



**Nurses' Knowledge and Attitudes, and Pain Management Practice of
Post-Operative Children in Bangladesh**

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Master of Nursing Science (International Program)**

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ABSTRACT

Immediately after surgery, a high level of pain is expected but the pain management provided appeared to be inadequate, which results in a number of post-operative complications. A strong clinical knowledge, attitude and skills on the part of nurses are essential for relieving the suffering of pain in children after undergoing surgery. The pain management nursing practices for children in Bangladesh are erratic, inconsistent and deviate from recommended standards. It is necessary to take initiatives to improve this current situation. To do so it is necessary to examine the level of nurses' knowledge and attitudes as well as their post-operative pain management practice for children in the context of Bangladesh. A descriptive survey was conducted from November 2009 to January 2010. After approval from the Institutional Review Board (IRB) of PSU, Thailand, and target hospital directors, data were collected from 93 pediatric surgical nurses at three medical college hospitals in Bangladesh. A survey questionnaire was used to collect data about the nurses' knowledge and attitudes, and their pain management practices for children after undergoing surgery. The data were analyzed by frequencies, percentages, means,

standard deviations, and the Pearson product-moment correlation coefficient. The study revealed that nurses' knowledge and attitudes concerning pain management was at the moderate level ($M = 66.79\%$) and pain management practice was also at the moderate level ($M = 78.16\%$). No relationship was observed between nurses' knowledge and attitudes, and their pain management practices ($r = .01$, and $p = .89$). The findings highlight the need to improve nurses' knowledge and attitudes, and their practice in some certain areas of pain assessment, and pharmacological and non pharmacological pain management. Initiatives are recommended, such as including pain content in the nursing curriculum, and arranging in-service-education and training in pain management for pediatric nurses in Bangladesh.

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CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGEMENT	v
CONTENTS.....	vi
LIST OF FIGURE	x
LIST OF TABLES	xi
CHAPTER	
1. INTRODUCTION.....	1
Background and Significance of the Problem.....	1
Objectives of the Study.....	5
Research Questions of the Study.....	6
Research Hypothesis.....	6
Conceptual Framework of this Study.....	6
Definition of Terms.....	9
Significance of the Study.....	9
2. LITERATURE REVIEW.....	11
Concept of Pain related to the Post-Operative Patients.....	12
Concept of pain.....	12
Types of pain.....	13
Post-operative pain.....	15
Pain theories and mechanism.....	16

CONTENTS (continued)

	Page
Factors Influencing Pain.....	19
Pain Assessment in Children.....	22
Pain Management in Children.....	27
Pharmacological pain management.....	27
Non-pharmacological pain management.....	30
Nurses' Knowledge and Attitudes, and Management of Pain in Children.....	33
Nurses' knowledge and attitudes towards pain in children.....	33
Nurses' pain management practice on post-operative children.....	35
Contributing factors influencing nurses' knowledge and attitudes, and practice of pain management.....	38
3. RESEARCH METHODOLOGY.....	42
Population.....	42
Sample and Sampling.....	42
Settings.....	43
Instrumentation	45
Validity of the Instruments.....	49
Reliability of the Instruments.....	50
Translation of the Instruments.....	50

CONTENTS (continued)

	Page
Data Collection.....	51
Ethical Considerations.....	52
Data Analysis.....	52
4. RESULTS AND DISCUSSION.....	54
Results.....	54
The Rate of the Returned Questionnaire.....	54
Demographic Characteristics of the Nurses.....	55
Nurses’ Knowledge and Attitudes Regarding Post-Operative Pain Management.....	56
Nurses’ Pain Management Practices in Post-Operative Children.....	61
The Relationship between Nurses’ Knowledge and Attitudes, and Pain Management Practices	63
Nurses’ Perceived Barriers to Optimal Pain Management in Post-Operative Children.....	63
Discussion.....	66
5. CONCLUSION AND RECOMMENDATIONS.....	79
Conclusion of the Study.....	79
Strength and Limitations.....	80
Implications and Recommendations.....	81

CONTENTS (continued)

	Page
REFERENCES.....	84
APPENDICES.....	91
A: Sample Size Estimation.....	92
B: Permission Letters for use and Modify of Instruments.....	93
C: Research Instruments.....	95
D: Validation of the Instrument Check.....	104
E: Back Translation of the Instrument.....	105
F: Approval Letters from IRB, PSU, Thailand.....	106
G: Permission Letters from Hospital Directors.....	109
H: Nurses' Demographic Data.....	111
I: Nurses' Knowledge and Attitudes Data.....	114
J: Nurses' Pain Management Practice Data.....	118
K: Nurses' Perceived Barriers Data.....	121
VITAE.....	123

LISTS OF FIGURE

Figure		Page
Figure 1	Conceptual Framework of this Study.....	8

CHAPTER 1

INTRODUCTION

Background and Significance of the Problem

A high level of pain is expected immediately after surgery. It has been reported that there are inadequate pain management practices after surgery. This is so particularly in children, who cannot speak for themselves when they are in pain. For them inadequate pain management is deleterious and can lead to a number of post-operative complications. Therefore, it must be relieved completely (Rao, 2006). A previous study reported that children with poorly managed post-operative pain may have longer stays in hospital, higher readmission rates, more frequent outpatient visits, delayed healing of wounds, and altered immune functions. There are also increased levels of stress and anxiety for the children and their families (Smart, 2005). Such poorly managed pain has profound long-lasting consequences and it increases emotional and behavioral responses during future painful events. For the effective management of pain in post-operative hospitalized children, strong clinical knowledge, attitudes and skills in the assessment of pain are essential for pediatric nurses. They must also perform well in the control of and effective administration of pain medication (Smart; Vincent, 2005). Nurses should therefore be able to assess and provide nursing intervention to relieve pain either by pharmacological or non-pharmacological techniques in order to help reduce the pain of children.

Effective post-operative pain management has numerous benefits. This not only reduces the child's pain but also leads to faster post-operative recovery, improved sleep, increased mobility, increased parental satisfaction, and leads to

shorter hospital stays. There are also fewer readmissions to hospital, and there is decreased need for post-discharge support (Smart, 2005). However, several obstacles to this have been identified. These include knowledge deficit on use of appropriate pain measure, and poor attitudes to and lack of resources for adequate pain management of children (Broom, Richtsmeier, Maikler, & Alexander, 1996). In particular, there is a remarkable deficit in knowledge and misconceptions among nurses regarding respiratory depression and addiction to pain medication for children. This results in the withholding of pain medication and severe continuous pain has been reported (Clarke et al., 1996; Vincent & Denyes, 2004). In Western countries it has been reported that pain is part of the content in the nursing curriculum. It is covered in seven areas: anatomy and physiology; etiology; beliefs and misconceptions; assessment; analgesics; non-pharmacologic issues and current research. However, the hours of teaching allocated in each area were inconsistent and less than optimal for preparing nursing students for managing post-operative pain in children effectively (Ferrell, McGuire, & Donovan, 1993). Thus nursing students may have limited knowledge about post-operative pain management in children.

The assessment of pain in children is the essential and first priority to manage children's pain. However, the use of pain assessment tools or flow sheets to document and evaluate the effectiveness of pain intervention is notably insufficient (Jacob & Puntillo, 1999). In addition, the study revealed that no pain assessment tool was used routinely by nurses in their practices dealing with pain management in children. Surprisingly, some nurses still believe that pain assessment tools are subjective and inaccurate and sometimes useless (Young, Horton, & Davidhizar, 2005). Some nurses reported that during pain assessment they relied on children's

behavioral response to pain rather than children's self-report. This is in spite of the fact that it is widely accepted that self-report is the gold standard for the assessment of pain intensity. However, another study revealed that there are age-appropriate pain assessment tools to measure children's pain accurately before and after administering pain medication (Jacob & Puntillo, 1999). Nevertheless, nurses still have misconceptions about pain assessment in children. Thus, lack of knowledge about pain assessment in post-operative children leads to poor management of pain in children undergoing surgery. This, in turn, leads to increased suffering of children.

The attitude of pediatric nurses to post-operative pain management is an important area of concern for the complete relief of pain. The vital aspects are the nurses' perception of children's feelings and responses to pain, factors influencing pain, the use of pain assessment tools for different ages, the use of pharmacological and non-pharmacological interventions, and perceived barriers for effective pain management. All of these are essential aspects in nurses' attitudes for the effective pain management of children. A great defect in nurses' attitudes about the incidence of respiratory distress and addiction associated with pain medications is revealed in the study of Ferrell et al. (1993). However, Walco, Cassidy, and Schechter (1994) found that the risk of incidence of respiratory distress is very rare as an analgesic side effect. Providing analgesics has potential benefit for patients during post-operative pain management for children. In addition, children are less vulnerable to the risk of addiction to opioids (Walco et al., 1994).

It is evident that some nurses believe that young children do not have the neurological capacity to experience pain. If young children experience pain, they have no memory of pain and therefore it has no long lasting consequences (Jacob &

Puntillo, 1999; Walco et al., 1994). On the other hand, Lee, Ralston, Drey, Partridge, and Rosen (2005) found that young children as young as the fetus before the third trimester can perceive pain. They can develop long lasting consequences as a result of poorly assessed and managed pain. Other false beliefs among nurses are that pain in children cannot be measured accurately and children may over-report or under-report during pain medication. Some myths and false beliefs affect nurses' attitudes at the time of making decisions about pain relief due to their lack of up-to-date knowledge. Myths and misconceptions about pain greatly affect nurse's decisions regarding the post-operative pain management of children (Jacob & Puntillo, 1999).

The non-pharmacological intervention for pain is one of the important aspects of practice for pediatric nurses in order to optimize post-operative pain relief for children. Clarke et al. (1996) found that nurses mainly used pharmacological and sometimes non-pharmacological interventions to alleviate pain in post-operative children. But records in charts for pain management showed no evidence of non-pharmacological pain intervention. Bicek (2004) found that nurses have positive attitudes to non-pharmacological pain intervention. However, the largest barrier to this is that patients are unwilling to apply non-pharmacological methods for pain relief. Furthermore, nurses are short of time and an increased workload provides little time for non-pharmacological pain interventions. Non-pharmacological pain management has been reported to work in combination with pharmacological measures to reduce pain effectively. However, nurses are not paying attention to applying non-pharmacological measures to help children relieve post surgical pain. The study of Alam, Waliullah, and Shamsuddin (2008) revealed that current analgesics practice for children in Bangladesh is erratic, and inconsistent. They

deviated from recommended standards that are in accord with modern concepts, institutional planning and systems of analgesic management in the post-operative period. Consequently children are still suffering from post-operative pain.

After 15 years working in the nursing field in Bangladesh, the researcher has found few research studies in the field of nursing practice dealing with post-operative pain management of children. The official record (2008) in the pediatric surgery unit at Chittagong Medical College Hospital (CMCH) Bangladesh reported that in the year 2008, 1995 children came to seek health care. Among these more than 60% of the children underwent operations (Pediatric surgery unit CMCH, 2008). Nurses manage children's post-operative pain around the clock under doctors' orders but they rarely use up-to-date knowledge in this area. In addition, nursing students should be prepared to manage children's post operative pain, but pain is not part of the content of the nursing curriculum. There are limitations in up-to-date knowledge in the area of children's pain assessment and management and these are absent from the nursing education curriculum. These are barriers for Bangladeshi nurses in their attempts to manage children's post-operative pain. In order to take any initiative to improve this current situation, it is necessary to examine the levels of nurses' knowledge and attitudes as well as their post-operative pain management practices for children.

Objectives of the Study

The overall objectives of this study are to explore the level of nurses' knowledge and attitudes, and their pain management practices for post-operative children within the context of Bangladesh.

The specific objectives of the study are:

1. To identify the level of nurses' knowledge and attitudes regarding post-operative pain management in children
2. To identify the level of pain management practice of nurses regarding post-operative pain management in children
3. To explore the relationship between nurses' knowledge and attitudes, and pain management practices in post-operative children

Research Questions of the Study

1. What is the level of nurses' knowledge and attitudes regarding the post-operative pain management of children?
2. What is the level of pain management practices of nurses regarding the post-operative pain management of children?
3. Is there any relationship between knowledge and attitudes, and the practice of nurses regarding the post-operative pain management of children?

Research Hypothesis

There is a positive relationship between nurses' knowledge and attitudes, and the practices of nurses regarding post operative pain management.

Conceptual Framework of the Study

The KAP (Knowledge, Attitudes, and Practice) model was used as the conceptual framework for this study. The KAP model was first introduced in the study of family planning and population in 1950 in India. This model gradually

became popular in the field of survey research, particularly in the organization of health care. Nurses' knowledge, attitudes, and practices are inter-related and interdependent in providing quality nursing care to patients. In order to improve the quality of nursing care baseline data about nurses' knowledge and attitudes, and practices are essential. This baseline data should be a precursor for making future plan and policy for nursing care development as well as for the development of programs in nursing education. The KAP is a suitable model to manipulate the extent of every aspects of the knowledge and attitudes, and practices of nurses. It can provide quantifiable data whereby researchers can find the gaps in knowledge and practice in order to find the answers to research questions (Launiala, 2009).

Nurses' knowledge is what nurses know based on science. Naturally, knowledge is possessed through different modes of the acquisition of ideas: perceptions, imagination, memory, judgment, abstraction and reasoning. Knowledge criteria centers around the sense that allows nurses to distinguish between right and wrong based on logic, scientific information and universal truth. Nurses' need high levels of knowledge about pain. This includes: knowledge of pain; types and causes of pain; pain assessment tools; pain assessment and management; adverse effects of pain and its management; and pain medication. Such knowledge is essential for practicing effective pain management in children.

However, education is the prerequisite of knowledge which has a significant relationship between knowledge and practice (Smyth, Caamano, & Fernandez-Riveiro, 2007). Attitude refers to the intention to behave in a certain way in certain situations. A person's attitude develops through a long sequence such as seeing and interpreting events according to certain situations, or to organize opinions

based on their perception. Personal values influence how a person intends to perform. Moral status and ethical issues may influence nurses' attitudes to practice. Attitudes are not always the intermediate variables which can translate knowledge into practice. Some beliefs come from traditional ideas, which are erroneous from a pain management perspective and make barriers to standard practice. However, it is constantly reported that attitudes and knowledge influence nurses' practices for pain in children (Broom et al., 1996; Vincent, 2005). Thus, nurses' knowledge and attitudes on post-operative pain management in this study were combined together in one topic in this study.

The practice of nurses addresses the ability of skills in the performance to a phenomenon on the basis of gained knowledge and the development of attitudes. Then the combination of acquired knowledge and positive attitudes make nurses perform efficiently for assessing and managing post-operative pain of children in their clinical practice (Broom et al., 1996; Vincent, 2005). To identify practice means establishing what nurses actually do and the extent to which they can take action in their clinical performance of pain management. Thus, the concept of this study could be justified because nurses' existing knowledge and enough positive attitudes directly affect appropriate practices of pain management in children.

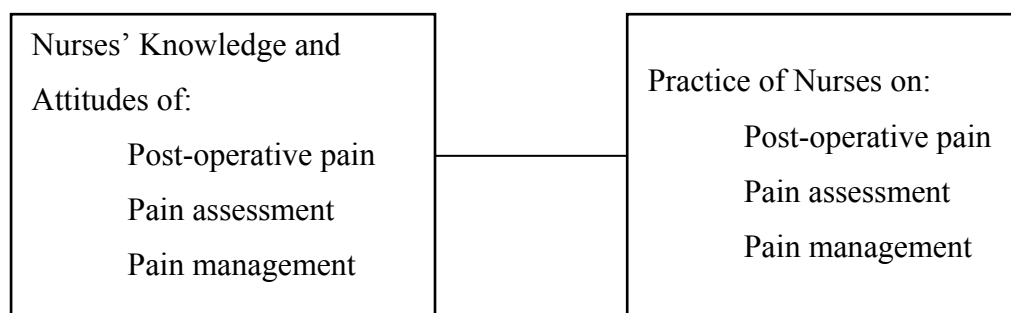


Figure 1

Conceptual Framework of this study

Definition of Terms

Nurses' knowledge and attitudes regarding post-operative pain management in children refers to nurses' understanding and beliefs about post-operative pain and its management for children post-operatively. In this study, knowledge and attitudes include all dimensions of pain. These include: perception and understanding about pain; types of pain; causes of pain; consequences of pain; factors influencing pain perception; pain pathways; pain assessment; and pain management. Nurses' attitudes refer to nurses' perception of what they believe and how they intend to behave regarding post-operative pain management for children. This was measured by the modified version of a questionnaire that assessed nurses' knowledge and attitudes on post-operative pain management in children.

Nurses' pain management practice refers to the set of activities those nurses usually perform and should perform in order to manage post-operative pain in children in their nursing practice. The actions that nurses implement in their practice in managing children's post-operative pain include the application of age-appropriate pain assessment tools, pharmacological and non-pharmacological pain relief, and preparedness for management of adverse effects of pain medication.

Significance of the Study

This study should contribute to nursing education, nursing practice, nursing administration and nursing research in Bangladesh.

1. Nursing education: This study will provide baseline information for further revising the nursing curriculum in Bangladesh. Results of this study will set an example during the teaching and learning of the nursing students. The finding of this

study will facilitate a comprehensive in-service educational program, particularly for pediatric pain management in nursing.

2. Nursing practice: The findings of this study will create awareness in assessment and management of pain in post-operative children among pediatric nurses in Bangladesh. It should stimulate them to know the correct answers so that they can then change pediatric nurses' attitudes in patient care. Information from this study could be used as guidelines for nursing practice in pediatric pain management.

3. Nursing administration: This study should provide valuable information to enhance quality nursing care regarding pediatric pain management. This may be the first research on the pediatric pain management area of nursing in Bangladesh. The findings of this study could be a milestone for future planning and policy making at the local levels of nursing administration in Bangladesh.

4. Nursing research: This study will contribute to a better understanding of the complexity of post-operative pain management in nursing. This should be a milestone for nursing research in Bangladesh and could contribute to further research. The findings of this study will explore how Bangladeshi nurses assess and manage children's post-operative pain in their practice. This should contribute by bringing all the knowledge from this study to help develop specific programs that could enhance nurses' knowledge and attitudes, and the management of pain in children.

CHAPTER 2

LITERATURE REVIEW

This chapter presents an integrated overview of explicit knowledge on the basis of existing theory and literature describing the concepts of interest to this study. The literature review is outlined as follows:

1. Concept of pain related to the post-operative patients
 - 1.1 Concept of pain
 - 1.2 Types of pain
 - 1.3 Post-operative pain
 - 1.4 Pain theories and mechanism
2. Factors influencing pain
3. Pain assessment in children
4. Pain management in children
 - 4.1 Pharmacological pain management
 - 4.2 Non pharmacological pain management
5. Nurses' knowledge and attitudes, and management of pain in children
 - 5.1 Nurses' knowledge and attitudes towards pain in children
 - 5.2 Nurses' pain management practice on post-operative children
 - 5.3 Contributing Factors Influencing Nurses' Knowledge and Attitudes, and Practice of Pain Management

Concept of Pain related to Post-Operative Patients

Concept of pain.

Pain is a universal human experience and is the most common cause of seeking medical care. Traditionally, pain was considered merely a physical symptom of illness or injury brought about by a simple stimulus-response mechanism. Though the historic roles of nurses were to relieve pain and suffering, there has been little understanding of the complexity of pain and only limited ways were developed to manage it. Recent research shows that feelings of pain have distinct relationships to the physical, emotional, and cognitive aspects of individuals. This view of pain has broadened our understanding of pain and given us new ways to understand its characteristics.

Pain was defined by the International Association of Pain (as cited in Okaes, 2001, p 547) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.” This definition indicates that pain is a complex entity and has not only a physical component but an emotional one as well.

Pain was also defined by McCaffery and Pasero (as cited in Jemes, Ashwill, & Dorske, 2002, p 420) as “whatever the experiencing person says it is and whenever he says it does.” By this definition we cannot measure pain objectively. Rather, pain should be measured subjectively as only the suffering person knows how the experience feels.

Thus, to measure children pain effectively, sometimes nurses need to rely on patients’ self-report of pain or need to measure pain by using appropriate pain scale. This is particularly for those children who often cannot speak for themselves.

Nurses need to assess and manage their pain by using an appropriate knowledge of pain. A body of knowledge on pain theory, assessment and management is essential for nurses in order to deal with children's pain in their practice (Clarke et al., 1996).

Types of pain.

Pain has been categorized into different types. This is depended on duration, sources and causes of pain (Oakes, 2001).

Based on duration, there are two main types - acute and chronic pain. Acute pain usually occurs in a sudden onset caused by an injury or operation, or a disease, and will disappear after the injury is healed or the disease resolved (Oakes, 2001). This pain lasts for a short period of time, ranging from one second to less than six months. This type of pain is usually accompanied by physiological and behavioral responses. Physiological responses include increased blood pressure, pulse rates, and respiratory rates. Behavioral responses include increased levels of anxiety, sleep disturbances, restlessness, irritability, aggression, and difficulties in movement (Oakes, 2001). The length of chronic pain depends on the healing process and usually persists for more than six months. It may be continuous or intermittent and may or may not be associated with a chronic disease or injury. There is no physiological response in chronic pain. Behavioral responses including long-term absence from school or work, unemployment, and reduction in social contacts and these are more prominent in patient with chronic pain (Tesler et al., 1998).

Based on source, pain is classified as nociceptive and neuropathic pain. Nociceptive pain is felt as a result of tissue damage. This provokes a pain-producing stimulus that sends an electrical impulse across a pain receptor by the way of a nerve fiber to the central nervous system. It is further divided into visceral and somatic pain.

Visceral pain results from the stimulation of nociceptors in the abdominal cavity and thorax. This pain is commonly described as pressure, deep and squeezing, and it is found as referred pain and is often difficult to localize, such as appendicitis (Urden, Stacy, & Lough, 2002). Somatic pain is divided as somatic and cutaneous pain. Somatic pain arises from bones, tendons, nerves, and blood vessels. Cutaneous pain originates in the skin or subcutaneous tissue (Oakes, 2001; Urden et al., 2002). Neuropathic pain is also known as non-nociceptive pain. It is caused by direct injury to the structure of the nervous system. This type of pain is generally described as a sensation of burning, stabbing, or soothing, or pins and needles. Often this pain may continue after the injury is healed. This pain occurs commonly in patients recovering after operation associated with nerves (amputation of a limb) or disease involved with nerves (Guillain Barre syndrom) (Oakes, 2001).

Based on causes or events, pain is classified in many ways. In the clinical setting, causes of pain have been identified as acute illness, surgery, trauma, invasive procedures, nursing and medical interventions, and diagnostic procedures and immobilization.

Psychogenic pain is one type of pain in which there is little or no physical evidence of organic disease or tissue damage in the body. The origin of this pain is in the patients' psychological and emotional domains. The common features of psychogenic pain are headache, muscle pain, back pain, and abdominal pain. Some types of mental or emotional problems can cause, increase, or prolong such pain. However, the lack of evidence does not mean that the client is not suffering from pain or he/she is malingering, but it may be described as pain. This pain can be treated by psychotherapy, antidepressants and non-narcotic painkillers (Pillay & Lalloo, 1989).

Pain is a complex and multidimensional experience, which is affected by physical, psychological, emotional, and cultural factors. Thus, it has been associated with sensory, affective, cognitive, physiological, and behavioral components of patient (Oakes, 2001).

Post-operative pain.

Pain associated with surgery is known as post-operative pain. This pain is the immediate consequence of surgery. Usually post-operative pain is considered as one type of acute pain and it might take a few days for it to subside (Smart, 2005). The most severe post-operative pain occurs within 48 hours after surgery depending on the site and type of surgery (Jacob, 2007). Pain is a result of tissue damage and injury and it is usually possible to protect the patient by attempting appropriate action. Due to surgical injury or tissue damage, the operation site releases some substances locally as histamine, bradykinin, substance P, and prostaglandin. These chemicals stimulate peripheral pain receptors then transmit pain impulse to the spinal cord via afferent nerve fibers. This stimulation produces the localization of pain. These fibers end in the dorsal horn of the spinal cord where they synapse with second order neurons which then ascend to the midbrain. These signals then relay pain sensation to the sensory cortex where pain signals are appreciated as coming from a specific part of the body which is known as a modulation of pain impulse (Oakes, 2001).

Post-operative pain arises not only from sensory components (due to local tissue destruction) but also from psychological components. Personal factors such as age, gender, past experience of pain, or socio-cultural group may also contribute to the expression of and coping with pain. Anxiety is an important factor which adds to the psychological component of post-operative pain. A highly anxious

child shows more distress and experiences more pain as compared to similar stimuli in children of the same age group. Pre-operative sharing of information about anticipated pain has shown a lowering of the level of post-operative pain (Jacob, 2007).

To assess and manage pain and its related factors in patients is an obligation of nurses in their practice. Many researchers have found that children unnecessarily suffer from high levels of post-operative pain due to poor knowledge of and attitudes to pain management practices of nurses (Broom et al., 1996; Clarke et al., 1996; Vincent, 2005; Vincent & Denyes, 2004). The consequence of inadequately treated pain is that pain becomes chronic and persistent followed by the progression of disease. Durbin and Rudra (as cited in Loeser & Melzack, 1999) explained that an acute pain may lead to a chronic pain when a huge nociceptive input produces an excitatory toxic effect of aminoacids. This can permanently change the normal function of the spinal cord. After surgery, the intensity and duration of pain also depends on the site and type of operation. Similarly, the extent of the operation, the degree of tissue damage and positioning of the patient during operation may contribute to the overall incidence and severity of post-operative pain.

Pain theories and mechanism.

There are many theories of pain in the literature. These include: the specificity theory of pain; the pattern theory of pain; the gate control theory; the anodal blocking theory of pain; and the pain theory of central inhibition. All of these theories have been proposed to understand the mechanism of pain and ways to alleviate it (Coffey & Mahon, 1982). However, in this study the gate control theory

has been chosen to explain the mechanism and pathways of pain. This is because it is easy to understand in the context of the pathway of post-operative pain.

The gate control theory: The gate control theory of pain was suggested by Melzack and Wall (1965) on the basis of physiological evidence on the spinal mechanism. They expressed in a simplified form of stimulation, modulation, transmission, and perception of pain. The noxious stimulation of the skin evokes nerve impulses that are transmitted to three spinal cord systems. These are the cells of substantia gelatinosa (SG cell) in the dorsal horn of the spinal cord, the dorsal column fibers that project towards the brain, and the first central transmission T cells in the dorsal horn. Gate control theory suggests that the spinal cord contains a neurological gate that either blocks pain signals or allows them to go on to the brain. The SG-cells in the gate control system acts as a gate. This gate opens and closes to allow pain impulse to pass through in the spinal cord operated by differentiating between the types of fibers (large and small fibers) carrying pain signals.

The gate may be closed when an input of a large number of large nerve fibers (A-beta) occurs. Some important factors contribute to close the gate. These may be: neurotransmitters (endorphin); psychological preparation and education; and pharmacological and non-pharmacological interventions. The gate may be closed by enhancing large nerve fiber impulses when applying a gentle touch or rubbing the painful area externally. The gate may be opened when an input of a large number of small nerve (A-delta and C) fibers occur. Previous painful experiences, fear and anxiety, neurotransmitters (substance P), and established pain pathways are the important factors which enhance the opening of the gate (Melzack & Wall, 1965).

The gating mechanism occurs when a pain impulse travels to the SG-cell in the dorsal horn of the spinal cord. After passing this impulse, it triggers T-cells that influence the transmission of pain impulses to the brain. This mechanism is controlled by descending nerve fibers from the thalamus and cerebral cortex that translates the sensory signal to the perception of pain. These also regulate the thoughts, beliefs, and emotions of a person. In this way surgical patients perceive pain. The activities of the gate control system may be mediated by a person's psychological factors such as past experience of pain, attention, and emotion (Malzack & Wall, 1965).

By appropriate clinical application of gate control theory, pediatric nurses can help children to reduce their pain by providing nursing interventions along with medication. The nursing interventions for pain control include touch, massage, imagery, distraction, or acupuncture as well.

Neurotransmitters of pain process.

The mechanism of pain in the body is a complex process. Even though a person is not consciously aware of the process, the experience of pain involves a complex sequence of biochemical and electrical events or processes. This begins with tissue damage, followed by transduction, transmission, perception and modulation. When tissue damage occurs it releases inflammatory chemicals, called excitatory neurotransmitters, such as histamine and bradykinin, a powerful vasodilator. Transduction occurs as the energy of the stimulus is converted to electrical energy. The transmission of the stimulus takes place when energy crosses into a nociceptor at the end of an afferent nerve fiber. Perception occurs when pain stimuli reach to the cerebral cortex; and the brain interprets the signal, processes information from

experiences, knowledge, and cultural associations, and perceives pain. The modulation occurs when the brain perceives the pain; the body releases neuromodulators, such as endogenous opioids (endorphins and enkephalins), serotonin, norepinephrine, and gamma aminobutyric acid. These chemicals hinder the transmission of pain and help produce an analgesic, pain-relieving effect. This inhibition of the pain impulse is called modulation (Loeser & Melzack, 1999; Melzack & Wall, 1965).

Neurotransmitters of pain process in the body are based on a spontaneous and natural process. Through knowing about this process, nurses can easily manage pain by inhibiting or breaking down the pain pathway with appropriate intervention. However, to do this, nurses need in-depth knowledge about this process and intervention.

Factors Influencing Pain

The perception of pain is influenced by an individuals' age, gender, genetic make up, cultural factors, fear and anxiety, and past experience of pain (Bradbury, 2003). These factors must be considered by nurses when providing care to a patient dealing with pain in their practice.

Age.

The age of the child is an important factor in dealing with pain. Pediatric nurses have to know that at different ages, children respond to pain in different ways. Younger children may not report pain verbally. Generally, they exhibit pain by their behavioral response. These responses are associated with vocalization, facial expressions and body movements (Jacob, 2007). Older children are able to

report their pain appropriately except for those who are cognitively disabled or are very sick. Children of preschool and school age can report pain but not intensely; therefore nurses need to use words familiar to them and with parents' assistance (Ely, 1992). Thus, when assessing pain, nurses should consider the developmental stage of each age group so that nurses can choose appropriate pain assessment.

Gender.

From the perspective of gender, women are more sensitive to pain than men (Jones & Zachariae, 2002). Males have a higher pain threshold and tolerance than females and females report more pain than males. In the same way, males report specific areas of pain whereas females report diffused areas of pain (Bradbury, 2003; Ely, 1992). There is limited knowledge as to whether there are gender differences in pain experience among children.

Genetic make up.

Based on genetic make up, feelings of pain differ in different ethnic groups. It was found that African Americans had higher levels of clinical pain, greater pain-related disabilities, and less pain tolerance compared with Caucasians because African Americans are a genetically mixed population (Edwards et al., 2001).

Cultural factors.

Cultural beliefs and values affect individuals' pain responses when they are in pain. Children usually learn from parents and family what behavior is acceptable and what is not. The meaning of pain itself may be markedly different among different cultures. In some cultures, any expression of pain is considered cowardly and shameful. Some ethnic groups see pain as a punishment for doing wrong. Others see pain as a test of faith and still others view pain as a challenge to be

overcome (Suza, Petpichetchian, & Songwathana, 2007). People in Asia, Filipinos, Saudis and Irish are more likely to express physical pain verbally, whereas people in Africa, such as the Tswana are stoic and usually refrain from expressing physical pain verbally. Emotional expressions of pain are commonly found people in the Filipinos, Botswana, and Ireland whereas people in Saudi Arabia, Asia, and Africa are less like to render emotional expressions of pain (Lovering, 2004). These cultural differences must be noted in nursing practice when dealing with pain.

Fear and anxiety.

Fear and anxiety is another factor influencing pain. Anxiety related to anticipatory pain or a fearful event can increase the intensity of pain (Tsao, Lu, Kim, & Zeltzer, 2006). Fear tends to increase the perception of pain and pain increases feelings of fear (Jones & Zachariae, 2002). This connection occurs in the brain because painful stimuli activate portions of the limbic system believed to control emotional reactions. People who are seriously injured or critically ill often experience both pain and heightened levels of anxiety due to their helplessness and lack of control (Jacob, 2007). Nurses need to address both pain and anxiety by using all appropriate measures to relieve suffering.

Past experience of pain.

It is common that children who have previous experience of multiple or prolonged pain will be less anxious and more tolerant of pain than those who have had little experience of pain (Lovering, 2004). Children who have a past experience of well managed pain are less anxious and less intense about pain than those who have a negative painful past experience. Often, children with more experience of pain are

more frightened because of subsequent painful events (Ebrahimi-Nejad, Bahrampour, & Kohan, 2007).

Pain is a universal concept that is experienced in many ways from birth to death. Sometimes children can not speak for themselves but they really do experience pain. It is an ethical matter to understand and manage children's pain appropriately when they are in pain, particularly in a post-operative period (Smart, 2005). Nurses need to know all factors and cultural differences in responding to pain during the assessment and management of a patient's pain. Regardless of language, religion, or situation, nurses should respect every individual and strive to alleviate pain and suffering in performing their duties.

Pain Assessment in Children

Pain assessment is one of the most important nursing interventions in dealing with pain management. Accurate post-operative pain assessment is essential to ensure that pain is managed effectively. Without assessment, it is impossible to identify the nature of pain. Effective communication is fundamental in the accurate assessment of pain. Nurses should take time to speak or listen to or observe the patients. The assessment of pain in children should include the location, intensity, quality, chronology, pattern, precipitating events, alleviating actions, and accompanying symptoms. We can get information about these factors by asking pain history, physical examination, observations, and using various pain assessment scales appropriate to age. There are three types of pain measures: 1) behavioral measures (what children do); 2) physiologic or biological measures (how their bodies react); and 3) self-reports (what children say) (Jacob, 2007).

Behavioral measurement of pain.

Behavioral pain measurement can provide a complete picture of the total pain experience. These should include distress behaviors such as vocalization, facial expressions, and body movements associated with pain (Jacob, 2007). Behavioral pain assessment is useful for measuring pain in infants and pre-verbal children who do not have enough language skills to communicate that they are in pain. These types of pain measures are also useful for children with mental disturbances and confusion that inhibit their ability to communicate meaningfully. Behavioral pain assessment may be more time consuming than self-reporting. It is recommended that behavioral observation is the primary non-verbal pain assessment in post-operative children. These measures depend on a trained observer watching and recording the pain behaviors. In this paper, the three most commonly used behavioral pain measurement tools will be considered. These are: the FLACC Scale (Face, Legs, Activity, Cry, Consolability); the CHEOPS (The Children's Hospital of Eastern Ontario Pain Scale); and the TPPPS (The Toddler-Preschooler Post operative Pain Scale).

The FLACC Scale (Face, Legs, Activity, Cry, Consolability): This scale was developed by Merkel, Terri Voepel-Lewis, Shayevitz in 1997. It is a behavioral scale for scoring post-operative pain in young children for the ages 2 - 7 years. It is an interval scale that includes five categories of behavior: facial expression, leg movement, activity, crying and consolability. It measures pain by quantifying pain behaviors with scores ranging from 0 - 10. Validity was tested by using analysis of variance to compare FLACC scores before and after analgesia. It was reported that pre-analgesic FLACC scores were significantly higher than post-

analgesia score at 10, 30, and 60 minutes ($p < .001$ for each time). The correlation coefficient used to compare FLACC pain scores and the OPS (Objective Pain Score) showed a significant positive correlation between FLACC and OPS scores ($r = .80$, $p < .001$). Furthermore, a positive correlation was found between FLACC scores and nurses global rating of pain ($r = .41$, $p < .005$) (Jacob, 2007).

The CHEOPS (The Children's Hospital of Eastern Ontario Pain Scale): This scale was developed to measure post-operative pain in children. It measures six categories of behaviors: crying, facial expressions, verbalising, the torso, touching and legs. Scoring was devised as: 0 = behavior that is the antithesis of pain; 1 = behavior that is not indicative of pain and is not the antithesis of pain; 2 = behavior indicating mild or moderate pain; and 3 = behavior indicating severe pain. The range of total score is 4-13. A score greater than 4 indicates significant pain. This scale is recommended for children 1-7 years old. This scale was developed in collaboration with experienced recovery room nurses. They were asked as to the behaviors they most frequently observe to determine whether a child is in pain. In concurrent validity, the Behavioral Observation of Pain Scale (BOPS) and CHEOPS scores had a positive correlation indicating that both tools described similar behaviors ($r = .87$, $p < .001$) (Jacob, 2007).

The TPPPS (The Toddler-Preschooler Post-operative Pain Scale): This observational scale was developed for measuring the post-operative pain of children for the age group 1-5 years. This scale consists of seven items divided among three categories of pain behavior: (1) expressing vocal or verbal pain- crying, screaming, groaning, moaning, or grunting; (2) expressing facial pain- open mouth, lips pulled back at corners, squinting, closed eyes, furrowed forehead, and bulging brow; and

(3) expressing bodily pain- restless motor behavior when touched in the painful area (Jacob, 2007).

Physiological measurement of pain.

The physiological measurement of pain is useful for infants and children who are unable to communicate verbally. It provides indirect estimation of pain such as the presence and strength of pain. Profound physiologic changes are often accompanied by the experience of pain. Physiological measures include heart rates, respiratory rates, blood pressure, sweating palms, cortisone levels, transcutaneous oxygen, vagal tone, and concentrations of endorphin. These measurements provide useful information about the general distress levels of children experiencing pain rather than the localization of pain (Jacob, 2007).

Self-report.

Self-report is now well accepted as the gold standard for pain measurement in a pediatric population. This is useful for those who are able to communicate verbally by using cognitive characteristics particularly for school age children (Ely, 1992). The child's thinking trend is to be egocentric, concrete and perceptually dominated. Simple, concrete anchor words such as "not hurt" to "biggest hurt," are more appropriate than "less pain sensation to worst intense pain imaginable" (Jacob, 2007; Tesler et al., 1998). The commonly used tools are the Faces Pain Scale, Verbal Rating Scale (VRS) and Visual Analog Scale (VAS).

The Wong-Baker Faces Pain Scale: This was developed by Wong Baker (as cited in Jacob, 2007) which is considered as a self-report and allows children to communicate their level of pain. This scale provides a series of facial expressions depicting gradations of pain consisting of six faces assigned a rating from

0 to 5. A 0 (zero) represents no pain and 5 represent the most intense pain. The Wong-Baker Faces Pain Scale has been widely used to obtain self-reports of pain from children as young as 3 years old. This scale is not only easy to understand, but also the scale is translatable into several languages (Jacob, 2007; Tesler et al., 1998).

The Verbal Rating Scale (VRS): The VRS consists of a list of adjectives describing different levels of pain intensity, such as burning, sharp, tearing and aching, corresponding to pain fibers. It also can determine whether the pain is acute or chronic and can identify the origin of the pain. VRS involves asking the patients to select a word that describes their pain. These words are numerically ranked in order to provide a pain score. This pain scale is usually appropriate for school age children (Jacob, 2007; Tesler et al., 1998).

Visual Analog Scale (VAS): The VAS employs a drawn or printed straight line of a specified length, with verbal anchors at each end, to represent a subjective state or stimulus. It consists of a 100 mm line drawn horizontally on paper with right angle stops placed at both ends. The verbal anchors of "no pain" and "pain as bad as it could possibly be" are placed to the outside of the left and right angle stops respectively. This pain scale is recommended for children more than 4.5 years of age. The VAS provides interval level data at least (Jacob, 2007).

In summary, it is true that for the complete assessment and management of pain in children, nurses need to ask, observe and use of appropriate pain assessment scales. Nurses also need to know in details the components of different pain assessment scales and the principles of pain assessment for children. Without complete assessment, pain management will be poor.

Pain Management in Children

Complete pain management in children is a complex job. In order to overcome this complexity, many acute pain services and pediatric centers developed strategies to approach pediatric post-operative pain management. The approaches are aimed at: recognizing pain in children; minimizing moderate and severe pain safely in all children; preventing pain as predicted; rapidly bringing the pain under control; and continuing control pain after discharge from hospital (Lonnqvist & Morton, 2005).

Pain management strategies consist of both pharmacological and non-pharmacological approaches. These approaches are selected on the basis of the requirements and goals of particular children. Whenever possible, both pharmacological and non-pharmacological approaches should be used; however, the non-pharmacological approaches are not substitutes for analgesics.

Pharmacological pain management.

Pharmacological pain management is used to relieve pain by methods of medication. There are two primary groups of pain medications: nonopioids and opioids. A third group of drugs called adjuvant or co-analgesics are used to relieve symptoms that often accompany pain such as insomnia, muscle spasm, anorexia, anxiety, and depression.

Nonopioid analgesics: Nonopioid analgesics relieve pain by acting on peripheral nerve endings at the injury site to decrease the level of inflammatory mediators. This group of analgesics includes drugs such as acetaminophen (Tylenol), and non steroidal anti-inflammatory drugs (NSAIDs) such as acetylsalicylic acid (aspirin) and ibuprofen (Motrin). The specific actions and dosages of these analgesics

vary. Generally speaking, however, they have analgesic, antipyretic, and anti-inflammatory effects and are useful for mild to moderate pain (Jacob, 2007).

Opioid analgesics: Opioid (narcotic, CNS-acting) analgesics are derivatives of opium and include drugs such as morphine, codeine, and methadone. These drugs modify the perception of pain and provide a sense of euphoria by binding to specific opiate receptors throughout the central nervous system (Jacob, 2007). The actions of various opioids differ from person to person. But morphine is considered the gold standard for the management of severe pain. When morphine is not a suitable opioid, hydromorphone and fentanyl are effective substitutes.

Both opioids and NSAIDs have some side effects. The major concerns with opioids are respiratory depression, sedation, nausea, vomiting, mental clouding, hallucination, constipation, pruritis, urticaria, and orthostatic hypotension. The most serious complication arising from opioids is respiratory depression and this occurs most likely in case of under-sedated children. Even though the incidence rate is rare, nurses must be well-prepared for quick and appropriate intervention. Constipation is a common side effect of opioids, causing decreased peristalsis and increased anal sphincter tone. Sometimes this constipation may become serious. The pediatric nurse can prevent constipation easily by providing stool softeners and laxatives. Additional dietary treatment such as increased fiber, fluid, and fruit intake and physical activity are very effective interventions. Nausea and vomiting and sedation usually subside within two days of opioids consumption. Sometimes oral or rectal antiemetics may be very helpful (Jacob, 2007). Tolerance is an important issue for optimal pain management when treated with opioids, benzodiazepines, and barbiturates. Sometimes nurses need to pay attention to increased dosages or decreasing the

duration to maintain the original effects of opioids (Oakes, 2001). Signs of tolerance are decreased pain relief and decreased duration of pain relief. Opioids have a tendency to cause dependence when used for a long time. There are two types, physiological and psychological dependence. The initial signs of physical dependence are withdrawal symptoms such as lacrimation, rhinorrhea, yawning, or sweating. The later signs of withdrawal symptoms are restlessness, irritability, tremors, anorexia, dilated pupils, and gooseflesh (Wong, 1993).

Adjuvant analgesics (co-analgesics): Adjuvant analgesics are drugs that were developed for uses other than pain. Adjuvants have been found to enhance the effects of analgesics, and to prevent or minimize the side effects of opioids or other analgesics. Commonly these drugs are prescribed in conjunction with primary analgesics. There are many classes of adjuvant agents such as antidepressants, anticonvulsants, neuroleptics, psycho-stimulants, corticosteroids and centrally acting skeletal muscle relaxants (Jacob, 2007). For example, the Buvanendran and Kroin's (2007) study found that pre operative administration of a selective cyclooxygenase 2 inhibitor is beneficial to reduce post-operative pain and also reduces opioid consumption after operations. Nurses need to remember that adjuvants are "helper drugs," not substitutes for analgesics. When children are in pain they still need analgesics. In addition, Saeed, Ashfaq, Khanzada, and Anjum (2008) demonstrated that mind-body relaxation therapy was an effective adjuvant in helping to reduce post-operative pain. They also suggested that this therapy can significantly reduce post-operative analgesia requirements and hospital stays after surgery.

Placebo: A placebo is a "sugar pill" with no active ingredients. Even so, research has found that placebos produce hoped-for results in 30 to 50% of the

people who take them. This so-called placebo effect has been exploited for centuries by hucksters and charlatans who sell tonics, treatments, and gadgets to people in pain. Legitimate medical practice does not use placebos because their purpose is to deceive and strip individuals of the right to make informed decisions. Such acts violate the ethical principles of honesty and autonomy. The only exception to this prohibition is made in research studies, when subjects give prior consent for the possible use of placebos (Tesler et al., 1998).

There are three groups of pain medication. The pediatric nurse must have knowledge of the role of opioids, nonopioids, and adjuvants as pharmacological interventions including doses, side effects, and drug interactions. Furthermore, they should be able to decide the most effective method of pharmacological pain management for an individual patient.

Non-pharmacological pain management.

Non-pharmacological pain management is an approach to a comprehensive method of post-operative pain management of children. These methods are used in combination with pharmacological methods of pain management in order to enhance pain relief more effectively. This is not an alternative to or replacement of pharmacological pain management. Three categories of non-pharmacological interventions are generally popular in the pain management of children in hospital settings: physical intervention, cognitive-behavioral intervention, and environmental or emotional intervention (Bicek, 2004).

Physical intervention: Comfort measures such as clean, smooth sheets, soft, supportive pillows, warm blankets, and a soothing environment have been used by nurses throughout history to relieve pain and suffering. Positional change and

movement are well-known pain-relieving interventions. Moving the body, even a small amount, relieves muscle spasm and provides a degree of pain relief. Massage relieves muscle spasm, improves circulation, and provides cutaneous stimulation. Hot and cold applications are effective pain-relieving measures when used appropriately. Heat decreases muscle spasm and increases blood flow to an area. Cold decreases blood flow, edema, inflammation and may decrease muscle spasm and pain. Transcutaneous electrical nerve stimulation (TENS) provides a continuous, mild electric current via 2 to 4 electrodes placed on the skin near a painful site. The stimulator is a small, battery operated device worn by the client. Experienced as a tingling sensation, TENS works by stimulating large nerve fibers to close the “gate” in the spinal cord (Oakes, 2001). It also stimulates endorphin secretion (Bicek, 2004).

Cognitive-behavioral intervention: This is one kind of psychological intervention that is effective in pain management. The aims of this approach are to move a child from a helpless and anxious painful situation, and to empower the child to cope well. The psychological intervention approaches include: the psycho educational approach; deep breathing; distraction; relaxation; play therapy; guided imagery; cognitive behavioral therapy; and hypnosis. Relaxation and guided imagery are particularly suitable methods for school aged children and can reduce post-operative pain at this age because of their developmental maturity. These are effective when used in combination with pharmacological intervention (Polkii, Vehvilainen-Julkunen, & Pietila, 2001). Relaxation exercises are useful ways to reduce anxiety, decrease muscle tension, and lower blood pressure and heart rates in children. This intervention consists of slow and rhythmic abdominal breathing conducted by an expert nurse. By using relaxation techniques, pain is reduced by relaxing tense

muscles which contribute to pain particularly in the post-operative period (Oakes, 2001). Guided imagery is similar to relaxation exercises in that the coach leads the subjects using a calm, clear voice, and often beginning with a relaxation exercise. Distraction diverts the attention of patients away from painful stimuli (Bicek, 2004). When people focus on something that gives pleasure, they are less likely to feel pain. This phenomenon occurs because the reticular activating system briefly inhibits the awareness of pain. Distraction works best for short and acute pain, such as needle-stick pain.

Environmental or emotional interventions: These interventions are strategies that can help in relieving pain in children and include touch and reassurance. The internal room decoration can be made familiar and pleasurable to children with combination of toys or colorful paintings and pictures and can help in reducing pain after surgery (Bicek, 2004).

Non-pharmacological intervention is an important aspect for a comprehensive approach to optimum pain management of children after operation. There is no risk of adverse effects or interaction with drugs as may be the case with pharmacological intervention (Buvanendran, 2007a). In order to maximize patient's benefits, nurses need to be able to combine pharmacological and non-pharmacological interventions to manage the pain of children in their practice. Sometimes these treatment options overlap each other. Pediatric nurses have to consider a range of facts. These include the appropriateness of specific approach to an individual patient, the relationship between pharmacological and non-pharmacological interventions, and children's and parent's previous experience of and willingness to undergo the approach (Oakes, 2001).

Nurses' Knowledge and Attitudes, and Management of Pain in Children

Nurses' knowledge and attitudes towards pain in children.

Pain is the universal experience of everyone. It is an intolerable sensation which makes a person vulnerable. It is now well established that the consequences of poorly managed pain are deleterious and may lead to a number of complications in the post-operative period. In order to minimize these deleterious consequences and complications, the up-to-date knowledge and positive attitudes of nurses are essential precursors in their clinical practice of post-operative pain management for children. The nurses who work in the area of children's pain are obliged to possess in depth knowledge and understanding of pain, its characteristics, and the assessment and management of pain (Rao, 2006). The in-depth knowledge of the concept of pain required includes: types and causes of pain; the pathophysiology of pain; and individual differences in pain perception in relation to the age and cultural or spiritual aspect of patients. The knowledge of assessment of pain includes clear concepts and use of different tools as appropriate for an individual patient. The importance and prioritization of pain in children are vital for accurate pain assessment. The nurses who are working in the area of children's pain must know every aspect of pain management. This management will include both the pharmacological and non-pharmacological pain management. Knowledge of the indications and contra-indications of analgesic drugs, the side effects of pain medication, and the doses, routes and actions of specific drugs are essential for providing nursing care by pediatric nurses. This knowledge and good preparation for emergency assessment and management at the time of adverse reactions related to pain medications are very important as a part of life saving actions. For effective pain

management nurses need to be concerned about established guidelines and protocols from a pain management perspective. Nurses should also know about the ethical issues of children's pain in order to protect the rights of children or patients and their family, as well as nurses' individual and professional rights.

Many studies have found nurses' knowledge and attitudes to be inaccurate, insufficient and poor in assessing and managing children's pain. Jacob and Puntillo (1999) found that most of the nurses strongly agree that pain assessment is the essential first priority for pain relief in children. Young et al. (2005) also found that nurses believe that pain assessment tools are an important part of assessing pain properly and addressing pain problems effectively. However, most of them (29 of 52 nurses) believed that pain assessment tools are subjective and inaccurate. Other studies (Vincent, 2005; Vincent & Denye, 2004) revealed that nurses have poor knowledge about the effectiveness of non-pharmacological interventions for mild to moderate pain control. They also exposed nurses' poor knowledge about using a non-recommended drug (Meperidine) for children's pain management. Golianu, Krane, Syebold, Almgren, and Anand (2007) found that non-pharmacological techniques are very effective for mild to moderate pain in children.

Vincent (2005) stated that nurses still incorrectly believed that respiratory depression occurred more often than rarely in children who received opioids. She also found that nurses believe that more than 20% children over-report their pain. James et al. (2002) found that less than 10% of children may over-report when they are in pain. In this study, nurses believed that children had no memory of pain perception due to the immature development of the nervous system. However, two studies (Lee et al., 2005; Walco et al., 1994) stated that children did really

experience pain, and even a fetus has pain perceptions from the beginning of the second trimester. They also suggested that discovering methods for quantitatively assessing children's pain is important in order to manage it effectively. A continuing belief among some nurses is that children can easily become addicted to narcotic analgesics. However, the reality is that there is no identified characteristic of childhood physiology or development that indicates any increased risk of physiologic or psychological dependence. The actual risk of addiction is rare in children and infants (James et al., 2002).

The myths and false beliefs among pediatric nurses interfere with the provision of adequate management of pain in infants and children in their practice. Appropriate information and up-to-date knowledge and continuing in-service education on pediatric pain could help nurses to improve their knowledge and attitudes in order to provide adequate management of pain to children.

Nurses' pain management practice on post-operative children.

The pain management practices of nurses depend on their existing knowledge and attitudes regarding pain. Pediatric nurses are responsible for providing optimal pain relief to their patients during practice. They are accountable to ensure that their patients are receiving appropriate evidence-based nursing assessment and interventions in order to effectively treat the pain of children under their care. They are also responsible and accountable to follow recognized pain management standards and guidelines. Currently much research evidence reveals that children continually experience unnecessary post-operative pain due to the lack of knowledge and attitudes of nurses (Broom et al., 1996; Clark et al., 1996; Jacob & Pontillo, 1999; Manworren, 2000; Polkki et al., 2001; Vincent, 2005). Nurses are practicing with huge knowledge

gaps about the routine use of age appropriate pain scales. As a result children's pain is assessed inaccurately and the outcome is inappropriate pain management in nursing practice (Broom et al.; Twycross; 2007a, 2007b). In California a majority of nurses believe that the assessment of pain is the first priority for effective pain management in children. But nurses rarely evaluate the effectiveness of pain medication after administering it to children. It was found that no pain assessment tool was routinely used by nurses to assess the children's pain (Jacob & Pontillo).

Another study in Bangladesh indicated that currently analgesic practices in relieving children's pain are erratic and inconsistent. They deviated from the recommended standards based on modern concepts, planning and systems of post-operative analgesic management in institutions. Furthermore, no policy or system existed for the administration of post-operative analgesics in relieving children's pain. Narcotic and non narcotic drugs were often administered singly rather than in combination with NSAIDs for post-operative pain control. The intervals for administering pain control drugs were longer than the recommended dose interval, and the commonly used routes were intramuscular and per rectal rather than intravenous (Alam et al., 2008). These practices adversely affect children's post-operative pain management.

Broom et al. (1996) found that a majority of nurses (73%) use at least one pain assessment scale as part of children's pain management. Normally several are used, including self-report to measure pain in their practice. Among others (27%) reported that they use no specific pain assessment tools to assess the children's pain. In addition, they use behavioral observation to assess children's pain much less than average. A number of studies (Clark et al., 1996; Twycross, 2007a) found that most of

the time nurses routinely use pharmacological interventions in relieving children's pain rather than non-pharmacological interventions. Polkli et al. (2001) found that nurses commonly use non drug intervention to relieve children's pain, such as emotional support, helping with daily activities and creating a comfortable environment. Cognitive behavioral and physical methods are practiced less commonly in their control of children's pain.

In 1992 the AHCPR (Agency for Health Care Policy and Research, cited in Twycross, 2007a, p 870) reviewed the clinical guidelines related to pain management of children. The review indicated that for the effective management of pain in children nursing practice required certain steps. These included: taking a pain experience history from the child and parent on admission; assessing children's pain using a valid and reliable age-appropriate pain assessment tool; taking into account children's behavioral cues and physiological indicators of pain when assessing pain; administering appropriate analgesic drugs; using non-drug methods of pain relief as appropriate; involve parents during pain assessment and the management of their children; adopting a multidisciplinary approach on an institution basis; documenting pain scores and pain interventions, re-assessing pain after pain intervention to observe the effectiveness of the pain intervention provided; altering the plan of care if necessary; and communicating with children and their parents about all aspects of pain management (p 870).

In order to maintain the effective pain management practice of nurses, it is essential to concentrate on the knowledge of the nurse themselves, their knowledge of pain, and their knowledge of care standards.

Contributing factors influencing nurses' knowledge and attitudes and practice of pain management.

Despite the proliferation of pain management research in nursing in the past 20 years children are still suffering moderate to severe pain unnecessarily (Twycross, 2002). Nurses' knowledge and attitudes, and pain management practices are still less than optimal levels (Broom et al., 1996; Clarke et al., 1996; Vincent, 2005). This can be attributed to many factors that influence nurses' knowledge and attitudes as well their pain management practices in the clinical setting. These include institutional factors, personal factors relating to nurses themselves, and patient-related factors.

Institutional factors: Many hospitals have written and established measurable standards of care and pain service in order to achieve optimal pain management as their institutional goal. This is an essential component for quality pain management by an institution. This is done in order to resolve and remove the underlying causes of existing problems, and is not about repeating solutions for dealing with the same problems again. Nurses are responsible for managing the pain of children in their care but multi-disciplinary problems mean that nurses cannot manage pain effectively on their own. By establishing a quality system in an institution, a basis is put in place for collaboration in pain management. This will involve staffs from across the multi-disciplinary spectrum those have an interest in pain management (Twycross, Moriarty, & Betts, 1998).

The existing curriculum in nursing education is another factor that contributes to preparing nurses in providing care for optimal pain relief in their practice. The literature relating to pain management demonstrated that nurses

continue to have knowledge deficits in concerning post-operative pain management. The deficient areas of nurses' knowledge and attitudes include pain assessment, pharmacological and non-pharmacological pain management. Much depends on how well a nursing curriculum has featured pain management content. Furthermore, sufficient hours of education have to be allocated for this content in order to prepare nursing students to manage pain during their practice (Ferrell et al., 1993). A significantly higher level of knowledge and attitudes regarding the management of children's pain was found among nurses who had higher levels of educational preparation (Manworren, 2000).

Personal factors of nurses themselves: Nurses' are often found to have knowledge deficits and negative feelings regarding pain assessment and pain management. This has an effect on optimal pain management for children. Pain management has to be based on a scientific rationale rather than individual nurses' beliefs and perceptions. Appropriate education and evidence based knowledge can eradicate the myths and false beliefs of nurses undertaking pain management in their practice (Doris, Lorna, Leslie, Judith, & Nora, 2000). Another study (Twycross, 2007b) showed that nurses may have had good levels of theoretical knowledge regarding children's pain management, but this did not reflect in their practice. This, in turn, meant children still suffered moderate to severe pain. The explanation for the gap between theoretical knowledge and actual practice could be that nurses may not understand the rationale for using specific pain management interventions. Initiatives taken in clinical teaching programs may helpful to minimize this gap between the theoretical knowledge and practice of nurses (Twycross, 2007b). Continuing education and in-service training, plus educational programs for nurses in pain

management, may help to change nurses' knowledge of and attitudes to pain management. Training through refresher courses has a good effect in enhancing such changes over time (Doris et al., 2000).

Some personal factors of nurses often contribute to their attitudes as well as their pain management practices. A nurses' past personal experience of pain and analgesic use has been found to be an important factor in changing their attitudes towards pain. This also helps them achieve optimal pain management outcome in their practice (Coubani et al., 2004; Pud, 2004). However, having a child who has suffered from a painful episode does appear to influence nurses' decisions regarding the administration of analgesics. Nurses' knowledge about the effects of pain relieving interventions may contribute to their practice. Hence nurses with a greater knowledge regarding opioid analgesics appeared more comfortable about administering them. The fact that nurses work in a pediatric post-operative unit, and the duration of that experience, may contribute to determining how a child's pain can be managed effectively. Nurses are often ethnocentric, and culture or ethnicity is an important consideration with respect to children's pain. This is manifested by its influence on attitudes, such as the meaning of illness and pain, and through learned behavior patterns and norms (Twycross et al., 1998).

Patient related factors: The age and the temperament or behavioral expressions of a child, such as shouting or crying, may trigger nurses to administer an analgesic promptly. This may be earlier than for another child who does not react in a verbal manner (Vincent & Denyes, 2004). Nurses may also be influenced by a child's medical diagnosis, or the type and duration of an operation; these may become indicators of pain intensity and need for analgesic administration (Twycross, 2002).

Some other factors contribute to nurses' pain management practices in children. Existing barriers may sometimes affect nurses' decisions at the time of managing pain. Often a nurse does not have enough time to implement pain relief methods for children. Vincent (2005) found that physicians' inadequate ordering of pain medication was the greatest barrier for optimal pain management in nurses' clinical practice.

From the review undertaken in this chapter, children's pain is a complex human experience depending on age, gender, genetic make-up, culture, and past experience of pain. Nurses must have in-depth knowledge and positive attitudes in the areas of pain, pain assessment, and the pain management of children, particularly post-operative pain. The role of nurses in the management of pain in children is particularly important. This is because they are often responsible for their patients' assessment and the management of pain relief interventions, and the evaluation of their effectiveness. Nurses are also regularly responsible for deciding which pain relief measures should be offered to individual patient as appropriate and are often involved in the forming and evaluation of healthcare decision. Thus, the management of pain is considered to be one of the most important technical and moral tasks for nursing personnel throughout their work. The ultimate goal of this study is to identify and expand the body of nurses' knowledge and attitudes, and their practices in relation to post-operative pain management in children. This should, in turn, contribute to improvements in health care as well as the nursing profession.

CHAPTER 3

RESEARCH METHODOLOGY

This is a quantitative descriptive study. A survey design was used to explore the level of nurse's knowledge and attitudes, and practices related to post-operative pain management of children in Bangladesh. This chapter describes the research methodology and research design used. This includes: the study population, sample and sampling; the study setting; the instruments used for data collection; the validity and reliability of the instruments; translation of the instruments; data collection; ethical considerations; and data analysis.

Population

The population consisted of all registered nurses who have working experiences in pediatric surgical units at government medical college hospitals in Bangladesh.

Sample and Sampling

A total of ninety three registered nurses were recruited for this study. The sample consisted of all registered nurses who were currently working in pediatric surgical units, and who had been working in this area over the past one year. They were senior staff nurses, staff nurses, and nursing supervisors in Pediatric Surgical Units at three Medical College Hospitals in Bangladesh. These were the Dhaka Medical College Hospital (DMCH); the Sir Salimullah Medical College Hospital (SSMCH) in Dhaka; and Chittagong Medical College Hospital (CMCH) in

Chittagong. A purposive sampling technique was used to select the sample based on the following inclusion criteria:

1. Nurses who were currently working at the pediatric surgical wards and providing care for children undergone surgery.
2. Nurses who had been working at pediatric surgical wards over the past one year and currently rotated to work at other wards.
3. Nurses who had completed a three years diploma in nursing and one year additional diploma in midwifery or another equivalent diploma.

The sample size in this study was estimated by using power analysis based on the most similar previous study entitled “Relieving Children’s Pain: Nurses’ Abilities and Analgesic Administration Practices” (Vincent & Denyes, 2004). The effect size was calculated based on correlation coefficients taken from that study. These were knowledge and attitudes and ability to overcome barriers to optimal pain management, $r = .31$. The accepted alpha (α) level was .05 with the power ($1-\beta$) of .80. Therefore, the estimated total sample size in this study was 88 (Polit & Beck, 2008, p 605) (Appendix A). During data collection, 96 eligible nurses were approached as the researcher did not expect a perfect response rate. Eventually 93 nurses returned the questionnaire. Finally the researcher includes a total of 93 nurses who met the inclusion criteria.

Settings

In Bangladesh, there are 15 government medical college hospitals. Among them, only five hospitals have pediatric surgical wards. However, this study was conducted at three Government Medical College Hospitals: Dhaka Medical

College Hospital (DMCH); Sir Salimullah Medical College Hospital (SSMCH) in Dhaka; and Chittagong Medical College Hospital (CMCH) in Chittagong. These hospitals were selected because they are the top level reference hospitals, and have the high technology required for providing surgery for pediatric patients in Bangladesh.

In addition, all nurses working in these Government Medical College Hospitals have completed at least a three year diploma in nursing. They had extended their study to a one year additional diploma in midwifery, or another equivalent diploma. The curriculum, licensing, and the quality of the nursing service are controlled by the Bangladesh Nursing Council (BNC). Registered nurses working in the Government Medical College Hospitals are routinely assigned to work in whatever wards the superintendent of nursing administration department assigns them to. They are assigned to work in a ward for about 3-6 months, and then they are rotated to work in other wards. No nurses are assigned to work permanently in one ward, except a head nurse or nurses in charge of the ward. In order to get enough subjects for this study, registered nurses who had been working in the pediatric surgical wards over the previous one year were included. The researcher collected the list of nurses' names from the official record of the nursing administration. The lists consist of all the registered nurses who were working currently and had been working within the previous one year at a pediatric surgical ward. The subjects who met the inclusion criteria were recruited purposively from the selected three medical college hospitals in Bangladesh.

Instrumentation

The instruments used in this study were modified from available instruments related to nurses' knowledge and attitudes, and pain management practices for children. The previous instruments with the permission for use and modification from the original authors (Appendix B) included:

1) The "Knowledge and Attitudes Survey Regarding Pain" developed by Ferrell and McCaffery in 1987 and revised in 2008 was available through the internet (<http://prc.coh.org>). The construct validity was established by comparing scores of nurses at various levels of expertise: students, new graduates, oncology nurses, graduate students, and senior pain experts. The tool was identified as discriminating between levels of expertise. Test-retest reliability was $r > .80$ by repeat testing in a continuing education class with 60 staff nurses. The internal consistency reliability was established as $r > .70$ with items reflecting both knowledge and attitude domains.

2) The "Survey of Pediatric Pain Practices" was developed by Broom et al. in 1996. It was developed by five members of a pediatric pain team and was based on their experience and discussions with colleagues. It consisted of a total of 59 questions in a five categories: pain standards and education; pain assessment strategies; options for pharmacological and non pharmacological management; management of severe, ongoing pain; and utilization of pain services.

3) The "Nurses' Knowledge and Attitudes Survey Regarding Pain" was developed by Vincent, 2005. It consisted of 31 items related to children's pain, pain perceptions, consequence of pain, and pain assessment in children, pharmacological and non pharmacological interventions, and preparedness for

adverse effects of pain medication. The instrument includes: 20 items of dichotomous questions; 11 items multiple choice questions; and two case scenarios. It was modified from Ferrell and McCaffery's (1997) instrument in which the test-retest reliability was 0.80 and the internal consistency was 0.70. The content validity of the modified instrument was reviewed by experts in children's pain and instrument development and was pilot tested. The internal consistency of the modified instrument was 0.64.

The instruments in this study consisted of four parts: 1) Demographic characteristics of nurse participants; 2) A survey questionnaire for nurses' knowledge and attitudes on pediatric pain management; 3) A survey questionnaire for the pediatric pain management practice of nurses; and 4) Open-ended questions for asking about barriers to optimal pain management for children (Appendix C).

Part 1: This part consisted of a questionnaire on demographic characteristics and pain management experiences in training. It was made up of 13 items for collecting demographic information. This included: age; gender; duration of service; education; duration of service in the pediatric surgical area; experience of providing direct nursing care to post-operative children; current working area; and current position in nursing. The additional questions for pain experiences related to institutional standards for a pain management protocol, how often they read nursing journals and whether pain content was in their nursing curriculum. In this part, questions 12 and 13 were taken from Broom et al.'s questionnaire with some modification. The modifications made concerned cultural relevance, ease of understanding for Bangladeshi nurses and the structure of the question.

Part 2: This was a questionnaire on nurses' knowledge and attitudes on post-operative pain management in children. It consisted of 45 true/false statements where nurses had to mark either true or false against the statements. For each correct answer the researcher assigned a score of one (1), and a zero (0) score was assigned for an incorrect answer. The scoring ranged from 0 - 45. There were 27 positive items and 18 negative items. This questionnaire covered nurses' knowledge of and attitudes to children's perceptions regarding: pain assessment; side effects or adverse effects of pain medication; use and effectiveness of pharmacological and non-pharmacological interventions; recommended routes; and dosages; and the duration of the action of drugs. Some items were directly transferred from Vincent's original version and some items were modified.

The scores for knowledge and attitudes, and the practice of participants were categorized in accord with McDonald's (2002) learning outcomes. McDonald categorized the learning outcomes of multiple choice examinations into five grades (A, B C, D, and F) or five levels (very high, high, moderate, low, and very low) as follows:

Grade	Composite Percent Score	Levels
A	90.00 - 100%	= Very High
B	80.00 - 89.99%	= High
C	70.00 - 79.99%	= Moderate
D	60.00 - 69.99%	= Low
F	< 60%	= Very Low

In this study, the researcher modified the McDonald learning outcomes into three levels in order to grade nurses' knowledge and attitudes of post-operative pain management as follows:

Composite Percent Score		Levels
80.00 - 100%	=	High
60.00 - 79.99%	=	Moderate
< 60 %	=	Low

Part 3: This comprised a questionnaire on the practices of nurses in using pain assessment and pain management related data for post-operative children: This part contained 19 items and the participants marked their performance on a five-point Likert scale, ranging from 1-5 ('never' to 'constantly'), respectively. For each item, a score of 5 was accorded for 'constantly' and a score of 1 for 'never'. The score ranged from 19-95. This part included the measurement of a number of practices. These included: performance in children's pain assessment and management; the use of different age-appropriate pain measurement tools for pain assessment; the use of pharmacological and non-pharmacological pain management measures; showing sufficient awareness and preparedness for the adverse effect of pain medication; and reassessment of pain in order to evaluate the effectiveness of pain medication and the frequency of use of PRN (Pro Re Nata) pain medication for pain management. Some items (13, 14, 15, and 16) were taken directly from the Broom et al.'s original questionnaire and some were modified.

The scores for participants' pain management practices were also categorized into three levels, high, moderate, and low levels as follows:

Composite Percent Score		Levels
80.00 - 100%	=	High
60.00 - 79.99%	=	Moderate
< 60%	=	Low

Part 4: This part dealt with the barriers perceived by nurses for optimal pain management of children in their clinical practice. It consisted of four open-ended questions related to pain assessment, pharmacological and non-pharmacological pain management, and other barriers perceived by nurses. To answer this part, participants were asked to write in their own language what they perceived as the barriers in pain management practice. The data obtained from the barrier part were analyzed by using content analysis.

Validity of the Instruments

The instruments were validated by three experts. One was a lecturer from the Faculty of Nursing, Prince of Songkla University (PSU), Thailand. The second was a pediatrician at the Department of Anesthesia, Faculty of Medicine, PSU. The third was a head nurse working in the pediatric surgical ward, Songklanagarind Hospital, Thailand. In addition, a pediatrician (a specialist) from the pediatric surgical ward, Chittagong Medical College Hospital, Bangladesh was invited to examine the cultural relevance of the instrument. All experts were skillful in the area of pediatric pain management. The expert teams evaluated the content validity of the instruments, whether they were sufficiently relevant, and whether they adequately measured the variables in the study (Appendix D). The researcher then further modified the instrument based on their recommendations.

Reliability of the Instruments

The reliability of the instruments were tested by Kuder Richardson (KR-20) and Cronbach's alpha coefficient. The internal consistency of the nurses' knowledge and attitudes on post-operative pain management questionnaire was tested by KR-20 yielding a coefficient of .71. The Cronbach's alpha coefficient of the pediatric nurses' pain management practice questionnaire was .75. In addition, the stability of the instrument was tested by using test-retest reliability with 20 nurses at Chittagong Medical College Hospital in Bangladesh. The test-retest was conducted two weeks apart. Pearson's correlation-coefficient indicated a significant positive correlation between the first and the second reliability test ($r = .72$, $p < .01$ for the knowledge and attitudes questionnaire; and $r = .93$, $p < .01$ for the practice questionnaire), respectively.

Translation of the Instruments

The original instruments for this study were developed by the researcher in English. The English version was then translated into a Bengali version and translated back into English with the help of three bilingual translators who were competent in both the English and Bengali languages. The back translation process was done by following three steps. The English version was directly translated into a Bengali version by a lecturer from the College of Nursing, Chittagong, Bangladesh. A bilingual English-Bengali translator from the Chittagong Government College, Bangladesh, then translated it back into an English version. The original English version and the second English version instruments were compared for the linguistic discrepancies by a professor (a medical doctor) from the National Institute of

Cardiovascular Diseases and Hospital, Bangladesh. Finally, after suggestions, small modifications were made in the Bengali instrument when discrepancies were checked, to ensure it had the same meaning as the original questionnaire (Appendix E).

Data Collection

Approval was obtained from the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkla University, Thailand. Then permission to collect data was given by the directors of Dhaka Medical College Hospital (DMCH), Sir Salimullah Medical College Hospital (SSMCH), and Chittagong Medical College Hospital (CMCH). Data collection then started. The objectives of the study were explained to the heads of the pediatric surgical wards, the nursing superintendents and the head nurses of the selected three hospitals. The researcher collected the lists of names from the administration offices of eligible registered nurses currently working or had been working in the pediatric surgical ward within the last year.

All registered nurses listed were treated as eligible subject for this research. The researcher distributed the questionnaire directly to the registered nurses with the help of the head nurses and nursing supervisors. The researcher asked the individual participants to fill up the questionnaires independently. The questionnaires were collected by the researcher after one week. The researcher took care to check that all returned questionnaires were completed. If any question was not complete, then the researcher asked the respondent to complete it. After collecting all questionnaires, the researcher separated all the top sheets of the questionnaires from original questionnaire thus removing identification of the participants and hospitals.

All the collected questionnaires were kept by the researcher for further data analysis. The duration of data collection was from November 2009-January 2010.

Ethical Considerations

The researcher's proposal was submitted and approved by the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkla University (Appendix F). Permission for data collection was obtained from the directors of three selected hospitals before data collection was started (Appendix G). The objectives and procedures of the study were explained to the hospital directors, nursing superintendents, unit heads (heads of the pediatric surgery wards), nursing supervisors and head nurses of the wards concerned.

The subjects then received a further brief explanation of the study. They were also informed that they had the right to stop or discontinue for any reason without penalty at anytime. A coding system was used to identify participants and hospitals. Participants were assured of the anonymity and confidentiality of all information that they provided, and that such information would be used only for the purposes of this study. After data analysis the researcher would incinerate all the questionnaires.

Data Analysis

Data were analyzed by using a computer program. Before data analysis, all data were entered, checked, and cleaned. Checking and cleaning involved manually checking all data entered into computer against each subject's original questionnaire to ensure the accuracy of the data entry. Frequencies, percentages,

means, and standard deviations were used to describe the nurses' demographic characteristics. Nurses' knowledge and attitudes, and practices about pain management data were analyzed and presented in terms of frequencies, percentages, means, and standard deviations, and minimum and maximum scores. Pearson's product-moment correlation (r) was used to examine the relationship between nurses' knowledge and attitudes, and pain management practices data. Prior to perform the Pearson product-moment correlation, assumptions of normality, homoscedasticity, and the linear relationship of the variables were all tested. In addition, content analysis was used to analyze the perceived barriers of nurses to reporting by subjects on optimal pain management.

CHAPTER 4

RESULTS AND DISCUSSION

The purpose of this chapter is to present the findings of the study. It begins with the rate of returns of questionnaires, the demographic characteristics of the nurses, nurses' knowledge and attitudes regarding post-operative pain management, and nurses' pain management practices in post-operative children. The finding of the relationship between nurses' knowledge and attitudes, and pain management practices is then presented. Next, the findings relating to the barriers perceived by nurses towards pediatric pain management practice are presented. The last part focuses on discussion.

Results

The Rate of the Returned Questionnaire

A total of ninety six questionnaires were distributed to eligible nurses in three hospitals in Bangladesh. Ninety three questionnaires (96.88%) were returned. The return rate for each hospital was: 100% from Chittagong Medical College Hospital (H-1), 96.87% from Dhaka Medical College Hospital (H-2), and 94.44% from Sir Salimullah Medical College Hospital (H-3) (Table 1).

Table 1

Percentage of Returned Questionnaires of Each Hospital (N = 93)

Hospital	Distributed Questionnaires	Returned Questionnaires	
	<i>N</i>	<i>n</i>	%
H-1	28	28	100
H-2	32	31	96.87
H-3	36	34	94.44
Total	96	93	96.88

Demographic Characteristics of the Nurses

Most nurses' were between 30-39 years old (46.2%). All subjects were female. Most of the nurses were Muslim and Hindu (48.4% and 45.2%, respectively). The duration of nursing service for most of them was between 6-10 years (38.71%) or between 11-12 years (31.18%). Some others had more than 21 years (30.11%) service. The mean duration of nursing service was 16.20 years. Most of the nurses' service experience in the pediatric area was between 1-5 months (37.6%). Some had between 6-11 months (32.2%), and of the rest some had between 1-5 years (23.7%) and others 6-10 years (6.5%), respectively. Most of the nurses were not currently working in the pediatric post-operative area (58.1%). Only 41.9% of nurses were currently working in pediatric post-operative area. Before working in pediatric post-operative areas, most of the nurses had worked for 1-5 months (32.3%). Some had worked for 6-11 months (20.4%) and others worked for 1-5 years (5.4%), respectively (Appendix H, Table 8).

Almost of the nurses had obtained at least a diploma in nursing (80.6%). Only 16.2% of nurses had a Bachelor of Science in nursing, and the rest had a Master of Science in nursing (3.2%). Most of the nurses (51.6%) currently did not provide direct nursing care to post-operative children. Only 38.7% of nurses currently did, and another (9.7%) of nurses answered that they were not sure. For the majority of nurses' their current position was senior staff nurse (67.7%), and the rest of them were staff nurses (12.9%), in charge of wards (10.8%), and nursing supervisors (8.6%), respectively. Two thirds (63.4%) of the nurses never read nursing journals, 26.8% did yearly, 5.4% did quarterly, and 3.2% did so monthly.

The majority (69.9%) of nurses reported that there was no pain content included in their nursing curriculum. However, 8.6% reported that there was pain content included in their nursing curriculum, whereas 21.5% reported that they were not sure. Most of the nurses (59.1%) stated that there was no pain management standard or protocol used as a basis in the hospital. On the other hand, 18.3% stated that there was a pain management standard or protocol in their hospital, and 22.2% of the nurses answered that they were not sure (Appendix H, Table 8).

Nurses' Knowledge and Attitudes Regarding Post-Operative Pain Management

Nurses were asked to answer 45 true/false questions related to nurses' knowledge and attitudes towards pain management in children. The questionnaire included nurses' knowledge and attitudes on post-operative pain, pain assessment in children, and pharmacological and non-pharmacological pain management.

Overall, it was found that nurses' knowledge and attitudes regarding post-operative pain management were $M = 66.79\%$ and $SD = 9.88$ (minimum 46.67% and maximum 88.89%), respectively. This was at the moderate level (Table 2).

Table 2

Frequency, Percentage, Mean, Standard Deviation, Minimum, and Maximum Scores of Nurses' Knowledge and Attitudes of Post-Operative Children (N = 93)

Variable and level	Overall nurses' knowledge and attitudes				
	<i>n</i> (%)	<i>Min</i>	<i>Max</i>	<i>M</i> (<i>SD</i>)	Level
Nurses' knowledge and attitudes		46.67	88.89	66.79 (9.88)	Moderate
- High level (80.00-100 %)	10(10.8)				
- Moderate level (60.00-79.99%)	61(65.6)				
- Low level (< 60 %)	22(23.7)				

Five additional items were analyzed to determine the areas that the nurses answered correctly. It was found that the five ranking order of the most correct answers were: 1) during the post-operative period, children may cry for many causes, not only from surgical wounds (98.9%); 2) pain should be assessed before and after administering pain drugs (96.8%); 3) each pediatric patient will have specific different post-operative pain, and the child should be advised to use non-drug techniques along with pain medication (95.7%); 4) nurses' knowledge and understanding of post-operative pain management can make them more able to manage the pain better, and the side effects of narcotics should be observed at least 20 minutes after administration (93.5%); and 5) distracting children by using music or story telling-

Table 3

Frequency and Percentage of the Five Ranking Orders of the Most Correct Answers and the Five Ranking Orders of the Least Correct Answers regarding Nurses' Knowledge and Attitudes of Post-Operative Children (N = 93)

Rank Order	Items of correct answer	n	%
Five highest items			
1	During the post-operative period, children may cry for many causes, not only from surgical wounds	92	98.9
2	Pain should be assessed before and after administering pain drugs	90	96.4
3	The experience of pain will affect the psychological, neurological and personal development of a child, The child should be advised to use non drug techniques along with pain medication	89	95.7
4	Nurses' knowledge and understanding of post-operative pain management can make them more to manage the pain better, Side effects of narcotics should be observed at least 20 minute after administration	87	93.5
5	Distracting children by using music or story telling during invasive procedure will help decrease pain for children	86	92.5
Five lowest items			
1	Children who can be distracted from pain usually do not have severe pain	22	23.7
2	Observable changes of vital signs must be relied upon to verify a child's statement that he/she has severe pain	25	26.9
3	After an operation, if the child seems to rest in bed, and there is no body movement it means that the child has no post-operative pain	26	28.0
4	If the source of pain is unknown, a pain drug should not be used during the pain evaluation period, because this could mask the ability to correctly diagnose the cause of pain	28	30.1
5	Non-drug interventions (such as heat, music, imagery, touch) are very effective for mild-moderate pain control but are rarely helpful for more severe pain	35	37.6

during invasive procedures will help decrease pain for children (92.5%) (Table 3).

The five ranking orders that least nurses provided the correct answer for were: 1) children who can be distracted from pain usually do not have severe pain (23.7%); 2) observable changes of vital signs must be relied upon to verify a child's statement that he/she has severe pain (26.9%); 3) after an operation, if the child seems to rest in bed, and there is no body movement it means that the child has no post-operative pain (28%); 4) if the source of pain is unknown, a pain drug should not be used during the pain evaluation period, because this could mask the ability to correctly diagnose the cause of pain (30.1%); and 5) non-drug interventions (such as heat, music, imagery, touch) are very effective for mild-moderate pain control but are rarely helpful for more severe pain (37.6%), respectively (Table 3).

In addition, when analyzing the items, it was found that nurses had a high level of knowledge and attitudes (score >80%) on pain management in some areas. These included: 1) the side effects of narcotics should be observed at least 20 minutes after administration (93.5%); 2) distracting children by using music or story telling during invasive procedure will help decrease the pain of children (92.5%); 3) during the caring of pediatric patients, providing comfort and good positioning may help to reduce muscle tension which, in turn, can reduce pain (91.4%); 4) an appropriate assessment of pain is the first priority for effective pain management in the post-operative period (91.4%); 5) most of the children age over 6 years can express feelings of pain clearly (90.3%); 6) fear and anxiety about separation from parents will lead to increased pain (89.2%); 7) initially post-operative analgesics should be given around the clock on a fixed schedule (87.1%); 8) after operations, if the children have severe pain they may show abnormality in vital signs (87.1%);

9) lethargy and discomfort after an operation will lead to increased pain (86%); 10) parents should be allowed to be with and to participate with the child during invasive procedure or after surgery and this will help to reduce the child's pain (81.7%); and 11) after the initial recommended dose of opioid analgesic, subsequent doses should be adjusted according to the individual patient's response (81.7%) (Appendix I, Table 9).

It was also found in some areas that nurses had low level of knowledge and attitudes (score <60%) concerning pain management. These included: 1) the nurse's role during post-operative pain management is to follow the doctors order only (58.4%); 2) the usual duration of action of IV morphine sulphate is 6-8 hours (59.1%); 3) meperidine (Pethidine) is generally NOT recommended for treatment of children's post-operative pain (59.1%); 4) the nurse is the best one who can tell the children's feelings about pain (57.0%); 5) for pediatric pain control, morphine sulphate IV should be given as ordered 4-6 hourly and SOS (PRN) (55.9%); 6) physiological pain assessment is a more suitable method than behavioral and self-reporting assessment of pain in children (51.6%); 7) based on cultural or spiritual belief, children or their parents may think that pain and suffering is necessary (50.5%); 8) children can use self-reporting to identify their pain intensity by themselves (46.2%); 9) usually children perceive pain less than adults (44.1%); 10) pain assessment by behavioral observation is not appropriate for young children, 11) beyond a certain dosage of strong opioids (morphine), increases in doses not increase pain relief (43%); 12) vital signs are always reliable indicators to assess the intensity of post-operative pain (40.9%); and 13) children may sleep in spite of severe pain (39.8%) (Appendix I, Table 9).

Nurses' Pain Management Practices in Post-Operative Children

Nurses were asked to score 19 questions on a five-point likert scale related to nurses' pain management practice in children.

Overall, it was found that nurses' pain management practice were $M = 78.16\%$ and $SD = 6.51$ (minimum 66.32% and maximum 98.95%) respectively, which were at the moderate level. In addition, the levels of nurses' pain management practice were analyzed. It was found that nearly two thirds of nurses' pain management practice was at the moderate level (60.2%), and the rest was at the high level (39.8%) (Table 4).

Table 4

Frequency, Percentage, Minimum and Maximum Score, Mean, and Standard

Deviation of the Level of Nurses' Pain Management Practices (N = 93)

Variable and level	Overall nurses' pain management practices				
	<i>n</i> (%)	<i>Min</i>	<i>Max</i>	<i>M</i> (<i>SD</i>)	Level
Nurses' pain management practices	-	66.32	98.95	78.16 (6.51)	Moderate
- High level (80.00-100 %)	37(39.8)				
- Moderate level (60.00-79.99%)	56 (60.2)				
- Low level (< 59.99 %)	-				

In addition, the ranking orders were analyzed to determine the area that nurses constantly perform at high level to manage pain management in their clinical practice. It was found that the five highest ranking orders of constant high performance were: 1) after surgery, you suggest children to tell the nurse when they

are in pain (80.6%); 2) you administer pain medication to children as ordered by doctor around the clock (76.3%); 3) after surgery, you arrange comfortable positions to help relieve pain for children (75.3%); 4) you ask and help children to support the painful area during moving or coughing after surgery (74.2%); and 5) you observe the side effects of pain medication (morphine) after giving it to the child (72%) (Table 5).

Table 5

Frequency and Percentage of the Five Highest Orders of “Constantly” and the Three Highest Orders of “Never” of Nurses’ Pain Management Practices (N = 93)

Rank Order	Ranking order of nurses’ pain management practice	<i>n</i>	%
Highest items of “Constantly” practice			
1	After surgery, you suggest children to tell the nurse when they are in pain	75	80.6
2	You administer pain medication to children as ordered by doctor around the clock	71	76.3
3	After surgery, you arrange comfortable positions to help relieve pain for children	70	75.3
4	You ask and help children to support the painful area during moving or coughing after surgery	69	74.2
5	You observe the side effect of pain medication (such as Morphine) after giving it to the child	67	72.0
Highest items of “Never” practice			
1	You administer pain medication to children by your own adjustment	70	75.3
2	You use a self-reported pain scale (such as VAS, FACE scale) for the assessment of children’s pain in your practice	62	56.6
3	You use a behavioral pain scale (such as FLACC) for assessment of children’s pain in your practice	57	61.3

In addition, the three ranking orders were analyzed to determine the areas that nurses never perform in managing pain in their clinical practice. These were: 1) you administer pain medication to children by your own adjustment (75.3%); 2) you use a self-reported pain scale (such as VAS, FACE scale) for assessment of children's pain in your practice (66.6%); and 3) you use a behavioral pain scale (such as FLACC) for assessment of children's pain in your practice (61.3%) (Table 5).

The Relationship between Nurses' Knowledge and Attitudes, and Pain Management Practices

The relationship among nurses' knowledge and attitudes, and pain management practices did not correlate with the pain management practices ($r = .014$; $p = 0.89$) (Table 6).

Table 6

The Relationship between Nurses' Knowledge and Attitudes, and Nurses' Pain Management Practice (N = 93)

Variable	Practice (r)	p value
Nurse's Knowledge and Attitudes	.014	.89

Nurses' Perceived Barriers to Optimal Pain Management in Post-Operative Children

Nurses were asked to answer four open-ended questions regarding barriers to optimal pain management in post-operative children. This topic is

presented with the overall five ranking order of the barriers, and then the results of three open-ended questions are reported.

Overall, the top five ranking orders of barriers to managing children's pain during practice were: 1) there is no pain assessment scale in the hospital (93.4%); 2) nurses have poor knowledge of pain assessment because there is no pain content in the nursing curriculum and have had no formal education or training for pain management (92.5%); 3) nurses have poor knowledge about pain drugs and calculating their dosage, because they have never attended any training or formal education on pain drugs and pharmacology (88.2%); 4) insufficient doctors' order for pain medication and duty doctors are not available in the ward all the time (74.1%); and 5) nurses cannot administer any pain drug without doctors' prescriptions, even for a basic pain medication such as paracetamol (72.2%) (Table 7).

Table 7

The Frequency and Percentage of the Five Highest Barriers Perceived by Nurses in Managing Children's Pain during Practice (N = 93)

No	Five highest perceived barriers in pain assessment	<i>n</i>	%
1	There is no pain assessment tool in the hospital	87	93.4
2	Nurses have poor knowledge of pain assessment, because there is no pain content in the nursing curriculum and no formal education or training for pain management	86	92.5
3	Nurses have poor knowledge about pain drugs and calculating their dosage because they have never attended any training or formal education on pain drugs and pharmacology	82	88.2
4	Insufficient doctors' order for pain medication and duty doctors are not available in the ward all the time	69	74.1
5	Nurses can not administer any pain drug without doctors' prescription, even for a basic pain medication such as paracetamol	67	72.2

Perceived barriers to pain assessment for optimal pain management.

Nurses perceived that barriers to pain assessment for optimal pain management were: 1) it is difficult to assess children's pain behavior when they are in fear, crying, shy or angry; and 2) nurses assess children's pain by their own judgment without using any standard pain assessment scale, so the pain may not be assessed accurately (Appendix K, Table 11).

Perceived barriers to providing pain medication for optimal pain management.

Nurses perceived that there were some barriers for providing pain medication in order to obtain optimal pain management. These included: 1) there is not enough pain medication available in the ward; 2) children hide their pain experience because they are afraid to get shot; 3) nurses cannot administer pain medication when children feel fear or cry a lot to receive pain medication; and 4) nurses feel fear of drug addiction and adverse reactions to pain medication and then they hesitate about providing drugs to children (Appendix K, Table 11).

Perceived barriers to non-drug intervention for optimal pain management.

Nurses' perceived that the barriers to providing non-drug intervention for optimal pain management were: 1) nurses have no idea/poor knowledge about non-drug intervention for pain management; 2) parents usually prefer the use of drugs for pain management in their children rather than help children to cope with pain by using non-drug interventions; 3) there are no non-pharmacological pain management methods or materials for use in the ward in order to manage children's pain; 4) nurses cannot make the environment quiet for post-operative children, because it remains

overcrowded all the time; 5) nurses do not have enough time to provide non-pharmacological pain intervention because of their work load; and 6) parents are not allowed to stay with their children in the post-operative room, so there is no person available to nurses to help children in relieving their pain (Appendix K, Table 11).

Discussion

Demographic Characteristics of Nurses

A total of 96 questionnaires were distributed. Ninety three of questionnaires were returned (96.8%) with a refusal rate of less than 4%. The reasons for not participating in the study included a long vacation and physical illness. This low non-participation rate in this study indicated that those sampled were more representative of the population (Burns & Grove, 2003, p 239).

The majority (46.2%) of nurses was in the middle age group (30-39 years) and all were female. Thus the study results could not be generalize to male nurses. From the study subjects' religious backgrounds, the majority of nurses were Muslim (48.4%) and Hindu (45.2%). A few were Buddhist (3.3%) and Christian (3.3%). Thus the nurses' pain management practices for post-operative pain in children might be influenced by religion and culture beliefs. The results of this study suggest that pain management in post-operative children in each culture need to be explored. Surprisingly, the experience of nurses in the nursing service was an average of 16 years, but the average work experience of nurses (32.2%) in pediatric area was 1-5 months.

Only 41.9% of the nurses were currently working in pediatric post-operative areas, and 58.1% were currently working in other areas. Thus, the study results might not accurately reflect current knowledge of pain management for post-operative children since nurses were assigned to rotate in order to work in other wards. Thus they might not accurately recognize how to manage children's post-operative pain. Generally, nurses were assigned to rotate as needed by local nursing administration. A suggestion arising from this study is that some nurses should be assigned to work in only one area, such as a pediatric post-operative ward. This would be in order to improve their knowledge and experience in taking care of post-operative children.

It was also noted that the majority of nurses (80.6%) had only a diploma in nursing education (studying nursing for three years in). Only 16.2% of the nurses had a bachelor degree, and a few nurses (3.2%) had a master's degree. In addition, almost three quarter of the nurses (69.9%) stated that there was no pain content in their nursing curriculum, and only 8.6% reported they had pain content in the nursing curriculum. Furthermore, most of the nurses (59.1%) reported that there was no pain management standard or protocol in their hospitals. Lastly, two-thirds of the nurses (63.4%) in this study never read any nursing journals. These results suggest that the majority of nurses gain knowledge of post-operative pain management in children by learning from doctors' activities and treatment. The results of this study suggest that pain management should be included in the nursing curriculum so that nurses can gain more knowledge of the pain area earlier. This would, in turn, enable them to provide nursing care more effectively.

Nurses' Knowledge and Attitudes on Post-Operative Pain Management

The study findings revealed that, overall, nurses' levels of knowledge and attitudes to post-operative pain management in children was at the moderate level ($M = 66.79\%$, $SD = 9.88$, minimum = 46.67%, and maximum = 88.89%). Only 10% had a high level and 23% had a low level (Table 2). These findings were generally similar to a previous study (Clarke et al., 1996). They found that the overall nurses' knowledge and attitudes to pain management was at the moderate level ($M = 62\%$, range from 41% - 90%). In this study, it was found that nurses had a moderate level of knowledge and attitudes in post-operative pain management in children. This was because the majority of nurses had a diploma in nursing in which no pain management content was taught in the curriculum. They learned and gained knowledge of how to manage pain in children from the doctors' activities and orders. Thus the levels of knowledge and attitude were only moderate.

Analysis of the five ranking orders of correct answers shows that almost all the nurses demonstrated high levels of knowledge and attitudes in some areas of pain management of post-operative children (higher than 92.5%). These included behavioral pain expression in children, the effects of pain on psychological and neurological development, and using non-pharmacological pain management to distract children's pain (Table 3). In contrast, the five ranking orders of the least correct answers (lower than 37.6%) were that nurses had poor knowledge and negative attitudes in some parts of pain management in children (see table 3). These ideas included: children who can be distracted from pain usually do not have severe pain; observable changes of vital signs must be relied upon to verify a child's statement that he/she has severe pain; after an operation, if the child seems to rest in

bed with no body movement, it means that the child has no post-operative pain; if the source of pain is unknown, a pain drug should not be used during the pain evaluation period because this could mask the ability to correctly diagnose the cause of pain; and non-drug interventions (such as heat, music, imagery, touch) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.

This study clearly points to the fact that nurses' knowledge and attitudes of pediatric pain management are dependent on certain factors. Thus length of service and experience and being up-to-date in the management of pediatric pain are very important for nurses for improving their knowledge and skill in providing care for post-operative children. In this study most of the nurses' service experience was within 11–20 years (38.71%). However, they had only worked in the pediatric area for around 1-5 months. Thus nurses might not accurately recognize how to manage children's post-operative pain.

In addition, pain as content of was not usually included in their basic nursing curriculum. Thus it is not surprising that nurses in this study have knowledge of pain management in some areas and lack of knowledge in other areas as well. These findings were similar to previous studies (Manworren, 2000; Vincent, 2005). They found that pediatric nurses had deficiencies in pain management knowledge and negative attitudes about some parts such as pain assessment, and pharmacological and non-pharmacological pain management areas. This might be because these areas of nurses' knowledge and attitudes require a deep concern for theoretical knowledge. This is so for post-operative pain, pain assessment, pain medication, and non drug interventions for pain management. This lack of concern was the reason why nurses were unable to answer correctly in these areas. Emphasis should be placed on

continuing nursing education and in service training in pain management for pediatric nurses to bring about further improvement.

Interestingly, nurses demonstrated less than optimal levels of knowledge and attitudes in some important areas of pain assessment. Their responses to some items were negative regarding pain assessment: vital signs are always reliable indicators to assess the intensity of post-operative pain (40.9%); pain assessment by behavioral observation is not appropriate for young children (43%); and physiological pain assessment is a more suitable method than behavioral and self-reporting assessment of pain in children (51.6%). These results indicated inadequate knowledge and misconceptions among nurses about appropriate pain assessment; this inhibits nurses' decision for optimal pain management during practice. This data supported the nurses' statements about perceived barriers as they had never received any education or training in pain assessment for children, and there is no pain assessment tool available in the clinical setting (Appendix K, Table 11). These reports also support the nurses' response that pain content was not included in the basic nursing curriculum, which should be designed to prepare student nurses to assess children's pain accurately (Appendix H, Table 8).

Nurses also demonstrated less than optimal levels of knowledge and attitudes in some important areas of pain medication. These included: for pediatric pain control, morphine sulphate IV (intravenous) should be given as ordered at 4-6 hourly intervals, and SOS (PRN) (55.9%); mepiridine (Pethidine) is generally not recommended for treatment of children's post-operative pain (59.1%); the nurses role during post-operative pain management is only to follow the doctors' orders (58.4%); the usual duration of action of IV morphine sulphate is 6-8 hours (59.1%); nurses

should not administer pain medication continuously during the first 24-48 hours because the child may become addicted to the drug (61.3%); and the most common side effect of morphine is respiratory distress (64.5%).

Surprisingly, the results indicated nurses' poor knowledge and misconceptions on pharmacological pain management, even though these are very important areas of knowledge for pediatric surgical nurses. These data also supported the nurses' statements about perceived barriers as they had never had any formal education or training for pain medication (Appendix K, Table 11). Thus nurses need to be educated in pain medication area in order to effectively manage pain in post-operative children.

In summary, the findings of this study revealed that there were deficiencies and inconsistencies in the nurses' knowledge and attitudes concerning post-operative pain management in children. For further improvement, emphasis should be made on providing in-depth information on pediatric pain assessment, and pharmacological and non-pharmacological pain management for pediatric nurses. Emphasis should also be given to including pediatric pain content, including pharmacological and non-pharmacological pain management, in the basic and bachelor nursing curriculums in Bangladesh. However, education is only the first of many steps. While pain management is frequently found to be insufficient in the existing literature, there is no way whereby formal organizations can undertake initiatives to change this situation. Organizational systems, standards, policy and protocol must ensure that all health care providers, not only nurses, are accountable in prioritizing promoting effective measures for the management of post-operative pain.

Institutional commitment, goals and processes, plus national initiatives are vital for effective practice in pain management (Brown et al., 1999; Hamilton & Edgar, 1992).

Nurses' Pain Management Practice

Overall, nurses' pain management practice in dealing with children's pain management was at the moderate level ($M = 78.16\%$, $SD = 6.51$, minimum = 66.32% and maximum = 98.95%). This result is congruent with previous studies (Broom et al., 1996; Clarke et al., 1996). They found that nurses had knowledge deficits and also negative attitudes which, in turn, led to nursing practices only at the moderate level.

An analysis of the five ranking orders of constantly perform pain management practice was undertaken. This was found that the five highest ranking orders of constant performance were: 1) after surgery, you suggest to children to tell the nurse when they are in pain (80.6%); 2) you administer pain medication to children as ordered by doctors around the clock (76.3%); 3) after surgery, you provide comfortable positions to help relieve pain in children (75.3%); 4) you ask and help children to identify and support the painful area when moving or coughing after surgery (74.02%); and 5) you observe the side effects of pain medication (such as Morphine) after giving it to the child (72%) (Table 5). It is clear that nurses constantly asked children to tell the nurses when they were in pain. Furthermore, nurses constantly used non-pharmacological pain management in helping relieve the child of pain. However, nurses still administered pain medication only by following doctors' order.

In contrast, nurses reported that there were methods they rarely practiced in providing care for children who had post-operative pain. These included: 1) you administer pain medication to children by using your own judgments (75.3%); 2) you use a self-reporting pain scale (such as VAS, FACE scale) for assessing children's pain in your practice (66.6%); 3) you use a behavioral pain scale (such as FLACC) for assessing children's pain in your practice (61.3%) (Table 5). These results supported whether nurses provided pain medication to children depended only on doctor's orders around the clock. Moreover, a few nurses (19.4%) constantly provided pain addictive medication to relieve pain when children needed PRN or SOS, which the doctor had prescribed. Thus, children might not get enough pain medication to reduce their post-operative pain if nurses provided pain medication using their own judgment without asking children whether they were in pain or not.

In addition the results showed that nurses' rarely used pain assessment scales when assessing children's post-operative pain. Furthermore, nurses' responses to the open-ended questions stated that there was no pain assessment scales used in the clinical setting. This point to the fact that nurses might over or under estimate children's pain which, in turn, meant children might not get enough pain medication to reduce their pain. This finding of the study is similar to previous studies (Alam et al., 2008; Broom et al., 1996; Clarke et al., 1996). Previous researchers found that only a half of nurses use self-reporting pain scales to assess children's pain; and only half of them administered pain drugs PRN basis to manage children's pain. Furthermore, the administration of post-operative analgesia was erratic, inconsistent and deviated from recommended standards that were in accord with modern concepts. These data also indicated that pediatric nurses managed children's pain at less than

optimal levels, which, meant children were still suffering from post-operative pain unnecessarily. This finding emphasizes the need to improve pain assessment practices by nurses in Bangladesh.

This findings of this study revealed that nurses provided pain medication to relieve children's post-operative pain by following doctors' orders. In addition, when it was necessary to administer pain drugs to the children after operations, these drugs were not always available or to hand. This was because of insufficient drug supplies in hospitals or sometimes relatives were unable to purchase the drugs because of lack of money. This indicates insufficient administration of pain medication and inappropriate management of children's post-operative pain. This supports a previous study (Jacob & Puntillo, 1999). They found that from 17%-56.8% of all prescribed medications were not administered in the 24 hours period after operation. Furthermore, the charts studied did not provide evidence for an evaluation of the effectiveness of pain drugs administered. This might be the result of the unavailability of pain drugs in clinical settings. It might also be because of the lack of nurses' knowledge in pain medication whereby children get less pain medication than they need. This finding emphasizes that Bangladeshi nurses need to be improved in their pharmacological pain management practices in order to manage the pain of post-operative children effectively.

It is apparent that nurses sometimes used non-pharmacological techniques in helping reduce pain in the child. These include talking to the child with a soft voice, providing comfortable positions, supporting the painful area during movement or coughing, and arranging a calm and quiet environment. However, these methods were used for limited times and without standard methods. Nurses also

reported that they did not have enough time to provide non-pharmacological techniques because of their work load. In addition, they could not provide a quiet environment for post-operative children because wards remain overcrowded all the time. In addition, they had no basic education on non-pharmacological pain management. These findings are consistent with a previous study (Clarke et al., 1996). Clarke stated that from 90% of nurses' documentation it was found that there was no evidence of them using non-pharmacological interventions for pain relief. Thus nurses still need to be educated on the topic of non-pharmacological techniques in order to help reduce children's pain effectively.

This study suggests that pediatric nurses should become more aware of the effectiveness of administering pain medication and using of standardized tools to assess children's pain during their pain management practices. More emphasis needs to be placed on educating nursing students as well as nursing staff regarding post-operative pain management. This must be done by including the pain as content in basic and bachelor nursing curriculums and in-service training. It also emphasizes the need to arrange clinical learning in order to enhance practical skills in the real situation.

The Relationship between Nurses' Knowledge and Attitudes, and Pain Management Practices

The relationship between nurses' knowledge and attitudes ($M = 66.79$, $SD = 9.88$), and pain management practices ($M = 78.16$, $SD = 6.51$) in this study was not correlated ($r = .014$, $p = .89$). This result might be because of the questionnaires which were quite long and not specific in terms of asking about nurses' knowledge

and attitudes regarding the pediatric post-operative pain management. The findings of this study do not fully meet the research hypothesis. This was that there is a positive relationship between nurses' knowledge and attitudes, and the practices of nurses regarding post-operative pain management. This is consistent with the study conducted by Foster and Hester (1990). This suggests that the instrument used for assessing nurses' knowledge and attitudes, and their pain management practices, should be further refined in order to develop a more specific questionnaire.

In the present study, nurses demonstrated they still have poor attitudes about post-operative pain management. In addition, nurses in Bangladesh administer pain medication to help the child reduce pain by following the doctors' orders around the clock. They assess levels of pain with their own judgment and without pain assessment tools, and sometimes provide non-pharmacological technique without using standard methods. Furthermore, there is no pain content studied in the nursing curriculum. They thus learn pain content and its related practice by imitating the doctors' activities without searching for up-dated knowledge from published articles, books, or the internet. This lack of knowledge of pain management and poor attitudes to pain management combine together to adversely affects practices.

The Barriers to Optimal Pain Management Practices Perceived by Nurses

Overall, the nurses demonstrated the barriers to optimal pain management practices for post-operative children in Bangladesh. The top five barriers reported by nurses to optimal pain management in children in their practice were: there was no pain assessment scale in the hospital (93.4%); nurses have poor knowledge of pain assessment; there is no pain content in the nursing curriculum and

no formal education or training for pain management (92.5%); nurses have poor knowledge about pain drugs and calculating doses because they have never received training or formal education in pain drugs and pharmacology (88.2%); nurses have no idea or poor knowledge about non-drug intervention for pain management (68.8%); and there are no non-pharmacological pain management methods or materials for use in the ward to manage children's pain (61.2%). The barriers reported by nurses in this study are mostly similar to a previous study (Vincent, 2005). This finding indicates that nurses need to be educated in order to improve their knowledge and attitudes. In addition, the findings of this study suggest that further continuing education and in-service training is needed for nurses. This might trigger appropriate pain management practices on the part of pediatric nurses in Bangladesh.

Overall, the nurses' knowledge and attitudes, and pain management practices were at a moderate level. In addition, there was no correlation between nurses' knowledge and attitudes, and pain management practices. It was also found that there were two top perceived barriers identified by pediatric nurses. One was the absence of pain assessment tools in the clinical setting. The second was the inadequate preparation of Bangladeshi nurses in the area of pain assessment and pain management. These findings were seen as the major obstacles for optimal pain management in post-operative children in the context of Bangladesh. Thus nurses need to be educated in order to improve their knowledge and skill about pain. This would be possible only if nurses possessed high levels of knowledge, positive attitudes, and the skills needed for pain management practices so they could provide effective care to post-operative children. This study should be used as evidence to promote further educational efforts in order to eradicate some of myths,

misconceptions and attitudes that negatively affect nurses' decisions about pain management in children. The use of age appropriate pain assessment tools is essential for the effective pain management of pediatric nurses. In addition, this study suggests the need for the development of nursing science and future research in the area of pediatric pain management nursing in the context of Bangladesh.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

This chapter reports the conclusion and the strengths and limitations of the study. Finally, the implications and recommendations for nursing education, nursing practice, nursing administration and nursing research are presented.

Conclusion of the Study

A descriptive survey study was conducted to identify nurses' knowledge and attitudes, and practices regarding post-operative pain management in children. The relationship between nurses' knowledge and attitudes, and pain management practices in the context of Bangladesh were also examined. Ninety three pediatric surgical nurses were recruited from three tertiary level hospitals in Bangladesh. Data were collected by providing a self directed questionnaire from November 2009-January 2010. The data collected were analyzed by using descriptive statistics and the Pearson product moment correlation. Data about barriers were analyzed by using content analysis.

The study findings revealed moderate levels of nurses' knowledge and attitudes ($M = 66.79\%$, $SD = 9.88$, minimum = 46.67% and maximum = 88.89%), and also a moderate level of practices ($M = 78.16\%$, $SD = 6.51$, minimum = 66.32% and maximum = 98.95%). The findings established no relationship between nurses' knowledge and attitudes, and practices of post-operative pain management in children. Several obstacles were identified by nurses that create barriers to optimal pain management. These included: there was no pain assessment scale used in the

hospitals; there was limited knowledge of pain assessment and pain management; there was limited knowledge of pain drugs and the calculation of doses, there were insufficient doctor's prescriptions for pain drugs, and nurses were not allowed to administer pain drugs independently.

The Strengths and Limitations

The strength of this study firstly lies in the number of study subject and the high rate of return of the questionnaires; these indicated that the samples were representatives of the population. Secondly, the study was conducted at the same level in three medical college hospitals where all subjects in this study practiced similar post-operative pain management. These strengthened the homogeneity of the study sample and helped to ensure that study findings were more representatives of the study population. Thirdly, the study used a valid and reliable instrument which made the study data valid and reliable. Finally, the instruments consisted of both open and close-ended questions. The answers obtained through these two methods enriched the data and complemented each other and enhanced the validity of the findings.

Despite these strengths, this study had several limitations. One limitation of this study was that the subjects were recruited from only government medical college hospitals. Thus the results of this study may not be representative of the pediatric surgical nurses from private medical college hospitals and other non-government hospitals in Bangladesh. Another limitation was that all the study subjects were female. Thus, the results of the findings might be limited in applying them to the male nurses working in pediatric surgical wards in other medical college hospitals in Bangladesh. A major limitation was that the findings of this study might have been

influenced by subjects' response bias because of the self-reporting nature of the questionnaire. The subjects might not give accurate responses about their practice because of the way they might reflect on nurses. However, nurses' knowledge, attitudes, and practices are not totally different. Thus the results of this study may well reflect the nurses' real knowledge, attitudes and practice.

Implications and Recommendations

The findings of this study provide several insights and implications for nursing education, nursing practice, nursing administration and future research in pediatric pain management nursing in the context of Bangladesh.

In nursing education.

The findings of this study show that nurses working in government hospitals in Bangladesh are not aware of up-to-date knowledge based on current literature and research related to pediatric post-operative pain management. Accordingly, this is reflected in their practice. The nursing profession is the cornerstone for providing effective pain management. However, many of the nurses in this study were unprepared for providing care for pain management in post-operative children. Thus knowledge about pain, pain assessment, pharmacological and non-pharmacological pain management should be added as content to the curriculums for basic and bachelor nursing students.

In nursing practice.

In Bangladesh, nurses mainly concentrate on administering pain medication according to doctors' order rather than considering or collaborating with others about pain management approaches. This study's finding also shows that

pediatric surgical nurses' pain management practices are deviate surprisingly from standard practices for pain assessment and pain management. The study findings suggest that in-service-education and training in pediatric pain management is necessary for pediatric nurses in Bangladesh. Education and training must involve in-depth knowledge of pain, pain assessment, pharmacological, and non-pharmacological pain management for pediatric nurses. In addition, the findings suggest that pain assessment tools be available. Pediatric nurses could then use them routinely for assessing children's pain which, in turn, would contribute to improving the quality of pain management practice. Finally, it is recommended that pharmacological and non-pharmacological methods be applied in combination to facilitate pain management methods in relieving children's pain during clinical practice.

In nursing administration.

This study provides some valuable information regarding nurses' knowledge, attitudes, and pain management practices. These impacts on the quality of nursing care regarding pediatric pain management in Bangladesh. However, there are few research papers in the field of pediatric pain management nursing in Bangladesh. This might be the first research on pediatric pain management area of nursing in Bangladesh. The findings of this study should be a basis for future planning and policy making at the local level as well as the national level of nursing administration in Bangladesh.

In nursing research.

The findings of this study show the existing levels of nurses' pain management knowledge and attitudes, and how Bangladeshi nurses assess and

manage children's post-operative pain in their clinical practice. The barriers to pediatric post-operative pain management in children have also been shown. Further qualitative and experimental research in the specific area of post-operative pain management and pediatric pain management in nursing is needed and recommended. Thus it is hoped that knowledge of pain in pediatric care in the context of Bangladesh will be extended in the future.

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APPENDICES

Appendix A

Sample Size Estimation

Sample size estimation by Power Analysis as Estimated Population Correlation

The approximate sample size for this study = 88.

Selected level of Power (β) = .80

Alpha (α) = .05

Effect size .30

Estimated population correlation coefficient (r)										
Power	.10	.15	.20	.25	.30	.40	.50	.60	.70	.80
.60	489	218	123	79	55	32	21	15	11	9
.70	616	274	155	99	69	39	26	18	14	11
.80	785	349	197	126	88	50	32	23	17	13
.90	1050	468	263	169	118	67	43	30	22	17
.95	1297	577	325	208	145	82	53	37	27	21

(Polit & Beck, 2008, p 605)

Appendix B

Permission Letters for use and Modify of Instruments

Permission Letter from Catherine Vincent

From: Catherine Vincent <vincentc@uic.edu>
To: Mdsazzad Hossain <mdsazzadh@yahoo.com>
Sent: Thursday, June 11, 2009 12:53:09 AM
Subject: Re: Asking permission to use instrument

Dear Md Sazzad Hossain

Thank you for your inquiry. I am happy to send you a copy of the instrument that I used for the study. It is attached with a key. It appears that you have read my paper published in MCN The American Journal of Maternal Child Nursing, 30, 177-183. There is another paper you may be interested in-Vincent, C. V. & Denyes, M. J. (2004). Relieving children's pain: Nurses' abilities and analgesic practices. Journal of Pediatric Nursing, 19, 40-50 (available online).

As you know from reading the MCN article, my knowledge and attitudes instrument is a modification of Ferrell and McCaffery's Nurses' Knowledge and Attitudes Survey Regarding Pain (NKAS). Since the conduction of my research study, Renee Manworren also has developed a tool for pediatric pain modified from the NKAS. Her version, the Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain (PKNAS) has been more extensively used than the tool that I used. You may want to review her publications or contact her directly (you can find her contact information on the Web). She has two articles about the tool that you can find in Pediatric Nursing, 2000 and 2001.

In regard to your question about my dissertation, I believe that you can purchase dissertations online but I am not sure about where. A Google search should help you find the site.

Good luck with your project.

Catherine Vincent, RN, PhD

Assistant Professor
Department of Women, Children, and Family Health Science (MC 802)
College of Nursing
University of Illinois at Chicago
845 South Damen Ave, Room 854
Chicago IL 60612-7350
FAX (312) 355-3283, (312) 996-8871 , vincentc@uic.edu

Permission Letter from Marion E. Broome

From: "Broome, Marion E" <mbroome@iupui.edu>
To: Mdsazzad Hossain <mdsazzadh@yahoo.com>
Sent: Tuesday, August 11, 2009 4:40:00 AM
Subject: RE: Asking permission to see questionnaire

Ms. Hossain,

I published that paper and would be happy to scan it and send to you if that is what you mean. It was not my dissertation just a study we did and published. Do you have a copy of the instrument?

I am glad to help however I can.

Marion

Marion E. Broome, Ph.D., R.N. FAAN
Dean and Distinguished Professor
Indiana University School of Nursing
Editor, Nursing Outlook, Official Journal of the American Academy of Nursing
317-274-1486 (phone)
317-278-1842 (fax)

Appendix C

Research Instruments

“Survey Questionnaire for Pediatric Nurses’ Knowledge and Attitudes, and Pain Management Practices of Post-Operative Children”

Thank you for giving time to help me with this aspect of my Masters study. Your investment of time will help me to improve the understanding and management of pediatric post-operative pain in Bangladesh perspective.

The attached questionnaire has 4 parts. There are 13 items in part 1; 45 items in part 2; 19 items in part 3; and 4 items of open-ended questions in part 4. It will take approximately 30-40 minutes to complete the questionnaire. This is not a test, but it is very important for my study that you provide information by completing these questionnaires. Please answer the entire questionnaires individually and independently so that the information analyzed will be accurate and valid.

Part 1: “Demographic Characteristics of Nurse-Participants”

Direction: Please mark “X” in the box that is appropriate for you

1. Age - 20 - 29 years 30 - 39 years 40 - 49 years 50 - 59 years
2. Gender- Male Female
3. Religion - Islam Hindu Buddhist Christian
4. Duration of nursing service in year
5. Duration of service in pediatric post-operative area
 1-5 months 6 – 11 months 1- 5 Years
 6 – 10 years 11 - 15 years More than 16 years
6. Are you currently working in pediatric post-operative area?
 Yes No
 If no, please answer the question no 7. If yes, please leave the question no 7
7. How long had you been working in pediatric post-operative area?
 1 – 3 month 4 – 6 month 7 – 9 month 10 – 12 month
8. Educational qualification in nursing
 Diploma Bachelor in Nursing Science (B Sc)
 Master in Nursing Science (M Sc) Others (Please specify)
9. Current position in nursing
 Ward In-charge (Head nurse) Staff Nurse
 Senior Staff Nurse Nursing Supervisor
10. Do you provide direct nursing care to post-operative children?
 Yes No Rarely
11. How often do you read nursing journal?
 Monthly Quarterly Once a year
 Never Other
12. Is there pediatric pain management contents included in nursing curriculum when you studied?
 Yes No Not sure
13. Are there any pain management standards or protocols in your hospital?
 Yes No Not sure

Part 2: “Survey Questionnaire for Nurses’ Knowledge and Attitudes on Pediatric Pain Management”

Direction:

Please circle the correct answer (for example, children can run at one year T (F))

- T F 1. Usually children perceive pain less than adults
- T F 2. When children get pain, this will be reduced or disappear immediately and spontaneously
- T F 3. The nurse is the best one who can tell the children’s feelings of pain
- T F 4. Nurses’ knowledge and understanding of post-operative pain management can make them more able to manage the pain better
- T F 5. Based on cultural or spiritual beliefs, children or their parents may think that pain and suffering is necessary
- T F 6. If children experience pain frequently and over long periods, there is no effect on the development of children
- T F 7. The impacts of unrelieved post-operative pain on physiological aspects include muscle tension and chest wall compliance
- T F 8. Previous pain experience cannot increase a child’s current post-operative pain
- T F 9. The experience of pain will affect the psychological, neurological and personal development of a child
- T F 10. Each pediatric patient will experience specific post-operative pain differently
- T F 11. The cause of post-operative pain is tissue injury
- T F 12. After operations, if the children have severe pain, they may show abnormality in vital signs
- T F 13. Lethargy and discomfort after operations will lead to increased pain
- T F 14. Fear and anxiety about separation from parents will lead to increased pain
- T F 15. During the post-operative period, children may cry from many causes, not only from surgical wounds

Part 2 (continued)

- T F 16. Pain assessment by behavioral observation is not appropriate for young children
- T F 17. Children can use self-report to identify their pain intensity by themselves
- T F 18. Children may sleep in spite of severe pain
- T F 19. Pain should be assessed before and after administering pain drugs
- T F 20. Children who can be distracted from pain usually do not have severe pain
- T F 21. After an operation, if the child seems to rest in bed with no body movement, it means that the child has no post-operative pain
- T F 22. Vital signs are always reliable indicators to assess the intensity of post-operative pain
- T F 23. Physiological pain assessment is a more suitable method than behavioral and self-reporting assessment of pain in children
- T F 24. Assessment of school aged children's pain by self-report is more reliable than physiological assessment
- T F 25. The nurse's role during post-operative pain management is to only follow the doctors' orders
- T F 26. Observable changes of vital signs must be relied upon to verify a child's statement that he/she has severe pain
- T F 27. Most of the children over 6 years of age can express feelings of pain clearly
- T F 28. Usually less than 10% of children over-report their pain
- T F 29. Appropriate assessment of pain is the first priority for effective pain management in the post-operative period
- T F 30. The usual duration of action of IV morphine sulphate is 6-8 hours
- T F 31. For pediatric pain control, morphine sulphate IV should be given as ordered at 4-6 hourly intervals and S O S (PRN)

Part 2 (continued)

- T F 32. Acetaminophen and non-steroidal anti-inflammatory agents are effective analgesics for children's post-operative pain
- T F 33. The most common side effect of morphine is respiratory distress
- T F 34. Initially post-operative analgesics should be given around the clock on a fixed schedule
- T F 35. The side effects of narcotics should be observed at least 20 minutes after administration
- T F 36. After the initial recommended dose of opioid analgesic, the subsequent doses should be adjusted according to the individual patient's response
- T F 37. Meperidine (Pethidine) are generally NOT recommended for the treatment of children's post-operative pain
- T F 38. Nurses should not administer pain medication continuously during the first 24-48 hours because the child may become addicted to drugs
- T F 39. Non-drug interventions (such as heat, music, imagery, touch) are very effective for mild-moderate pain control but are rarely helpful for more severe pain
- T F 40. Allowing parents to be with and participate with the child during invasive procedures or after surgery will help to reduce the child's pain
- T F 41. Distracting children by using music or story telling during invasive procedures will help decrease children's pain
- T F 42. Beyond a certain dosage of strong opioids (morphine), increases in dosage does not increase the pain relief
- T F 43. During the caring of pediatric patients, providing comfort and positioning them may help to reduce muscle tension which, in turn, can reduce pain
- T F 44. Children should be advised to use non-drug techniques along with pain medication.
- T F 45. If the source of pain is unknown, a pain drug should not be used during the pain evaluation period because this could mask the ability to correctly diagnose the causes of pain

Part 3: “Survey Questionnaire for Pediatric Pain Management Practices of Nurses”

Direction: Please circle the answer to show what you usually do in a reality in your nursing practice.

For example, if the child has a high temperature, you will apply a tepid sponge immediately. If you do this frequently you can put the circle around 4.

5	<input checked="" type="radio"/> 4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

1. After surgery you observe behavioral change in children (such as being awake, crying, limited body movement, withdrawal, agitation, or not talking) in order to assess their pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

2. After surgery, you observe physiological change in children (such as BP, respiration rate, heart rate, body temperature, or O2 saturation) in order to assess their pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

3. After surgery, you assess children’s pain at least once a shift

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

4. You use self-reporting pain scale (such as VAS, FACE scale) for the assessment of children’s pain in your practice

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

5. You use a behavioral pain scale (such as FLACC) for assessment of children’s pain in your practice

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

Part 3 (continued)

6. You administer pain medication to children as ordered by a doctor around the clock

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

7. You observe the side effects of pain medication (such as Morphine) after giving it to the child

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

8. You observe the following side effects such as respiratory distress, urticaria, nausea, vomiting if a child receive opioids drug (Morphine)

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

9. You administer pain medication to children by your own judgment

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

10. You administer additional pain medication to relieve pain when needed (PRN or SOS)

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

11. You reassess children's pain after giving pain medication in order to evaluate the effectiveness of pain medication

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

12. After surgery, you distract children from pain by using several techniques (such as giving them toys for playing, listening to music, telling stories, touching them)

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

Part 3 (continued)

13. After surgery, you talk with children with a soft voice to comfort them when they are in pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

14. After surgery, you arrange the environment to be calm and quiet in order to help children sleep easily

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

15. After surgery, you advise and give opportunities to parents to help reduce their children's pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

16. After surgery, you ask parents to be involved in assessing their children's pain (such as asking children if he/she has pain by using familiar words and language)

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

17. After surgery, you provide comfortable positions to help relieve children's pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

18. After surgery, you tell children to tell the nurse when they are in pain

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

19. You ask and help children to support the painful areas when moving or coughing after surgery

5	4	3	2	1
Constantly	Frequently	Occasionally	Infrequently	Never

Part 4: “Open Ended Questions for Asking Barriers to Optimal Pain Management”

Direction: Please feel free to fill out the barriers that you find during managing children’s pain in your clinical setting

1. What are the barriers you find in assessing pain in children?
 - a)
 - b)
 - c)
 - d)
 - e)

2. What are the barriers you find in giving pain medication to children?
 - a)
 - b)
 - c)
 - d)
 - e)

3. What are the barriers you find in providing non-drug intervention in managing children’s pain?
 - a)
 - b)
 - c)
 - d)
 - e)

4. What are the other barriers that you find in managing children’s pain?
 - a)
 - b)
 - c)
 - d)
 - e)

Please return this questionnaire to investigator immediately after completion

THANKS FOR YOUR CO OPERATION

Appendix D

Validation of the Instrument Check

The content validity of the newly developed questionnaire was determined by four consulting experts. Three experts were from Thailand, and one expert was from Bangladesh. They are listed:

1. Dr. Wongchan Petpichetchian
Assistant Professor, Department of Surgical Nursing,
Faculty of Nursing, Prince of Songkla University,
Thailand.
2. Dr. Luksamee Chanwas
Assistant Professor, Department of Anesthesia,
Songklanagarind Hospital,
Thailand
3. Ms. Pikul Ratt Somporn
Head Nurse, Pediatric Surgical Ward,
Songklanagarind Hospital, Hatyai,
Thailand.
4. Dr. Tahmina Banu
Professor and Head, Department of Pediatric Surgery,
Chittagong Medical College and Hospital
Bangladesh.

Appendix E

Back Translation of the Instrument

Three persons worked on back translation of the instrument
“Survey Questionnaire for Pediatric Nurses Knowledge and Attitudes, and Pain
Management Practices of Post-Operative Children”

They are listed:

1. Mrs. Rubi Dutta
Lecturer, College of Nursing,
Chittagong,
Bangladesh.

She was translated the questionnaire from English to Bengali version.

2. Mr. Sanjib Kumar Dey
Assistant Professor, Department of English
Chittagong Government College, Chittagong,
Bangladesh.

He was translated the questionnaire from Bengali to English version.

3. Dr. M. Enamul Hakim
Assistant Professor (Vascular Surgery)
National Institute of Cardiovascular Diseases and Hospital
Dhaka, Bangladesh.

He checked the linguistic discrepancies both the original English version questionnaire and the back translated English version questionnaire.

Appendix F

Approval Letters from IRB, PSU, Thailand

**FACULTY
OF NURSING**



PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
SONGKHLA, THAILAND, 90112
FAX NO. 66-74-212901
TEL. NO. 66-74-286456,
66-74-286459

MOE 0521.1.05/3491

October 24, 2009

To
Director Dhaka Medical College Hospital, Dhaka,
Bangladesh,

Dear Sir,

This letter is to inform you that Mr. Md. Sazzad Hossain, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in his last semester. As passed of the requirement of the course, he has to conduct a research study in Bangladesh. His thesis entitled: "Nurses' Knowledge and Attitude, and Pain Management Practices of Post-Operative Children in Bangladesh." Under the supervision of Asst. Prof. Dr. Wantanee Wiroonpanich. The thesis proposal has been approved on 29 September 2009. Therefore, he will collect data from nurses at Dhaka Medical College Hospital, Dhaka, Bangladesh. During 1 month (November – December, 2009)

I will be greatly appreciated if Mr. Md. Sazzad Hossain is permitted to collect his data in your hospital, as it will provide valuable information for Pediatric Nursing to enhance nurses' competence in this particular area.

If you need any further information regarding his study, please do not hesitate to contact us at the above address or e-mail us at: wantanee.w@psu.ac.th. as his advisor.

Sincerely Yours,

Sang-arun

Assistant Professor Sang-arun Isaramalai, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND

FACULTY
OF **NURSING**



PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
SONGKHLA, THAILAND, 90112
FAX NO. 66-74-212901
TEL. NO. 66-74-286456,
66-74-286459

MOE 0521.1.05/3499

October 26, 2009

To
Director Sir Salimullah Medical College Hospital, Dhaka,
Bangladesh,

Dear Sir,

This letter is to inform you that Mr. Md. Sazzad Hossain, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in his last semester. As passed of the requirement of the course, he has to conduct a research study in Bangladesh. His thesis entitled: "Nurses' Knowledge and Attitude, and Pain Management Practices of Post-Operative Children in Bangladesh." Under the supervision of Asst. Prof. Dr. Wantanee Wiroonpanich. The thesis proposal has been approved on 29 September 2009. Therefore, he will collect data from nurses at Sir Salimullah Medical College Hospital, Dhaka, Bangladesh. During 1 month (November - December, 2009)

I will be greatly appreciated if Mr. Md. Sazzad Hossain is permitted to collect his data in your hospital, as it will provide valuable information for Pediatric Nursing to enhance nurses' competence in this particular area.

If you need any further information regarding his study, please do not hesitate to contact us at the above address or e-mail us at: wantanee.w@psu.ac.th. as his advisor.

Sincerely Yours,

Assistant Professor Sang-arun Isaramalai, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND



**FACULTY
OF NURSING**



PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
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TEL. NO. 66-74-286456,
66-74-286459

MOE 0521.1.05/๖๔๑๖

October ๒๖ , 2009

To
Director Chittagong Medical College Hospital, Chittagong,
Bangladesh,

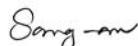
Dear Sir,

This letter is to inform you that Mr. Md. Sazzad Hossain, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in his last semester. As passed of the requirement of the course, he has to conduct a research study in Bangladesh. His thesis entitled: "Nurses' Knowledge and Attitude, and Pain Management Practices of Post-Operative Children in Bangladesh." Under the supervision of Asst. Prof. Dr. Wantanee Wiroonpanich. The thesis proposal has been approved on 29 September 2009. Therefore, he will collect data from nurses at Director Chittagong Medical College Hospital, Chittagong, Bangladesh. During 1 month (November – December, 2009)

I will be greatly appreciated if Mr. Md. Sazzad Hossain is permitted to collect his data in your hospital, as it will provide valuable information for Pediatric Nursing to enhance nurses' competence in this particular area. .

If you need any further information regarding his study, please do not hesitate to contact us at the above address or e-mail us at: wantanee.w@psu.ac.th. as his advisor.

Sincerely Yours,



Assistant Professor Sang-arun Isaramalai, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND



Appendix G

Permission Letters from Hospital Directors

Dhaka Medical College Hospital, Bangladesh

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিচালকের দপ্তর
ঢাকা মেডিকেল কলেজ হাসপাতাল, ঢাকা।

স্মারক নং ঢামেকহা/সেবা-০১/

তারিখঃ /০১/২০১০ ইং

প্রতিঃ

অধ্যাপক

ও

বিভাগীয় প্রধান, শিশু সার্জারী বিভাগ, ঢাকা মেডিকেল কলেজ হাসপাতাল, ঢাকা।

বিষয়ঃ Prince of Songkla University MSC Nursing Student জনাব-মো:সাজ্জাদ হোসেন
শিশু সার্জারী ওয়ার্ডে Nurses knowledge and Attitudes and Pain Management
Practice রিচার্স এর ডাটা সংগ্রহের অনুমতি প্রসঙ্গে।

সূত্র নং এমওই/০৫২১.১.০৫/৩৪৯১ তারিখ-২৮/১১/০৯ইং

উপর্যুক্ত বিষয়ও সূত্র মোতাবেক Prince of Songkla University MSC Nursing Student
জনাব-মো:সাজ্জাদ হোসেন আপনার শিশু সার্জারী ওয়ার্ডে Nurses knowledge and Attitudes and
Pain Management Practice রিচার্স এর ডাটা সংগ্রহের অনুমতি প্রদান করা হইল। (ইহাতে পরিচালক
মহোদয় সদয় অনুমতি রহিয়াছে)

উপ-পরিচালক
ঢাকা মেডিকেল কলেজ হাসপাতাল

স্মারক নং ঢামেকহা/সেবা-০১/ ৩৭৩/১৮৪

তারিখঃ ০১/০১/২০১০ইং

অনুলিপি অবগতির জন্য প্রেরণ করা হইল :-

০১। সহকারী রেজিষ্টার, শিশু সার্জারী ওয়ার্ড, ঢাকা মেডিকেল কলেজ হাসপাতাল, ঢাকা।

০২। সেবা তত্ত্বাবধায়ক, ঢাকা মেডিকেল কলেজ হাসপাতাল, ঢাকা।

০৩। ওয়ার্ড ইনচার্জ, ৩৫বি নং ওয়ার্ড, ঢামেকহা।

০৪। জনাব মো:সাজ্জাদ হোসেন MSC Nursing Student Prince of Songkla University Thailand.

০৫। যথাযথ নথি।

সহকারী পরিচালক(প্রশাঃ)
ঢাকা মেডিকেল কলেজ হাসপাতাল

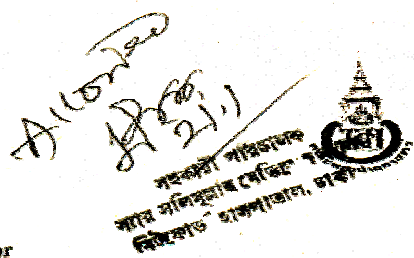
Sir Salimullah Medical College Hospital, Bangladesh

To
Director
S. S. Medical College Hospital
Mithora,
Bangladesh.

Through proper channel.
Subject: Prayer for permission of data collection for research.

Sir

My name is Mdi Sazzad Hossain, Master of Nursing Student (International



Duty No. 268
Date: 21/11/22
Director: 7. 2011
Dr. Director: [Signature]
A. U. Khan, M.B.B.S.
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Appendix H
Nurses' Demographic Data

Table 8

Demographic Characteristics of Nurses (N = 93)

No	Subjects' characteristics	<i>n</i>	%
1.	Subjects' age		
	20 - 29 years	2	2.2
	30 - 39 years	43	46.2
	40 - 49 years	37	39.8
	50 - 59 years	11	11.8
2.	Gender		
	Male		
	Female	93	100
3.	Religion		
	Islam	45	48.4
	Hindu	42	45.2
	Buddhist	3	3.2
	Christian	3	3.2
4.	Duration of Nursing Service		
	6 - 10 years	29	31.9
	11- 20 years	36	38.7
	> 21 years	28	30.1

Table 8 (continued)

No	Subjects' characteristics	<i>n</i>	%
5.	Duration of Service in Pediatric Area		
	1 - 5 months	35	37.6
	6 months - 11 months	30	32.2
	1 - 5 years	22	23.7
	6 - 10 years	6	6.5
6.	Currently Working in Pediatric Post-Operative Area		
	Yes (currently working)	39	41.9
	No (currently working in other ward)	54	58.1
7.	How Long Before Working at Pediatric Post-Operative Area		
	1 - 5 months	30	32.3
	6 months - 11 months	19	20.4
	1 - 5 years	5	5.4
8.	Educational Qualification in Nursing		
	Diploma in Nursing	75	80.6
	B Sc in Nursing	15	16.2
	M Sc in Nursing	3	3.2
9.	Provide Direct Nursing Care to Post-Operative Children		
	Yes	36	38.7
	No	48	51.6
	Not Sure	9	9.7

Table 8 (continued)

No	Subjects' characteristics	<i>n</i>	%
10.	Current Position in Nursing		
	Ward Incharge	10	10.8
	Staff Nurse	12	12.9
	Senior Staff Nurse	63	67.7
	Nursing Supervisor	8	8.6
11.	Reading Nursing Journal		
	Monthly	3	3.2
	Quarterly	5	5.4
	Yearly	25	26.9
	Never	59	63.4
	Other	1	1.1
12.	Pediatric Pain Content Included in Nursing Curriculum		
	Yes	8	8.6
	No	65	69.9
	Not sure	20	21.5
13.	Having Pain Management Standard or Protocol in Hospital		
	Yes	17	18.3
	No	55	59.1
	Not sure	21	22.6

Appendix I

Nurses' Knowledge and Attitudes Data

Table 9

Frequency and Percentage of Nurses' Knowledge and Attitudes on Pain Management

(N = 93)

Knowledge and attitudes statement	n	%
During post-operative period, children may cry for many causes, not only from surgical wound	92	98.9
Pain should be assessed before and after administer pain drugs	90	96.8
Each pediatric patient will have specific post-operative pain differently	89	95.7
The child should be advised to use non drug techniques along with pain medication.	89	95.7
Nurses' knowledge and understanding of post-operative pain management can make them be able to better manage the pain	87	93.5
Side effects of narcotics should be observed at least 20 minutes after administration	87	93.5
Distracting children by using music or story telling during invasive procedure will help children decrease pain	86	92.5
During caring of pediatric patient, providing comfort and positioning may help to reduce muscle tension which in turn, can reduce pain	85	91.4
Appropriate assessment of pain is the first priority for effective pain management in post-operative period	85	91.4
Most of the children age over 6 years can express feelings of pain clearly	84	90.3
Fear and separation anxiety from parents will lead to increase pain	83	89.2
Initially post-operative analgesics should be given around the clock on a fixed schedule	81	87.1

Table 9 (continued)

Knowledge and attitudes statement	<i>n</i>	<i>%</i>
After operation, if the children have severe pain, they may show abnormality in vital signs	81	87.1
Lethargy and discomfort after operation will lead to increase pain	80	86.0
Allow parents to be and participate with the child during invasive procedure or after surgery will help to reduce the child's pain	76	81.7
After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted according to the individual patient's response	76	81.7
Assessment of school aged children's pain by self-report is more reliable than physiological assessment	72	77.4
If children experience pain frequently and long period, there is no effect on development of children.	70	75.3
The experience of pain will affect on psychological, neurological, and personal development of a child	69	74.2
Cause of post-operative pain is tissue injury	69	74.2
Acetaminophen and non steroidal anti inflammatory agents are effective analgesics for children's post-operative pain	69	74.2
Usually less than 10% of children over report their pain	66	71.0
The most common side effect of morphine is respiratory distress	60	64.5
Previous pain experience can not increase child's current post-operative pain	59	63.4
When children get pain, this will be reduced or disappeared immediately and spontaneously	58	62.4
Nurse should not administer pain medication continuously during the first 24-48 hours because the child may become addicted to drug	57	61.3

Table 9 (continued)

Knowledge and attitudes statement	<i>n</i>	%
Impacts of unrelieved post-operative pain to physiological aspect include muscle tension and chest wall compliance	56	60.2
The usual duration of action of IV morphine sulphate is 6-8 hours	55	59.1
Meperidine (Pethidine) are generally NOT recommended for treatment of children's post-operative pain	55	59.1
Nurse's role during post-operative pain management is to follow the doctors order only	54	58.4
Nurse is the best one who can tell the feelings of children pain	53	57.0
For pediatric pain control, morphine sulphate IV should be given as ordered 4-6 hourly and SOS or PRN	52	55.9
Physiological pain assessment is suitable method than behavioral and self-report assessment of pain in children	48	51.6
Based on cultural or spiritual belief, children or their parents may think that pain and suffering is necessary	47	50.5
Children can use self-report to identify their pain intensity by themselves	43	46.2
Usually children perceive pain less than adult	41	44.1
Pain assessment by behavioral observation is not appropriate for young children	40	43.0
Beyond a certain dosage of strong opioids (morphine), increase in doses not increase the pain relief	40	43.0
Vital signs are always reliable indicators to assess the intensity of post-operative pain	38	40.9
Children may sleep in spite of severe pain	37	39.8
Non-drug interventions (e.g. heat, music, imagery, touch) are very effective for mild-moderate pain control but are rarely helpful for more severe pain	35	37.6

Table 9 (continued)

Knowledge and attitudes statement	<i>n</i>	<i>%</i>
If the source of pain is unknown, pain drug should not be used during the pain evaluation period, because this could mask the ability to correctly diagnose the cause of pain	28	30.1
After operation, if the child seems to rest in bed, and no body movement it means that the child has no post-operative pain	26	28.0
Observable changes of vital signs must be relied upon to verify a child's statement that he/she has severe pain	25	26.9
Children who can be distracted from pain usually do not have severe pain	22	23.7

Appendix J

Nurses' Pain Management Practice Data

Table 10

Frequency and Percentage of Pain Management Practice by Nurses (N = 93)

Pain management practice statement	Constantly	Frequently	Occasionally	Infrequently	Never
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
After surgery, you suggest children to tell the nurse when they are in pain	75 (80.6)	7 (7.5)	4 (4.3)	1 (1.1)	6 (6.5)
After surgery you observe behavioral change in children (such as awake, cry, limited body movement, withdrawal, agitation, or deny to talk) in order to assess their pain	47 (50.5)	27 (9.0)	19 (20.4)	-	-
After surgery, you assess children's pain at least once a shift	44 (47.3)	38 (40.9)	8 (8.6)	1 (1.1)	2 (2.2)
After surgery, you ask parents to involve in assessing their children's pain (such as asking children if he/she have pain by using their familiar words and language)	34 (36.6)	41 (44.1)	14 (15.1)	1 (1.1)	-
After surgery, you observe physiological change in children (such as BP, respiration rate, heart rate, body temperature, or O2 saturation) in order to assess their pain	33 (35.5)	39 (41.9)	19 (20.4)	1 (1.1)	1 (1.1)
You use behavioral pain scale (such as FLACC) for assessment of children's pain in your practice	10 (10.8)	10 (10.8)	14 (15.1)	2 (2.2)	57 (61.3)

Table 10 (continued)

Pain management practice statement	Constantly	Frequently	Occasionally	Infrequently	Never
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
You use self-reported pain scale (such as VAS, FACE scale) for assessment of children's pain in your practice	7 (7.5)	9 (9.7)	14 (15.1)	1 (1.1)	62 (66.6)
You administer pain medication to children as ordered by doctor around the clock	71 (76.3)	16 (17.2)	6 (6.5)	-	-
You observe the side effect of pain medication (such as Morphine) after giving it to the child	67 (72.0)	20 (21.0)	5 (5.4)	1 (1.1)	-
You observe the following side effects such as respiratory distress, urticaria, nausea, vomiting if the child receive opioids drug (i e Morphine)	62 (66.7)	25 (26.9)	6 (6.5)	-	-
You reassess children's pain after giving pain medication in order to evaluate the effectiveness of pain medication	32 (34.4)	33 (35.5)	12 (12.9)	3 (3.2)	13 (14.0)
You administer additional pain medication to relieve pain when needed (PRN or SOS)	18 (19.4)	24 (25.8)	25 (26.9)	1 (1.1)	25 (26.9)
You administer pain medication to children by your won adjustment	4 (4.3)	6 (6.5)	11 (11.8)	2 (2.2)	70 (75.3)
After surgery, you provide comfortable position to help relieve pain for children	70 (75.3)	22 (23.7)	1 (1.1)	-	-
You ask and help children to support the painful area during moving or coughing after surgery	69 (74.2)	22 (23.7)	2 (2.2)	-	-

Table 10 (continued)

Pain management practice statement	Constantly	Frequently	Occasionally	Infrequently	Never
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
After surgery, you talk with children with soft voice to comfort them when they are in pain	60 (64.5)	25 (26.9)	5 (5.4)	-	3 (3.2)
After surgery, you advise and give opportunity for parents to help reduce their children's pain	46 (49.5)	25 (26.9)	20 (21.5)	1 (1.1)	1 (1.1)
After surgery, you distract children from pain by using several techniques (such as giving them toy for play, listening to music, telling the stories, touching them etc)	25 (26.9)	30 (32.3)	36 (38.7)	-	2 (2.2)

Appendix K

Nurses' Perceived Barriers Data

Table 11

Top Barriers Perceived by Nurses in Managing Children's Pain during Practice
(N = 93)

No	Perceived barriers for optimal pain management	<i>n</i>	%
1	There is no pain assessment tool in the hospital	87	93.4
2	Nurses' have poor knowledge in pain assessment, because there is no pain content in nursing curriculum and no formal education or training for pain management	86	92.5
3	Nurses' have poor knowledge on pain drug and their dose calculation, because they never attended in any training or formal education on pain drugs and pharmacology	82	88.2
4	Insufficient doctors' order for pain medication and duty doctors are not available in the ward all the time	69	74.1
5	Nurses can not administer any pain drug without doctors' prescription, even though a basic pain medication such as paracetamol.	67	72.2
6	I have no idea/ poor knowledge about non-drug intervention for pain management	64	68.8
7	Parents usually like to use drugs for pain management of their children other than help children to cope with pain by using non-drug intervention	58	62.3
8	There is no non pharmacological pain management methods or materials to use in the ward in order to manage children's pain	57	61.2
9	It is difficult to assess children's pain behavior when they are in fear, cry, shy or angry.	50	53.8
10	There are not enough pain medication available in the ward	49	52.7

Table 11 (continued)

No	Perceived barriers for optimal pain management	<i>n</i>	%
11	Nurses can not make the environment quiet for post-operative children, because it remain overcrowded all the time	33	35.4
12	Children hide their pain experience because they afraid to get shot (injection).	30	32.2
13	Nurses can not administer pain medication when children feel fear or cry a lot to receive pain medication	23	24.7
14	Nurses don't have enough time to provide non pharmacological pain management because of work load	14	15.0
15	Nurses' assess children's pain by their own adjustment without using any standard pain assessment scale, so the pain may not assess accurately.	13	13.9
16	Nurses feel fear of drug addiction and adverse reactions of pain medication and then they hesitate to provide drugs to the children	13	13.9
17	Parents are not allowed to stay with their children in the post-operative room. Thus, there are no person available for nurse to help children in relieving their pain	8	8.6

VITAE

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Educational Attainment

Degree	Name of Institution	Year of Graduation
Diploma in General Nursing	Chittagong Nursing Institute Chittagong, Bangladesh.	1991
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Public Health Nursing	University of Dhaka, Bangladesh.	
Master of Nursing Science	Faculty of Nursing	2010
Pediatric Nursing	Prince of Songkla University, Thailand.	
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