THE IMPACT OF NURSE INITIATED PAIN PROTOCOL:
IN EMERGENCY DEPARTMENT

by

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Abstract

Even though pain is a common symptom in the emergency departments inadequate analgesic and suboptimal management of pain is not very uncommon. Pain is one of the factors influencing the triage acuity level. Prompt pain management with a thorough pain assessment is necessary for meeting patient care needs. Therefore, a Nurse Initiated Pain Protocol is one of the strategies to manage pain in a timely manner and achieve patient satisfaction.

With the guidance from other research studies from Australia, Sweden and United States using Nurse Initiated Pain Protocol in the ED and Latimer et al’s (2010) KUPC model, this study was performed to capture the pain management practices of ED nurses with a Nurse Decision Support Tool. The Nurse Decision Support Tool was introduced in one of the emergency departments in the Lower Mainland. The 300 charts were randomly selected and data collected with the data collection sheet. Statistical Program for the Social Sciences (SPSS) version 1.0 was used to analyse the data. Mean, median and standard deviation were used to interpret the data. Unfortunately, there were no significant differences between before and after the initiation of the Nurse decision Support Tool in the ED. However, the study provided preliminary findings in the pain management practices in emergency department by the nurses.
Preface

All of the work presented here was conducted in the emergency department of one of the hospitals in the Lower Mainland. I was involved for data collection, findings and discussion of the findings. Data collection was done with the help of a data collection sheet. SPSS version 1.0 was used for data analysis.

The research supervisor, Dr. Anne Louise Dewar helped throughout the project with making necessary modifications in the data collection sheet and analysis of the data along with the discussion of the findings. Dr. Tarnia Taverner, one of the members in my thesis committee was helpful in directing towards meeting the research question and editing the thesis. Janice Muir, Clinical Nurse Specialist for pain management at St. Paul’s Hospital (SPH) was the resource person in drafting the data collection sheet and helping with data analysis through statistician from the cheos department at SPH.

The Medical Records department at SPH and Aggie Black, the Nursing Research Facilitator were the key in facilitating the project in the emergency department through selection of the appropriate charts of the patients.
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CHAPTER ONE

Background to the problem

Pain is one of the most common and frequent presenting symptoms in emergency departments (ED) (Canadian Pain Society, 2005; Finn et al., 2012; Fry, Ryan & Alexander, 2004). However, evidence suggests that inadequate analgesic and suboptimal management of patients with pain is very common in the ED (Finn et al., 2012; Fosnocht & Swanson, 2007).

In the ED, a patient is triaged according to acuity of their illnesses and priority is given to the patient who is critically ill. Pain is one of the factors that influence the triage level and patient care is prioritized according to the Canadian Triage and Acuity Scale (CTAS) (retrieved from caep.ca on January 12, 2014). However, pain assessment and prompt pain management is important in meeting the health care needs of all ED patients regardless of triage level. One of the strategies for timely pain management is assessing pain and administering analgesics with a Nurse Initiated Pain Protocol (NIPP) (Fry & Holdgate, 2002). A NIPP is sometimes referred to as a Nurse Decision Support Tool and it enables a registered nurse to initiate analgesics before the physician assesses the patient. Researchers have shown that when a NIPP is implemented in the ED, the time from triage to administration of the first analgesic dose is reduced. (Asaro, Lewis & Boxerman, 2007; Ballejos-Campos, 2012; Finn et al., 2012; Fosnocht & Swanson, 2007; Fry et al., 2012; Fry, Ryan & Alexander, 2004; Kelly et al., 2005; Muntlin et al., 2011).

Delays in time to see a physician and get pain treatment in the ED often affect health care outcomes, patient satisfaction and the provision of quality care (Asplin, 2006; Pines & Hollander, 2008). Moreover, untimely pain management leads to increased patient suffering with inadequate pain relief complicating the discharge process, and can lead to congestion in hospitals
and increased health care costs (Bell & Duffy, 2009). An organisational structure which supports the nursing staff to provide timely pain management by rapid pain assessment and administration of appropriate analgesics (Fry & Holdgate, 2002) is a way of providing quality care to the patients (Ballejos-Campos, 2012).

Furthermore, pain is subjective, which makes pain management a challenge for nurses (Fry & Holdgate, 1996; Karlsten et al., 2012). Fosnocht and Swanson (2007) and Seguin (2004) reported that patients and families believe that ED staff often ignore pain, prolong the wait times for pain treatment or do not even provide analgesics. Inadequately treated pain may lead to central nervous system damage, patient and family dissatisfaction but also is an ethical and moral issue for nurses in busy emergency departments (Fry et al., 2004). Even though evidence shows that untimely and inadequately managed pain has a physiological and psychological impact, achieving analgesia for many patients remains a problem in the ED (Finn et al., 2012). Often there is a wide time gap between when a patient presents with pain is seen by the physician and actually receives an analgesic. Therefore, using a NIPP where a nurse can assess patients’ pain and administer the appropriate analgesic is a favorable strategy to reduce this time gap (Finn et al., 2012).

Effective pain management in ED also requires timely reassessment of a patient’s pain (Macintyre et al., 2010) to evaluate the effectiveness of the pain intervention and is considered an essential component of good practice (American Pain Society, 2005; Bucknall, Manias, & Botti, 2007) and quality care (Macintyre et al., 2010). The recommendation for pain reassessment is within thirty minutes to one hour of parenteral or oral administration of analgesics respectively or with any change in a patient’s condition (Bucknall, Manias, & Botti, 2007; Canadian Pain Society Accreditation Standards, 2005).
In British Columbia, the College of Registered Nurses of British Columbia (CRNBC, 2007) Practice Standards recommends administration of Schedule III drugs to patients after a nursing diagnosis by registered nurses (CRNBC Practice Standards Retrieved on May, 2013). Administration of these analgesics is permitted through the policy and protocol established by the nurse’s employing organization. Nurses can use pre-printed orders to administer Schedule III drugs such as acetaminophen and ibuprofen when the organization has established the order. However, this is currently not in practice in emergency departments of major hospitals in the Lower Mainland of British Columbia. Therefore, this research focused on the impact of implementing the Nurse Decision Support Tool in the emergency department of a major hospital in the Lower Mainland, B.C.

1.1 Significance

Every patient seeking health care has a right to the best possible pain relief (CPS Accreditation Standard, 2005). Finn et al. (2012) claim that the time to first analgesic administration depends on the workload of the ED. Studies show that the wait time to first analgesic in the ED is very long (Fry & Holdgate, 2002; Fry, Bennett & Huckson, 2011; Todd et al., 2007). Therefore; a NIPP is the best option for the timely administration of analgesics for patients in pain presenting to the emergency departments. Both timely administration of analgesic and pain reassessment are important for satisfactory pain management. Yet to date, little research has focused on pain reassessment of patients after analgesic administration. In the evidence based literature, as far as the author is aware, there are limited studies of pain reassessment of patients following analgesic administration in the ED. Therefore, this research uses a retrospective chart audit to focus on the impact of a Nurse Decision Support Tool in the ED on pain assessment, time to first analgesic, and pain reassessment.
1.2 Problem Statement

It is known that patients with better and timely managed pain have decreased complications with a higher quality of life (Hefland & Freeman, 2009; Herr & Titler, 2009). Research shows that a timely assessment, intervention and reassessment of pain in the ED can improve pain management (Canadian Pain Society Accreditation Standard, 2005). Therefore, in order to improve pain control in emergency departments, a Nurse Initiated Pain Protocol (NIPP) that falls within the Scope of CRNBC Medication Administration Standards was deemed necessary.

1.3 Purpose

The purpose of this study was to analyse the impact of Nurse Initiated Pain Protocol which in this research is called a Nurse Decision Support Tool within an emergency department on patient’s pain outcomes and nursing practice. The analysis was undertaken using a retrospective chart audit to examine the documented pain activities of pain assessment; time to first analgesic, type of analgesics administered and pain reassessment.

1.4 Research Question

1) How frequently was a Nurse Decision Support Tool Used?
2) Was there any change in wait times to first analgesic after a Nurse Decision Support Tool was introduced?
3) Do nurses reassess patients’ pain after the administration of analgesics?
4) Were there differences in the amount and type of analgesics administered after the implementation of a Nurse Decision Support Tool?
1.5 Hypothesis

1) Nurses use Nurse Decision Support Tool for the pain management in ED.
2) Nurse Decision Support Tool does improve the wait time for the administration of analgesics to patients in the emergency department.
3) Nurses reassess patients’ pain after the administration of analgesics.
4) There were differences in the amount and type of analgesics administered after the implementation of a Nurse Decision Support Tool.

Latimer, Johnston and Ritchie’s (2010) conceptual framework of Knowledge Use in Pain Care guided this research. This will be discussed in Chapter Two.

1.6 Chapter Summary

Implementing NIPP in ED in other countries such as Australia and Sweden has significantly decreased the time to first analgesic (Finn et al., 2012; Muntlin et al., 2011). The decreased time to first analgesic helped to manage patients’ pain in a timely fashion with increased patient satisfaction. In British Columbia, CRNBC Practice Standards allow a registered nurse to administer Schedule III drugs without a physician’s order after a nursing diagnosis of pain. Based on these standards, a NIPP was introduced in the ED of one of the hospitals in the lower mainland and this study analysed the impact of NIPP in ED through retrospective chart audit to see if time to first analgesic decreased and to determine the pattern of pain reassessment.

In Chapter Two, the literature review will highlight the research about the impact of NIPP in ED. The effect of NIPP in timely pain management of the patients in the ED is
discussed with a reference to Latimer, Johnston and Ritchie’s (2010) conceptual framework of Knowledge Use in Pain Care.
CHAPTER TWO

Literature Review

The purpose of this literature review was to evaluate current research findings about using a NIPP in the ED. The literature review highlights the current pain management in the ED with complications of unmanaged pain and the need for NIPP and is guided by Latimer, Johnston and Ritchie’s (2010) conceptual framework of Knowledge Use in Pain Care (KUPC).

The literature review was completed using the databases CINAHL, EBSCOhost, ProQuest Dissertations and Theses, PubMed, MEDLINE and Web of Science from the year 2000 to 2013 in English language and using the following key words: nurse initiated analgesic, nurse initiated pain protocol, pain management, pain assessment, pain reassessment, emergency department and emergency room. The search was done for all ages of patients with pain visiting EDs with pain.

2.1 Pain

According to International Association for the Study of Pain (IASP), pain is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Merskey & Bogduk, 2013, p. 209-214). Irrespective of the type of pain, patients can become frustrated with wait times for analgesics in emergency departments which can aggravate dissatisfaction in the health care system (Fry et al, 2004; Herr & Titler, 2009).

Pain is typically classified as either acute pain or chronic pain. The Canadian Pain Society (CPS) describes acute pain as temporary or nociceptive pain with a rapid onset of less
than twelve weeks duration (CPS retrieved on May, 2013). Acute pain is self-limiting with an identifiable cause and is protective in nature as it warns the patient and care providers about the injury so that measures are taken to promote tissue repair and adequate timely treatment allows healing without complications (Roden & Sturman, 2009). Conversely, chronic pain persists for at least three months or reoccurs within three months from the start of the symptoms and often leads to complications (canadianpainsociety.ca retrieved on May 2013; Roden & Sturman, 2009). IASP (2013) defined chronic pain as any pain that has no biological value and has persisted more than three months which is considered as the normal tissue healing time.

For some, unrelieved acute pain may develop into chronic pain due to nervous system impairment. Chronic pain affects the patient’s functional ability and can have cardiovascular, pulmonary, gastrointestinal and neurological complications (Bell & Duffy, 2009; Herr & Titler, 2009; CPS, 2005; McGillion et al, 2011). Chronic pain also increases the stress on the family and contributes to financial hardship (Roden & Sturman, 2009). The symptom of pain is costly for individual, family and society due to decreased productivity. The World Health Organization (WHO) indicates that 20% of the world population are suffering from pain and of this number, 33% cannot achieve their livelihood (Benneth, Fry & Huckson, 2011). Therefore, adequate and timely management of pain is necessary to improve productivity, lessen costs on the health care system, decrease suffering and increase patient perception of quality of care.

2.2 Pain Relief as a Fundamental Right of the Patient

The WHO recommends appropriate pain management with access to pain relief for all patients (Fry et al., 2011). The Canadian Pain Society states that pain relief is a patient’s fundamental right irrespective of the age, sex, ethnicity, religion, socio-political and economic
context (CPS, 2005). It is unethical for a patient to suffer pain without being given adequate pain relief (Chung & Joseph, 2003). Therefore pain assessment, pain management and pain reassessment are important in providing pain relief for patients.

Hefland and Freeman (2009) suggest that appropriate interventions for a patient’s pain should be carried out through proper pain assessment and pain reassessment by the nurses. The Canadian Pain Society’s (2005) position statement for pain relief states that specific interventions for pain are necessary to relieve a patient’s pain to regain functional ability. Unrelieved and prolonged (more than six weeks) pain is a common cause for physical and psychological disability of the patient and family (Hirsh, Jensen & Robinson, 2009). Well-managed pain increases the confidence and satisfaction of the patient and family in the health care team and improves the quality of life (Karlsten et al., 2012). Hefland and Freeman (2009) stated that the trust and confidence of the patient and family in the health care system are increased with adequate pain relief. Hence, timely pain assessment with appropriate analgesic administration as well as the reassessment of a patient’s pain is important to decide the treatment modalities, and to evaluate the effectiveness of the current treatment.

Unfortunately studies show that despite growing recognition of the importance of pain management, patients continue to suffer pain (Benneth, Fry & Huckson, 2011; Fry & Holdgate, 2002; McGillion et al, 2011; Todd et al., 2007; Yanuka et al., 2008). A Canadian study of 72 Health Care Professionals randomly assigned to either Standardised Patients or Deteriorating Patients’ simulation intervention revealed that one of the common reasons for inadequate pain management is the lack of pain assessment (McGillion et al, 2011). In addition, discrepancies between patient’s report of pain intensity and nurse’s or physician’s assessment (Chung & Joseph, 2003; Muntlin et al., 2011) are influenced by individual differences in the perception and
exhibition of pain, lack of communication between patients and the health care team, and
attitudes of both patients and health care team towards pain.

The need for timely and appropriate pain management with a Nurse Decision Support
Tool can be explained with the concepts of socio-political, organizational and patient factors
based on Latimer, Johnston and Ritchie’s Knowledge Use in Pain Care.

2.3 Conceptual Framework: Latimer et al.’s Knowledge Use in Pain Care

Latimer et al. (2010) originally developed the conceptual framework: Knowledge
Use in Pain Care (KUPC) that describes the pertinent factors to be considered to increase the
knowledge of health care providers to reduce pain in hospitalised children. The KUPC model
(See Figure 1) describes health care provider factors that influence pain management and in this
research will be used to facilitate our understanding of how pain can be managed in the ED. The
authors tested the model to enhance pain care delivery in paediatric age group. But, they
recommended using the model in other clinical areas to establish the presence as well as strength
of the various components and their relationships. This model consists of four components
including organisational, nurse, patient and socio-political factors. The organisational
components described are: available opportunities, resources with accessible information, and
support from the authorities that influence the attitude of nurses to perform the task. Important
nurse components that influence pain assessment are knowledge, education and experience,
while patient’s age and acuity of the illness are described as patient factors that link to pain
assessment and management. The fourth factor in the Knowledge Use in Pain Care framework is
socio-political, which includes accreditation requirements, practice guidelines, and policy and
standards of practice for nurses to provide a uniform baseline platform for pain management. For
the purpose of this study, consideration will be given to the socio-political factors, organizational factors and patient factors that influence pain management.

Figure 1. Adapted from Latimer, Johnston and Ritchie (2010) KUPC model

2.3.1 Socio-political Component of Pain Management

In Sweden and Australia nurses have permission to administer opioids, acetaminophen and/or ibuprofen without a physician’s order to eligible patients with complaints of pain by using either a protocol or a NIPP (Finn et al., 2012; Fry, Bennett & Huckson, 2011; Fry, Ryan & Alexander, 2004; Fry & Holdgate, 2002; Muntlin et al., 2011).

In BC, according to the BC Provincial Drug Schedule, a pharmacist can sell Schedule III drugs from the self-selected area of a pharmacy to adults (CRNBC Practice Support, retrieved from crnbc.ca on January 12, 2014). In 2007 the CRNBC Scope of Practice Standards for Registered Nurses were modified to permit registered nurses to administer Schedule III drugs...
(acetaminophen and ibuprofen) based on nursing assessments and diagnosis of an uncomplicated condition and following a protocol established by their employing organization. This change in practice standard recognizes the knowledge and skills of registered nurses to assess and manage pain. In BC, Schedule IA such as opioids are dispensed only with controlled prescription.

2.3.2 Organizational Component of Pain Management

An unresolved complaint of pain is a health care crisis which is attributed to the lack of timely and appropriate interventions by the health care providers (McGillion et al., 2011). In order to meet the rights of the patient for the best possible pain relief, the organization is required to provide opportunities, resources, and adequate support for the staff through in-services, conferences and workshops and pain management protocols (Canadian Pain Society, 2005; Latimer et al., 2010; McGillion et al., 2011).

These organizational factors are important to improve nurses’ knowledge and skills in pain assessment and pain management and to provide quality care to patients (Canadian Pain Society, 2005; Latimer et al., 2010; McGillion et al., 2011). In the ED all patients are triaged according to Canadian Triage and Acuity Scale (CTAS) by a Registered Nurse and classified as Level 1, 2, 3, 4 and 5 depending on the acuity of the patient’s presenting signs and symptoms. Level 1 are the most acute patients who are to be treated first. Pain, being one of the chief complaints of the patients in the ED, influences the triage level. An important organizational factor is a standardized pain assessment tool- a method of recording pain and pain management practices. In this research pain assessment is included in the triage assessment form. The NIPP or as it was termed a Nurse Decision Support Tool was developed through discussions between nursing, medicine, pharmacy, computer systems and the researchers. The Tool permitted the
nurses to administer 975mg of acetaminophen every six hours x 2 doses and 400mg of ibuprofen every four hours x 2 doses based on nursing diagnosis of patient’s pain. The computer system in the ED was set up for the nurses to access this protocol and was located within the ED order systems with other nurse initiated protocols such as chest pain management, asthma protocol, sepsis guidelines, anaphylaxis protocol, etc.

The Nurse Decision Support Tool for pain management was introduced in the ED by the Clinical Nurse Specialist (CNS) in pain management, ED Nurse Educator and one of the ED Clinical Nurse Leaders through fourteen ten minute educational sessions held from November 17 to December 4, 2012. The educational sessions included 1) how the ED RN may initiate acetaminophen and/ or ibuprofen by mouth for pain - 2) how to access these medications orders via online ordering computer system as well as a quick reference card regarding the use of acetaminophen and ibuprofen on the Decision Support Tool. These education sessions were attended two to four nurses per session and they were conducted at the nursing station.

2.3.3 Patient Component of Pain Management

Pain is often under assessed and thus inadequately treated and this has been shown to be influenced by sex, race, age and acuity of illness of the patients. Hirsh, Jensen & Robinson (2010) in a US study of 54 surgical nurses and virtual human technology found that females tend to have their pain under assessed more than males, minorities are at higher risk for inadequate pain assessment than Caucasian patients, and older adults suffer more pain than younger patients.

A descriptive review of 868 records by Heins, Grammas, Costello, Huang, and Mishra (2006) in the United States on patients 18 years and older admitted to the ED with
musculoskeletal pain revealed that African Americans received fewer opioids and discharge analgesics than Caucasians. Also, younger patients with trauma and chronic pain received more opioids and discharge analgesics than older adults. Mills, Shofer, Boulis, Holena, and Abbuhl (2011) conducted a retrospective cohort study of 20,125 adult patients presented to two ED in United States with back or abdominal pain found that non-white patients waited longer for their analgesics and even received fewer analgesics than the whites. Another study of all ambulance transfers in North Carolina in 2011 comparing the analgesic administration in older adults (65 years & older) and younger adults (18 to 64 years) showed that older men received fewer analgesics than younger men irrespective of the pain severity while older women with severe pain received more analgesics than younger women. But, with mild or moderate pain, younger women received more analgesics than older women (Platts-Mills, et al., 2013). The National Hospital Ambulatory Medical Care Survey from 2003 to 2009 of the American EDs revealed that out of 88,031 pain related visits of patients 18 years and older, older patients (75 & older) received fewer analgesics than younger adults (Platts-Mills, Esserman, Brown, Bortsov, Sloane, & McLean, 2012). A prospective cohort study of 981 non pregnant adults admitted to the ED in United States with abdominal pain showed that even though men and women had the same mean pain scores, women waited longer and received fewer analgesics than men (Chen et al., 2008). Therefore, age, sex and gender of the patients and acuity of the illness influence the pain management in the ED.

The literature shows that nurses often under assess and underestimate patient’s pain (Chen, Lin & Watson, 2010). Therefore, self-report of pain is considered the standard for pain management (Latimer et al., 2010).
Shaw and Alison (2010) reviewed the literature and found a variety of patient factors including a patient’s tolerance to pain, psychological imbalance, stress, depression, addiction and non-compliancy affects nurses’ assessment and management of a patient’s pain. The authors argued that patients with chronic pain have more tolerance to pain and the inability to find an objective reason for pain makes health care providers attribute pain to the psychology of patients. Even though stress and depression themselves do not cause pain, chronic pain leads to stress in life along with depression (Dewar, 2006).

2.4 Pain Management in the Emergency Department

As discussed earlier pain is one of the most common causes of suffering and the most frequent symptoms reported in the ED (Finn et al., 2012; Fry et al., 2004). According to the Canadian Pain Society, 78% of patient visits to the ED are for complaints of pain (2013). However, Fosnocht and Swanson (2007) state that inadequate analgesic administration is common. Todd et al. (2007) studied 20 ED sites across Canada and United States, and found that only 60% of patients who presented with complaints of pain received analgesics.

Despite the number of patients who report pain, those who do receive analgesics often have a substantial wait for pain relief. In Canada and United States, Todd et al. (2007) found that the median wait time was 90 minutes for the first analgesic which was either morphine or another opioid, ibuprofen and acetaminophen and these were ordered by the physician. While, researchers in Australia through audited data from 36 EDs which had specific procedures and policies for pain management including nurse initiated analgesic, revealed the median wait time from the time of arrival to first analgesic was 70 minutes (Fry, Bennett & Huckson, 2011). A common practice over the past century is to hold analgesic for patients with abdominal pain until
a medical diagnosis is made. But, evidence supports that analgesics do not mask the symptoms nor do they delay diagnosis (Fry & Holdgate, 2002). So, withholding analgesics for these patients are not warranted but seems that these patients may wait even longer for analgesics. Muntlin et al. (2011) in a study of 200 Swedish ED patients with abdominal pain found an average wait time of 2.5 hours for the first analgesic.

Studies indicate that pain management in the ED is still inadequate and patients continue to suffer. Bell and Duffy (2009) reported that while patients did get pain assessments and treatments in the ED; this treatment may not be adequate as 50% to 70 % of patients still suffered from unrelieved pain. Todd et al. (2007) found that 74% of the admitted patients in the ED were discharged with moderate to severe pain, while 42% of the patients who requested analgesics did not receive them. Yanuka et al. (2008) showed that only 30% of patients in an Israeli ED received analgesics. Furthermore, timely and effective treatment of pain reduces the number of patients who walk out without being seen by a health professional and increases patient satisfaction, which predicts the clinical outcome of the quality of care (Ballejos-Campos, 2012). Summary of the studies are shown in Appendix B.

Although the relationship between pain and violence is not well studied, anecdotal evidence indicates that prolonged wait times in the ED attributes to 60% of the hospital and environmental factors contributing to violence against ED workers (Gates, Ross & McQueen, 2006). Gates, Ross and McQueen (2006) surveyed 242 employees at five EDs in United States reported that most employees suffered verbal harassment but there were 319 physical assaults by patients and 10 participants reported assaults by visitors towards employees.
Adequate pain management with a timely administration of analgesic is crucial to maintain the quality of care in the ED (Ballejos-Campos, 2011). Recently there were organisational changes with the introduction of NIPP that have occurred internationally in health care where patient satisfaction with pain relief in a timely manner influenced hospital economies as ED accounts for the majority of the hospital admissions (Muntlin et al., 2011). Patient satisfaction is a key marker in the quality of care provided and early pain relief assists in rapid turnover of the patients and decreased congestion in the hospitals. In BC, Patient Satisfaction Steering Committee under the direction of the Deputy Minister of Health conducted a survey on patients who visited EDs in the province between February and April 2007. The results reported that 57% of the participants experienced pain in the ED. Forty three percent of those patients reported severe pain while 44% suffered moderate pain and 13% had mild pain. Out of 54% of the patients with pain 85% reported that they received adequate analgesics while 19% felt that the ED pain management was inadequate. Sixty-two percent of the people were positive about the aspects of care including wait times in the EDs in the province and pain management (Murray, 2008).

Therefore, an important strategy to achieve patient satisfaction through timely pain management is with a NIPP or a nurse Decision Support Tool. This tool allows nurses to administer analgesics to patients with pain without awaiting a physician’s order.

2.5 Nurse Initiated Pain Protocol

Several studies (Finn et al., 2012; Fry, Bennett & Huckson, 2011; Fry & Holdgate, 2002; Fosnocht & Swanson, 2007; Muntlin et al., 2011) have found that when nurses were allowed to administer analgesics including opioids based on their own assessments, patients’ wait time for
analgesics decreased. Use of a NIPP enabled nurses to make decisions about the administration of analgesics for better pain management. Finn et al. (2012) in an Australian before and after intervention study of 889 ED patients found that the median time to first analgesic was 28 minutes with NIPP while at ED without a NIPP the median wait time was 98 minutes. In this study nurses were able to administer morphine, acetaminophen or ibuprofen based on the pain score of the patients and on their nursing assessments. In a Swedish quasi-experimental study, Muntlin, Carlsson, Safwenberg and Gunningberg (2011), found that when a nurse initiated intravenous morphine protocol was used for patients with abdominal pain, the time to analgesic was reduced to a mean of 1.3 hours from 2.5 hours without any harmful effects. The study also showed that 65 % of the patients in the ED with pain received analgesics using the NIPP as compared to only 46 % without NIPP. The patients also perceived that the quality of pain management was also higher. Furthermore, there were no harmful effects for the patients and no added hospital costs. Fry, Bennett and Huckson (2011) conducted a 12 month retrospective chart audit in 36 Australian ED and found that 74.9% of the admitted patients in ED received analgesics with a median wait time of 70 minutes. The majority of the hospitals (69.4 %) had NIPP for administering opioids, nitrous oxide, NSAIDS and acetaminophen. Fosnocht and Swanson (2007) with a before and after observational study in an urban ED in United States stated that 70% of the patients received analgesic within 40 minutes with NIPP (where nurses were able to administer acetaminophen, ibuprofen, hydrocodone or morphine according to their assessment of the patient’s pain) while only 45% patients received analgesic with a mean wait time of 76 minutes without NIPP. In this study nurses were able to administer ibuprofen, acetaminophen or morphine according to the pain intensity score of the patients. Fry & Holdgate (2002) in an Australian study showed that the median time for medical assessment in the ED was
52 minutes, while patients received morphine 26 minutes earlier with NIPP than awaiting medical assessment. It is worthy to note that all these studies allowed ED nurses to administer opioids to patients with pain while awaiting the assessment by a physician.

Effective pain management depends on pain assessment and pain reassessment. Even though pain reassessment is important in evaluating pain management; research shows that there is a lack of pain reassessment after analgesic administration by the nurses.

2.6 Pain Reassessment

While pain assessment is the base for analgesic administration, pain reassessment determines the effect of the analgesic. Continuous and systematic reassessment of a patient’s pain is as important as pain assessment in identifying barriers to the treatment; evaluating the effectiveness of the treatment and achieving optimal pain management (Ene et al., 2008). As well, pain reassessment is an important communication tool between health care providers. Although patients may receive analgesics, pain reassessments are not emphasised in practice. Unfortunately, patients can have very intense pain, endure a long wait for inadequate analgesic and then not have their pain reassessed (Muntlin et al., 2011; Todd et al., 2007). Todd et al. (2007) reported that pain reassessment was not done in the ED even though pain assessments were completed on 83% of patients who were in severe pain (intensity of 8 out of 10). An Australian study demonstrated 26.4 %( 522 of 1976) of patients in ED had a pain triage score documented, and of these 1473 (74.5%) received analgesics. But only 32.7 %( 482) had their pain reassessed (Fry et al., 2011).

According to the best practice guidelines of Registered Nurses Association of Ontario (RNAO, 2002), the recommendation for pain reassessment after the administration of analgesics
is 15 to 30 minutes after parenteral analgesics, one hour after immediate release analgesics and four hours after sustained release analgesics. The Canadian Pain Society (2005) recommends pain assessment to be done at least once per shift or when a patient reports with pain or their condition changes. However, there is no specific statement on pain reassessment following administration of analgesics.

Unfortunately, research shows that nurses are not performing systematic pain reassessments. Researchers have found recording of pain reassessments is limited (Bucknall, Manias & Botti, 2007; Fry, Bennet & Huckson, 2011; Herr et al., 2004; Cohen et al., 2003). Herr et al., (2004) revealed that only 15.3% of patients with hip fractures receiving non-patient controlled analgesics were reassessed within one hour during a 72 hour period. Cohen et al. (2003) found that only 34% of out-patients and 44% of in-patients with cancer are reassessed after analgesic administration. Fry et al (2011) conducted a retrospective cohort audit of 36 Australian hospitals EDs regarding pain management patterns in patients with migraine, abdominal pain and fractured femoral neck and concluded that only 32.7% of 1473 (482) patients had pain reassessments. Researchers have yet to examine the reasons for lack of pain reassessment and as most studies are retrospective or chart audits which add to the difficulty of determining if reassessment are done or just not recorded.

2.7 Chapter Summary

There are several factors that influence pain management in the ED including socio-political, organisational and patient factors. Also, adequacy of patient’s pain treatment is based on pain assessment and reassessment activities of the nurses (Schopflocher et al., 2011). In the ED, individual nurses perform patient’s pain assessments and reassessments. Therefore, a
standardized nursing pain assessment and management protocol could further optimal pain management in the ED patients. The organisational structure has to provide adequate knowledge to the nurses about pain, pain assessment and analgesics (Muntlin et al, 2011).

Research and literature supports the NIPP in the ED for faster pain relief and better patient satisfaction in the health care system. Studies in Australia, Sweden and United States highlighted that NIPP in the ED have significantly reduced the time to first analgesic.

In Chapter Three, the methodology highlights the study design, procedures and characteristics of the data and methods of data analysis.
CHAPTER THREE

Methodology

This chapter describes the study design, the process of development and implementation of the Nurse Decision Support Tool, process of evaluation of the impact of the Tool, sample, data collection, data analysis and ethical considerations. The sampling plan consisted of the sample population, inclusion and exclusion criteria, recruitment method and power analyses to determine the sample size.

3.1 Study Design

The study design chosen was a retrospective chart review of the patients admitted to the emergency department within an urban hospital in May 2012 and May 2013. The Nurse Decision Support Tool was initiated in December 2012. With the Nurse Decision Support Tool, ED patients 18 years and older with pain and triaged CTAS (Canadian Triage and Acuity Scale) from 2 to 5 are eligible for analgesic administered by the triage nurses while awaiting the physician’s assessment.

A cross sectional study was conducted with an audit of the charts of the patients in the emergency department of a selected hospital in the Lower Mainland, B.C. This was a three-phased project. Phase 1 - developed the Nurse Decision Support Tool and education sessions for the initiation of acetaminophen and/ or ibuprofen were arranged for the ED RNs and physicians. Phase 2 - implemented the Nurse Decision Support Tool in the ED and Phase 3 – evaluated the Nurse Decision Support Tool with pre and post comparisons via chart audit of patient outcomes such as time to first analgesic, pain assessments and reassessments. The same month May was chosen for both before and after so that any seasonal differences could be minimized.
3.2 Sample

The sampling plan consisted of the sample population, inclusion criteria, exclusion criteria, recruitment method and power analyses to determine the sample size.

3.2.1 Sample population

Charts of 600 patients 18 years and older admitted in the emergency department of an urban hospital in Providence Health Authority with a CTAS level 2 to 5 in the months of May 2012 and 2013 (300 for each of the two months) were randomly selected. The researcher audited each chart for pain as the chief complaint on admission, either recorded on the triage form or on the emergency nursing record. The charts of the patients admitted to ED without pain as a chief complaint were excluded. Charts of patient with a CTAS level 1 were not included in the sample because they were considered critical and needed to be seen by the physician immediately. Following these processes, which are described in detail below, 300 charts were used for this study.

3.2.2 Power Analysis

An a-priori power analysis was conducted to determine the sample size required to detect a relationship between the nurses’ administration of analgesic and mean wait time for the first analgesic using descriptive statistics. Given a power of 0.8, a two-tailed alpha of 0.05 and an effect size of 0.3, the sample size needed was 150 pre and post implementation of Nurse Decision Support Tool for a total of 300 charts.
3.3 Data collection

Data were gathered by a retrospective chart audit. This method was selected because it allowed capture of all the recorded pain assessment and interventional activities of the nurses in the triage without the influence of external factors such as time, place, and being observed. Moreover, the information was readily accessible and available (Dalton et al., 2001). Chart reviews with well-defined chart audit data collection sheet helped the researcher to be objective and avoid bias.

The data collection sheet (Appendix A) included patients’ demographic data, diagnosis, pain assessment approaches used by the ED nurses and time and type of analgesic given. Originally the data collection sheet was developed by Poulton and Muir in 2009 to collect data regarding the pain management activities of nine Lower Mainland EDs (Poulton & Muir, 2009, unpublished data). It was reviewed by a panel of expert pain management nurse researchers for content validity but other psychometric measures were not used.

3.3.1 Procedure

To start with the process of accessing the charts, the request for access to view patient health records was given to the manager of the Medical Records Department by the CNS in pain management. The auditor (Gisha Ashly) completed and signed the request for retrieval/access that enabled her to view the patient health records. The hospital also required her to receive training on Patient Care Information System (PCIS) prior to allowing her to access the charts. Once these procedures were completed, the Quality Improvement Department randomly selected 300 charts with a built in random sorting function of Structured Query Language (SQL) for the months of May 2012 and May 2013 (total 600 charts) and provided the researcher with the
patient’s medical record number, visit number, date of birth, age, sex, CTAS level, admission date and time, discharge date and time, diagnosis and registration time. The Medical Records Department needed five days to enter all 600 patient charts into the electronic data system to be accessed by auditor who used the patient’s medical record number to access the charts electronically from this system. The auditor included a chart in the sample if pain as a chief complaint was recorded in the triage form or emergency nursing record. Then using the data collection sheet described above the auditor reviewed each chart until there were 150 charts from each of the months May 2012 and May 2013 that indicated pain as a chief complaint; the other charts were eliminated. Thus from 300 charts for each year, the first 150 charts that indicated pain as a chief complaint were selected for this study. The data provided by the Medical Records Department and the Quality Improvement Department was entered on a spreadsheet; each chart was reviewed according to the data collection sheet (Appendix A).

The following are the definitions of the indicators on the data collection sheet. Patient registration time was when the clerk registers the patient in the computer data system. Patient triage time was when a nurse assessed the patient in the ED and recorded the time. There were four ways that pain assessment was categorized: pain recorded, pain comment, pain assessed, and pain narrative. Pain was considered recorded only if the nurse has assessed patients’ pain and recorded it and any characteristics of the pain such as provoke, quality, region, and severity in addition to the Numerical Rating Scale (NRS). Pain comment was a broad categorization indicating that the nurse had assessed a patient’s pain with a written comment about it being present or not. The term pain assessed was designed to indicate only if intensity was recorded with a Numerical Rating Score (NRS). Pain narrative determined that there were some comments about pain and characteristics but excluded the NRS.
Pain *reassessment* was considered to be any pain comment or narrative or NRS recorded one hour after analgesic administration. Non-pharmacological interventions were all nursing activities other than administering analgesic. The following were accepted and recorded: providing warm blanket, applying ice, slings, helping with crutches, positioning and providing music.

Each chart selected was reviewed by the researcher for patient’s age, CTAS level, diagnosis, initial pain score with pain comment, or narrative recorded or not, whether or not the nurse Decision Support Tool was initiated, time patient was triaged, time patient was seen by the ED physician, time seen by the ED nurse, type of analgesic received, time the analgesic was administered, whether or not pain was reassessed after analgesic administration and any non-pharmacological interventions used. The data were entered in the data collection sheet to ensure completeness. The nurses’ progress notes and pain flow sheets were reviewed for the assessment and documentation of the patient’s pain. The Medication Administration Record was reviewed for the type and time of analgesic administered by the ED nurse.

The researcher allocated plenty of time to review each chart as the recorded data in the charts had abbreviations and some were difficult to read. All the charts were reviewed and discussions held with CNS about pain reassessment to be acceptable if done within one hour of the analgesic administration. The CNS also audited some charts randomly and compared it with the entered data to ensure reliability.

**3.4 Data Analysis**

Statistical Program for the Social Sciences (SPSS) version 1.0 was used to analyse the data. Mean, median and standard deviation were used to interpret the data. Descriptive statistics
of chi-square and Wilcoxon Rank Sum Test with p-values used to interpret the level of significance.

3.5 Ethics

The Behavioural Ethics Review Board of the University of British Columbia and Providence Health Care Research Institute (PHCRI) of Providence Health Care Authority provided ethics approval. A copy of the Ethics Approval is attached (Appendix C). Access to the charts was facilitated through the Medical Records with the help of Quality Assurance Department. Patients’ names were not entered into the data collection sheet and the spread sheet for data entry to safeguard confidentiality and to respect privacy. Patients’ ID, medical records number were used only for follow-up purposes if necessary and kept under lock and key in CNS’s office in the hospital. A password-secured computer program located in the CNS’s office was used to store and analyse the data. All raw data will be destroyed in 5 years.

Patient consent was not needed in this study as only the documented data from the charts were audited for CTAS level, pain assessment, analgesic administered with time to first analgesic without any patient identifiers.

3.6 Chapter Summary

This chapter described the study design, data collection, sample population, inclusion exclusion criteria, data analysis plan and procedures including ethical considerations. The study was cross sectional with retrospective chart audit in the ED of Providence Health Authority. The findings of the study and description are discussed in the next chapter.
CHAPTER FOUR

Findings

This chapter highlights the findings of the study. Data are reported on the demographic characteristics of the selected population, type of analgesics administered, wait time for the first analgesic in the ED, types of pain assessment and pain reassessment by the ED nurses.

4.1 Sample Characteristics: Demographics

The demographic information including age, gender and diagnosis of the patients from the audited charts was analysed to determine the sample characteristics. The age of the patients ranged from less than 20 years to over 90 years. However, the majority of patients were 20-59 years both 2012 and 2013 (Table 1). The mean age for 2012 was 48 years (SD=19.17) while for 2013 was 44 years (SD=16.55). There were no significant differences between the age groups for the years 2012 and 2013. Majority of the population were males in 2012 (56%) and 2013 (59%); while females were 44% and 41% respectively (Table 2). There were no significant differences in the years 2012 and 2013 between males and females. In 2012, majority (31%) of the patients were diagnosed with limb pain, 22% with abdominal pain, 10% with chest pain and 36% with other pain. In 2013, 39% of the patients were diagnosed with limb pain, 16% with abdominal pain, 7% with chest pain and 38% with other pain (Table 3). There were no significant differences in the diagnosis of patients in both years (p >0.05).
Table 1. Frequency table for patient’s age

<table>
<thead>
<tr>
<th>Variable</th>
<th>Year 2012 N=149</th>
<th>Year 2013 N=150</th>
<th>T-test</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>4 (3%)</td>
<td>3 (2%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>24 (16%)</td>
<td>33 (22%)</td>
<td>1.9187</td>
<td>297</td>
<td>0.056</td>
</tr>
<tr>
<td>30-39</td>
<td>29 (19%)</td>
<td>28 (19%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>29 (19%)</td>
<td>29 (19%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>22 (15%)</td>
<td>31 (21%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>18 (12%)</td>
<td>13 (9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-79</td>
<td>12 (8%)</td>
<td>7 (5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-89</td>
<td>8 (5%)</td>
<td>6 (4%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 &amp; &gt;90</td>
<td>3 (2%)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A two-tailed t-test for the two samples confirmed that there was no significant differences between the ages of the patients in 2012 and 2013 (p = >0.05).

Table 2. Frequency table for sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>Year 2012 N=149</th>
<th>Year 2013 N=150</th>
<th>Chi-Square value</th>
<th>df</th>
<th>Asymp.Sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>84 (56%)</td>
<td>88 (59%)</td>
<td>0.16</td>
<td>1</td>
<td>0.69</td>
</tr>
<tr>
<td>Female</td>
<td>65 (44%)</td>
<td>62 (41%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A Chi square goodness of fit test was run and confirmed that there was no significant difference (p= 0.69) in the numbers of males and females in 2012 and 2013.

Table 3. Frequency table for diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Year 2012 N=149</th>
<th>Year 2013 N=150</th>
<th>Chi-square Value</th>
<th>df</th>
<th>Asymp. Sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal pain</td>
<td>33 (22%)</td>
<td>24 (16%)</td>
<td>1.83</td>
<td>1</td>
<td>0.18</td>
</tr>
<tr>
<td>Chest pain</td>
<td>15 (10%)</td>
<td>10 (7%)</td>
<td>1.23</td>
<td>1</td>
<td>0.29</td>
</tr>
<tr>
<td>Limb pain</td>
<td>47 (31%)</td>
<td>59 (39%)</td>
<td>1.98</td>
<td>1</td>
<td>0.16</td>
</tr>
<tr>
<td>Others*</td>
<td>54 (36%)</td>
<td>57 (38%)</td>
<td>0.099</td>
<td>1</td>
<td>0.75</td>
</tr>
</tbody>
</table>

* Includes fever, headache, back pain, dysuria, head injury, facial trauma, burns<5%Body Surface Area, Scrotal pain, neck pain, ear ache, dental pain, eye pain.

The Chi-square goodness of fit test confirmed that there were no significant differences in the diagnosis of the patients in 2012 and 2013 (p > 0.05). Therefore, we can determine that patient characteristics from 2012 and 2013 were significantly similar.

4.2 Types of analgesics administered

All the selected charts were audited for type of analgesics administered. Even though, Nurse Decision Support Tool was only for administering acetaminophen and/or ibuprofen to patients with pain, information on other analgesics were also collected (Table 4). In 2012 most of the patients (30%) received acetaminophen while 29 (19%) received ibuprofen, 33 (22%) received oral opioids and 36 (24%) received intravenous opioids- all of these were prescribed by a physician. In 2013, 38 (25%) and 33 (22%) patients received acetaminophen and ibuprofen respectively. These were both prescribed by physicians and by nurses following the Nurse Decision Support Tool. The majority of the patients received IV opioids in 2013 (28%). Twenty
two percent of patients received PO opioids and 19% received NSAIDS in 2013. The Chi-square goodness of fit test confirmed that there were no significant difference in the type of medications administered to patients between 2012 and 2013 except for other NSAIDS which had a level of significance of 0.0001. Between 2012 and 2013, more patients received more than one type of analgesic (p=0.0001).

Table 4. Frequency table for types of analgesics administered

<table>
<thead>
<tr>
<th>Variables</th>
<th>Year 2012 N=149</th>
<th>Year 2013 N=150</th>
<th>Chi-square Value</th>
<th>df</th>
<th>Asymp. Sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>44 (30%)</td>
<td>38 (25%)</td>
<td>0.22</td>
<td>1</td>
<td>0.64</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>29 (19%)</td>
<td>33 (22%)</td>
<td>0.80</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>Other NSAID (aspirin, celecoxib, indomethacin, ketorolac, naproxen)</td>
<td>8 (5%)</td>
<td>28 (19%)</td>
<td>14.84</td>
<td>1</td>
<td>0.0001</td>
</tr>
<tr>
<td>PO Opioids (codeine, hydromorphone, methadone, morphine, oxycodone, percocet)</td>
<td>33 (22%)</td>
<td>33 (22%)</td>
<td>0.09</td>
<td>1</td>
<td>0.76</td>
</tr>
<tr>
<td>IV Opioids (Demerol, fentanyl, morphine, hydromorphone)</td>
<td>36 (24%)</td>
<td>42 (28%)</td>
<td>1.42</td>
<td>1</td>
<td>0.23</td>
</tr>
<tr>
<td>Administered more than one type of analgesic</td>
<td>31 (27%)</td>
<td>56 (52%)</td>
<td>9.90</td>
<td>1</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

N= number of patients, NSAID= non steroidal anti inflammatory drug, PO= per oral, IV= intra- venous

4.3 Time to First Analgesic from the Time of Registration in Minutes

In 2012 the mean wait time for the first analgesic from time of registration of patients in the ED was 91.49 minutes while in 2013 the mean wait time was reduced to 85.57 minutes (see Table 5). This demonstrated a reduction of 5.92 minutes which was not significant. Since the
data were not normally distributed, a Wilcoxon Rank Sum test was performed and p-value was 0.71 which is not statistically significant. Because of the small sample size in using the Nurse Decision Support Tool, it was not possible to undertake statistical analysis to determine if the Nurse Decision Support Tool reduced the time to first analgesic.

**Table 5. Difference in time from registration to first analgesic**

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Wilcoxon Rank Sum Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 N= 114 (Patients received analgesics)</td>
<td>91.49</td>
<td>73</td>
<td>69.73</td>
<td>Vs. 2012 p=0.71(Z=0.37)</td>
</tr>
<tr>
<td>2013 N=107 (patients received analgesics including via Tool)</td>
<td>85.57</td>
<td>73</td>
<td>57.72</td>
<td>Vs. 2012 p=0.90(Z=0.45)</td>
</tr>
<tr>
<td>2013 N= 103 (Patients received analgesics without Tool)</td>
<td>86.88</td>
<td>39.50</td>
<td>26.89</td>
<td>Vs. 2013 p=0.90(Z=0.45)</td>
</tr>
</tbody>
</table>

N= number of patients, SD= standard deviation, Vs= Versus

**4.4 Pain Assessment and Pain Reassessment**

From the audited charts, as outlined in Chapter Three (Methods) pain was assessed by *pain comment*, with the *NRS* or *pain recorded* or *pain narrative*. The majority of the chart entries were *pain comment* indicating whether or not pain was present and with the location of the pain (see Table 6). In 2012 and 2013 *pain comment* contributed to 90% of the type of pain assessments done. The *Numerical Rating Scale* was used 26% in 2012 and 33% in 2013. As described earlier, *pain recorded* was considered and 87% of the patients in 2012 had their *pain*
recorded while in 2013 pain recorded was 81%. Pain narrative was 5% in 2012 and increased to 9% in 2013.

As per the criteria (any pain comment recorded one hour after analgesic administration) described for pain reassessment 34% of the patients in both years had pain reassessments done by nurses after all types of analgesics were administered.

Table 6. Frequency table for pain assessment and pain reassessment

<table>
<thead>
<tr>
<th>Variables</th>
<th>Year 2012 N=149</th>
<th>Year 2013 N=150</th>
<th>Chi-square value</th>
<th>df</th>
<th>Asymp.Sign (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain comment</td>
<td>134 (90%)</td>
<td>135 (90%)</td>
<td>0.0004</td>
<td>1</td>
<td>0.98</td>
</tr>
<tr>
<td>Pain recorded</td>
<td>129 (87%)</td>
<td>121 (81%)</td>
<td>1.91</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>Numerical Rating Scale</td>
<td>38 (26%)</td>
<td>50 (33%)</td>
<td>2.21</td>
<td>1</td>
<td>0.14</td>
</tr>
<tr>
<td>Narrative</td>
<td>7 (5%)</td>
<td>13 (9%)</td>
<td>1.89</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>Pain reassessment</td>
<td>39 (34%) N=114</td>
<td>36 (34%) N=107</td>
<td>0.19</td>
<td>1</td>
<td>0.93</td>
</tr>
</tbody>
</table>

N= number of patients

A chi-square goodness of fit test concluded that there were no significant differences (p > 0.05) for pain assessment and pain reassessment activities of the ED nurses in 2012 and 2013.

4.5 Research Questions

1) How frequently was a Nurse Decision Support Tool used?

From the frequency statistics, the Nurse Decision Support Tool was used only four times within the random sample in the year 2013. This was not statistically significant because of the
very small sample size (Figure 1). Therefore, hypothesis 1 could not be tested and therefore could not be confirmed.

**Figure 1. Frequency of the Nurse Decision Support Tool**

2) **Was there any change in wait times to first analgesic after a Nurse Decision Support Tool was introduced?**

To determine whether the wait time has improved the data were collected. However, the Nurse Decision Support Tool was used only four times in the randomly selected patient charts. The mean wait time to first analgesic in 2012 was 91.49 min (median=73; Interquartile range (IR) = 47, 109), in 2013 with Nurse Decision Support Tool was 85.57 (median=73; IR= 42, 114) and without Tool in 2013 was 86.88 (median=73; IR=45, 114). Median wait time for both years remained the same (Figure 2). Even though the Nurse Decision Support Tool was used only four times, the mean and median wait time to first analgesic from the time of patient registration in
those four instances decreased to 51.75 minutes and 39.50 minutes respectively. This was not statistically significant but this reduction in time to first analgesic is important to be considered in the future.

**Figure 2. Mean wait times to first analgesic**

![Bar chart showing mean wait times to first analgesic](image)

3) Do nurses reassess patient’s pain after administration of analgesics?

From the Table 6 it was evident that only 34% of the patients received pain reassessments after they received analgesics in both 2012 and 2013. There were no significant difference in pain reassessments in both years from the Chi-square test (p=0.93). Also, there were no significant differences in pain *comment* (p=0.98), pain *recorded* (p=0.17), *NRS* (p=0.14) and pain *narrative* (p=0.17) in both years. Therefore, hypothesis 3 was rejected (Figure 3).
4) Were there differences in the amount and type of analgesics administered after the implementation of Nurse Decision Support Tool?

Other NSAIDS were administered more frequently in 2013 than in 2012. The Chi-square goodness of fit test revealed that there was a significant difference in other NSAIDS administered between both years (p=0.0001). Also, more patients received more than one analgesic in 2013 than in 2012. The Chi-square test revealed that there was a significant difference (p=0.0001). No significant differences were found when Chi-square test was run for acetaminophen (p=0.64), ibuprofen (p=0.37), PO opioids (p=0.76) and IV opioids (p=0.23) in 2012 and 2013. Therefore, hypothesis 4 is supported (Figure 4). There were significant differences in other NSAIDS but as these were not part of the nurse Decision Support Tool other factors must account for the significant increase in the amount of these medications that were administered.
Figure 4. Frequency and amount of analgesics administered

4.6 Chapter Summary

This chapter described the sample demographics, type of analgesics administered, pain assessments and pain reassessments performed by the nurses after analgesic administration. Four hypotheses were tested and findings were illustrated. The next chapter will discuss the study findings in relation to hypotheses, literature and theoretical framework; strengths and limitations; implications for nursing practice and recommendations for future research.
CHAPTER FIVE

Discussion

This chapter highlights the study outcomes and these are discussed in relation to the hypothesis, research questions, comparing with the literature along with theoretical framework. Also, the strengths, limitations, implications for nursing practice and recommendations for future research are outlined.

5.1 Review of Findings in Relation to the Research Questions

The purpose of the study was to analyse the impact of a Nurse Decision Support Tool on ED pain management. In relation to the research questions:

1) How frequently was a Nurse Decision Support Tool Used?

The research showed that the tool was not used enough to have any statistical significance and therefore it was not possible to determine whether the tool had any impact on pain management. Future research is needed before generalizing the results to the community.

2) Was there any change in wait times to first analgesic after a Nurse Decision Support Tool was introduced?

Similarly, significant differences (p=0.71) were not found in the wait times for the first analgesic between 2012 and 2013. Furthermore, the time to first analgesic was still high with a median wait time of 73 minutes for 2012 and 2013. The mean wait time for first analgesic in 2012 was 91.49 minutes and 2013 was 85.57 minutes.

3) Do nurses reassess patients’ pain after the administration of analgesics?
There were no significant differences (p=0.93) in the number of pain reassessments performed by the ED nurses in 2012 and 2013. Thirty-four percent of the patients who received analgesics had their pain reassessments done in 2012 and 2013.

4) Were there differences in the amount and type of analgesics administration after the implementation of a Nurse Decision Support Tool?

Significant differences were not found in the amount and type of analgesics administered after the implementation of the Tool except for the administration of NSAIDS which increased in 2013 over the amount given in 2012 (p value =0.0001). These NSAIDS included ibuprofen administered via the Tool and other NSAIDS prescribed by the physician.

The literature shows that the combination of analgesics provide multimodal coverage for pain with synergistic action of the individual analgesics in lower doses and with decreased incidence of adverse effects, thus increasing the safety profile (Demeules, Rollason, Piguet & Dayer, 2003; Raffa, 2001). Furthermore, combination analgesics are suited for pain management as multiple pathways of central nervous system and peripheral nervous system are responsible for body’s pain perception and prevent gaps in analgesia (McCaffery & Pasero, 2011; Raffa, 2001). This might account for the increased use of other NSAIDS in the particular research. Even though the reason for this increased usage is not clear, organizational factors such as educational sessions or increased awareness among the staff might have contributed.

5.2 Findings in Relation to Literature

The study findings were not significant in terms of the frequency of use of the Nurse Decision Support Tool, time to first analgesic, pain assessment and pain reassessment by the ED nurses and the type and amount of analgesics administered. However, studies from Australia, Sweden and United States which investigated the use of a nurse initiated pain protocol that
allowed nurses to administer opioids as well as acetaminophen and/or ibuprofen demonstrated a statistically significant decreased time to first analgesic (Finn et al, 2009; Fosnocht & Swanson, 2006; Fry & Holdgate, 2000; Fry, Bennetts & Huckson, 2006; Fry, Ryan & Alexander, 2003; Muntlin, Carlsson, Säfwenberg, & Gunningberg, 2009; Todd et al., 2006).

In Canada, the Office of the Controlled Substances of Health Canada regulates Controlled Drugs through the federal legislation of Controlled Drugs and Substances Act, the Narcotic Control Regulations, Part G (Controlled Drugs) of the Food and Drug Regulations and Benzodiazepines and Other Targeted Substances Regulations (www.collegeofnursesofontario.org/practicestandard/medications, page 11). In B.C, according to the CRNBC Scope of Practice Standards for Registered Nurses, nurses are allowed to administer certain Schedule II drugs (e.g. sublingual nitroglycerin for chest pain) and Schedule III (e.g. acetaminophen and/or ibuprofen for pain) without a physician’s order to patients following a nursing diagnosis of their condition. However, narcotics or opioids fall under the category of Controlled Prescription Program (Schedule IA) and nurses need an order to administer these medications (CRNBC Practice Support, 2013). However, the WHO pain ladder has pain management guidelines that include mild pain (1-3/10) requiring only non-opioids, moderate pain (4-6/10) requiring opioids and severe pain (7-10/10) that requires to start with strong opioids and all these levels of pain management include adjuvant therapy with NSAIDS that have synergistic effect on opioids and non-opioids (retrieved from southwesthealthline.ca). Unfortunately in this particular study pain was recorded on patients’ charts as pain recorded, pain narrative and NRS. But NRS was used only in 26% of the patients in 2012 and 33% of the patients in 2013 where it was not possible to show a relationship between pain severity and type of analgesics administered. Therefore, nurses may be waiting for the prescription for opioids or other NSAIDS rather than addressing pain
with adjuvant therapy. If the nurses had enough understanding about multimodal analgesic, they would have administered low doses of analgesic to provide some pain relief for the patients (Raffa, 2001).

Even though pain reassessment is considered important for evaluating the effectiveness of the treatment (Ene et al., 2008), research has shown that pain reassessments are not done or done infrequently in the ED after analgesic administration (Fry, Bennett & Huckson, 2011; Muntlin et al., 2011; Todd et al., 2007). Similar to the above studies, in this particular study there was no significant differences in pain reassessments between 2012 and 2013 (p= 0.93). The pain reassessments were done only in 34% of the patients who had analgesics in both 2012 and 2013. Even though, it is unclear that why pain reassessments were not performed by the nurses, it may be because the data were collected via retrospective chart audit and nurses may be reassessing but are not recording their reassessments. As there were no significant differences in pain reassessments between 2012 and 2013, the education sessions and introduction of the Nurse Decision Support Tool did not impact on the frequency of pain reassessment. Literature reveals that despite of the evidence based policies for pain reassessments, continuous educational sessions, changes in routine bedside flow sheets, expert and direct leadership, auditing and feedback are necessary in order to achieve a substantial change (Gordon et al., 2008).

5.3 Findings in Relation to the Theoretical Framework

The theoretical framework for this study was Latimer, Ritchie and Johnston’s (2010) Knowledge Use in Pain Care. This model explained how the socio-political, organizational, nurse and patient factors affect pain management in children. As the authors suggested using the
model in other clinical areas and with other patient groups, it was used as a guide for this particular study of pain management with an adult population in the ED.

In consideration of the socio-political factors in this study, since 2007 the legislation permits nurses in B.C. to administer acetaminophen and/or ibuprofen to patients with pain based on their own assessments and by following a protocol established by their institution. This represents a change in practice. However, the doses that are approved are 975mg of acetaminophen every six hours x 2 doses and 400mg of ibuprofen every four hours x 2 doses; these are the same doses that patients could self-administer or buy over the counter. Therefore, the scope of responsibility for nurses is limited. If they were allowed to administer opioids based on their own assessments and following a protocol, nurses might use this protocol more frequently. However, as nurses did not use the protocol, further investigation may be required prior to nurses initiating the administration of opioids. Such a practice change would need to be supported with additional education as well as a change in legislation.

With respect to organizational factors, the organizational structure has to have policies, protocols and resources to support nurses. As well it needs to provide opportunities for nurses to become knowledgeable about pain assessment, pain reassessment and methods of pain relief including the administration of analgesics (CRNBC Practice Support 2013; CNO 2014; Latimer et al., 2010; Schopflocher et al., 2011). In the ED, individual nurses decide the pattern of pain assessment and reassessment. Therefore, a standardized nursing pain assessment and management protocol should further optimal pain management in the ED patients. For this particular study, the organization provided educational sessions for the ED nurses about how to use the Nurse Decision Support Tool and pain management. Yet, despite of this educational
support the Tool was not used by the ED nurses and the median wait time for the first analgesic remained the same as 73 minutes.

However, for this particular study, the computer systems in the ED were not user friendly. The Nurse Decision Support Tool was not readily accessible as it was filed under the nurse protocols and in the ED the nurses have to search for the protocol under all other nurse initiated protocols in order to find it once patient with pain was triaged. This process was time consuming and may have contributed to the limited number of times that the Tool was used. This, in combination with the low doses of analgesics that nurses could initiate did not render the Nurse Decision Support Tool successful in the present study. Therefore, organizational support is a key factor in supporting nurses to change analgesic administration practices but educational sessions without appropriate resources will not enable nurses to relieve pain.

Another component considered in pain management is patient factors. Researchers have found that a patient’s age, sex, race and acuity of illness influenced pain assessment and therefore pain management practices in the ED (Chen et al., 2008; Heins et al., 2006; Hirsch, Jensen & Robinson, 2010; Mills et al., 2011; Platts-Mills et al., 2013). However in this particular study there were no significant differences in age and sex of the patients between 2012 and 2013 i.e. age and sex of the patients did not influence the type of analgesics given nor the time to first analgesic. Even though patients were triaged as CTAS level 2 – 5 according to the acuity of the illness, there were insufficient numbers to within each CTAS level to determine whether if there was any difference in the analgesics given. Also, patients were not categorized according to race.

Thus, socio-politically The CRNBC Practice Standards for Registered Nurses has to bring about the changes to support nurses as well as provide autonomy in practice to help with
pain management in the ED. Similarly, organization has to support nurses with policies, guidelines and protocols to achieve faster pain relief in ED. Nurses are to be given education through evidence based information so that they might be motivated to bring about changes in pain management. But as nurses were not motivated to administer even low doses of analgesics, nurses’ attitudes about pain management also need exploration.

5.4 Strengths and Limitations

As strengths, the study consisted of the comparison between two groups similar in demographic status in 2012 and 2013 in the same month of May. The total sample size was 300 patients categorized with the CTAS level of 2 to 5 which added enough power to the study. The post hoc power with sample size of 300 and effect size of 0.3 was 0.999. The Tool used for data collection had been used in previous research and had been reviewed by a group of expert nurses for content. However, other measures of validity were not undertaken. There were some reliability testing as the CNS checked some of the patients’ records for consistency.

In regards to the limitations of the research, data collection via retrospective chart audit itself was a limitation because if assessments are not recorded it is assumed that it was not done. Pain was recorded in different ways on the NRS, pain comment and pain narrative were also accepted as outlined in Chapter Three. Nurses did not always record pain according to the NRS which is the “gold standard” of measurement of pain intensity but made written comments and some written comments were difficult to read. Furthermore, charts were audited only by one person- myself but checked with the CNS during the auditing process.

This particular study was conducted in the ED of one hospital of the Providence Health Authority which is one of the five Health Authorities in B.C. So, generalization is not possible
without further research as is reflective of one ED. Another limitation is the restriction of the 
nurses in B.C. where they are not allowed to administer opioids without prescription while in 
Australia, Sweden and United States the Nurse Initiated Pain Protocol include opioids. There 
may be a possible reason of small doses of acetaminophen and ibuprofen for nurses in the ED for 
not using the Nurse Decision Support Tool and preferred to wait for the physician to write the 
orders rather than initiating the analgesics even though the patients were eligible. Finally, the 
computer system was not user friendly for the ED nurses as the Decision Support Tool was 
embedded in the protocols and nurses had to hunt for it in order to use it which was time 
consuming.

5.5 Implication for Nursing Practice

Even though the Nurse Decision Support Tool was used very seldom, this is an important 
step in developing autonomy and independent practice for nurses in ED. These findings also 
support CRNBC’s Practice Standards for Registered Nurses in medication administration. 
Within the Practice Standards if nurses were allowed to administer opioids to patients with pain 
in ED, the pain management may be better through the reduction in time to first analgesic as 
other studies revealed. These opioid doses would be in limited amounts and would follow a 
protocol established by the organization. User friendly electronic systems could provide support 
and opportunity for nurses to use the Tool in an effective manner.

5.6 Suggestions for Future Research

Although the study could not find any significant results, further research is needed to assess the 
implications of a Nurse Decision Support Tool in pain management. Also, future enquiry about
why nurses are reluctant to use the protocol even if it is established it is needed. Studies in different Health Authorities to be performed to generalize the results.

5.7 Conclusion

Guided by Latimer et al’s KUPC model, this study was conducted to know the impact of a Nurse Decision Support Tool in ED pain management focusing on demographic characteristics of the patients including age, sex, diagnosis; type of analgesics administered, pain assessments and pain reassessments performed by the ED nurses. A total of 300 charts of the patients were selected for the pre and post implementation years of 2012 and 2013. The data were analyzed using t-test, Chi-square and Wilcoxon rank sum test. There were no statistically significant differences between 2012 and 2013 in age, sex, diagnosis, type of analgesics administered pain assessments and reassessments and time to first analgesic. Also, Nurse Decision Support Tool was not used enough to make a conclusion of whether it helped to decrease the time to first analgesic or not. The only statistically significant difference between the two groups was for the administration of other NSAIDS. Even though the study findings were non-significant in terms of the research questions, there was an opportunity to look at the frequency of usage of the Decision Support Tool and the ED nurses’ pain management practices. The study provided preliminary findings with the comparison of two groups of patients before and after the initiation of a Nurse Decision Support Tool. The Tool should be compared with others in other Health Authorities and hospitals with a larger sample size.
References


## Appendix A

Can a Nurse Initiated Pain Protocol (NIPP) improve pain management in the emergency department?

<table>
<thead>
<tr>
<th>Appendix A</th>
<th>Chart Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient ID</td>
<td>MRN:</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td></td>
</tr>
<tr>
<td>Patient’s Age</td>
<td>years</td>
</tr>
<tr>
<td>ED Visit Date</td>
<td>dd/mm/yy</td>
</tr>
<tr>
<td>Sex:</td>
<td>Male □ Female □</td>
</tr>
</tbody>
</table>

### Audit items

Use 24hr clock for times

| Time of Triage | ……………… hours |
| Time of Registration | ……………… hours |
| Time seen by Triage Nurse | ……………… hours |
| Time seen by ED Nurse | ……………… hours |
| Presenting complaint | |
| Date of admission/discharge | ……………… hours |
| Time seen by Emergency Physician | ……………… hours |

### Triage Acuity:

- CTAS 2 □
- CTAS 3 □
- CTAS 4 □
- CTAS 5 □

### Pain Assessment & Management

- Patients initial pain score: Numerical Rating Score (NRS) 0 1 2 3 4 5 6 7 8 9 1
- Narrative pain score □ (small, medium, large)
- Narrative pain comment □
- Not recorded □

| Was patient eligible for the NIPP protocol | Yes □ No □ |
| Was NIPP protocol initiated/applied | Yes □ No □ |

<table>
<thead>
<tr>
<th>Name of medication, time &amp; route of administration. Select all that apply.</th>
<th>Pain re-assessment (Within 1 hour post analgesic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO Acetaminophen ..........hours</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>PO Ibuprofen .............hours</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>IV /PO NSAIDS ..........hours</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>PO Opioids ..............hours</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td></td>
<td>IV Opioids □</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td></td>
<td>........hours</td>
</tr>
<tr>
<td>Antiemetics □</td>
<td></td>
</tr>
<tr>
<td>........hours</td>
<td></td>
</tr>
<tr>
<td>Anticonvulsants □</td>
<td></td>
</tr>
<tr>
<td>........hours</td>
<td></td>
</tr>
<tr>
<td>Sedatives □</td>
<td></td>
</tr>
<tr>
<td>........hours</td>
<td></td>
</tr>
<tr>
<td>Naloxone administered</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>Time of first pain</td>
<td></td>
</tr>
<tr>
<td>reassessment</td>
<td>........ hours</td>
</tr>
<tr>
<td>Non-pharmacological</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>interventions</td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Date of study / Country</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Fry &amp; Holdgate</td>
<td>2000 / Australia</td>
</tr>
</tbody>
</table>
| Fry, Ryan & Alexander       | 2003 / Australia        | Describe efficiency of Nurse Initiated Panadeine forte in ED                  | 12 week prospective exploratory study | 202 patients-15yrs & >, oriented, with fractures, lacerations, infections, no allergies to codeine or acetaminophen | • Median wait time to first analgesic with NIPP- 6 min.  
• Median wait time for physician assessment- 71min                                                                                                                                                       |
| Bucknall, Manias & Botti    | 2005 / Australia        | Identify pain reassessment activities of nurses                              | Naturalistic observation         | 52 nurses in 2 surgical settings | Lack of pain reassessment activities                                                                                                                                                                       |
| Fry, Bennett & Huckson      | 2005-2006 / Australia   | Investigate pain management practices in EDs with NIPP(opioids, acetaminophen, NSAIDS, nitrous oxide) & without NIPP | Retrospective descriptive cohort audit | 36 EDs with total 1966 completed patient records | Median wait time for first analgesic  
• NIPP– 1.74h  
• Without NIPP- 1.77h                                                                                                                                                                            |
| Todd et al.                 | 2006 / Canada & US      | Assess current ED pain management practices                                  | Prospective with structured interview & chart audit | 842 patients from 17 US & 3 Canadian EDs with 8 yrs & > | • Median wait time for first analgesic-90min  
• Pain assessment -83%  
• Received analgesics – 60%  
• Pain reassessment – uncommon                                                                                                                                                                        |
<table>
<thead>
<tr>
<th>Author</th>
<th>Date of study / Country</th>
<th>Study purpose</th>
<th>Design</th>
<th>Population</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fosnocht &amp; Swanson</td>
<td>2006 / US</td>
<td>Evaluate efficiency of triage pain protocol with acetaminophen, ibuprofen, hydrocodone or IV morphine</td>
<td>Before &amp; after observational study</td>
<td>112 – intervention group 471- control group 18 yrs &amp; &gt; with musculoskeletal pain</td>
<td>Mean time to first analgesic decreased from 76 min to 40 min</td>
</tr>
</tbody>
</table>
| Finn et al.                   | 2009 / Australia        | Describe effects of NIPP (acetaminophen, ibuprofen, IV morphine or endone) on pain management | Before & after study                        | 144 – pre intervention 745- post intervention 18yrs & >, no chest pain, not pregnant, no allergies to NIPP drugs | • Median time to first analgesic decreased from 98 min to 28 min  
  • Median time to pain assessment decreased from 47 min to < 1min |
| Muntlin, Carlsson, Säfwenberg, & Gunningberg | 2009 / Sweden           | Compare Nurse Initiated IV morphine to standard ED care | Quasi-experimental design with three phases:  
  • A1 - Standard ED procedure  
  • B - NIPP  
  • A2 - NIPP withdrew | A1 - 50  
  B - 100  
  A2 – 50  
  Patients with abdominal pain, 18yrs & > | Mean time to first analgesic decreased from 2.5h to 1.3h |