a 24 hour basis to consult with staff regarding pain management of older patients. For role expectations of the resource nurses, see Appendix F.

Clinical support was provided by members of the interdisciplinary team. The geriatrician, pharmacist, and orthopaedic nurse educator conducted weekly rounds to review the patients with the assigned nurses in order to ensure that appropriate patients were included in the program and to make modifications to the treatment approach if warranted. The presence of the interdisciplinary team members highlighted the importance of pain management to the unit staff.

The program activities clearly linked with the defined short term outcomes of changes in attitudes and knowledge required by the surgeons and nurses. These activities could facilitate the adoption of desired behaviours that would lead to attentive, safe, and effective pain management thus achieving the ultimate goal of patient comfort. The application of the Logic Model affirmed the conceptual integrity of the FEPMP.
Study Hypotheses and Research Questions

The FEPMP was chiefly concerned with the adoption and consistent application of clinical standards to achieve optimal pain control with minimal side effects in the frail older patient. In the Logic Model the standards are the defined intermediate outcomes. The focus of this study was to test whether the FEPMP resulted in nurses and surgeons consistently adopting the standards of practice and to observe for selected patient outcomes.

The hypotheses tested were as follows:

1. Surgeons’ analgesic ordering practices are more consistent with the standards of pain management practice in the post-program period (1997-98) compared with practices in two baseline periods (1992-93 and 1994-95).

2. Nursing assessment documentation is more consistent with the standards in the post-program period compared with practices in two baseline periods.

3. Nurses’ recorded analgesic administrations are more consistent with the standards of pain management practice in the post-program period compared with practices in the two baseline periods.

The following research questions were addressed:

1. What is the frequency and the change in frequency of recorded adverse analgesic effects (vomiting, over-sedation, urinary retention requiring catheterization and pruritus) in the post-program period compared with the two baseline periods.

2. What is the frequency of recorded behaviours related to pain and delirium such as agitation, restlessness, confusion and resistance to turning in the post-program period compared with the...
two baseline periods.

3. What is the frequency of the use of psychoactive medications in the post-program period compared with the two baseline periods.

Significance of the Study

The evaluation can determine the success of the FEPMP in changing specific behaviours of nurses and physicians to achieve better pain control for older orthopaedic patients who have a high incidence of cognitive impairment. The results can give direction for improving the program and suggest that it would be worth while to trial the program in other areas with older patients. This study can provide an example of a program to manage pain in a complex older population post surgically and illustrates a systematic approach to evaluate selected outcomes.

Overview of the Thesis Content

This thesis is divided into five chapters. Chapter one provides the background to the problem, a description of the Logic Model framework and its application to the community hospital pain management program and outlines the purpose of the study. Chapter two reviews selected literature pertaining to the frail older population with respect to the impact of postoperative pain, factors that influence pain management, principles of pain management and studies that test the outcomes of programs implemented to improve pain management. Chapter three describes the design, the sampling strategies, the instrument, the data collection, and the statistical procedures that were used. In chapter four, the sample is described, and the findings are presented and discussed. The final chapter consists of a summary of the study and conclusions. Implications for nursing practice, administration, education and recommendations for future research are explored.
CHAPTER TWO
REVIEW OF THE LITERATURE

In this section, the foundation for the program evaluation of the FEPMP is expanded through a synthesis of the theoretical and empirical literature. The review is divided into four key areas of the literature: 1) the impact of inadequate postoperative pain management on the frail older adult, 2) factors that influence the pain management process, 3) the process of adequately managing pain in this population, and 4) studies that test the outcomes of programs implemented to improve pain management.

Impact of Inadequate Postoperative Pain Management

Decades of research have shown that the traditional approach to postoperative pain management, that is, nurse administered doses ‘as required’ (PRN) of intramuscular (IM) analgesics, leave 30 to 70% of patients suffering moderate to severe pain (Moote, 1993; Ward & Gordon, 1996). There is universal agreement among geriatric pain experts that acute pain management for frail older patients is even worse than for the general population (Egbert, 1996; Ferrell, 1996; Novy & Jagmin, 1997; Parmelee, 1996; Pasero & McCaffery, 1996).

The stress response evoked by inadequately managed pain may lead to cardiovascular complications, tissue breakdown, and impaired immune function. The immobility that frequently accompanies moderate to severe pain can result in pulmonary and thromboembolic complications (AHCPR, 1992), constipation, urinary retention, skin breakdown, and deep vein thrombosis (Creditor, 1993). Unrelieved moderate to severe postoperative pain may lead to changes in the dorsal horn of the spinal cord that prolong the pain experience and intensify the patient’s pain sensation with subsequent exposures to painful stimuli, a phenomena known as
pain sensitization (Al-Chaer, Westlund, & Willis, 1996). Poorly managed pain has been linked to psychological distress, prolonged recovery periods and increased use of health care resources (AHCPR, 1992).

Frail older adults who have age-related organ decline interacting with pre-existing morbidity may be at the highest risk of all patients for the adverse effects of the hip fracture and pain (Egbert, 1996). These patients do not have the reserve to cope with the stress response evoked by pain. For example the increase in the cardiac demands due to the stress of postoperative pain may lead to cardiac ischemia in a frail older patient, who also has coronary artery disease.

The immobility imposed by pain may result in a rapid decline in the frail patient's already diminished functional status. Elderly orthopaedic patients experience dramatic declines in muscle mass and bone density with even short term bedrest. While a young person on bedrest will lose about one percent of their muscle strength per day, an older person will lose five percent of muscle strength each day they are confined to bed (Creditor, 1997). Hirsch et al. (1990) report that the "older patient may experience a burden of new and worsened functional impairment during hospitalization that improves at a much slower rate than the acute illness" (p. 1296). Matheson and McConnell (1988) describe a "vicious cycle of dependency" that is fueled by the patients reluctance to move, low expectations of the elder's performance, and overly solicitous care. Dependent behaviour in the patient is reinforced and the patient's previous skills and abilities decline. Effective pain relief and efforts to promote mobility are paramount in the recovery of these patients.

Pain is a significant factor contributing to delirium in frail older patients (Duggleby &
Lander, 1994). Postoperative delirium is a transient form of cognitive impairment with an organic cause that is linked to functional decline, increased length of hospital stay and institutionalization following hip fracture repair (Hall & Wakefield, 1996; Kiel, Eichorn, Intrator, Stillman & Mor, 1994; Young, Brant, German, Kenzora & Magaziner, 1997). Estimates of the incidence of acute delirium in elderly postoperative patients with orthopaedic surgeries range between 30 and 60% (Duggleby & Lander, 1994; Harvey, Cardwell, Lapsley, Churchward, & Adcock, 1994). Effective pain management may reduce the incidence and severity of postoperative delirium (Duggleby & Lander, 1994).

Pain should be viewed in the context of the older person’s perceived quality of life (Ferrell, Wisdom, Rhiner, & Alletto, 1991). An unexpected traumatic event such as a hip fracture is laden with fear, anxiety and distress which can result in suffering. The fall and the resultant hip fracture results in many losses for the patient, not the least of which may be the patient’s autonomy. In addition to the physical harm that may be caused, older persons in pain may experience depression, social isolation and spiritual distress. Frail older patients are particularly sensitive to the affective dimensions of pain (Parmelee, 1996). The pain is a constant reminder of the injury and the hopes and fears associated with it (Egan, 1989).

The literature clearly illustrates that inadequately managed postoperative pain is hazardous to the body, mind and spirit of the frail older patient. The stress response evoked by pain draws heavily on the diminished reserves of the frail patient and can result in complications and increased health care utilization. The loss of function and the psychological and spiritual distress caused by the injury can have long lasting consequences to the patient if the management of pain is not made a priority in the postoperative care.
Factors Influencing Pain Management

Factors that are specific to: a) patients, b) health care providers, c) and institutions will ultimately influence the quality of pain management practice. Older patients' attitudes, the high incidence of cognitive impairment and age related changes in physiological function can impede pain management. Health care providers may have inadequate knowledge and may also hold ageist attitudes that can prohibit exemplary practice. Practice changes are not likely to occur without an institutional commitment to pain management including ongoing education, standards and quality improvement initiatives. A knowledge of factors in these three key areas; patients, health-care providers, and institutions, helps to guide the planning and evaluation of pain management programs. Each is separately addressed in the following discussion.

Patient Factors

Patient related factors may hinder the process of pain management. Older patients may hold attitudes that lead them to suffer in silence. The pain of patients with cognitive impairment may go undetected and untreated by providers. Age related changes impact the pharmacodynamics of analgesics and complicate the practice of pain management. These three factors are discussed in more detail below.

Attitudes of Patients

Patient knowledge and attitudes can adversely effect efforts to relieve pain. Pasero and McCaffery (1996) advise that patients, particularly older ones have, “... an unhealthy respect for health care providers. Because of their desire to be seen as good patients coupled with a pioneer spirit typical of their generation, they are likely to suffer pain stoically” (P.9). Older patients
expect to have pain and fear the undesirable effects of analgesics including addiction, sedation and constipation (Ferrell, 1996). Patients are known to express high levels of satisfaction with their pain control despite reporting high levels of pain (Ward & Gordon, 1995). Patients who are satisfied with the status quo are not likely to demand good pain management.

**Cognitive Impairment**

Cognitive impairment significantly impedes the older person’s ability to communicate and participate in pain assessment and places him or her at high risk for inadequate pain management. Cognitive impairment can be either irreversible as evidenced in individual’s experiencing a dementia such as Alzheimer disease or it may be reversible as evidenced in individuals experiencing a delirium usually due to a treatable organic cause. Cognitive impairment is a form of brain failure that negatively affects the processes by which knowledge is acquired, retained and used (Abrams, Beers, Berkow & Fletcher, 1995). Approximately 47% of persons over the age of 80 have pre-existing irreversible cognitive deficits (Parmelee, 1996). These patients are at high risk to develop a delerium superimposed on their dementia when acute illness occurs (Buckwalter & Buckwalter, 1998; Hall & Wakefield, 1996). Forty to 60% of patients with hip fractures will develop delirium, “a clinical state characterized by fluctuating disturbances in cognition, mood, attention, arousal, and self-awareness, which arises acutely either without prior intellectual impairment or superimposed on chronic intellectual impairment” (Abrams et. al, 1995, p. 1141). The diagnostic criteria for delirium include: 1) evidence of disorganized thinking as evidenced by incoherent, rambling or irrelevant speech, 2) diminished level of arousal, 3) perceptual disturbances, 3) disturbed sleep-wake cycle, 4) altered psychomotor activity, 5) disorientation, and 6) memory deficits (American Psychiatric
Patients with delirium often become very anxious and agitated or withdrawn and may think in paranoid ways (Abrams et al., 1995).

Patients who have cognitive impairment due to dementia or delirium tend to under report pain and when they do report pain, health care providers may consider the reports invalid (Parmelee, 1996). Caregivers are often reluctant to administer opioids to cognitively impaired patients for fear of increasing the confusion (Pasero & McCaffery, 1996). Patients who exhibit anxiety and agitation due to delirium may be medicated with psychoactive medications in an effort to control this behaviour. This may lead to further under reporting of pain, under medication, and a worsening of the delirium (Marcantonio et al., 1994). Duggleby and Lander (1994) explored the relationship between pain, pain treatment and cognitive status in a population of postoperative patients between the ages of 50 and 80 years old who had undergone surgery for a total hip arthroplasty. They concluded that pain was poorly managed and that the poor pain management was a predictor of mental status decline. Health care providers are advised to assume that pain is present and to treat the patient accordingly (Pasero & McCaffery, 1996).

**Age Related Physiological Changes**

Pain management in older people is complicated by physiological changes that occur in hepatic, renal and circulatory functions, that predispose the patient to the adverse effects of analgesia. These changes are intensified by chronic disease, organ damage, exposure to toxins, malnutrition and deconditioning that occur in varying degrees in the population. Popp and Protenoy, (1996) observe that “the degree of variability in the elderly compounds the challenges posed by the narrow window between efficacious and toxic doses” (p. 22).
Egbert (1991) and Forman (1996) note that physiological changes impact on the pharmacokinetics of analgesics and render their effects more pronounced in the older person. Physiological changes that occur alter the distribution, metabolism, clearance and excretion of drugs. Distribution is diminished by the increased proportion of fat, and the decline in lean body mass that causes lipophilic medications to be stored for longer periods of time. The overall decrease in fluid volume and a decrease in serum proteins results in a higher plasma concentration, higher peak action and a longer duration of action than in younger patients.

Drug metabolism is slowed due to a decrease in: the quantity of hepatic enzymes, hepatic blood flow and the liver mass that occurs with ageing. These changes result in a prolonged action of the drug and a delay in the clearance and excretion of metabolites by the kidneys. Excretion of drugs is impacted by changes in the kidney including a decrease in renal mass, blood flow, glomerular filtration rate and tubular secretion that impede the clearance of analgesics and increase the concentration of metabolites (Popp & Portenoy, 1996).

These physiological changes place the older person at high risk for the adverse effects of analgesics. While Morphine is the drug of choice for the elderly, it has two metabolites, 6 glucuronide, a potent analgesic and 3 glucuronide, a nonanalgesic toxin. These two substances are cleared and excreted by the kidneys. When clearance and excretion are delayed due to declines in renal and hepatic function, the patient may experience drowsiness, dysphoria and nightmares due to central nervous system toxicity. Demerol, a commonly prescribed postoperative analgesic, is not recommended for the older population. Demerol, and its neurotoxic metabolite normeperidine have decreased renal clearance and are associated with twitching, seizures, and delirium (Forman, 1996).
Analgesics adversely impact the urinary and gastrointestinal processes. Urinary retention is a common adverse effect of opioids, especially in elderly men with prostatic hypertrophy, although the mechanism behind it is not well understood (AHCPR, 1992). Changes in the gastrointestinal system include an increased gastric pH, decreased gastric surface area, decreased intestinal blood flow and diminished bowel motility (Popp & Portenoy, 1996). While these changes do not significantly affect drug absorption, they do render the older person more susceptible to gastric ulceration secondary to NSAID use. Administration of Raniditine or Misoprostal may serve to protect the stomach from the irritating effects of NSAIDs (Pasero & McCaffery, 1996). Opioids will decrease bowel motility compounding the frail older person’s tendency to constipation. Constipation can be managed through the implementation of a bowel protocol that includes monitoring, use of lubricating agents, bowel stimulants and, when the patient can tolerate it, a high fluid and fibre diet (Ferrell & Ferrell, 1992).

While the age related changes render the older person more susceptible to the adverse effects of analgesics, appropriate analgesic therapy can be used safely and effectively. Clinical implications include the need for a cautious, individualized approach to dosing, careful monitoring and management of over sedation, urinary retention, constipation and avoidance of the drug, Demerol. The key to effective management is individualized assessment and treatment based on a knowledge of age related changes and anticipated adverse effects.

Knowledge and Attitudes of Health Care Providers

Deficient knowledge and ageist attitudes concerning pain in older adults can have a negative impact on practice. Pain management has not been a priority in the preparation of physicians and nurses. The neglect of pain management in medical education is denounced by
many authors (AHCPR, 1992; Ferrell, 1995; Harmer, 1991). Puntillo (1997) observes that nurses are taught to be far more concerned with the side effects of analgesics such as sedation and confusion than with the consequences of unrelieved pain including cardio-vascular and respiratory complications and the potential for pain sensitization. The belief that unrelieved pain is benign while pain management techniques are potentially harmful has resulted in resistance by some providers to efforts to improve pain management (AHCPR; Puntillo, 1997).

Herr and Mobily (1991), urge providers to be aware of personal biases that may colour how they interpret the verbal reports and pain behaviours of older patients. Pasero and McCaffery (1996) identify beliefs held by members of the health care team that are barriers to effective pain management in the older adult. These include the notion that pain is an inevitable part of ageing, that pain perception diminishes with age, that people who don’t complain are not having pain and that opioids are too risky to use with older patients. These ageist beliefs hamper pain assessment and intervention.

Gordon, Dahl and Stevenson (1996) charge that the most compelling reason for inadequate pain control is a lack of accountability among providers. Von Gunten and Roenn (1994) note that health care workers are not subject to administrative review for their patient’s suffering the way they would be for other clinical failures. Health care providers may be more committed to avoiding the relatively low risk of respiratory depression than they are to achieving their patients’ comfort.

Institutional Commitment

Gordon, Dahl and Kunz Stevenson (1996) argue that for pain management programs to succeed, there must be an institutional commitment that involves changing practice to meet
standards. Firmly entrenched institutional habits such as: cumbersome documentation systems, patterns of PRN dosing and administration of IM Demerol are barriers to pain control (AHCPR, 1992; McCaffery, 1996). There is a substantial body of literature that describes strategies for improving pain management in institutions through the use of quality improvement initiatives. (American Pain Society Quality of Care Committee [APSQCC], 1995; Barnason et al, 1998; Ferrell, Whedon, & Rollins, 1995; Gordon et al, 1996).

An institutional commitment to pain management begins with establishing an interdisciplinary planning group consisting of representatives from at least nursing, pharmacy and medicine to promote joint accountability for the program. (AHCPR, 1992; Barnason, Nerboth, Poezl, & Tietjen, 1998). “In order to achieve quality pain management we must influence the practice of all disciplines” (Gordon et al., p.12)

The need to develop guidelines or standards of practice based on the AHCPR (1992) guidelines is a recurrent theme in the literature. (Gordon, et al., 1996; Moote, 1993; Maxam-Moore, Wilkie, & Woods, 1994). “The standardization and stabilization of nursing practice related to pain management is an essential aspect to improving patient clinical outcomes” (Barnason et al., 1998 p. 35). Standards provide direction for clinical practice. For program planners, guidelines and standards direct the design of activities and can serve as the measure of program success. Visible, pertinent, consistent, pain documentation is a standard that is vigorously promoted in the literature (AHCPR, 1992; APSQCC, 1995; Gordon et al., 1996; McCaffery & Beebe, 1989 ). “When assessments of pain and pain relief are performed and documented it is difficult to ignore unrelieved pain” (Gordon et al., 1996, p. 18). Standards should also be developed to guide the appropriate use of pharmacological interventions to
manage pain (AHCPR, 1992; Moote, 1993). Protocols to support optimal analgesia should be readily accessible along with explicit policies for the use of advanced technologies including monitoring, intervening, and documenting adverse effects (APSQCC, 1995; Gordon et al., 1996).

Once standards have been established, the current state of pain management should be described. Current practices can then be contrasted with the standards, providing in many cases, evidence of the need for change (APSQCC, 1995; Barnason et al, 1998; Ferrell, Whedon, et al. 1995; Gordon et al, 1996). The description can be used as a baseline to measure changes in practice following implementation of strategies to improve pain management (Ward & Gordon, 1996). Ongoing monitoring of outcomes is an important interdisciplinary responsibility (Gordon et al. 1996). Indicators of pain management quality monitoring have been identified by Ferrell, Whedon, et al. (1995) and Gordon et al. (1996) as:

- institutional assessment of structures that support pain relief e.g. available treatment modalities, standards and protocols, flowsheets and education provided.
- periodic surveys of patients to determine pain intensity, expectations and goals for pain relief, satisfaction with staff response, impact of pain on quality of life and adequacy of discharge instructions.
- chart audits to determine the nature and frequency of documented pain assessment and the prescribing and administration of analgesics.
- chart audits of the incidence and severity of side effects.
- chart audits of the incidence and rate of complications associated with treatments.
- analysis of costs related to pain e.g. rates of re-hospitalization, length of stay etc.
The factors discussed in this section have a significant influence on pain management practice. Older patients are more likely to be under or over medicated due to inappropriate attitudes, communication deficits and inadequate knowledge of both patients and providers. Older patients with stoic attitudes and those who strive to be good patients are unlikely to demand and receive optimal pain control. Those with cognitive impairment may not communicate pain in ways that are easily understood and are at high risk for under treatment. Ageist attitudes that result in under treatment of pain by providers include the erroneous belief that pain perception decreases with age and that patients who do not complain are not experiencing pain. Medical and nursing education may not prepare providers for the complex skills required to manage pain in the elderly.

The variable age related declines in organ function render some older patients susceptible to the adverse effects of analgesics unless a careful, individualized approach to dosing is taken. Providers who are unaware of the impact of age related changes may inadvertently over medicate older patients. On the other hand, providers attempting to avoid harmful side effects such as delirium and respiratory depression, may err on the side of caution and administer lower doses of analgesics than required to control pain.

Improvements in pain management practices are clearly warranted however these changes are not likely to occur without an institutional commitment to pain management. Institutional support for pain management includes developing and implementing standards of practice, education and ongoing quality improvement initiatives.
The Process of Adequate Pain Management

The management of postoperative pain is a multidisciplinary effort that primarily involves: the patient in pain and his or her family, the physician who prescribes the analgesic and the nurse who assesses the patient and administers the analgesic. As previously mentioned, pain management is a process of: identifying that a patient has pain, assessing and measuring the pain and its impact on the patient, selecting and implementing interventions to relieve the pain, evaluating the patient’s response to the interventions and titrating the interventions to suit the patient (Lamb, 1997). The review that follows includes literature related to the process of pain management, and is presented under two main headings, assessment and intervention.

Assessment

The successful management of postoperative pain is dependent upon identification that pain exists, assessment of pain intensity and its impact on the patient, and monitoring the patient’s response to interventions (Lamb, 1997). As previously noted, older patients tend to under-report pain and may not use words or behaviours that are typically associated with pain (Pasero & McCaffery, 1996). Providers should assume that pain is present after trauma and surgery, even in the absence of typical behaviours and complaints of pain (Egbert, 1996). The impact of unrelieved postoperative pain can be observed by monitoring the patients’ ability to breathe deeply, cough, turn in bed, participate in prescribed exercises, mobilize, and sleep (AHCPR, 1992).

Pain assessment in the frail older adult may be complicated by diminished cognitive status, concurrent illness, painful conditions, and visual and sensory impairment. Parmelee, Smith and Katz (1993) found that mild to moderate cognitively impaired elderly patients are able
to communicate pain using a pain intensity scale. The Wong Baker Faces Scale, the verbal descriptor scale and the 0 - 10 numeric scale have been used successfully with older patients (Pasero & McCaffery, 1996). Duggleby and Lander (1994) warn that exclusive use of the pain intensity scale is a "unidimensional" assessment that results in an "impoverished construct" (p 20) for the measurement of the pain experience in the elderly. Given the prevalence of comorbid conditions and chronic pain in the older population, it is essential that these areas be included in the admission assessment. The impact of chronic pain on the patients activity, mood and sleep and the high incidence of depression in persons with pain should also be examined along with the strategies the patient uses to cope with the pain (Ferrell, 1993; Novy & Jagmin, 1997). Pre-admission analgesic use may reveal a tolerance to opioids that ought to be considered in postoperative analgesic dosing.

Consideration related to the environment and the quality of assessment tools are important for older adults who may be visually, hearing and or cognitively impaired. The assessment should be conducted in a quiet environment with adequate nonglare lighting, and proceed at a slow pace. The patient should have visual and hearing aids in place. Pain scales and teaching materials, adapted with large print and pictures, should be provided and accompanied by a demonstration of their use, where required (Herr & Mobily, 1991).

Assessment of Cognitively Impaired Patients

While self-report of pain using a pain scale is the most reliable indicator of pain intensity (McCaffery & Beebe, 1989), a pain scale rating would not be an appropriate indicator for those who lack the requisite cognitive abilities due to a severe dementia or delirium. Although the presence of universal pain cues has not been verified, nurses should be attuned to facial
expressions, vocalizations, rigid posture, unwillingness to mobilize as well as agitated and aggressive behaviours that often herald the presence of pain (Pasero & McCaffery, 1996). The literature on patients with dementia in extended care settings provides some useful direction for pain assessment in this population. Marzinski (1991) found that nursing staff on a dementia care unit inferred pain by detecting subtle, behavioural changes in their patients. Parke (1995) noted that nurses in an extended care setting, observe appearance, behaviour and sounds to successfully determine pain cues of known patients with severe cognitive impairment. For patients who are unable to report pain using the pain scale, pain behaviours specific to that patient should be identified (Parke, 1995). The indicator of comfort for the severely cognitively impaired patients is a lessening of pain behaviours specific to the patient. Nurses on surgical units rarely have the opportunity to know their patients prior to the immediate postoperative period and may be unable to detect subtle cues that indicate pain. Consultation with family / caregivers to determine the unique pain behaviours of the patient may assist the nurse to better assess the patient.

The absence of typical pain behaviours does not equate to the absence of pain (Ferrell, 1996; Parmelee, 1996). Many patients with dementia and chronic pain fail to display these typical pain behaviours while experiencing known pain producing events. Verbal reports and observation of a person's specific pain behaviours provides the only known access to the person's pain experience (Loeser & Egan, 1989). Again it is important to assume that pain is present following the trauma of the hip fracture and the surgery.
Assessing Analgesic Efficacy

Assessment of the patient's response to the analgesics is integral to pain management. The safe and effective administration of analgesia is achieved by titrating the medication based on the patient's response. Pain intensity and sedation should be assessed prior to analgesic dosing, during peak effect, and a minimum of every four hours for the postoperative course (Pasero & McCaffery, 1996). Assessments should also be made during and after painful activities such as mobilizing and dressing changes (Gordon, Dahl & Stevenson, 1996). Analgesic side effects including nausea, sedation, pruritus, delirium, constipation and urinary retention should be anticipated, assessed and addressed (Egbert, 1996; Forman, 1996).

The American Pain Society (1992) argues that the most common reason for under treatment of pain is the failure of staff to assess and document pain assessment. Documented pain assessments make pain visible and difficult to ignore (Gordon, Dahl & Kunz Stevenson, 1986). The presence of chronic and acute pain should be documented including analgesics and other therapies the patient has been using to control pain. Flowsheet documentation enables the nurse to rapidly record the intervention, the patient's response to it, and facilitates ongoing evaluation (McCaffery & Beebe, 1989).

The literature regarding pain assessment reflects the complex nature of managing pain in the older person. Nurses are advised to assess pain on admission and at regular intervals in a quiet environment using appropriate tools. The high prevalence of comorbid conditions, drug use and depression are important facets of assessment. Involving the family / caregivers in the assessment helps to determine the unique pain behaviours of the cognitively impaired patient.
Interventions

The literature related to interventions promotes a preventive approach to pain management, the use of combinations of preferred medications, preferred routes, a cautious, individualized approach to the titration of analgesia and anticipation and minimization of adverse effects from the analgesia (Gordon, Dahl & Stevenson, 1996). To prevent pain, analgesics should be administered on a regular time schedule rather than on an as needed (PRN) basis. Pasero and McCaffery (1996) report that the PRN method of dosing leads to under treatment of pain partly because it relies upon the patient to request pain medication and older people are often reluctant to ask. Regularly scheduled dosing of analgesics helps to prevent pain by maintaining a therapeutic blood level of analgesia (Novy & Jagmin, 1997).

Pasero and McCaffery (1996) recommend using a balanced approach to analgesia, combining agents thereby reducing the chance of toxic effects from any one agent. Morphine is considered the drug of choice for managing moderate to severe pain in the elderly (Forman, 1996; Novy & Jagmin, 1997). While morphine does have serious side effects, it is an effective pain reliever and is less toxic than some of the other opioids. Demerol, a commonly prescribed postoperative analgesic, is not recommended due to its neurotoxic metabolites (AHCPR, 1992; Forman, 1996). Delirium is associated with postoperative administration of Demerol (Marcantonio et al., 1994).

The combination of an opioid with acetaminophen or a nonsteroidal anti-inflammatory drug (NSAID) can create synergistic benefits because both acetaminophen and NSAIDs act at the site of injury and help to control the mediators of inflammation, while the opioid exerts its effect on the central nervous system. This reduces the dose requirements and thereby the risk of
adverse effects associated with an opioid (Pasero & McCaffery). NSAIDS should be used with caution in older patients as their main side effects are delirium and gastro-intestinal irritations (Egbert, 1996).

The oral route should be used whenever possible (AHCPR, 1992), however, in the immediate postoperative period the patient may not be able to tolerate oral medication and may require parenteral analgesia. The intravenous (IV) route is preferred over other parenteral routes because it facilitates rapid analgesia. The subcutaneous route is also acceptable, although medications are less reliably absorbed than through the IV route and the drug delivery may be damaging to tissues. Egbert (1996) recommends using spinal opioid for the cognitively impaired patient undergoing major surgery due to the decreased opioid requirements and the excellent analgesia it provides. The spinal route however, is associated with an increased incidence of respiratory depression and requirements for greater physician expertise and nursing time (Egbert, 1996), commodities that may not be readily available in community hospitals. The commonly used intramuscular (IM) route should be avoided as it is painful, damaging to tissue, associated with episodes of hypoxia, and the absorption of the drug tends to be unpredictable (AHCPR, 1992). Egbert (1996) recommends using IV-PCA to avoid the delay between pain and pain relief as well as the variable drug level and the dose dependent respiratory depression associated with IM injections. PCA is not an appropriate modality for those who lack the cognitive and executive skills to use it, that is, those with delirium and or dementia or those who are very weak (Egbert, 1996). Therefore PCA would have limited use in the postoperative period for frail patients with hip fracture repairs.

Age related declines in the hepatic, renal, and circulatory functions occur in varying
degrees throughout the older population necessitating an individualized and cautious approach to dosing (Egbert, 1996). In general the maxim for dosing is to "Start low and go slow", that is, start with half the usual adult dose and titrate up to find the level of maximum comfort with minimum side effects. Providers are urged to introduce new drugs slowly and monitor the patient's response carefully (Ferrell & Ferrell, 1992; Harkins, Price Busch & Small, 1994; Pasero & McCaffery, 1996). Providers should verify whether patients are tolerant to opioids in addition to determining their general health status before restricting themselves to a conservative dosing approach, otherwise some patients may suffer due to under dosing (Harkins et al.).

Adverse effects frequently occur during analgesic therapy. Constipation is an expected consequence of opioid therapy and requires a preventive approach that may include diet, increased fluids, stool softeners and laxatives (Ferrel, 1995). Over sedation and respiratory depression may be managed with the gradual administration of naloxone (narcan), a narcotic antagonist agent (AHCPR, 1992). Nausea and vomiting may be managed with antiemetics. Antiemetics should be used sparingly in frail older patients due to their potent anticholinergic effects (Marcantonio et al., 1994). Administration of antiemetics should begin with half the usual adult dose (eg. 25 mg. of Gravol or 5 mg. of Stemetil). Urinary retention may be managed with intermittent catheterization. Treatment of pruritus may include the use of topical lotions such as calamine and or low doses of naloxone or benadryl (AHCPR, 1992). Patients who are experiencing delirium due to analgesics may improve if their analgesic dose is decreased or if an alternate analgesic is used (Pasero & McCaffery, 1996). Benzodiazepines typically used to manage agitation and or calling out behaviours are contraindicated in the postoperative period as they mask pain and may escalate the delirium (Marcantonio et al., 1994).
Outcome Evaluations of Pain Management Programs

There is a dearth of pain related research in the frail older patient. Apart from isolated studies on specified drugs or modalities, programs implemented and evaluated to improve nursing and medical pain management practice were not reported in the literature reviewed. However, studies have been done that test outcomes of pain management initiatives in the general population and these are discussed below. To be included in this review, the study had to include a systematic measurement of the impact a program had on practice including at least one of the following: assessment, prescription of pharmacological agents and administration of pharmacological agents. Table 1 provides an overview of these studies.

Humphries, Counsell, Pediani and Close (1997) measured the effects of prescribing guidelines on physicians’ prescribing practices. Appropriate prescribing practices were defined, and concise written guidelines for prescribing were provided to physicians. The pharmacy department conducted an audit of prescribing practices prior to the distribution of the guidelines and then one year later. A total of 242 prescriptions were examined, 120 in the pre-guideline period and 122 in the post-guideline period. While the results showed a significant decrease in the number of inadequate prescriptions, the overall level of improvement was lower than expected and the authors concluded that “a more directive rather than an advisory stance…” (p 748) was required to change entrenched patterns of practice.

Barnason et al. (1998) measured outcomes following the completion of a Self-Study Pain Management Module. The module reviewed pain management principles, pharmacology and clinical standards. Each section contained readings, a summary of key principles and application exercises. Using convenience sampling, the researchers assessed the knowledge
levels of 125 nurses, surveyed patient satisfaction and pain ratings of 47 patients and audited their charts to determine prescribing and administration behaviours. Validity and reliability of the patient interview and chart audit were not established. Pre and post testing of the nurses' cognitive abilities showed a significant improvement in the post-program group. While they reported an improvement in pain management practice, 62% of the patients reported moderate to severe pain and 48% of the patients received IM injections. Patient satisfaction was high but this has been disputed as an indicator of good pain management practice (Donovan, 1990; Ward & Gordon, 1996). As well, there was no baseline data to support the claim that practice had improved as only post-program measures were used in the patient sample.

Franke, Luiken, de Schepper et al. (1997) and Dalton et al (1996) each used a time series design and surveyed nurses to assess their knowledge and reported practice changes before and after an education program. The goal of both programs was to improve knowledge related to pain assessment and pharmacological and non-pharmacological interventions. Both studies reported modest gains in assessment and documentation, based on the nurses self report. The program evaluated by Franke, Luiken, de Schepper et al. was provided in eight weekly sessions of three hours each to a convenience sample of 48 nurses. A control group of 58 nurses was used as a comparison. Sessions were student directed and used discussions, case studies, readings and audio visual materials. Dalton et al. conducted 209 chart audits to monitor changes in documented assessments and interventions. Improvements in the quality of assessments documented did not begin to occur until six months after the program. The delivery of the program evaluated by Dalton et al. was not described. In both studies, the researchers concluded that clinical policies and interdisciplinary support were lacking and this hampered their success.
Faries et al (1991) and Voigt et al (1995) measured patient pain intensity ratings, nursing documentation and analgesic provisions as outcomes following the implementation of a pain flow sheet. Faries et al focussed on oncology patients and compared a treatment group of 20 patients, where a flowsheet was implemented with a control group of 23 patients where pain assessment continued to be documented on the nurses notes. The treatment group reported significantly lower pain intensity ratings. Using a pre experimental pre and post test design, with patient surveys and chart audits, Voigt et al noted improved documentation, lower pain ratings and more pain medication administered to cardiac surgery patients in the post test group. The researchers of both studies concluded that systematic visible assessment of pain leads to better efforts to control pain.

Ward and Gordon (1996), measured the effects of a pain management program consisting of: 1) the education of unit staff nurses to serve as Pain Resource Nurses for their peers, 2) monthly pain case conferences, 3) pain assessment flow sheets, 4) readily available reference cards and 5) ongoing presentations by pain experts. Methods to evaluate the program included a patient survey, a post discharge telephone survey and a chart audit. The researchers found that patients had high satisfaction levels with pain management both at base line and after the initiatives were implemented, however pain intensity ratings were unchanged from an average of seven on the 0-10 pain rating scale. Analgesics continued to be prescribed and administered PRN. The researchers noted a need for concrete tools to guide the prescription and administration of analgesics. They also speculated that the two year time frame of the study may have been too soon to see the impact of the initiatives.

Howell, Foster, Hester, Vojir and Miller (1996), reported on a process evaluation of a
pediatric pain management research utilization program that was successful in changing practice. The program was implemented on an inpatient paediatric unit and consisted of education, system and clinical support designed to improve pain assessment, intervention and documentation consistent with the principles of the American Pain Management Guideline Panel. Five formal education sessions were conducted on topics related to pain physiology, assessment, intervention and documentation. Clinical support was provided by program educators and a unit-based staff nurse liaison. Flow sheets and paediatric assessment tools were developed to facilitate ongoing assessment and documentation. The program instruments and content were modified on an ongoing basis in response to participant feedback. Findings included self reports of increased knowledge and perceived benefits from the program by the staff, and greater than anticipated documentation on the assessment forms. Analgesic prescribing and administration practices were not reported, nor was information on patient outcomes. Implementation of the flowsheet, the staff nurse liaison and the willingness of the educators to modify the program and tools in response to feedback were critical factors in staff decisions to adopt the desired behaviours.

The studies reviewed used samples from a range of settings including home care, paediatric, and general medical surgical populations. Most of the studies evaluated the impact of education and or the implementation of flow sheet documentation. While the documentation studies demonstrated improved pain management, education programs alone were not entirely successful at changing practice. Modifying the program and its tools in response to participant feedback was described as an important factor in the success of the program evaluated by Howell et al. (1996). Delaying the evaluation to ensure that program effects had an opportunity
to emerge was important.

Three main methods were used to assess pain management practices: 1) provider assessments of knowledge and self report of practices, 2) patient assessments of satisfaction, and pain ratings. 3) chart audits of assessments, pharmacological prescription, patterns of administration, and adverse effects. The chart audit has been promoted as an effective method to evaluate the documented assessments, pharmacological interventions, patterns of pharmacological administration, and adverse effects (Ferrell et al., 1991). While several studies used patient pain ratings and or satisfaction surveys, they all excluded patients with language barriers or communication deficits. Severely cognitively impaired patients may not be able to respond to rating scales and satisfaction surveys because they lack the requisite cognitive skills.

Summary of the Literature Review

The review of the literature provides a synthesis of the theoretical and empirical literature. The review focuses on four key areas of the literature: 1) the impact of inadequate postoperative pain management on the frail older adult, 2) factors that influence the pain management process, 3) the process of adequately managing pain in this population, and 4) studies that test the outcomes of programs implemented to improve pain management.

Inadequately managed postoperative pain is hazardous to the body, mind and spirit of the frail older patient. The stress response evoked by pain draws heavily on the diminished reserves of the frail patient and can result in complications and increased health care utilization. A number of factors were identified that influence pain management.
<table>
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<tr>
<th>Study</th>
<th>Purpose</th>
<th>Sample/ Setting</th>
<th>Design / Methods</th>
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<td>Barnason et al. 1998</td>
<td>To measure clinical outcomes following the introduction of pain standards and a pain management education program: cognitive knowledge of nurses, patient satisfaction with pain management, consistent practice patterns of pain management.</td>
<td>1) Convenience sample of 125 nurses. 2) Convenience sample of 47 adult acute medical and surgical patients.</td>
<td>Program evaluation with multiple measures. 1) Patient Satisfaction Interview using a structured guide post-program only. 2) Measurement of pain management experience. Concurrent chart audit with nurse and patient interviews post-program only. 3) Nursing cognitive assessment of pain management knowledge pre and post program. Validity and reliability established.</td>
<td>Claimed an improvement in pain management practice although no baseline data were collected. Improvement in nurses knowledge levels based on pre &amp; post program comparisons. Only 38% of patients achieved an acceptable level of pain control. 48% of patients received IM injections.</td>
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<td>Dalton et al., 1996</td>
<td>To determine whether education changes knowledge and pain management practices: assessments, and analgesic choices.</td>
<td>Convenience sample of 29 home care nurses Setting: Rural home care, North Carolina.</td>
<td>Quasi-experimental time series design. Measurements at 5, 10, and 12 weeks, 6 months and 1 year after the program. Repeated testing of nurses' knowledge using Cancer Pain Knowledge Inventory. Survey of Expectations used to assess for changes in practice. Reliability and validity of the above two tools established, Chart audit to determine baseline clinical practice and comparative review: tool not described.</td>
<td>Results were not evident until 6 months after the program. Nurses reported feeling more credible when teaching patients and claimed they were more effective in managing pain. The chart audit revealed an improvement in documentation of assessment and analgesic selection.</td>
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Table 1. (con't)
Outcome Evaluations of Pain Management Programs

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| Faries et al. 1991           | To evaluate the outcome following implementation of systematic assessment using a pain flow sheet: patient pain intensity ratings. | Convenience sample of oncology inpatients.  
Experimental group: N 20  
Control group: N 23  
Setting: Acute Care Oncology Unit. | Quasi experimental nonequivalent control group design.  
Pain Assessment Tool adapted from McCaffery by authors. Validity and reliability established.  
Pain flow sheet. Validity and reliability established. | Significantly more patients in the treatment group reported lower pain ratings than those in the control group. |
| Franke, Luiken, de Schepper et al., 1997 | To determine the effects of a continuing education program on nurses' pain assessment practices. | Convenience sample of 106 nurses randomized into two groups:  
Treatment: N 48  
Control: N 58 | A time series design with questionnaires distributed to the sample: pre-program, at one month, and at six months.  
Reliability and validity were established. | The quality of assessment data improved in the treatment group, however the frequency of use of the pain rating scale did not increase.  
Effects were most pronounced at one month but persisted at six months. |
### Table 1. (con’t)

**Outcome Evaluations of Pain Management Programs**

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| Howell et al., 1996 | To describe a pediatric pain management research utilization program, its effects, how it was implemented and to determine factors that led to its successes & failures. | Inpatient pediatric unit. Sample included all R.N.s & L.P.N.s employed on the unit N36. | Process evaluation with a time series design.  
Data sources: anecdotal - field notes, informal interviews, written comments, taped interviews.  
Author’s chart forms: 1) Pain Experience History (Validity and reliability not reported) 2) Pain Observation Scale, validity reported. 3) Pain flow sheet, validity & reliability not discussed.  
Poker chip tool validated.  
Program Feasibility  
Ratings survey completed by nurses. Content validity.  
Focus Group interviews | Described process that staff used to learn new ideas, try ideas in practice, revise strategies and ultimately adopt innovations. Pain documentation systems were modified in response to participant feedback. Documentation improved over time. Responsiveness to participants’ feedback and the role of clinical leaders were considered to be critical factors in program success. |
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Outcome Evaluations of Pain Management Programs

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<td>Humphries et al., 1996</td>
<td>To describe the effects of prescribing guidelines on analgesic prescriptions.</td>
<td>Acute care setting. Analgesic prescriptions processed in Pharmacy department. Pre N 140 Post N 142.</td>
<td>Pre and post test design. Analgesic prescriptions were analyzed according to drug, dose, frequency and compared to standards. Modest prescription improvement post program. Lack of adequate medical school training and need for directive rather than advisory guidelines were implicated in the disappointing outcomes.</td>
<td>Described process that staff used to learn new ideas, try ideas in practice, revise strategies and ultimately adopt innovations. Pain documentation systems were modified in response to participant feedback. Documentation improved over time. Responsiveness to participants' feedback and the role of clinical leaders were considered to be critical factors in program success.</td>
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<td>Voigt et al. 1995</td>
<td>To determine the impact that a standardized flow sheet has on patient reported pain intensity.</td>
<td>Convenience samples of cardiac patients for pre and post-implementation measures: Pre: N 30 Post: N 31</td>
<td>A pre-post test design was used. Pain intensity ratings were measured using 0-10 pain scale. Validity and reliability were established. Retrospective chart audits were conducted. The audit tool was not described, nor were validity and reliability discussed.</td>
<td>The post implementation group received more frequent pain assessments, more analgesic, and had lower pain ratings than the pre-implementation group.</td>
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<tr>
<td>Ward &amp; Gordon, 1996</td>
<td>To determine the effects of pain management initiatives on patient satisfaction, pain severity and analgesic prescriptions.</td>
<td>Convenience sample of in &amp; outpatients: Surveys N 306 Phone interviews N 869 Chart audit N 112</td>
<td>Time series design. APS questionnaire (modified) was administered to inpatients. Phone interview post discharge. Chart audit tool to assess adherence to AHCPR guidelines. Reliability only established.</td>
<td>Patient satisfaction levels high pre and post interventions. No change in pain intensity ratings. Analgesia continued to be ordered PRN.</td>
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Medical and nursing education may not prepare providers for the complex skills required to manage pain in the elderly. Older patients are more likely to be under or over medicated due to inappropriate attitudes, communication deficits and inadequate knowledge of both patients and providers. Older patients tend to under-report pain and may not use words or behaviours that are typically associated with pain (Pasero & McCaffery, 1996). The impact of unrelieved postoperative pain can be observed by monitoring the patients’ ability to breathe deeply, cough, turn in bed, participate in prescribed exercises, mobilize, and sleep (AHCPR, 1992).

Effective pain management is achieved through informed assessment and timely appropriate interventions. Pain assessment in the frail older adult may be complicated by diminished cognitive status, concurrent illness, painful conditions, and visual and sensory impairment. A preventive approach to pain management, the use of preferred medications, preferred routes, cautious, individualized titration of analgesia and anticipation and minimization of adverse effects from the analgesia are advised (Gordon, Dahl & Stevenson, 1996).

Due to a dearth of program evaluations specific to the postoperative frail elderly, the studies reviewed used samples from general and paediatric settings. Programs consisting of education alone were not entirely successful at changing practice. Programs that were successful in changing practice focussed on improving pain management documentation. Modifying a program in response to participant feedback was cited as an important factor in the success of one of the programs (Howell et al., 1996). Chart audits were considered a useful vehicle for monitoring changes in pain management practice. While several studies used patient pain ratings and or satisfaction surveys as measures of program success, they all excluded patients with communication deficits, a common problem for the frail older adult.
CHAPTER THREE

METHODS

In this chapter the study design, sample and setting, data collection and analysis procedures are described. The operational definitions of frail elder, delirium, cognitive impairment and appropriate prescribing, assessment and pain management practices are delineated. The audit tool is presented and validity and reliability of the tool are established. Ethical considerations and the limitations of the study are outlined at the end of the chapter.

Design

A pre-experimental pre and post-test design was used in this evaluation (Burns & Grove, 1993). This design enables the researcher to measure variables before and after an intervention has occurred and is appropriate to use to determine whether changes have occurred that may be attributable to the program. The pain management program was officially launched in September of 1995. Prior to the program beginning in 1995, there were sporadic inservices directed at improving pain management, but no systematic approach to improve pain control. To examine changes in practice over time, the pre-program baseline was measured for two time periods. Charts were randomly selected from patients discharged from May 1 to April 30, in each of the year periods 1992-93, and 1994-95. The post-test consisted of an audit of randomly selected charts of patients discharged from May 1, 1997 to April 30 1998. This time frame addresses the baseline changes that occurred over time prior to the program. It also allows time for the program effects to emerge, an important consideration given the magnitude of the knowledge and attitude changes that were required to change practice.
Sample and Setting

The sample for this evaluation was the charts of patients age 75 and over who were admitted to the orthopaedic unit following surgery to repair a hip fracture and who were cared for on the orthopaedic unit for the first 48 hours following the surgery. According to Polit and Hungler (1991), the sample size can be approximated by estimating: the risk of type one error, the magnitude of the effect size and the desired power. The risk of type one error was set at .05 for this study (Burns & Grove, 1993). The program effects are readily observable, so the effect size can be estimated at the moderate level of .50 (Polit & Hungler, 1991). In order to achieve power at .80, the level deemed acceptable for most nursing studies, the sample size was determined to require approximately 50 for each group (Polit & Hungler, 1991).

Patients who were cared for on other nursing units during this period were excluded from the study as well as the records of those who died within 48 hours of surgery. Patients who used PCA or epidural analgesia during the study period were excluded because these patients were managed successfully with an existing program.

Excluding patients with PCA eliminated patients in the population who were likely not frail. PCA therapy is the preferred option for managing pain following major orthopaedic surgeries and is ordered by the surgeon or anaesthetist for patients judged to possess the cognitive and executive abilities required to use the pump. Exclusion of patients using PCA restricted the sample to those who were deemed too frail mentally or physically to successfully use the PCA program. For the purposes of this study, a frail older adult is someone over the age of 75 with diminished adaptive capacities and functional decline that may be due to a combination of age-related changes, chronic medical and psychiatric illness, weakness and social losses. A frail elder will be operationally defined for the study as someone who: 1) is 75
years or older, 2) had a surgical hip fracture repair within the past 24 hours, 3) is not using PCA therapy and 4) was hospitalized during the periods May 1, 1992 to April 30, 1993; May 1, 1994 to April 30, 1995; or May 1, 1997 to April 30, 1998.

Cognitive impairment is operationally defined as a diminished ability to process and communicate information that may be due to reversible or irreversible causes (Abrams, Beers, Berkow & Fletcher, 1995). Delirium, a reversible syndrome that causes cognitive impairment is operationally defined as an acute, decline in mental status that is characterized by; 1) a fluctuating course, 2) inattention, 3) either disorganized thinking or altered level of consciousness, and 4) a change in baseline behaviour that is either hyper or hypo activity (Inouye et al. 1990).

The orthopaedic unit had 35 beds and admitted patients with a range of orthopaedic diagnosis including multiple trauma, total joint replacements, back pain, osteomyelitis, and serious fractures. Approximately 40 % of the unit census consisted of older adults with hip fractures. The community hospital is located in a large city in Western Canada. Approximately 150 patients over the age of 70 are discharged annually from the community hospital with surgically repaired hip fractures (Medical Records, 1998). Using a simple random sampling technique, the medical record numbers (MRNs) of all of the eligible patients were pooled and randomly drawn from a list by the medical records clerk to acquire the desired sample for each of the study periods.

**Data Collection Procedures**

The method used to gather data for this study was a chart audit. Chart audits are commonly used to collect data related to the clinical practice of pain management and were used in several of the studies discussed in the literature review. Ferrell, Whedon and Rollins (1995) note that a chart audit tool is a useful and practical way to evaluate the assessment and
management of pain. The chart audit process is not dependent upon the participation of the
nurses and surgeons who may have limited time to participate. Clarke et al. (1996) identified
that documentation may be a better indicator of practice than verbal self reports. In a study
examining pain management practices they found that while nurses consistently reported using
the pain scale to rate pain, many patients denied being asked about pain and only a small
percentage had pain ratings documented.

Gordon et al. (1996) view chart audits as an important evaluation tool that provides data
on pain assessments, analgesic prescription and administration practices, and observation
related to sedation, respiratory depression and other adverse effects. Nurses and physicians are
required by law to document prescriptions and medication administration on the patient’s
record. The hospital’s policy and procedure in this study directs nurses to assess pain and
monitor the patient for pain relief and adverse effects following the administration of an
analgesic. Medical record audits provide immediate access to the sample to be studied. The
nonintrusive nature of chart audits make it a good method for studying the frail older patient
who may not be able to tolerate the presence of an observer or participate in surveys.

Chart audits are dependent upon the quality and quantity of information recorded in the
chart. Camp (1988) demonstrated that nurses document less than 20% of the patient’s pain
information. Records are generally weakest when it comes to describing the process of decision
making (Witkin & Altschuld, 1995). While the documentation of medication is a legal
requirement and likely to be done, assessments are generally not governed by laws and have
not been a priority for nurses (Wallace et al., 1997).

Witkin and Altschuld (1995), caution that from an evaluation perspective, audits are
often not fully representative of the effects of the program. With a chart audit, the data are
second hand observations and subject to the perceptions, skill and whims of the recorder. As
previously noted, nurses may record only a fraction of the patient’s pain experience. In addition, records may not always be accurate. Investigators have noted that nurses sometimes make judgements that are not in keeping with the patients own account of the pain experience (Camp, 1989). Therefore the record may not reflect the patient’s true comfort level and response to the interventions. While chart audits provide convenient access to important data, records are usually not designed with audits in mind (Witkin & Altschuld, 1991). Audits may be time consuming with auditors examining multiple documents within the chart. In addition, the skill of the auditor and ability to adhere to the process of the audit may influence the quality of the data collection process. Therefore measures to establish interater reliability were necessary and are described later in this chapter.

Operational Definitions of the Standards

The main focus of the study was to determine the adequacy of: prescribing practices of the physician, the assessments and pain management practices of the nurse and selected patient outcomes. The prescribing, assessment and administration patterns were measured against the defined standards of practice for pain management. Operational definitions for these study variables are outlined below.

Appropriate Prescribing Practices

Adequate prescribing practices were measured by the degree that each of the following prescribing practices had occurred:

1. One or more of the following analgesics have been prescribed: Morphine, Codeine, Leritine, Fentanyl, Dilaudid and Oxycodone.

2. Regular dosing of Acetaminophen, was prescribed unless contraindicated.
3. More than one opioid option was prescribed.
4. A range of doses was prescribed.
5. The dose prescribed was appropriate for each drug.
6. Breakthrough pain analgesic dosing was prescribed.
7. The appropriate parenteral route was ordered.
8. Equianalgesic oral analgesic was prescribed.
9. A low dose anti-emetic option was prescribed.
10. Narcan was ordered in increments.

Each of the above prescribing practices were scored as present or absent and given a score of 1. If all elements were present, total prescribing practices would sum to 10. The higher the score, the more optimal the prescribing practices.

Appropriate Pain Assessment

Appropriate pain assessment was measured by the degree that each of the following assessment practices were recorded:

1. Pain history (ongoing pain at home, location of pain, intensity).
2. Interventions used for chronic pain conditions were recorded when these conditions were present.
3. For patients who were cognitively impaired, pain behaviours were recorded.
4. For patients who were cognitively impaired, family/caregivers were consulted regarding pain behaviours.
5. Pain intensity ratings or pain behaviours were recorded on the pain flowsheet or the nurses notes q4h at minimum (while awake).
6. Pain intensity ratings were recorded immediately prior to each analgesic dose.
7. Sedation scale ratings were recorded immediately prior to each analgesic dose.

8. Pain intensity was measured within one hour after analgesic administration.

9. Sedation levels were recorded within one hour after analgesic administration.

10. The adverse effects of analgesia were recorded (e.g., vomiting, pruritis, urinary retention, sedation).

Each of the above assessment practices were scored as: recorded, not recorded, unable to say or not applicable. The item was scored ‘1’ if present, and ‘0’ if not recorded. If the item is not applicable it will be recorded as N/A but be given a score of ‘1’. If it is not possible to determine whether an item occurred in practice, it will be assumed it did not and the item will receive 0 as the score. The maximum score would sum to 10. The higher the score, the more optimal the assessment practices.

**Appropriate Pain Management by Nurses**

Appropriate pain management by nurses was measured by the degree to which each of the following practices were recorded:

1. Analgesics were administered regularly unless there were clear indicators of reasons which would contraindicate.

2. Acetaminophen was administered q4h while awake unless contraindicated.

3. Analgesics were administered for breakthrough pain if needed.

4. Analgesics were administered using the appropriate route.

5. Analgesics were administered prior to painful events (turning, mobilizing, traction application, etc.) unless contraindicated.

6. Reassessment of analgesic effectiveness was recorded.
7. Titration of dose was based on pain ratings or behaviours. When pain behaviours were evident and ratings had not significantly declined to the level of 4 or below with the previous analgesic dose, a higher dose of analgesic was administered.

8. Ongoing pharmacological interventions were provided if pain was rated greater than four out of ten, if pain was unacceptable to the patient, or if behavioural indicators appeared to be present.

9. Ongoing nonpharmacological interventions were provided if pain was rated greater than four out of ten, if pain was unacceptable to the patient, or if behavioural indicators appeared to be present.

10. Appropriate measures are used to increase comfort and safety from the adverse effects of analgesics eg. low doses of antiemetics if vomiting, intermittent catheter if urinary retention, administration of narcan if over sedated.

11. Only nonpharmacological measures (i.e. not Psychotrophic medications) are used to relieve anxiety, agitation and calling out behaviour.

Each of the above pain management practices were recorded or not and given a score of ‘1’ when recorded. If the item was not applicable to the patient N/A was recorded and this item also received ‘1’ as a score. If all elements were present, total pain management practices would sum to 11. The higher the score, the more optimal the nurses’ pain management practices. If it was not possible to determine whether an item occurred in practice, it was assumed it did not and the item was scored as ‘0’.

Pain Control

Pain control was assessed by reviewing all pain ratings, pain complaints and pain behaviours in the 48 hours postoperatively to determine the presence and persistence of pain.
There had to be at least four assessments in the 48 hour period that indicated the patient’s pain level, otherwise pain control was noted as ‘unable to be determined’. If all pain assessments in the 48 hours were negative for pain, pain control was classified as good. If one or more assessment showed pain, but more than half the assessments were negative, pain control was noted as adequate. If less than half of the assessments were negative for pain, pain control was recorded as poor.

The Audit Tool

Data were collected using the Pain Management - Post-op Chart Audit Tool (PMPCAT). The tool incorporates content and themes developed by Ferrell, Whedon and Rollins (1995) and Barnason et al., (1998) in their chart audits both of which had established content validity. Data about; a) surgeons’ analgesic ordering practices, b) nursing assessment, c) pain management practices, d) frequency of adverse analgesic effects, e) frequency of pain behaviours, f) use of psychoactive medications, and g) demographic and illness-related information were collected on the tool. It was divided into five sections: demographic and frailty-related information; physician prescribing and nurses analgesic administration patterns; nursing assessment and action related to other symptoms; the overall impression of pain practice and control. A summary section or flow chart captured the extent to which nurses met the standards, correlating their analgesic administration and their assessments of patients’ need for analgesic with analgesic effectiveness. The audit can be viewed in Appendix G.

Section 1: Demographics and Frailty-related Information

Demographic and frailty-related information were collected such as gender, age, pre-existing dementia, nature of other concurrent illnesses and painful conditions and whether there have been previous falls. Information on the current injury and other injuries sustained at the time of the fracture and the number of hours since admission to hospital were also collected.
Section 2a: Physician Prescribing Practices

The audit tool identified the medications ordered, the frequency and range of dosage, the number of analgesics ordered as well as orders for breakthrough pain, antiemetics, and anti-sedation agents. This information was tabulated on the chart audit in section 2a. Prescribing practices were then evaluated in terms of the degree to which they met the standards.

Section 2b: Nurses' Analgesic Administration Practices

Information on the medications administered, the frequency and dose was tabulated from the chart. This provided information on whether the medications were administered within the appropriate dose range and whether they were given on a regular or PRN basis. In addition, information on reasons why usual practice was not followed was noted, e.g. reasons if Acetaminophen or Morphine were not given. The practices were later compared with the standards. Further evaluation of pain management practices required synthesis of the assessment information with the administration practices using the flowsheet.

Section 3: Assessment

This portion of the audit was concerned with nursing assessment. Information was collected related to the location, frequency and pattern of pain assessment practices.

Section 4: Assessment and Action Related to Other Symptoms

In this section, information about the occurrence of symptoms that might be adverse effects of analgesics were recorded such as the presence of vomiting, over-sedation, urinary retention. Interventions that were employed to manage these were noted. The presence and level of sedation were noted on the flow sheet in section 5. Indicators of pain behaviours such as the presence of agitation, restlessness and resistance to care were noted in addition to the presence of confusion. These same indicators could also be reflective of delirium.
Psychoactive medications are sometimes used to manage agitated and restless behaviours. Good pain management and knowledge of the importance of avoiding these medications may result in their diminished use thus the PMPCAT measured the frequency of use of psychotrophic medications.

Section 5: Overall Impression of Pain Practice and Control

This section measured the pain management practices (prescribing, assessment, and administration), and the adequacy of pain control achieved by the patient, in relation to the standards as specified in the operational definitions using a criterion checklist.

The quality of analgesic prescription was assessed in view of the selection of drugs, the dose range, route and whether breakthrough dosing was ordered. Nursing assessment practice was evaluated with respect to: a) the frequency of pain assessment, b) whether the pain scale was used to rate pain, and if patients were cognitively impaired, whether pain behaviours were documented. Consultation with the family of cognitively impaired patients to determine pain behaviours is also noted, and c) the relationships between the timing of assessments (sedation scale and pain intensity), and the interventions that followed.

Appropriateness of pain management by nurses was assessed in relation to the selection of analgesics the route of administration, and the titration and timing of dosing. Measures taken to increase safety and comfort were assessed as well as the use of psychotrophic medications to manage anxiety, agitation and calling out behaviour. The patient’s pain control was assessed in relation to the frequency and intensity of pain rating and behavioural assessments.

Section 6: Flowsheet Reflecting Pain Assessment, Analgesic Administration and Response

To encapsulate the flow of pain assessment and analgesic administration, information was summarized on a flowsheet. This facilitated the evaluation of frequency of pain assessment, resulting actions related to pain and the effectiveness of those measures in
alleviating pain. Although it was difficult to determine overall comfort level and adequacy of pain management actions, it was facilitated by seeing the information in a time dimension.

Validity and Reliability

Content validity for the audit tool was supported in that the items in the tool reflect information from the literature and from the practice standards. In addition, an expert panel consisting of two clinical nurse specialists (CNS), one masters prepared geriatric nurse educator, and a masters prepared clinical pharmacist reviewed the tool for content validity. They were given the operational definitions (adequate prescribing practices, appropriate pain assessment practices, appropriate pain management practices by nurses and adequate pain control) and asked to rate the relevancy of each component of the audit tool “1= not relevant; 2= unable to assess relevance without item revision; 3 = relevant but requires minor revision; 4 = very relevant and succinct” (Lynn, 1989, p. 384). The experts validated each item of the tool in terms of its ability to reflect the indicators of the operational definitions.

After the expert panel had reviewed the tool, ten charts were audited on a trial basis and changes were made to the tool as indicated. Interrater reliability was established with the two data collection assistants by performing independent reviews of ten charts for each assistant in comparison with the researcher. A comparison of the number of agreements on the audit tool was made using the following equation to calculate the percentage of agreement between raters:

$$\frac{\text{Number of agreements}}{\text{Number of possible agreements}}$$

The interrater reliability scores were .88 and .92 for the two assistants. A level of .80 or higher indicated acceptable interrater reliability. The assistants worked directly with the researcher and
periodic checks for accuracy and completeness were made during data collection. Charts were compared with the data recorded on the audit tool and corrections were made as warranted.

Internal consistency of the audit tool was evaluated in relation to the operational definitions for prescribing, nursing assessment and pain management practice using Cronbach's alpha. The alphas for prescribing and pain management practice were in the desirable range, at .87 and .79 respectively (Burns & Grove, 1993). The alpha coefficient of nursing assessment was extremely low at .19, indicating a lack of internal consistency for this portion of the tool.

Data Analysis Procedures

The data were recorded on the audit sheet and entered for subsequent analysis into a computerized data base. Prior to testing the hypotheses, the data were reviewed to gain familiarity with them, to observe how they were distributed within the sample. The SPSS program was applied to the data base and descriptive statistics including frequency distributions, means, ranges and standard deviations were used to describe the sample and each of the variables. Summed scores were computed for each of the practices: a) adequate prescribing practices, b) appropriate pain assessment practices, and c) appropriate pain management practices by nurses. The components and totals for each were examined. It was these summed totals that were used to compare the pre-program baseline practices with the post-program practices. Data for the hypotheses and research questions were summarized and presented in terms of descriptive statistics to reflect frequency for all periods of time. Comparisons were presented and each hypothesis tested using Chi-square or ANOVA, depending on the level of the variable. Comparisons were primarily made between each
baseline period to the post-program period. Differences between the baseline periods were also examined.

**Ethics**

Ethical approval was obtained from the Hospital Research Committee and the UBC Office of Research Services and Administration. Patient confidentiality was protected by using only medical record numbers and not names on the audit form, and by ensuring that the actual records remained at all times in the medical records department, a restricted, controlled area in the hospital.

**Limitations**

This research was subject to a number of limitations. A full scale evaluation of the FEPMP was beyond the scope of this study. This evaluation measured only selected pain management behaviours and outcomes and did not assess program implementation or the factors that may have lead to its successes or failings. This program is unique and specific to this community hospital and the findings from the evaluation would not be generalizable across settings. Given that there were six years between the pre and post test audits, it may not be possible to claim the findings as solely the result of the program. Staff have been exposed to multiple factors beyond the purview of the program that may have influenced practice. Changes in operative procedures and recovery room practices could have influenced the outcomes. Changes in staffing mix and levels may have altered the amount of nursing time available for pain management practices.

The chart audit cannot verify the patient’s pain experience and response to the analgesic dosing pattern, thus it cannot be stated with certainty whether patients were medicated appropriately. Faries et al. (1991) and Camp (1988) have both noted that nurses’ documentation
of pain assessment tends to be scanty therefore it may be difficult to discern trends in pain status and the patient's perspective.

Summary

This chapter outlined the research design, the sampling procedure, the data collection process, the chart audit tool and the data analysis strategies. Ethical considerations and the limitations of the design were also described. In the next chapter, the findings of the study are presented and discussed in relation to the characteristics of the sample, the hypotheses, the research questions and the Logic Model Framework.
CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

In this chapter the research findings are presented and discussed under the following three sections. Section one provides a description of the sample. Section two presents the findings and answers the hypotheses and research questions. Section three discusses the representativeness of the sample, the research findings and methodological concerns.

The Study Sample

Selection of the Sample

In this section, the sample selection process is reviewed. The number of patients over age 75 who had hip fracture repairs at the hospital in question was 104 in 1992-93, 117 in 1994-95, and 96 in 1997-98. Charts were randomly selected from each period. The researcher and assistants reviewed each chart and excluded 24 charts that did not meet the study criteria. There were 147 records in the final analysis, 47 in the 1992-93 group and 50 in each of the other two periods. As this was a program evaluation measuring changes in the baseline over time and in response to the program that commenced in September of 1995, the 1992-93 period is referred to as baseline one, 1994-95 is called baseline two and the 1997-98 period is termed the post-program (see Figure 5).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 1</td>
<td>→</td>
<td>Baseline 2</td>
<td>→</td>
<td>Program Start</td>
<td>→</td>
<td>Post-program</td>
</tr>
</tbody>
</table>

Figure 5. Evaluation Time Frame
Characteristics of the Sample

In this section the sample characteristics are described including; gender, age, cognitive status, chronic conditions and surgical information.

Gender

In terms of gender there were 122 (85%) women and 23 (15%) men. Data were missing on two of the audit forms related to gender. The breakdown by gender (women to men) was similar for all three time periods (86% / 14%; 84% / 16%; 82% / 18%).

Age Range

The age range is described as follows and is shown in Table two. In baseline one, the range was 75 to 99 years with a mean of 81.96 (SD 5.23) years. For baseline two, the range was 77 to 99 years with a mean of 83.83 (SD 4.81) years and for the post-program period ages ranged from 75 to 101 with mean of 83.76 (SD 5.17) years. There was no significant difference in age among the three periods.

Table 2.

Age Distribution of Sample Per Time Period

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Baseline 1 1992-93</th>
<th>Baseline 2 1994-95</th>
<th>Post-program 1997-98</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq (%)</td>
<td>Freq (%)</td>
<td>Freq (%)</td>
<td>Freq (%)</td>
</tr>
<tr>
<td>75-79</td>
<td>18 (38)</td>
<td>11 (22)</td>
<td>13 (28)</td>
<td>42 (29)</td>
</tr>
<tr>
<td>80-84</td>
<td>13 (28)</td>
<td>20 (40)</td>
<td>10 (20)</td>
<td>43 (29)</td>
</tr>
<tr>
<td>85-89</td>
<td>9 (19)</td>
<td>13 (26)</td>
<td>20 (40)</td>
<td>42 (28)</td>
</tr>
<tr>
<td>90+</td>
<td>7 (15)</td>
<td>6 (12)</td>
<td>6 (12)</td>
<td>20 (14)</td>
</tr>
<tr>
<td>Total</td>
<td>47 (32)</td>
<td>50 (34)</td>
<td>50 (34)</td>
<td>147 (100)</td>
</tr>
</tbody>
</table>
Cognitive Impairment

The percentage of patients who were diagnosed with a chronic irreversible dementia prior to the hip fracture was 43% at baseline one, 52% at baseline two and 50% in the post-program period. Following the hip fracture repair, the presence of cognitive impairment due to pre-existing dementia and or to a newly acquired delirium was 68.2% at baseline one, 72% at baseline two, and 60% in the post program group. These differences were not significant (see Figure 6).

Chronic Conditions

The frequency of chronic illness was consistent among the time periods. Most patients in each period had two or more chronic illnesses (M = 2.29, Range 0-8). The most common conditions were: cardiac problems, hypertension, osteoarthritis and osteoporosis. Chronic pain was identified in 25% of the baseline one patients, 12% of baseline two, and 30% of the post-program patients. A weak effect (p = .07) was found with the 1997-98 group having the highest reports of chronic pain.

Surgical Information

Over 90% of the patients had their surgery within 24 hours of admission and over 85% were discharged from the recovery room to their nursing units within two hours of their surgery. In baseline one, 5 (11%) had a spinal anesthetic, compared to 11 (22%) in baseline two and 16 (32%) in the post-program period. Significantly more patients in the post program period had a spinal anesthetic compared to the first baseline period ($\chi^2 = 6.51, p = .02$).
In summary, the three periods were similar with respect to gender, age, cognitive status, occurrence of chronic illness, and surgical information. There were more patients in the post-program group who had spinal anaesthetics than in baseline one. The post-program group also had more reports of patients with pre-existing pain.

Research Findings

The research findings are presented in relation to the hypothesis and research questions. While the focus of the study was comparing each of the baseline periods to the post-program period, differences between baselines one and two were also examined and will be identified if they were significant.
Hypothesis One: Pain Management Prescribing Practices

The first hypothesis related to surgeons' analgesic ordering practices and predicted that practices would be more consistent with the standards of pain management practice in the post program group than either of the two baseline periods. To determine whether prescribing practices had improved in keeping with the standards, they were scored and compared across the three periods. Before presenting the scores for total prescribing practices, descriptive information will be given on each of the prescribing components. The ten components of appropriate prescribing practice are derived from the operational definition and include the following:

1. One or more of the following opioid analgesics have been prescribed: Morphine, Codeine, Leritine, Fentanyl, Dilaudid, Oxycodone, Tylenol #3.
2. Regular dosing of Tylenol is prescribed unless contraindicated.
3. More than one opioid option is prescribed.
4. A range of doses is prescribed.
5. The dose prescribed is appropriate for each drug.
6. Breakthrough pain analgesic dosing is prescribed.
7. The appropriate parenteral route is ordered.
8. Equianalgesic oral analgesic is prescribed.
9. A low dose anti-emetic option is prescribed.
10. Narcan is ordered in increments.

Appropriate opioid analgesic prescriptions, component one, were significantly increased in the post-program (pp) group compared to baseline one (bl 1) and baseline two (bl 2) periods (bl 1 to pp $\chi^2 = 25.84, p = .0005$; bl 2 to pp $\chi^2 = 19.25, p = .0005$). Morphine, Codeine, and Leritine were the commonly prescribed appropriate parenteral analgesics. In baseline one, only 4% of the patients were prescribed at least one of the appropriate parenteral medications. In baseline two, 40% of patients had an appropriate parenteral prescription and in the post-program period, 94% of patients had appropriate medications prescribed. Tylenol #3 was the other appropriate opioid commonly prescribed. Prescriptions for Tylenol #3 were consistent over the three periods (see Figure 7).
Prescriptions for Tylenol, component two, increased significantly over the three periods. There was a significant difference between baseline one and two (bl 1 to bl 2: $\chi^2 = 12.76$, $p = .0007$). The differences between the two baselines and the post-program group were significant as well (bl 1 to pp: $\chi^2 = 12.50$, $p = .0008$; bl 2 to pp: $\chi^2 = 6.35$, $p = .023$). At baseline one, only 2% of patients had Tylenol prescribed; this increased to 29% in baseline two and 60% in the post-program period. (see Figure 7).

Prescriptions for undesirable analgesics declined over time, most significantly in the post-program group. These differences were significant between baselines one and two ($\chi^2 = 20.84$, $p = .04$) as well as between the two baselines and the post-program period (bl 1 to pp: $\chi^2 = 25.84$, $p = .0005$; bl 2 to pp: $\chi^2 = 19.24$, $p = .0005$). Undesirable analgesics prescribed...
included Meperidine, IM Morphine, and Darvon. In baseline one, 94% of patients were prescribed one or more of these medications whereas in baseline two, 70% were prescribed them and in the post program period, only 12% were prescribed one or more of these

Figure 8. Percentage of Patients Prescribed Less Desirable Analgesics by Period

The post-program group had significantly more prescriptions with more than one opioid than the previous periods (component three). In baseline one, 64% of patients had more than one opioid analgesic prescribed; in baseline two, 76% had more than one prescribed and in the post program group, 94% had more than one opioid option prescribed (bl 1 to pp: \( \chi^2 = 61.22, p = .0005 \); bl 2 to pp: \( \chi^2 = 6.35, p = .023 \)).
Prescription practices related to range dosing, component four, were not significantly different between time periods, with 75% having a range of doses prescribed in baseline one, 88% in baseline two and 94% in the post-program group.

Prescribing of appropriate analgesic doses, component five, improved over time, most significantly in the post-program group. The difference between the two baselines was significant ($\chi^2 = 11.24, p = .001$), however, between the post-program group and the baseline periods the improvement was greater (bl 1 to pp: $\chi^2 = 61.22, p = .0005$; bl 2 to pp: $\chi^2 = 27.37$, $p = .0005$). Only 5% of patients in baseline one and 31% in baseline two had appropriate dosing compared to 84% in the post program period.

Similarly, the frequency of breakthrough dosing prescriptions, component six, altered dramatically from the baseline to the post-program group. Breakthrough dosing was prescribed for 4% in baseline one, and 6% in baseline two, compared to 48% in the post-program. Again this was statistically significant (bl 1 to pp: $\chi^2 = 22.95, p = .0005$; bl 2 to pp: $\chi^2 = 14.96, p = .0020$).

Component seven, prescription of appropriate parenteral routes, evidenced significant improvement in the post-program group. In baseline one, only 2% of patients had the appropriate parenteral route prescribed increasing to 29% in baseline two and then 80% in the post-program group (bl 1 to pp: $\chi^2 = 74.68, p = .0005$; bl 2 to pp: $\chi^2 = 48.53, p = .0005$).

Prescriptions for equianalgesic doses, component eight, were evident for only 2% of patients at baseline one, 22% at baseline two and 35% in the third period. There was no significant difference between baseline two and the post-program group, however, both groups were significantly more likely to have equianalgesic dosing prescribed than patients in baseline one (bl 1 to bl 2: $\chi^2 = 8.83, p = .005$; bl 1 to pp: $\chi^2 = 16.76, p = .0008$).
The prescribing of the low dose anti-emetic option, component nine, increased significantly between baselines ($\chi^2 = 6.06, p = .0276$) and between the post-program group and the baseline periods (bl 1 to pp: $\chi^2 = 50.26, p = .0005$; bl 2 to pp: $\chi^2 = 27.00, p = .0005$). In baseline one, 14% of patients had a low dose anti-emetic option prescribed, in baseline two, 34% had this prescription compared to 80% in the post-program group.

Prescribing practices related to Narcan, component ten, changed significantly in the post-program group. In baseline one, appropriate Narcan prescriptions were not evident. Baseline two had appropriate Narcan prescriptions on only 11% of charts with a sharp increase to 67% in the post-program group (bl 1 to pp: $\chi^2 = 46.75, p = .0005$; bl 2 to pp: $\chi^2 = 30.13, p = .0005$).

A graphic illustration of the changes that occurred in the components of prescribing practices over each time period is shown in Figure 8 and Table three. All of the post program components were significantly improved from the baseline, with the exception of the range dosing component, which had a high frequency throughout the three periods. There were significant differences between baseline one and two for some components however these improvements were small compared to the differences between the baseline and post-program periods.
Table 3.

**Frequency of Appropriate Prescribing Practices Over The Three Periods**

<table>
<thead>
<tr>
<th>Prescribing Practice</th>
<th>1992-93 Baseline 1</th>
<th>1994-95 Baseline 2</th>
<th>1997-98 Post-Prog.</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F (%)</td>
<td>F (%)</td>
<td>F (%)</td>
<td></td>
</tr>
<tr>
<td>1. Appropriate medication(s)</td>
<td>23 (52)</td>
<td>31 (64)</td>
<td>49 (98)</td>
<td>B C</td>
</tr>
<tr>
<td>2. More than one opioid option</td>
<td>28 (64)</td>
<td>38 (76)</td>
<td>47 (94)</td>
<td>B C</td>
</tr>
<tr>
<td>3. Range dosing</td>
<td>33 (75)</td>
<td>41 (82)</td>
<td>46 (92)</td>
<td></td>
</tr>
<tr>
<td>4. Dose appropriate for each drug</td>
<td>2 (4)</td>
<td>14 (28)</td>
<td>42 (84)</td>
<td>A B C</td>
</tr>
<tr>
<td>5. Breakthrough pain analgesic prescribed</td>
<td>0</td>
<td>18 (36)</td>
<td>24 (48)</td>
<td>A B C</td>
</tr>
<tr>
<td>6. Recommended route</td>
<td>2 (4)</td>
<td>11 (22)</td>
<td>40 (80)</td>
<td>A B C</td>
</tr>
<tr>
<td>7. Regular dosing of Acetaminophen prescribed (unless contraindicated)</td>
<td>1 (2)</td>
<td>14 (28)</td>
<td>40 (80)</td>
<td>A B C</td>
</tr>
<tr>
<td>8. Equianalgesic dosing</td>
<td>1 (2)</td>
<td>11 (22)</td>
<td>17 (34)</td>
<td>A B</td>
</tr>
<tr>
<td>9. Low dose anti-emetic</td>
<td>6 (14)</td>
<td>17 (34)</td>
<td>40 (80)</td>
<td>A B C</td>
</tr>
<tr>
<td>10. Narcan ordered in increments</td>
<td>0</td>
<td>5 (10)</td>
<td>31 (62)</td>
<td>A B C</td>
</tr>
</tbody>
</table>

*P = < .05 difference between groups identified as A, B, & C.*

A = Baseline 1 & baseline 2
B = Baseline 1 & post-program
C = Baseline 2 & post-program
Figure 9. Changes in Prescribing Components by Period
Overall Prescribing Practices and their Change Over Time

A total prescribing practice score was obtained by summing the number of ‘yes’ responses to questions regarding whether each of the ten elements previously discussed were present for any patient. One point was scored for each ‘yes’ recorded and a zero was scored when an element was not present. Scores could therefore range between 0 to 10 per patient. The higher the score, the more appropriate the prescribing practice. Table 4 and Figure 10 illustrate the distribution of scores in each time period.

Table 4.

Prescribing Practices: Percentage of Patients at Each Score

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
<td>8 (16)</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>1 (2)</td>
<td>13 (26)</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>1 (2)</td>
<td>14 (28)</td>
</tr>
<tr>
<td>7</td>
<td>1 (2)</td>
<td>5 (10)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>6 (12)</td>
<td>6 (12)</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>5 (10)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>4</td>
<td>5 (11)</td>
<td>6 (12)</td>
<td>3 (6)</td>
</tr>
<tr>
<td>3</td>
<td>14 (30)</td>
<td>11 (22)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>2</td>
<td>10 (21)</td>
<td>8 (16)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>1</td>
<td>13 (27)</td>
<td>6 (12)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>0</td>
<td>5 (11)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>47 (100)</td>
<td>50 (100)</td>
<td>50 (100)</td>
</tr>
</tbody>
</table>
Figure 10. Distribution of Prescribing Practice Scores

The mean prescribing practice score increased significantly from 2.17 (SD 1.4) in baseline one, to 3.8 (SD 2.1) in baseline two, to 7.5 (SD 2.2) post-program. A one way ANOVA followed by a Scheffe procedure revealed that practice scores increased significantly over each period (F = 3.63, p = .0005). The difference was most pronounced in the post-program group. Because cognitive impairment could have a significant bearing on prescription, assessment and pain management practice, scores of patients with cognitive impairment were compared to those who were not cognitively impaired. There were no significant differences in the practice scores of those who were cognitively impaired versus those who were not.

Hypothesis one was therefore supported. The scores for appropriate prescribing practices were significantly higher for the post program period than the earlier two periods.

Hypothesis Two: Nursing Assessment Practices

Hypothesis two tested whether nursing assessment practice was more consistent with the standards of pain management practice post-program compared to the two baselines. Each element constituting appropriate assessment will be described followed by the scores for appropriate assessment practices compared within and across years. The frequency of assessments in the first 48 hours after surgery was calculated for each of the three study periods.
assessments in the first 48 hours after surgery was calculated for each of the three study periods and the differences were not significant. The mean number of assessments for the 1992-93 period was 5.2 (SD 2.7) while patients in 1994-95 had a mean of 4.0 (SD 2.3) assessments. In 1997-98, the mean number of assessments was 4.62 (SD = 2.48) per patient. The ten components of appropriate assessment practices are derived from the operational definition and are outlined below.

1. Pain history (ongoing pain at home, location of pain, intensity).
2. Interventions used for chronic pain conditions are recorded when these conditions are present.
3. For patients who are cognitively impaired, pain behaviours are recorded.
4. For patients who are cognitively impaired, family/caregivers have been consulted regarding pain behaviours.
5. Pain intensity ratings are recorded on the pain flowsheet or the nurses notes q4h at minimum.
6. Pain intensity ratings are recorded immediately prior to each analgesic dose.
7. Sedation scale ratings are recorded immediately prior to each analgesic dose.
8. Pain intensity is measured within one hour after analgesic administration.
9. Sedation levels are recorded within one hour after analgesic administration.
10. Adverse effects of analgesics are recorded.

Although many charts had information on the assessment of pain at home, in many cases it was impossible to say whether the assessment was done. For example, if an assessment was negative for chronic pain, it may not have been recorded. Therefore, if an assessment was not present on the chart it was impossible to know for sure whether it had been done and was negative or whether it had been simply neglected (see Table 5). The difference in frequency of assessment of ongoing pain at home, component one, was not statistically significant among the time periods. In baseline one, 41% of patients had assessments documented regarding chronic pain at home. In baseline two, 8% of patients had a chronic pain assessment and 35% had documented assessments related to pain at home in the post-program period.
Table 5.

Changes in Frequency: Assessment of Pain at Home

<table>
<thead>
<tr>
<th>Pain at Home</th>
<th>Baseline 1</th>
<th>Baseline 2</th>
<th>Post-program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F (%)</td>
<td>F (%)</td>
<td>F (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>20 (41)</td>
<td>8 (16)</td>
<td>18 (36)</td>
</tr>
<tr>
<td>No</td>
<td>7 (18)</td>
<td>19 (38)</td>
<td>14 (28)</td>
</tr>
<tr>
<td>Can't Say</td>
<td>20 (41)</td>
<td>23 (56)</td>
<td>18 (36)</td>
</tr>
<tr>
<td>N/A</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total           | 47 (100)   | 50 (100)   | 50 (100)     

Documentation of assessment of interventions for chronic pain, component two, did not differ significantly over time. Frequency of occurrence in each time period was 16% in baseline one, 11% in baseline two and only 20% in the post-program period. In many cases, it was impossible to tell whether or not this assessment had been done. If there was no documentation that the patient had chronic pain, then N/A was indicated (see Table 6).

Cognitively impaired patients in the post-program period were significantly more likely to have pain behaviours documented (component three) than patients in the baseline periods (bl 1 to pp: $\chi^2 = .798, p = .0094$; bl 2 to pp: $\chi^2 = 17.64, p = .0005$). Pain behaviours were documented for 20% in baseline one; 22% in baseline two and then a dramatic rise to 67% in the post-program period. Only two records of cognitively impaired patients had family or caregivers being consulted regarding the pain behaviours of the patient (component four). Those patients were both in baseline one.
Table 6.

Responses to Whether Interventions for Chronic Pain were Recorded

<table>
<thead>
<tr>
<th>Interventions</th>
<th>1992-93 Baseline 1</th>
<th>1994-95 Baseline 2</th>
<th>1997-98 Post-program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F (%)</td>
<td>F (%)</td>
<td>F (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>6 (16)</td>
<td>11 (22)</td>
<td>10 (20)</td>
</tr>
<tr>
<td>No</td>
<td>14 (22)</td>
<td>19 (38)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>Can't Say</td>
<td>20 (41)</td>
<td>50 (25)</td>
<td>16 (32)</td>
</tr>
<tr>
<td>N/A</td>
<td>8 (21)</td>
<td>2 (4)</td>
<td>22 (44)</td>
</tr>
<tr>
<td>Total</td>
<td>47 (100)</td>
<td>50 (100)</td>
<td>50 (100)</td>
</tr>
</tbody>
</table>

Recording of pain and sedation ratings was consistently poor across the three periods (component # 4, 5, 6, 7, 8). Only two patients in the sample had pain ratings recorded every four hours, one each in baseline two and the post-program period. Only two patients had pain ratings recorded before or after analgesic dosing, one each in baseline one and the post-program period. Sedation ratings were not recorded at all prior to opioid dosing. Only six patients, three in baseline one, one in baseline two, and two in the post-program group had pain ratings or behaviours recorded within one hour after analgesic administration. Ten patients, nine in baseline one and one in the post-program period had sedation levels recorded after opioid dosing.

Documentation of adverse effects of analgesia, component ten, was not statistically different over time. Indicators of adverse effects of analgesia had a documented frequency of 49% in baseline one, compared to 38% in baseline two and 62% in the post-program period.

Six of the components from the operational definition for appropriate assessment practice were eliminated from the analysis due to a lack of documentation. The documentation of pain behaviours in the cognitively impaired patient was the one component that was
significantly improved in the post-program period compared to the baselines. The components and frequencies for assessment practice are summarized in table seven.

**Overall Appropriate Assessment Practices and Their Change Over Time**

Six items were eliminated from the total assessment calculation because they had too few responses documented to permit statistical analysis. Five of the six items concerned assessment of pain or sedation in relation to analgesic administration (components #5, 6, 7, 8, & 9). One was related to consultation with family to identify pain behaviours (component #4).

The remaining four components were used to reflect the assessment scores. The total assessment score was obtained by summing the number of ‘yes’ or ‘NA’ responses to questions regarding whether the four components of appropriate assessment practices were present for any patient. One point was scored for each ‘yes’ or ‘NA’ response and a zero was scored when an element was not present as indicated by a ‘no’ or ‘can’t say’ response, with a maximum total score possible of four. The higher the score, the more appropriate the assessment practice.

Assessment scores were higher in the post-program group than the two baselines, but not significantly higher than baseline one. The mean assessment score for baseline one was 2.58 (SD = .96), for baseline two it was 1.9 (SD = .81), and the mean was 2.8 (SD = 1.17) for the post-program period (see Figure 11). One way ANOVA followed by a Scheffe procedure showed that baseline one and the post-program mean scores were not significantly different from each other but both were significantly higher than the baseline two period scores (F = 9.21, p = .0002).

Mean assessment scores were further analyzed according to cognitive status across the periods. The differences in scores of patients who were cognitively impaired versus those who were not cognitively impaired were not significant either within or between each time period.
### Table 7.
**Frequency of Appropriate Pain Assessment Practices Among Periods**

<table>
<thead>
<tr>
<th>Pain Assessment Practices</th>
<th>1992-93 Baseline 1 F (%)</th>
<th>1994-95 Baseline 2 F (%)</th>
<th>1997-98 Post-Prog. F (%)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assessed re chronic pain</td>
<td>18 (41)</td>
<td>4 (8)</td>
<td>14 (28)</td>
<td></td>
</tr>
<tr>
<td>2. Interventions for chronic pain recorded when present</td>
<td>7 (16)</td>
<td>5 (11)</td>
<td>10 (20)</td>
<td></td>
</tr>
<tr>
<td>3. Pain behaviours specified for cognitively impaired patients</td>
<td>6 (20)</td>
<td>8 (22)</td>
<td>20 (67)</td>
<td>B C</td>
</tr>
<tr>
<td>4. Family caregivers consulted re pain behaviours of cognitively impaired patients</td>
<td>2 (5)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5. Pain ratings/behaviours recorded q4h minimum</td>
<td>0</td>
<td>1 (2)</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>6. Pain ratings prior to analgesic</td>
<td>0</td>
<td>1 (2)</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>7. Sedation levels were recorded prior to opioid dosing</td>
<td>0</td>
<td>1 (2)</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>8. Pain ratings/behaviour was recorded within one hour after dosing</td>
<td>3 (6)</td>
<td>1 (2)</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>9. Sedation levels were recorded within one hour after dosing</td>
<td>8 (20)</td>
<td>0</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>10. Any indicators of adverse effects of analgesia were recorded</td>
<td>21 (49)</td>
<td>18 (38)</td>
<td>31 (62)</td>
<td></td>
</tr>
</tbody>
</table>

P = < .05 difference between groups identified as A, B, & C.
A = Baseline 1 & baseline 2
B = Baseline 1 & post-program
C = Baseline 2 & post-program
Hypothesis two was supported with mean scores for appropriate assessment being the highest in the post-program period. However, while the post-program scores were statistically higher than those of patients in baseline two, they were not significantly higher than the scores of patients in the baseline one period.

**Hypotheses Three: Nurses Pain Management Practices**

Hypotheses three tested whether nurses' pain management practices were more consistent with the standards post-program compared with the baseline periods. Before the scores for appropriate pain management by nurses are presented, each of the ten components will be described. The components of appropriate pain management practice were derived from the operational definition and are outlined as follows:
1. Analgesics are administered regularly (at least every six hours) unless there are indicators of reasons which would contraindicate.
2. Tylenol is administered q4h while awake unless contraindicated.
3. Analgesics are administered for breakthrough pain if needed.
4. Parenteral analgesics are administered using the appropriate route.
5. Analgesics are administered prior to painful events (turning, mobilizing, traction application, etc.) unless contraindicated.
6. Reassessment for analgesic effectiveness is recorded.
7. Titration of dose is based on pain ratings. When pain ratings are at seven or above on the scale or have not significantly declined to the level of 4 or below with the previous analgesic dose, a higher dose of analgesic is administered.
8. Ongoing pharmacological interventions are provided if pain is rated greater than four out of ten, if pain is unacceptable to the patient, or if behavioural indicators appear to be present.
9. Ongoing nonpharmacological interventions are provided if pain is rated greater than four out of ten, if pain is unacceptable to the patient, or if behavioural indicators appear to be present.
10. Appropriate measures are used to increase comfort and safety from the adverse effects of analgesics e.g. low doses of antiemetics if vomiting, intermittent catheter if urinary retention, administration of narcan if over sedated.
11. Only nonpharmacological measures (i.e. not psychotropic medications) are used to relieve anxiety, agitation and calling out behaviour.

Frequency of regular administration of analgesia, component one, increased significantly over the time periods. In baseline one, 11% of patients had analgesics administered regularly. This increased to 42% baseline two and 62% in the post-program period. The difference was significant between the two baselines ($\chi^2 = 11.36, p = .0015$) and the post-program period. (bl 1 to pp: $\chi^2 = 26.06, p = .0005$; bl 2 to pp: $\chi^2 = 14.86, p = .045$).

The regular administration of Tylenol, component two, increased significantly between baseline one and two ($\chi^2 = 7.5, p = .012$). A greater significant improvement occurred between the baselines and the post-program group (bl 1 to pp: $\chi^2 = 23.11, p = .0005$; bl 2 to pp: $\chi^2 = 6.68, p = .018$). Only 2% of patients had regular administration of acetaminophen in baseline one, increasing to 18% in baseline two and then 45% in the post-program period.

Significantly higher frequencies were seen related to component three, breakthrough dosing, for the post-program group compared to the two earlier periods (bl 1 to pp: $\chi^2 = 22.95, p = .0005$; bl 2 to pp: $\chi^2 = 14.86, p = .002$). When breakthrough dosing was required, only 13%
received it in baseline one and 27% in baseline two. Breakthrough dosing increased to 66% in the post-program period.

More patients had analgesics administered via the appropriate route (component four) over the three periods. Baseline two patients had significantly higher frequencies of appropriate route choices than baseline one ($\chi^2 = 7.45, p = .012$). The post-program period showed a significant improvement over the two baseline periods (bl 1 to pp: $\chi^2 = 74.68, p = .0005$; bl 2 to pp: $\chi^2 = 48.53, p = .0005$). In baseline one, only 5% of patients had analgesics administered using the appropriate route, compared to 46% in baseline two, and 96% in the post-program period.

Administration of analgesics prior to painful events, component five, changed over time but this change was not statistically significant. Only 4% of patients had analgesics administered prior to any painful events in baseline one, 6% in baseline two and 24% in the post-program period. A rise in the frequency of titration of analgesia based on pain ratings, component seven, was also not statistically significant. In baseline one, 13% of patients had analgesic doses titrated based on pain ratings compared to 8% in baseline two and 32% in the third period.

The frequency of ongoing pharmacological interventions, component eight, increased significantly in the post-program period over the two baseline periods (bl 1 to pp: $\chi^2 = 16.85$, $p = .0008$; bl 2 to pp: $\chi^2 = 16.17, p = .00012$). Only 9% of patients in baseline one and 2% in baseline two had ongoing pharmacological interventions when there were indicators of pain complaints or behaviours present in the documentation. The frequency of this practice increased sharply to 50% in the post-program period.

Significantly more patients in the post-program period than in either baseline period had appropriate interventions to increase comfort and safety from the adverse effects of analgesia.
In baseline one, 23% of patients had appropriate interventions, compared to 26% in baseline two and then 71% in the post-program period.

Recordings of assessment of analgesic effectiveness (component six) and nonpharmacological interventions (component nine) occurred infrequently and there were no significant differences among periods with respect to these components. Only ten patients in the sample had an assessment of analgesic effectiveness recorded within one hour after analgesic administration: eight were in the post-program period, and one each in the two earlier periods. Only 7% of patients had ongoing nonpharmacological interventions recorded in the baseline one period, with 4% in baseline two and 19% in post-program period. In spite of documented evidence of patient anxiety, agitation and calling out behaviours psychotrophic medications were infrequently used (component eleven) and there were no statistical differences among periods with respect to their use.

Findings related to the components of nursing pain management practice over the three periods are presented in Table 8 and Figure 12. Significant differences were evident between the baselines and the post-program group in relation to the regular administration of analgesics, choice of route, ongoing pharmacological efforts to relieve pain, breakthrough dosing and the interventions used to decrease the adverse effects of analgesia. Improvements also occurred between the two baseline periods however, these differences were smaller than those that occurred between either baseline and the post-program period.
Table 8.

Frequency of Appropriate Pain Management Practices by Nurses Across Three Periods

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Regular administration of analgesics</td>
<td>F (%)</td>
<td>F (%)</td>
<td>F (%)</td>
<td>A B C</td>
</tr>
<tr>
<td>2. Tylenol was administered every four hours</td>
<td>5 (11)</td>
<td>21 (42)</td>
<td>31 (62)</td>
<td>A B C</td>
</tr>
<tr>
<td>3. Breakthrough analgesics prn</td>
<td>1 (2)</td>
<td>9 (18)</td>
<td>23 (45)</td>
<td>A B C</td>
</tr>
<tr>
<td>4. Analgesics were administered using the appropriate route</td>
<td>5 (13)</td>
<td>12 (27)</td>
<td>31 (66)</td>
<td>B C</td>
</tr>
<tr>
<td>5. Analgesics were administered prior to any painful events</td>
<td>2 (5)</td>
<td>12 (27)</td>
<td>45 (96)</td>
<td>A B C</td>
</tr>
<tr>
<td>6. Reassessment of effectiveness was recorded within one hour after analgesic administration</td>
<td>4 (10)</td>
<td>3 (6)</td>
<td>12 (24)</td>
<td>C</td>
</tr>
<tr>
<td>7. Titration based on pain rating</td>
<td>0</td>
<td>1 (2)</td>
<td>8 (16)</td>
<td>C</td>
</tr>
<tr>
<td>8. Ongoing pharmacological interventions are provided if pain is unacceptable</td>
<td>3 (13)</td>
<td>4 (8)</td>
<td>16 (32)</td>
<td>B</td>
</tr>
<tr>
<td>9. Ongoing nonpharmacological interventions are provided if pain unacceptable</td>
<td>4 (9)</td>
<td>1 (2)</td>
<td>24 (50)</td>
<td>B C</td>
</tr>
<tr>
<td>10. Appropriate interventions are used to increase comfort and safety from the adverse effects of analgesia</td>
<td>3 (7)</td>
<td>4 (9)</td>
<td>9 (19)</td>
<td>B C</td>
</tr>
<tr>
<td>11. Psychotrophic medications are not used to relieve anxiety, agitation &amp; calling out</td>
<td>10 (23)</td>
<td>12 (26)</td>
<td>34 (71)</td>
<td>B C</td>
</tr>
</tbody>
</table>

P = < .05 difference between groups identified as A, B, & C.
A = Baseline 1 & baseline 2; B = Baseline 1 & post-program; C = Baseline 2 & post-program
Figure 12. Changes in Pain Management Practices
Total Appropriate Pain Management Practices of Nurses

A total pain management practice score was obtained by summing the number of ‘yes’ or ‘NA’ responses to ten questions regarding whether each of the components of pain management practice were present for any patient. One point was scored for each ‘yes’ or ‘NA’ response and a zero was scored when an element was not present as indicated by a ‘no’ or ‘can’t say’ response. One item, regarding reassessment within one hour following analgesic administration, was not scored due to the low number of responses. Scores could range between 0 to 10 per patient. The higher the score, the more appropriate the pain management practice. Table 9 and Figure 13 illustrate the distribution of scores across the three periods (see Table 9).

One way ANOVA followed by a Scheffe procedure demonstrated that all three groups were different from one another with scores increasing significantly over each period (F 94.21, p = .00005). The mean score for Baseline one was 1.6 (SD 1.0) for baseline two, it was 2.4 (SD = 1.7) and the mean was 5.1 (SD = 2.2) for the post-program period. No significant difference in the mean of pain management practice scores was found between patients who were cognitively impaired versus those who were not cognitively impaired within and between periods. Hypotheses three was therefore supported. Appropriate pain management practice scores were significantly higher for the post program group than either of the baseline periods.
Table 9.

Nursing Pain Management Practice Scores by Study Period

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
<td>1 (2)</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>1 (2)</td>
<td>7 (14)</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>1 (2)</td>
<td>7 (14)</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>1 (2)</td>
<td>12 (24)</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>4 (8)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>4</td>
<td>2 (4)</td>
<td>4 (8)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>3</td>
<td>5 (11)</td>
<td>10 (20)</td>
<td>7 (14)</td>
</tr>
<tr>
<td>2</td>
<td>15 (31)</td>
<td>11 (22)</td>
<td>4 (8)</td>
</tr>
<tr>
<td>1</td>
<td>19 (41)</td>
<td>15 (30)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>0</td>
<td>6 (13)</td>
<td>3 (6)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Total</td>
<td>47 (100)</td>
<td>50 (100)</td>
<td>50 (100)</td>
</tr>
</tbody>
</table>

Figure 13: Distribution of Pain Management Practice Scores
Research Question One: Adverse Analgesic Effects

The first research question related to the frequency and change in frequency of recorded adverse effects of analgesics including urinary retention, pruritis, vomiting and sedation. Information on urinary retention was not obtained because the majority of patients (n = 86) had an indwelling urinary catheter in place and most of these were in the latter two periods. No occurrence of pruritis was documented.

The frequencies of the adverse effects of vomiting and sedation were not significantly different across the three periods. In baseline one there were 12 episodes of vomiting, followed by 10 in baseline two, and four in the post-program period. Sedation occurred in 46% of the baseline one patients, 31% of the baseline two patients and in 23% of the post-program period patients.

Research Question Two: Delirium and Pain Related Behaviours

Research question two related to the frequency of behaviours related to delirium, and pain across the three periods. The behaviours related to delirium and pain that were monitored included documentation of agitation, confusion, restlessness, and resistance to care. They are reported and compared across the study periods (see Table 10 & Figure 14).

The frequency of agitated behaviour decreased in the post-program and this difference was significant relative to baseline two ($\chi^2 = 6.0, p = .0012$). The difference between baseline one and the post-program group was not significant with respect to this variable. In baseline one, 44% of patients had agitated behaviour, whereas 52% of patients were reported as agitated in baseline two and only 28% in the post program period.
Although not significant, patients in baseline two had a higher frequency of confusion than the other two periods ($p = .07$). In baseline one, 48% of patients had confusion documented, with 64% in baseline two and 42% with confusion in the post-program period. A decrease in resistance to care post-program was not statistically significant. Resistance to turning was evident in 22% of patients in baseline one, 30% in the baseline two period and with 22% in the post-program period.

Documentation of restless behaviours decreased significantly in the post-program group compared with the two baselines (bl 1 to pp: $\chi^2 = 6.14$, $P = .026$; bl 2 to pp: $\chi^2 = 9.89$, $P = .0016$). In baseline one 44% of patients had restless behaviours compared to 50% in baseline two, and 20% in the post-program period.

Figure 14. Frequency of Pain Related Behaviour Over the Three Periods
Table 10.

Frequency of Agitation, Confusion, Restlessness and Resistance to Care by Period

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Baseline 1 F (%)</th>
<th>Baseline 2 F (%)</th>
<th>Post-Program F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitation</td>
<td>21 (44)</td>
<td>26 (52)</td>
<td>14 (28)</td>
</tr>
<tr>
<td>Confusion</td>
<td>23 (48)</td>
<td>32 (64)</td>
<td>21 (42)</td>
</tr>
<tr>
<td>Restlessness</td>
<td>21 (44)</td>
<td>25 (50)</td>
<td>10 (20)</td>
</tr>
<tr>
<td>Resistance to turns</td>
<td>8 (22)</td>
<td>15 (30)</td>
<td>11 (22)</td>
</tr>
</tbody>
</table>

Impressions of Overall Effectiveness of Pain Control

The impression of overall pain control was evaluated by reviewing all pain assessments in the first 48 hours postoperatively to get a sense of the patients' reports of pain, pain behaviours, and the response to activities such as mobilizing and dressing changes. Pain control was classified as either good, adequate, poor, or unable to determine. To be described as good, there had to be at least four pain related assessments in the 48 hours postoperatively, and all assessments showing no indication of pain. Patients described as having adequate pain control had at least four assessments documented with more than half showing no indication of pain. Patients with poor pain control had at least four assessments and evidence of ongoing pain on most assessments. While some charts had evidence of good, adequate or poor pain control, in many cases it was impossible to determine the level of pain control due to a lack of documentation (see Table 11).

The post-program group evidenced the highest frequency of good or adequate pain control. In baseline one, none of the documentation had evidence of good or adequate pain control.
control, 30% had evidence of poor pain control documented and for the remaining 68%, the level of pain control could not be determined. In baseline two, only 8% of the patients' documentation displayed evidence of good or adequate pain control, while 12% had poor pain control. The level of pain control could not be determined for 80% of baseline two patients. In the post-program period, good or adequate pain control was evident in the documentation for 34% of patients while only 2% had poor pain control. In 64% of cases the level of pain control could not be determined. A one way ANOVA followed by a Scheffe procedure showed that the patients in the 1997-98 period were more likely to have good or adequate pain control than patients in the other two periods (F=1.61, p = .0005). There was no significant difference between the cognitively impaired and non-cognitively impaired patient within and between years with respect to the level of pain control.

Research Question Three: Psychoactive Medications

Research question three related to the frequency of use of psychoactive medications to control agitation, restlessness and calling out behaviours in the baseline periods compared to the post-program period. Psychoactive medications were used in only 14 cases to control agitation, restlessness or calling out behaviour, four patients in baseline two, and five patients each in baseline one and in the post-program period. Two of the patients treated with these medications appeared to be experiencing an alcohol withdrawal. Statistical analysis was not conducted due to the small numbers of patients who received these medications.

In this section, the research findings were presented in relation to the hypotheses and research questions. The three hypotheses were supported and the findings pertinent to the research findings were described.
Table 11.

Frequency of Levels of Pain Control by Period

<table>
<thead>
<tr>
<th>Level of Pain Control</th>
<th>Baseline 1 F (%)</th>
<th>Baseline 2 F (%)</th>
<th>Post-program F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good to adequate</td>
<td>0 (0%)</td>
<td>3 (6%)</td>
<td>17 (34%)</td>
</tr>
<tr>
<td>Poor</td>
<td>15 (32%)</td>
<td>6 (12%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Not determined</td>
<td>32 (68%)</td>
<td>42 (82%)</td>
<td>31 (62%)</td>
</tr>
<tr>
<td>Total</td>
<td>47 (100%)</td>
<td>50 (100%)</td>
<td>50 (100%)</td>
</tr>
</tbody>
</table>

Discussion of Findings

This section begins with a review of the representativeness of the sample. The discussion of findings will take place under each hypothesis and research question. Methodological concerns will be addressed at the end of this chapter.

Representativeness of the Sample

The demographic characteristics of the sample are reflective of the population of older people who sustain hip fractures at the hospital where the study took place and in terms of the literature. The charts that constituted the final sample represented more than half of the eligible patients in the hospital population. The ratio of women to men in the sample was six to one, identical to Harvey et al’s (1994) report. The number of patients with cognitive impairment were comparable with Duggleby and Landers (1994) and Egberts (1996) reports of dementia.
and cognitive impairment in the 40 to 60% range for older hospitalized patients. The fact that all of these patients had fallen, sustained a fracture, were age 75 or older and most had multiple chronic illness meant that they were by definition frail (Buchner, 1992).

Two variables had significantly higher frequencies in the post program group and may have influenced program outcomes; patients with pre-existing pain, and those who had spinal anaesthetic. These variables may have influenced behaviours related to pain, delirium and the level of pain control and they are discussed later in this chapter.

**Surgeons' Analgesic Prescription Practices**

In this section, the changes that occurred in analgesic prescription over time and the possible reasons for this change are discussed. Surgeons analgesic prescribing practices were more consistent with the standards of pain management practice in the post-program group compared to the two baseline periods. This is consistent with the findings of Humphries, Counsell, Pediani and Close (1997) who discovered that the implementation of guidelines for analgesic prescription were effective in changing prescribing practices.

It is not surprising that the post program period is associated with a significant change in the surgeons' prescribing practices. The preprinted orders were based upon clinical practice guidelines that were medically sanctioned, evidenced based and therefore had high credibility among the surgeons. The resource nurses and staff nurses on the orthopaedic unit frequently approached the surgeons to have the frail older patients' pain medication prescribed according to the pre-printed orders. Patients with pre-printed orders completed may require fewer revised analgesic orders and therefore fewer phone calls to physicians, a benefit to both surgeons and nurses. The preprinted analgesic orders were designed to be faster and easier to prescribe postoperative pain medication than in the traditional long hand manner. The fact that the preprinted orders were quick and convenient to complete likely contributed to their usage by the surgeons, who have little time to spare. Both surgeons and nurses offered anecdotal reports
of improved patient outcomes as a result of the pain management program. This may have reinforced prescribing practices in those already using the orders and perhaps persuaded those who weren't that they ought to try them.

**Nursing Assessment Documentation**

In this section the changes in nursing assessment documentation, hypothesis two, are discussed and the possible reasons for the lack of charting are explored. While hypothesis two was supported, there was only a marginal improvement in pain assessment documentation.

The lack of internal consistency for the pain assessment portion of the audit tool (Cronbach's alpha .19) further jeopardizes the support for this finding. Six of the components of appropriate assessment were not included in the analysis because there was not enough information documented. While one of the six components was the lack of family involvement, the remaining five of the six components were concerned with the documentation of pain ratings, behaviours or sedation scales in relation to analgesic administration. These are critical components of pain assessment practice and their absence in the documentation is disturbing. These findings are similar to those of MacLellan (1997). MacLellan audited documentation related to pain in an acute care teaching hospital and found that there was no reassessment after analgesics and that pain ratings and sedation scales were documented less than 15% of the time.

Despite the fact that both analgesic prescriptions and pain management practices improved significantly in the post-program period, pain assessment documentation was not statistically different than in baseline one. This lack of substantial improvement over time may be due to the differences in the documentation systems of the periods. The orthopaedic unit is a demanding, fast paced work place for nurses. These nurses require a documentation system that is easy and quick to use. In baseline one, documentation related to analgesics was facilitated by the medication administration record of that time. The record prompted nurses to document the rationale for administering an analgesic and its effect. A computerized MAR replaced this
document in early 1994 and does not have these prompts. Pain related charting is documented in long hand on the nurses notes and analgesics are documented on the MAR. The pain management flow sheet that had been designed and approved by the staff for the purpose of expediting pertinent and comprehensive documentation was not used at all. This may have been because the flowsheet necessitated double documentation. In addition to completing the flow sheet, nurses had to document on the MAR and the nurses’ notes.

The most important area of improvement in the post-program period was the documentation of pain behaviours for the cognitively impaired patient. This finding is encouraging because it suggests a heightened awareness of the need to observe the behaviours of these patients rather than relying on pain reports. There were, however, few occasions of caregivers or families being involved in identifying pain behaviours unique to the patient, an important component of appropriate pain assessment in the frail older population.

Despite the improvement in overall assessment in the post program group, the evidence of continued inadequate documentation of pain is concerning, in light of the research that demonstrates that visible pain documentation increases accountability and improves pain control (Faries et al.,1991; Voigt et al.,1995).

Nurses’ Pain Management Practices

Nurses’ pain management practices, hypothesis three, showed a significant and dramatic improvement in the post-program period compared to the baseline periods. The preprinted orders, pain resource nurses, interdisciplinary pain rounds on the unit and ongoing education likely heightened the nurses’ awareness and knowledge of pain management and promoted the application of the standards in practice. The improved physician’s prescriptions provided direction to nurses in accordance with the standards with a range of appropriate dosing and analgesic options to enable the provision of individualized care.
While there was a substantial improvement in most components of appropriate prescribing practices, some still had low frequencies. For example, regular administration of Tylenol was done in only 45% of cases. This is of concern because when Tylenol is administered with an opioid it may improve analgesia, reduce the opioid dose requirements and therefore the side effects of the opioid (AHCPR, 1992). The under dosing of Tylenol may have been due to the nurses’ lack of knowledge of these benefits or it may have been related to the patient’s status after surgery. Some frail patients may have been too weak after the surgery to tolerate oral medication. Others may have had a cognitive impairment that influenced their willingness or ability to take the medication. Rectal administration of Tylenol may have been perceived as too invasive by both the patient and the nurse, especially when paranoia presented as a clinical feature of the patient’s cognitive impairment. These factors may have resulted in the low frequency of Tylenol administration.

Evaluation of some of the components of appropriate pain management practices was not possible when nurses failed to document their practice. Nonpharmacological interventions such as repositioning, ice, warm blankets and relaxation exercises were part of routine care on the unit but were rarely recorded. Reassessment of analgesic effectiveness was rarely documented. The lack of documentation made it difficult to know the cases where breakthrough dosing and titration of medication were required. Only 24% of patients were known to have analgesics administered prior to painful events in the post program group (1997-98). Painful events, such as turning, mobilizing and dressing changes are activities that promote recovery and the patient’s pain may effect his or her activity tolerance. In many cases, it was impossible to tell by reading the chart when the painful event occurred in relation to the analgesic administration. The lack of pain related documentation hindered the analysis of these components of appropriate pain management practices.
Adverse Analgesic Effects

The adverse effects associated with analgesic administration did not change significantly over time. The adverse effects that were monitored included vomiting and sedation. It was expected that the incidence of vomiting and sedation might rise with an increased frequency of opioid dosing, however this trend was not evident in the sample. While analgesic dosing was more frequent for patients in the post program group, vomiting and sedation occurred more commonly in the two pre-program groups. The smaller dose sizes and the more appropriate analgesic choices in the post program group may explain this finding, however the small sample size and the study design preclude drawing these conclusions without further investigation.

Use of Psychoactive Medications

Psychoactive medications were administered infrequently across the three periods. It was expected that nurses in the baseline periods lacked the knowledge to assess pain behaviours and therefore might be more inclined to administer psychoactive medications to control agitation, restlessness and calling out behaviours. These behaviours could be the manifestation of unmanaged pain, and usually it would be inappropriate to administer psychoactive medication to control these behaviours after surgery. In fact, only 14/147 patients received psychoactive medications to control these behaviours and these patients were distributed evenly among the three periods. In two of these cases the patient was experiencing an alcohol withdrawal, and therefore the administration of psychoactive medication was warranted. The Clinical Nurse Specialist for Geriatrics and the Geriatrician were sometimes consulted for patients who were displaying these behaviours and may have played a role in minimizing the inappropriate use of psychoactive medications.
Behaviours Related to Delirium and Pain

Behaviours that are readily observed and documented as indicators of delirium and pain include agitation, confusion, restlessness and resistance to care. While these behaviours are not definitive signs of pain, they are at the least indicative of discomfort. Agitation, confusion, restlessness and resistance to care were less common in the post program group compared to the baseline periods, although restlessness was the only behaviour that was statistically different.

The decrease in these behaviours was evidence of achievement of the program goal of patient comfort. However, in addition to the pain management program, there are a number of factors that may have contributed to this outcome. Education sessions including a two day program and clinical reference materials designed to educate nurses on detecting and reversing clinical problems for the frail older adult were implemented at the hospital and well utilized by the orthopaedic nurses. Requests for consultations by the Clinical Nurse Specialist for Geriatrics and the geriatrician may have increased over time as staff became more sensitized to the complex needs of the frail elder. This may have resulted in detection and reversal of the underlying causes of delirium and a subsequent reduction in agitation, confusion and restlessness.

In comparison to the baseline periods, the post-program group had a higher number of patients with spinal as opposed to general anaesthetics. Patients with spinal anaesthetics may have had a lower frequency of restlessness, confusion, and agitation than those who received general anaesthetic. A comparison between those who had spinal anaesthesia and the rest of the sample yielded no statistical differences with respect to pain behaviours or pain control, however the sample was too small to draw definitive conclusions.

Patients in the post-program group had a higher reported incidence of pre-existing pain than the two baselines. This may have led to greater challenges in managing pain in this period.
and a dampening of the program effect. Patients who suffer prolonged moderate to severe pain may develop changes in the dorsal horn of the spinal cord that intensify pain sensation with subsequent exposure to painful stimuli (Al-Chaer, 1996). Intense pain and persistent pain behaviours could be more likely to occur in patients with chronic pain following surgery.

The Logic Model predicted that improved prescription and pain management practices would lead to attaining the goal of patient comfort as evidenced by the reduction in pain behaviours. The fact that delirium and pain related behaviours were less frequent in the post-program group is an encouraging sign that the program has led to some level of goal achievement.

**Overall Impressions of Pain Control**

An improvement in the level of overall pain control is further evidence of goal achievement for the study. Impressions of overall pain control were determined by reviewing the nurses notes for the 48 hour period to get an impression of the patients pain ratings, behaviours and tolerance to activity. In many cases it was not possible to tell whether the patient had good pain control even with the regular, appropriate administration of analgesics. For example, a patient’s tolerance for getting up in a chair after surgery was frequently charted. Tolerance to this activity could be affected by a number of factors such as fatigue, anemia, anxiety, and weakness as well as pain. Frequently there was no explanation for poor activity tolerance and therefore it could not be concluded that the patient had adequate pain control.

Despite the impoverished documentation, it was determined that there were significantly more patients with good to adequate pain control in the post-program group than in the baseline periods, where pain control was described as either poor or unable to be determined. The achievement of the long term goals of improved prescription and pain management practices may have led to better pain control, providing evidence that the program goal of patient comfort was achieved to some degree.
Methodological Concerns

There are three areas of methodological concern in this study: the time frame, the chart audit method and the sample size. The time frame for the study spanned six years with two years between the implementation of the program and the measurement of results. While this allowed adequate time for program effects to emerge, organizational and staffing changes occurred at the community hospital in the intervening time which may have influenced outcomes. The Acute Pain Management Guidelines were provided to all of the surgeons in 1992. Staff changes in the surgeon group may have improved prescribing practices. The geriatrician became more readily available as a resource to the orthopaedic nurses and surgeons beginning in 1994-95. Specialized inservices and written resources related to the care of the frail older adult were made available to staff. These factors may have positively influenced the program outcomes.

Other changes may have adversely impacted the program outcomes including an increased acuity of patients and changes in the ratio of RNs to LPNs on the orthopaedic unit. Over time, the acuity of the patients and the workload of the RN staff has increased. For example, in 1994, the length of stay for patients with joint replacements was 10 to 14 days whereas in 1998, it was five days. The trend to decreased length of stay means that most patients are in the acute phase of recovery from surgery throughout their hospitalization. This is the time when they are most prone to complications and most dependant on the nurses for assessment and care.

In spite of the increased acuity, in 1996 RN positions were deleted and replaced by LPN positions in an effort to save money. This change has placed additional responsibility and stress on the RN and has diminished the time available for patient assessment and documentation. The loss of RN positions also means that the general level of expertise is
reduced for the complex task of assessing pain in frail elders and titrating analgesia. These factors may have had a negative influence on the outcomes of the program.

Patton, (1986) and Shaddish (1995) observe that programs interact in rich environments. Changes in the documentation system, staffing changes, CNS and geriatrician availability, increased patient acuity and budgetary constraints are only a few of many environmental variables that may have interacted with this program. It is impossible to say that the findings of this study are purely attributable to the program given the myriad of factors that came in to play over the three study periods.

Another methodological concern is the difficulty in assessing pain and measuring outcomes for the cognitively impaired elder through a chart audit. While facial expressions and a wide range of nonverbal behaviours are believed to be cues to identifying pain, the behaviours manifested are highly individualized. Detection of these cues often depends on the nurses' ability to refer to the patient's pre-pain baseline presentation (Parmeele, 1996), and the orthopaedic nurses may lack knowledge of this baseline. Therefore, the pain behaviours to be measured for this study had to be both readily observable and likely to be charted. While agitation, restlessness and resistance to care are readily observable and frequently charted indicators of discomfort, they may also be present in the patient who is pain free but anxious. More subtle behaviours such as postural rigidity and social withdrawal may be pain related but are likely to go undetected and not charted. Therefore the methodology does not allow for a sensitive and accurate measure of the occurrence of pain.

There were methodological concerns associated with extracting data from the nurses' documentation for the audit. In many cases several questions on the audit tool could not be answered. This may have been more a reflection of the poor quality of charting as opposed to the construction and content of the audit tool. While the documentation of analgesic prescription and administration appeared to be complete, the quantity and quality of assessment
data was inadequate. Witkin and Altschuld (1995) warn that documentation is often incomplete especially when it comes to describing outcomes and rational for actions. Five of the six components of appropriate assessment were excluded from analysis due to the nurses’ failure to document pain intensity and sedation pre and post analgesia. Camp (1988) noted that nurses document only 18% of the patient’s pain information and that nurses view pain related charting as a burden. It is likely that assessments were done and not charted. The chart audit tool on its own may not be able to fully determine clinical practice in this area.

Finally there is a concern related to the relatively small sample size and the lack of power to detect all program effects. There were a few variables in the study where trends were discernable and yet a significant difference was not detected. For example, agitation was documented on 20 patients in 1992-93, and 24 in 1994-95 compared to 14 in 1997-98. While the difference between 1994-95 and the post program group were statistically significant, the differences between 1992-93 and the post program group were not. It is possible that with a larger sample a significant difference between the occurrence of agitation in 1992-93 and the post program group could become evident.

Summary

The sample consisted of the charts of 147 patients age 75 and older who had hip fracture repairs. The charts were randomly selected from each of three time periods with 47 charts in 1992-93, and 50 charts each in 1994-95 and 1997-98. The average age was 83 years, there were six times as many women as men, 60 to 70 percent had a cognitive impairment, and most had two or more comorbidities. Patients were similar in all three groups with respect to gender, age, cognitive status and number of pre-existing diseases. Patients in the 1997-98 group had significantly more reports of pre-existing pain documented than in the other two periods.
Overall, post program group pain management practices were more consistent with the practice standards than the two baselines and patient outcomes were also improved. The surgeons' prescription practices improved significantly. This improvement may be attributable to the preprinted analgesic orders which were well utilized by the surgeons. The overall pain management practices of nurses also improved significantly. The education sessions, preprinted orders, resource nurses and consultations with the CNS for geriatrics and the geriatrician may have influenced the achievement of this outcome. Pain assessment practice showed only a modest improvement and this was not statistically significant. The existing charting system was cumbersome and did not facilitate appropriate documentation. Charting may not have been a priority for the nurses who were coping with a high patient acuity and heavy workload.

In terms of patient outcomes, there was no increase in adverse effects of analgesia despite more frequent dosing in the post program group. While this may be the result of improved prescription and pain management practices, it could also be related to CNS and geriatrician interventions.

There were concerns with the methodology and these included the six year time frame and the substantial organizational and staffing changes that may have influenced the program outcomes through out that time. Another concern was that the chart audit tool lacked the sensitivity to gather accurate and complete data related to pain indicators and pain assessment practices. Finally, while the sample size was adequate in terms of the power analysis it still may have been too small to measure some of the program effects.
CHAPTER FIVE

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this study was to evaluate selected outcomes of a program to manage postoperative pain in the frail older adult with a hip fracture repair. The evaluation was chiefly concerned with changes that occurred in: 1) surgeon’s analgesic ordering practices, 2) nursing assessment related to pain, 3) nursing pain management practices, 4) patient comfort levels and 5) the adverse effects of analgesia. An overview of the study is presented in this chapter followed by conclusions, implications for nursing practice, and recommendations for future research.

Summary

Frail older adults are predisposed to falling and hip fractures due to a high incidence of osteoporosis and co-morbid conditions. Hip fractures are traumatic, painful injuries that are often treated with a surgical repair. Delirium and pain frequently complicate the postoperative course following hip fracture surgery. According to the literature, inadequately managed postoperative pain is hazardous to the body, mind and spirit of the frail older patient. The stress response evoked by pain draws heavily on the diminished reserves of the frail patient and can result in complications and increased health care costs. A number of factors were identified that influence pain management. Older patients are more likely to be under or over medicated due to inappropriate attitudes, communication deficits and inadequate knowledge of both patients and providers (Pasero & McCaffery, 1996).

The literature reveals that assessment and management of pain in this population is a complex process. Diminished cognitive status, concurrent illness, painful conditions, and sensory impairment may complicate pain assessment. These patients tend to be medically unstable and more susceptible to complications and the adverse effects of analgesics. A
preventive approach to pain management, the use of appropriate medications and routes, cautious analgesic titration and the anticipation and minimization of adverse effects from the analgesic are recommended pain management principles (Gordon, Dahl & Stevenson, 1996).

To date the literature pertaining to evaluations of acute pain management programs has only included evaluations for the general and paediatric settings. The studies used measuring tools that resulted in the exclusion of patients with communication deficits and cognitive impairment. In short, postoperative frail elders have been excluded from formal evaluation. Programs that were successful in changing practice focussed on improving pain management documentation and modifying the program based on participant response. (Feries et al., 1991; Howell et al., 1996). Despite certain limitations chart audits were considered a useful method for monitoring changes in pain management practice (Ferrell, Whedon & Rollins, 1995).

In 1995, the Frail Elder Pain Management Program (FEPMP) was launched at a community hospital. The program was based on standards of geriatric and pain management practice. The program focussed on reducing existing barriers that impeded practitioners' ability to meet the standards. Specifically the program focussed on education, and clinical and system supports. The program activities consisted of education sessions for nurses and surgeons, pre-printed analgesic order forms, a pain management flow sheet, written resources, and clinical support provided by resource nurses, and multidisciplinary team rounds.

The conceptual framework for this study was the logic model. Wong-Reiger and David (1993) describe the logic model as a drawing representing the logical relationships among the program activities, the service delivery outcomes, the intermediate results of the activities and the ultimate outcomes. Application of the logic model can test the program’s conceptual linkages and determine whether there are flaws in the program design or implementation that would jeopardize its success (Patton, 1986). Retrospective application of the logic model to the FEPMP demonstrated its conceptual integrity.
The following hypotheses and researched questions were studied:

Hypothesis:

1. Surgeons' analgesic ordering practices are more consistent with the standards of pain management practice in 1997-98 compared with practices in 1992-93 and 1994-95.

2. Nursing assessment documentation is more consistent with the standards in 1997-98 compared with practices in 1992-93 and 1994-95.

3. Nurses' recorded analgesic administrations are more consistent with the standards of pain management practice 1997-98 compared with practices in 1992-93 and 1994-95.

Research Questions

1. What is the frequency and the change in frequency of recorded adverse analgesic effects (vomiting, over-sedation, urinary retention requiring catheterization and pruritus) in 1992-93 and 1994-95 compared to 1997-98?

2. What is the frequency of recorded behaviours related to pain and delirium such as agitation, restlessness, confusion and resistance to turning in 1992-93 and 1994-95 compared to 1997-98?

3. What is the frequency of use of psychoactive medications in 1992-93 and 1994-95 compared to 1997-98?

The study sample consisted of the charts of 147 patients age 75 and older who had hip fracture repairs. Randomly selected charts from each of three time periods were audited so that there were 47 charts in 1992-93 and 50 charts each in 1994-95 and 1997-98. The 1992-93 and the 1994-95 periods served as pre-program baselines to compare with the post-program, 1997-98 period. The average age was 83 years, there were 124 women to 23 men, 60 to 70 percent had a cognitive impairment, and most had two or more comorbidities. Patients were similar in all three groups with respect to age, gender, cognitive status and number of pre-existing
diseases. Patients in the post-program group had significantly more reports of pre-existing pain documented than in the other two periods.

Overall, pain management was more consistent with the practice standards and patient outcomes were improved in the post program group. The surgeons' prescription practices improved significantly. This improvement may be attributable to the preprinted analgesic orders, which were well utilized by the surgeons. The overall pain management practices of nurses also improved significantly. The education sessions, pre-printed orders, resource nurses and consultations with the interdisciplinary team may have influenced the achievement of this outcome. Pain assessment practice showed a modest improvement that was not statistically significant. This may have been due to the fact that the documentation system changed between the baseline and the post-program periods. The post program documentation for pain was in multiple locations and required duplicate charting of analgesics. Charting may not have been a priority for the nurses who were coping with a high patient acuity, heavy workload and an unwieldy documentation system.

In terms of patient outcomes, there was no increase in adverse effects of analgesia despite more frequent dosing in the post program group. This may be the result of improved prescription and pain management practices. The frequency of restlessness was significantly lower in the post program group. Agitation, confusion and resistance to care were lower as well but these changes were not statistically significant. Pain control was assessed by reviewing all pain ratings, pain complaints and pain behaviours in the 48 hours postoperatively. There had to be at least four assessments in that period that indicated the patients pain level, otherwise pain control was noted as unable to be determined. If all pain assessments in the 48 hours were negative for pain, pain control was classified as good. If one or more showed pain but more than half the assessments were negative, pain control was noted as adequate. If less than half of the assessments were negative for pain, the pain control was recorded as poor. Patients in the
post program group were significantly more likely to have good to adequate pain control than the two baseline periods.

Conclusions

This evaluation is unique and specific to the FEPMP at the hospital where the study was conducted and the findings are not generalizable beyond the setting. Methodological concerns related to the long time frame for the study, retrieval of pain assessment data via the chart audit and the relatively small sample size point to the need for further investigation to support and expand upon the study findings. With these concerns in mind, the following conclusions are offered.

The study findings demonstrate that taking a programmatic approach to pain management is an effective method for improving practice and outcomes for the frail older adult. There was a dramatic improvement in prescriptions and practice related to pain management that translated into improved patient outcomes in the post-program group.

Although slightly improved in the post program group, documentation of pain assessment was poorly done. The pain flowsheet was the program activity that was designed to cue appropriate pain management practice and improve documentation. It was not used. The appropriate documentation of pain involved duplicating some of the same information on two forms, the MAR and the flowsheet, located separately, one at the patient’s bedside and one on the medication cart. This system was time consuming and inefficient.

Finding enough time to do the assessments may have been a problem for the nurses. Frail older patients are frequently delirious and medically unstable after surgery. They require close monitoring and a skillful approach to assessment and intervention. Cutbacks in RN positions occurred during the post-program period in the face of mounting patient acuity. As a result, RNs on the orthopaedic unit may not have had the time required to adequately assess, intervene and document pain in the frail older adult.
The Logic Model was useful for guiding the evaluation and interpreting the findings. Retrospective application of the Logic Model to the program demonstrated the conceptual integrity of the program. Planning the timing and methods for the evaluation were facilitated by specifying the ultimate goal and the long term and intermediate outcomes of the program as directed by the model. The Logic Model linked the program activities with the short and long term outcomes thereby assisting in the interpretation and explanation of findings. The pre-printed analgesic orders, the education sessions, the clinical support provided by the resource nurses and the support of the interdisciplinary team were designed to achieve the outcomes. Improvements in the post program group in the key areas of prescription, assessment, pain management practice and patient outcomes were predicted by the FEPMP Logic Model. The decrease in pain behaviours and improved perceptions of pain control was evidence of program goal achievement.

Implications for Nursing Practice

Although this study had some methodological concerns related to the lack of sensitivity inherent in the chart audit method, the long time frame and the sample size, implications for nursing administration, practice and education are evident.

Clinical Practice

The program resulted in a dramatic improvement in pain management prescriptions and practice related to pain management. This led to improved patient outcomes in the post-program group. Involvement of the interdisciplinary team and the unit nurses in the design and implementation of the program were likely critical factors in the success of the program. Designing and implementing activities that would both educate providers and support clinical practice may maximize program success. Future clinical programs should be developed with these factors in mind.
There is a need for continued improvement in the areas of prescribing, assessment and pain management practice. While all components of appropriate prescribing practices improved in the post program group, breakthrough and equianalgesic dosing were two components that occurred infrequently. Reasons for the low frequencies related to these components needs to be explored and appropriate corrective action taken if warranted.

There is clearly a need for major improvement with respect to documentation of pain assessment. Making pain visible through documentation improves accountability for pain control (Faries, 1991; Voigt, 1996) by prompting the nurse to engage in ongoing efforts to relieve pain. An improved documentation system may cue nurses regarding pain management practices and lead to better outcomes.

Involvement of family and caregivers appears to be neglected. This is an important aspect of pain assessment as pain expression tends to be highly individualized. Where possible, nurses should involve those who know the patient best to interpret pain behaviours and responses to interventions.

Further investigation is required to determine whether patients are receiving analgesics prior to painful events and whether medications are being titrated in relation to pain behaviours. These two important components of pain management practice occurred with low frequency however this may be due to an inability of the chart audit to elucidate practice in these areas.

**Administrative Practice**

From a patient care administrative perspective, the findings have implications for staffing levels, documentation systems, program expansion, and quality improvement. The workload of the RNs on the orthopaedic unit needs to be examined in relation to the complex needs of the patient population. In order to meet the challenges of mounting patient acuity and the complex care requirements of the increasingly frail older population, increases in the number of staff and the level of care provider may be necessary.
The documentation system should be redesigned to facilitate effective pain management charting. The pain management flow sheet could be integrated with the MAR system to promote the recording of assessments and reassessments in relation to analgesics and other interventions. This could also eliminate the inefficient practices of duplicate charting and recording pain related information in two separate locations. Integrating pain related documentation with the legal record of medication administration would make pain more prominent and may inspire increased accountability for pain control.

Given the apparent success of this program in achieving long term outcomes and the program goal, the program should expanded to other surgical, patient care areas. The Logic Model for the program could serve as a guide to the program activities, implementation and evaluation in the new area. The program tools such as the pre-printed physician analgesic orders and the written resources could be revised to suit the target patient population. The nursing staff and the interdisciplinary team should be involved in the implementation process and as clinical supports.

Gordon et al. (1996) note that it is easier to get a program going than it is to maintain the effort to keep it going. In order to ensure that pain management remains a priority for the hospital, it should be linked with the continuous quality improvement program. This would establish a system where pain management standards were regularly reviewed and updated, regular audits of the standards in practice were conducted and required improvements were identified and implemented on an ongoing basis.

**Education**

Ongoing planned education is necessary to improve and support pain management practice and documentation. Multiple methods including orientation sessions, clinical preceptorships, case study analysis inservices, and regular pain management audits followed by team discussions could be utilized. Readily available pocket cards with assessment prompts and
drug information could be used as quick reference tools. Bedside rounds with experts in pain and geriatrics consulting directly with the nurse and patient could be an effective means to improve practice. The experts could assess practice and give feedback in relation to the standards. They could also role model appropriate assessments, selection of options and documentation. This would both educate and involve the nurse in in-depth planning for pain management.

Davies et al (1996) contend that the feedback and discussion resulting from an audit improves practice. The findings of this study should be shared and discussed with the nurses and surgeons. Sharing the findings would be an opportunity to recognize the improvements in clinical practice and reinforce them. Areas where practice remains substandard could be explored in group sessions to determine what the barriers to practice are perceived to be and how these barriers could be addressed in the context of the setting. This process could stimulate awareness of deficiencies, promote accountability for practice, and help to generate creative and practical solutions. Ongoing pain audits involving the staff could lead to continued learning and an incentive for improvements to practice.

**Recommendations for Further Research**

The findings for this study inspire several suggestions for further research including the need for replication of the study and expansion of the methods, cost analysis, the impact of staffing levels on pain management, documentation systems and routes of analgesic administration. This study is only a partial evaluation that requires expansion of methods and replication. The chart audit was useful for determining prescription and medication administration however, assessment practices were difficult to discern with this method. Focus groups of nurses and structured clinical observations might help to illuminate the true practice picture. The sample size may have been too small to detect all program effects therefore it would be useful to replicate the study with a larger sample size.
Unmanaged pain has been shown to increase health care costs (AHCPR, 1992). An analysis of cost savings related to the outcomes of a pain management program might demonstrate cost savings that could be used to persuade administrators to invest in pain management practice.

Studies could be done to determine whether the level of care provider (RN versus LPN) is associated with the quality of pain assessment and management. These findings could provide useful information to guide decisions regarding the allocation of resources for the unit staffing mix.

The route of administration of analgesia after surgery is another area that requires further study. While the AHCPR (1992) recommends the oral route, for many patients this route is not appropriate in the first 48 hours after surgery because of nausea and weakness. Patients who are paranoid, a common feature of postoperative delirium, may fear and therefore resist taking analgesic. The rectal route is alternatively recommended, however this may be perceived as invasive and threatening to these patients. Analgesic gels and patches may be effective alternatives but they require testing in older postoperative patients prior to use. Research directed at finding reliable and noninvasive routes of analgesic delivery would be of benefit.

This evaluation highlighted the study hospital’s need for a restructured documentation system merging the pain flow sheet with the medication record. Studying the impact of this restructured documentation on practice and patient outcomes would be a worthy undertaking.

Final Comment

Historically the frail older population have suffered needlessly due to ageist beliefs that pain is ‘normal’ and harmless, that pain treatment is perilous, and that intervening with old and debilitated patients is futile. Practitioners often failed to notice pain in these patients and when they did recognize it, pain was commonly treated with inappropriate medications that were over
or under dosed. Until recently, postoperative pain management of the frail older adult has been a neglected area in the literature and descriptions and evaluations of pain management programs for this population are still lacking. The evaluation of the FEPMP showed that a programmatic approach to pain management based on standards can improve practice and lead to safe effective pain control with tangible, positive outcomes in old and frail patients.
References


Appendix A
Standards of Practice for Acute Pain Management

Assessment: Assume the patient has pain until proven otherwise.

The following assessments will be documented on the patient’s chart:

- The presenting pain will be assessed using a pain rating scale. For patients who are
cognitively unable to rate their pain, pain behaviours will be identified and observed.
Family/caregivers of cognitively impaired patients will be consulted to identify individual
pain behaviours.
- Patient will be assessed for chronic pain and interventions used to relieve it. The chart
and the family/caregivers will be consulted for collateral information if necessary.
- Postoperative assessment will include: Pain intensity and sedation scale measurements
with regular postoperative checks, Q1h X 12 hours, then 4h.

Interventions

- The following opioids may be prescribed and administered for patients over age 75:
  Morphine, Codeine, and Leiritine.
- More than one analgesic option will be prescribed.
- Range doses will be prescribed to promote effective titration.
- Breakthrough dosing will be ordered.
- Scheduled analgesics will be administered with additional analgesia provided for
  breakthrough pain.
- There will be ongoing interventions if pain is rated at >4/10, is unacceptable to the patient, or
  if behavioural indicators are present.
- The I.M. route will not be used.
- Tylenol will be administered Q4h while awake.
- Psychotropic medication will not be used unless the patient’s behaviour places
  him/herself or others at risk.
- A low dose anti-emetic will be administered if required for nausea or vomiting (use
  sparingly).
- Narcan will be ordered and administered in increments for over sedation.
BACKGROUND DATA

The older adult tends to be under treated for pain (AHCPR, 1992). The consequences of poorly managed pain in the elderly include immobility, acute confusional state, respiratory and cardiovascular complications, and depression. The reported reasons for under medication are fear of respiratory depression and the tendency for providers to under estimate pain. Elders may describe pain in ways that undermine its significance, using words such as sore, ache or uncomfortable. While they are more sensitive to the effects, opioid analgesics can be safely and effectively administered provided that the patient is judiciously monitored. Monitoring is especially important for patients with concurrent medical problems such as congestive heart failure, renal and liver disease. Chronic pain is a fact of life for many elders with arthritis and other chronic conditions. How they cope with chronic pain will have implications for the management of acute pain. It is important to recognize the varying requirements for analgesia and to titrate slowly to the dose that provides maximum relief with minimum side effects. Analgesics should be tapered down as the pain subsides. Care is focused on anticipating and relieving pain, promoting comfort, monitoring and treating adverse effects, and assisting the patient to feel in control of the pain.

A multidisciplinary approach to pain management that combines complementary and analgesic therapies has been proven to promote a more rapid return of abilities and shortened hospital stays.

CARE AND MANAGEMENT

1.0 Patient Outcomes

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<tr>
<th>Comfort</th>
<th>Safe Pain Relief</th>
<th>Patient Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports pain at or below 4 on a 0-10 pain scale OR lessening of pain behaviours specific to the patient</td>
<td>The patient will be free of over sedation and respiratory depression</td>
<td>The patient will have realistic expectations of the pain</td>
</tr>
<tr>
<td>Mobilizes without intense pain</td>
<td>Complications of the patient's medical condition, if they occur, will be detected early</td>
<td>The patient will notify the nurse regarding the need for analgesic before the pain is severe</td>
</tr>
<tr>
<td>Rests to promote healing and a sense of well-being</td>
<td>Side effects from medications will be detected early</td>
<td>The call light will be answered within 10 minutes</td>
</tr>
<tr>
<td>The patient will use complementary therapies to cope with ongoing pain</td>
<td></td>
<td>The patient will use complementary therapies to cope with ongoing pain</td>
</tr>
</tbody>
</table>
2.0 **Assessment**

<table>
<thead>
<tr>
<th>Presenting Pain</th>
<th>Impact of Pain on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Functional abilities</td>
</tr>
<tr>
<td>Radiation or spread</td>
<td>Activity tolerance</td>
</tr>
<tr>
<td>Quality of pain: eg. the patient's words – dull, ache, sharp</td>
<td>Mood</td>
</tr>
<tr>
<td>Intensity - use pain scale (faces are preferred)</td>
<td>Sleep</td>
</tr>
<tr>
<td>What makes pain better/worse</td>
<td></td>
</tr>
<tr>
<td>Autonomic responses: eg. changes in BP, pulse, pupil dilation, diaphoresis</td>
<td></td>
</tr>
</tbody>
</table>

**NB:** Do not rely on older patients to tell you they have pain. They may assume you know they hurt. Be sure to assess pain on an ongoing basis.

<table>
<thead>
<tr>
<th>Chronic Pain</th>
<th>Patients with a Cognitive Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review chart for history of chronic pain or diseases associated with chronic pain</td>
<td>Assess the patient's verbal and comprehensive abilities to report pain. Verbal reports of pain are valid.</td>
</tr>
<tr>
<td>Interview the patient using the assessment in 2.1 and 2.2 to describe the pain and its impact</td>
<td>Simplify questions: 1 noun, 1 verb</td>
</tr>
<tr>
<td>How does the patient cope with pain?</td>
<td>Ask about pain in present context</td>
</tr>
<tr>
<td>Medications: analgesics, sleeping pills and antidepressants; assess frequency and dose</td>
<td>Consult with family/caregivers to identify pain behaviours specific to that patient: eg. <strong>Verbal</strong> - moaning, calling out, grunting, groaning, crying, expressions of anger, repetitive speech</td>
</tr>
<tr>
<td>Use of alcohol and drugs: frequency and amount</td>
<td>Consult with family, care providers, documentation for information regarding the patient’s use of analgesics and complementary measures.</td>
</tr>
<tr>
<td>Complementary therapies: eg. heat, cold, distraction, TENS</td>
<td></td>
</tr>
</tbody>
</table>

3.0 **Interventions**

3.1 Reassure the patient that you understand that they have pain and that you will do whatever you can to make them comfortable.

3.2 Follow principles of analgesic therapy:
   - Prevent pain whenever possible. Initiate analgesia prior to painful events, eg. Surgery, procedures, mobilization. Provide scheduled analgesia to maintaining a therapeutic blood level unless pain is occasional. Combine opioids with non-opioids (NSAIDS, tylenol) for the management of moderate to severe pain.
   - Start with a low dose and titrate up by 25-50% to the level of maximum relief with minimal side effects. Consider patient’s tolerance due to chronic opioid use, weight, renal and hepatic function.
   - Assess response to analgesia and monitor for adverse effects. For opioids, note the onset and peak action of the drug. Monitor the patient’s sedation scale carefully, especially in the first 24 hours following initiation of therapy. Put patient on the bowel protocol. If the patient becomes confused, investigate the underlying cause. If analgesia is suspected, decrease the analgesic dose or switch to an alternate analgesia. Focus on patient’s response to the analgesic not on the amount of drug.
   - Taper opioid analgesics by 50% per day when pain subsides.
Avoid Demerol - it contains neurotoxic metabolites that can cause confusion and seizures.

3.3 Use Complementary Therapies:
- Relaxation exercises, repositioning, mattress overlay, distraction, music, massage, heat/cold application, TENS, therapeutic touch, visualization
- Consult Instructor, CNS or Physio.

3.4 Patient Education - Pre-operative
- Importance of pain management in recovery
  - Adverse effects of pain: increased stress, decreased mobility, more complications, decreased rest
- Working as a team to prevent pain
  - How to report pain using the pain scale
  - Informing nurse early, before pain intensifies
- Choosing interventions
  - Identify the appropriate alternatives and how to use them, e.g. relaxation breathing, heat, cold, distraction
- What to expect
  - "Usual" experience of pain for condition or surgery
  - Assessments that nurses do
  - Interventions and how they work really well (potentiate placebo effect)
  - How to help yourself - work with staff - learn coping strategies (relaxation, distraction)

4.0 Documentation

4.1 Pain Management Flow Sheet; Nurses Notes
- Document: location, intensity, aggravating factors associated with pain, and treatment rendered
- Side effects of treatment and effectiveness of treatment

5.0 References

U.S. Department of Health and Human Sciences. Acute Pain Management: Operative or Medical Procedures and Trauma


Goal is to keep pain intensity at or below 4/10 with minimal side effects

### Automatic Stop Orders

<table>
<thead>
<tr>
<th>Medication</th>
<th>Days to Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injectable narcotics and controlled drugs</td>
<td>5 days</td>
</tr>
<tr>
<td>Oral narcotics and controlled drugs</td>
<td>10 days</td>
</tr>
<tr>
<td>All Other Medications</td>
<td>30 days</td>
</tr>
</tbody>
</table>

### Drug Allergies

- None Known
- Physician’s Signature

### 2 EAST TRIAL

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
<th>D/C all prior Analgesics:</th>
<th>Administer the most Appropriate Analgesic</th>
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</thead>
<tbody>
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### For Moderate to Severe Pain

<table>
<thead>
<tr>
<th>Drug</th>
<th>Recommended</th>
<th>Alternate Dose</th>
<th>Route</th>
<th>Interval</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>5 - 20 mg</td>
<td>mg to mg</td>
<td>PO</td>
<td>q4h</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>1 - 2 mg</td>
<td>mg to mg</td>
<td>IV</td>
<td>q1h</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>2.5 - 7.5 mg</td>
<td>mg to mg</td>
<td>SC</td>
<td>q4h</td>
<td></td>
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</tbody>
</table>

### For Patients Unable to Tolerate Morphine

<table>
<thead>
<tr>
<th>Drug</th>
<th>Recommended</th>
<th>Alternate Dose</th>
<th>Route</th>
<th>Interval</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anileridine</td>
<td>25 - 75 mg</td>
<td>mg to mg</td>
<td>PO</td>
<td>q4-6h</td>
<td></td>
</tr>
<tr>
<td>Anileridine</td>
<td>12.5 - 25 mg</td>
<td>mg to mg</td>
<td>IM/SC</td>
<td>q4-6h</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>30 - 90 mg</td>
<td>mg to mg</td>
<td>PO/SC/IM</td>
<td>q4h</td>
<td></td>
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</tbody>
</table>

### For Mild to Moderate Pain

<table>
<thead>
<tr>
<th>Drug</th>
<th>Recommended</th>
<th>Alternate Dose</th>
<th>Route</th>
<th>Interval</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen with Codeine 30 mg</td>
<td>1 - 2 tabs</td>
<td>___ to ___ tabs</td>
<td>PO/PR</td>
<td>q4-6h</td>
<td></td>
</tr>
</tbody>
</table>

### Monitoring

Assess sedation scale, respiratory rate and pain level prior to each dose.

- Withhold analgesic if sedation scale ≥ 3 or 2, and/or if resp rate ≤ 10/min.
- If resp rate ≤ 8/min, administer naloxone as below and notify physician.

### For Breakthrough Pain

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<thead>
<tr>
<th>Drug</th>
<th>Recommended</th>
<th>Alternate Dose</th>
<th>Route</th>
<th>Interval</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>0.5 mg - 1 mg</td>
<td>mg to mg</td>
<td>IV</td>
<td>prn</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>2.5 mg - 5 mg</td>
<td>mg to mg</td>
<td>SC</td>
<td>prn</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>5 mg - 10 mg</td>
<td>mg to mg</td>
<td>PO</td>
<td>prn</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>15 - 60 mg</td>
<td>mg to mg</td>
<td>PO/IM</td>
<td>prn</td>
<td></td>
</tr>
</tbody>
</table>

### Monitoring (Continued)

Assess patient’s response. If necessary, repeat naloxone in increments of 0.5 mg every 8 h, assessing the patient’s response after each dose.

### For Management of Side Effects

<table>
<thead>
<tr>
<th>Drug</th>
<th>Recommended</th>
<th>Alternate Dose</th>
<th>Route</th>
<th>Interval</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimenhydrinate (Gravol)</td>
<td>25 - 50 mg</td>
<td>mg to mg</td>
<td>IV/IM/PO</td>
<td>q6-8h prn</td>
<td></td>
</tr>
<tr>
<td>Prochlorperazine (Stemetil)</td>
<td>5 - 10 mg</td>
<td>mg to mg</td>
<td>IM/PO</td>
<td>q6h prn</td>
<td>nausea</td>
</tr>
</tbody>
</table>

*Analgesic orders appear on the PRN MAR.
* Titrate dose & frequency as condition warrants.
Appendix D

Educational Session Outline

- Scope of the problem of pain in older patients including prevalence and consequences of unrelieved pain.
- Promote nursing and physician accountability for pain control.
- Social, psychological, and physiological factors that influence pain expression and management in older patients.
- Pain assessment practice and importance of documentation.
- Pharmacodynamics and kinetics in frail older adults.
- Principles of analgesic therapy.
- Principles of detection and management of adverse effects of analgesia.
- Introduction to the pain standards, pre-printed orders, pain protocol and pain flowsheet. Practice using these tools in case study analysis.
- Review patient and family teaching: content and strategies.
Goal is to keep pain at or below 4/10 with minimal side effects.

ASSESSMENT: Location Quality Pattern (see guidelines)

<table>
<thead>
<tr>
<th>Pain Assessment done while patient is at:</th>
<th>R = Rest</th>
<th>A = Activity</th>
<th>T = Treatment (RAT)</th>
</tr>
</thead>
</table>

PAIN RATING: Indicate patient's choice of scale for self report. 0 - 10

- No pain
- Mild
- Discomforting
- Distressing
- Very Bad
- As Bad As It Could Be

Numbers to record:

| 0 | 1-3 | 4-5 | 6-7 | 8-9 | 10 |

POSSIBLE PAIN BEHAVIOURS (numbered)

For patients with communication deficits only

1. 
2. 
3. 

SEDATION SCALE

| 0 None (Occasionally drowsy, can maintain contact) |
| 1 Mild (Frequently drowsy, falls asleep with light touch) |
| 2 Moderate (Somnolent, difficult to arouse) |
| 3 Severe (Rouses with light touch) |
| S Sleep |

DEGREE OF MOTOR BLOCK MB (for epidurals with local anesthetic)

| 0 Normal (full flexion of knees and feet) |
| 1 Partial (just able to move knees) |
| 2 Almost complete (able to move feet only) |
| 3 Complete (unable to move feet or knees) |

DATE/TIME | PAIN RATING | PAIN BEHAV. (#) | R A T | INTERVENTION: Titration of medication/other Treatment | VITAL SIGNS | SIDE EFFECTS/COMMENTS | INIT |
<table>
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</table>

Appendix E: Pain Management Flowsheet
Appendix F

Role Expectations of Resource Nurses

- Attend shift report to identify target patients and encourage assigned staff to request that surgeons initiate the Acute Pain Preprinted Orders. (It was assumed that the surgeons would require frequent reminders to access and use the preprinted orders.)
- Approach staff assigned to frail older patients to provide guidance in assessing pain and administering analgesics according to the standards.
- Interpret the standards, the protocol and the use of the preprinted orders with staff and surgeons as required.
- Liaise with the orthopaedic educator to report problems with the implementation of the program in the practice setting.
APPENDIX G

Pain Management - Post-op Chart Audit  Pre__ Post__

Chart # __________ 129

1. Demographics: Sex: □ M  □ F  Age: __ Date/Time admission_____________
□ Pre-existing dementia: Concurrent conditions □ diabetes □ parkinsons □ osteoarthritis □ hypothyroid □ heart
□ hypertension □ osteoporosis Cancer _______ Other: __________________________________________
Other injuries with this fracture _______ □ Pre-existing pain. □ At risk for withdrawal:
□ Pre/periop cath # of hrs. from adm. to OR _______ # of hrs in PAR ______ □ Spinal

2. a) Prescribing & Administering of Analgesics:
(Complete attached Worksheets)

   b) Reasons:
      i) if Tylenol not given: □ allergy □ refused □ not ordered
         □ unable to tolerate □ can't say
      ii) if Morphine not given □ allergy □ not ordered □ mild/no pain □ can't say
          □ confusion □ history of opioid use
          □ sedation □ refused □ agitation
      iii) if Morphine given above expected dose range:
          □ pain unrelieved with lower dose
          □ history of opioid use □ orders specify higher dose
          □ can't say
          □ pain > 7 and or moaning, crying
          □ agitated

   c) If pain persists after analgesic at 5 or higher or if behaviour indicators persist, corrective action taken re pain med:
      □ N/A □ breakthrough dose given
      □ no action □ med changed
      □ dose increased □ Dr. notified
      □ dose decreased □ can't say

3. Assessment:
   a) Assessment on: □ Flowsheet □ Nurses' Notes □ Pt. Profile/Assessment □ MAR
      # Of assessments in each 12 hr period: 1st ______ 2nd ______ 3rd ______ 4th ______
   b) # of pain scale ratings / Frequency of pain assessments: ______________
      □ No consistent pattern □ Not done

4. Assessment & Action Taken Related to Pain & Other Symptoms:
   a) # of sedation assessments
      i) # of sedation ratings prior to opioid dosing / # of doses: ______________________
      ii) # of sedation ratings following opioid / # doses given: ______________________
   b) # of analgesic admins per 12 hr period: 1st ______ 2nd ______ 3rd ______ 4th ______
   c) Presence & frequency of:
      □ Nausea X Gravol Dose _____ Freq admin_____
      □ Vomiting X ___
      □ Agitation
      □ Confusion
      □ Restlessness
      □ Resistance to turning / care
      □ # of in and out caths ______
      □ Decreased LOC _____ SS ___
d) Was agitation, confusion or restlessness present? □ Yes □ No
   If yes:
   i) Was analgesic:
      Discontinued □ Yes
      Changed □ Yes
      Dose reduced □ Yes
      Dose increased □ Yes
      Given regularly □ Yes
      No action noted □ Yes
   ii) Psychotropics given: N/A □ Drug ______________________ Freq.admin.____
      □ On psychotropics prior to admission.

5. Overall Impression of Pain Practice and Control
   a) Appropriate Prescribing Practices
   i) Appropriate drug was prescribed: (Morphine, Codeine, Leritine, Fentanyl, Dilaudid and Oxycodone)
      □ Yes □ No □ NA
   ii) More than one opioid option was prescribed □ Yes □ No □ NA
   iii) A range of doses was prescribed □ Yes □ No □ NA
   iv) Dose was appropriate for each drug □ Yes □ No □ NA
   v) Breakthrough pain analgesic dosing was prescribed □ Yes □ No □ NA
   vi) Recommended route was always prescribed □ Yes □ No □ NA
   vii) Regular dosing of Acetaminophen, was prescribed unless contraindicated □ Yes □ No □ NA
   viii) Equianalgesic dosing □ Yes □ No □ NA
   ix) Low dose anti-emetic option □ Yes □ No □ NA
   x) Narcan ordered in increments □ Yes □ No □ NA

   b) Appropriate Pain Assessment
   Evidence of cognitive impairment □ Yes □ No □ NA
   i) Patient assessed re presence of ongoing pain at home □ Yes □ No □ NA □ Can't say
   ii) Interventions used for chronic pain conditions are recorded when these conditions are present □ Yes □ No □ NA □ Can't say
iii) For patients who are cognitively impaired, pain behaviours were specified
☐ Yes ☐ No ☐ NA
☐ Can't say

iv) For patients who are cognitively impaired, family/caregivers were consulted regarding pain behaviours.
☐ Yes ☐ No ☐ NA

v) Pain intensity ratings / behaviours were recorded q4h minimum
☐ Yes ☐ No

vi) Pain ratings/behaviours were recorded prior to analgesic dosing: ___ # of ratings / # of doses ___

vii) Sedation scale ratings were recorded prior to opioid dosing. ___ # of ratings / # of doses ___

viii) Pain intensity/behaviours were recorded within one hour after analgesic dosing
___ # of ratings / # of doses ___

ix) Sedation levels were recorded within one hour after opioid dosing ___ # of ratings / # of doses ___

x) Any Indicators of adverse effects of analgesia (delirium, nausea and vomiting, sedation, urinary retention) were recorded.
☐ Yes ☐ No ☐ NA
☐ Can't say

c) Appropriate Pain Management by Nurses

i) Analgesics were administered regularly unless there are clear indicators of reasons which would contraindicate (eg. Sedation, asleep, refused, ____)
☐ Yes ☐ No ☐ Can't say

ii) Acetaminophen was administered q4h while awake unless contraindicated (asleep, unable to tolerate oral/rectal, refused, other ____)
☐ Yes ☐ No ☐ N/A
☐ Not ordered

iii) Analgesics were administered for breakthrough pain if needed (eg. between doses: Pain > 6, patient requests, moaning, crying, agitated)
☐ Yes ☐ No ☐ NA
☐ Can't say ☐ Not ordered

iv) Analgesics were administered using appropriate route
☐ Yes ☐ No ☐ NA
☐ Can't say ☐ Not ordered

v) Analgesics were administered prior to any painful events (turning, mobilizing, traction application, etc.) unless contraindicated.
☐ Yes ☐ No ☐ NA
☐ Can't say

vi) Reassessment of effectiveness was recorded within one hour of analgesic admin. 
# reassessments / # of doses ___________

vii) Titration of dose is based on pain ratings / behav (eg. analgesic increased if pain remains at 5 or above or if pain behaviours)
☐ Yes ☐ No ☐ NA
☐ Can't say
<table>
<thead>
<tr>
<th>Date</th>
<th>What Was Offered</th>
<th>Assessments / Pt status</th>
<th>Hrs. Postop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drug Dose Freq</td>
<td></td>
<td></td>
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</table>
Pain Management Postoperative Chart Audit - Worksheet

Interpretation of the Documented Behaviours of the Cognitively Impaired Patient

The following behaviours are probably indicative of pain: Agitation, restlessness, rigidity or stiffness, resistance to turns/care, aggressive or combative behaviour, vocalizations such as moans, cries, calling out, facial grimacing.

The following documentations are probably indicative of comfort. 'Settled', behaviours with 'comfortably' as a descriptor, laughing, smiling, tolerating turns/mobilization/care well, denial of pain (if pt. not severely confused).

No complaints, sleep or rest should not be counted as comfort behaviours without substantiating information. (Eg. If the patient was agitated then goes to sleep.)

The following documentations are indicative of sedation assessment. Alert, drowsy, sleeping and any activity that demonstrates that the patient is awake and responsive.

2. What was ordered (drug, dose and route). Include analgesics, antiemetics, narcan and psychotropics.

Morphine po Dose ______ Interval ______
Morphine iv Dose ______ Interval ______
Morphine Sc Dose ______ Interval ______
Leritine po Dose ______ Interval ______
Leritine im/sc Dose ______ Interval ______
Codeine im/sc/po Dose ______ Interval ______
Plain tylenol, Route: ______ Dose ______ Interval ______
Tylenol #3 Dose ______ Interval ______
Demerol im Dose ______ Interval ______
Demerol po Dose ______ Interval ______
Breakthrough: Narcan ______
Gravel: ______ Other: ______