

**NURSES KNOWLEDGE AND PRACTICE
REGARDING POST-OPERATIVES PAIN
MANAGEMENT IN ORTHOPEDIC WARD AT
HOSPITAL UNIVERSITI SAINS MALAYSIA
(HOSPITAL USM)**

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**SCHOOL OF HEALTH SCIENCES
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**NURSES KNOWLEDGE AND PRACTICE
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(HOSPITAL USM)**

by

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requirements for the degree of
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LIST OF ABBREVIATIONS

SASA	The South African Society of Anaesthesiologists
Hospital USM	Hospital Universiti Sains Malaysia
SPSS	Statistical Package of Social Sciences
ANOVA	Analysis of Variance

**NURSES KNOWLEDGE AND PRACTICE REGARDING POST-OPERATIVES
PAIN MANAGEMENT IN ORTHOPEDIC WARD AT HOSPITAL UNIVERSITI
SAINSMALAYSIA (HOSPITAL USM)**

ABSTRACT

The purpose of this descriptive study was to determine nurses' knowledge and practice levels regarding post-operatives pain management in orthopaedic ward at Hospital USM. Nurses of all three orthopaedic wards in Hospital USM were recruited. A descriptive cross sectional study was conducted on 40 nurses in three orthopaedic wards. Data was obtained using self-administered questionnaire were consist of three parts, Part A (demographic data), Part B (knowledge) and Part C (clinical practice). Three experts tested the content validity of instruments, and the reliability obtained by Cronbach's alpha coefficients were 0.60 and 0.60 by Kuder-Richardson formula respectively. The data were analysed with SPSS version 20.0, using descriptive statistic, ANOVA for answering the research questions. The result showed the majority of the nurses (97.5%) had high level of knowledge and practice (95%). One-way ANOVA revealed that there was difference between years of working and knowledge ($p=0.048$) while no difference between clinical practice ($p=0.528$). In conclusion, the findings of this study will provide guideline for nurses to improve the nurses' knowledge and practice regarding post-operatives pain management.

**PENGETAHUAN DAN AMALAN JURURAWAT BERKAITAN DENGAN
PENGURUSAN KESAKITAN POS-OPERATIF DI WAD ORTOPEDIK DI
HOSPITAL UNIVERSITI SAINS MALAYSIA (HOSPITAL USM)**

ABSTRAK

Kajian berbentuk keratan lintas dan bercirikan deskriptif ini bertujuan untuk menentukan pengetahuan dan amalan tahap dalam kalangan jururawat berkaitan dengan pengurusan kesakitan pos-operatif di wad ortopedik di Hospital USM. Jururawat daripada kesemua tiga wad ortopedik telah dipilih. Kajian berbentuk keratan lintas dan bercirikan deskriptif telah dijalankan pada 40 jururawat di wad ortopedik. Instrumen yang digunakan dalam kajian ini terdiri daripada tiga bahagian, Bahagian A (demografi), Bahagian B (pengetahuan) dan Bahagian C (amalan klinikal). Tiga orang pakar berpengalaman telah menguji tahap kesahan dalam kajian, dan kebolehpercayaan dalam penyelidikan pula diperolehi melalui kajian pilot dengan hasil Cronbach alpha masing-masing 0.60 dan 0.60 menggunakan formula Kuder-Richardson. Data seterusnya diproses menggunakan SPSS versi 20.0. Analisis data dijalankan menggunakan statistik deskriptif, ujian ANOVA. Berdasarkan keputusan kajian ini, majoriti daripada jururawat (97.5%) mempunyai tahap pengetahuan yang tinggi serta amalan klinikal (95%). Ujian ANOVA menunjukkan bahawa ada perbezaan di antara umur bekerja dan pengetahuan ($p=0.048$) manakala tiada perbezaan antara amalan klinikal ($p = 0.528$). Secara keseluruhannya, diharapkan hasil kajian ini dapat dijadikan panduan kepada jururawat untuk mempertingkatkan pengetahuan dan amalan klinikal mengenai pengurusan kesakitan pos-operatif.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Pain is a common problem encountered by hospitalized patients in general and surgical settings in particular. Numerous studies have revealed that the prevalence of pain remains high in post-operative patients (Alfelbaum, Chen, Mehta, & Gan, 2003; Moss, Taverner, Norton, Lesser, & Cole, 2005) reported that 79% of surgical patients experienced a great intensity of pain during the first 24 hours after surgery. Ignatavicius and Workman (2002) reported that for patients who underwent surgery, 20% of them experienced mild pain, 20% to 40% experienced moderate pain, and 40% to 70% experienced severe pain. Alfelbaum et. al., 2003 found that approximately 80% of patients described their pain is moderate, severe or extremely severe. Similarly a research conducted in United Kingdom showed that 60% of patients had pain score of 5 or more out of 10 on movement at 24 hours post-surgery. Their post-operative pain experiences resulted in post-operative complications (Moss et. al., 2003).

In 2005 the researcher became aware of inadequate pain management while working in the Orthopaedic High Care Unit of a tertiary hospital. The researcher observed that the patients appeared to receive optimal pain relief while in the unit, but on returning to the general ward, the patients complained of a lack of consideration of their pain needs. In the researcher's clinical practice, it was observed that the patients would have to wait for long periods without pain relief. Instead of using pain scales, the nurses used informal questioning of the patients regarding their pain. It was identified

nurses did not always believe the patient's report of pain, instead relying on their own interpretation of the patient's pain and associated behaviour of the patient (Pasero & McCaffery, 2001; Schafheutle, Cantrill & Noyce, 2001; Klopper, Andersson, Minkkinen, Ohlsson & Sjöström, 2006). Furthermore, the nurses would tend to express derogatory statements when the patients requested pain relief, for example, "the pain is not so severe" or "you are going to get addicted to morphine". These negative attitudes towards pain management culminated in the provision of inadequate post-operative pain relief.

Nurses are the health professionals, who operate in close proximity with the patients in post-operative units and thus have a significant professional responsibility on alleviation of post-operative pain. In the past few decades, numerous studies have shown that nurses' knowledge deficits related to post-operative pain management can significantly contribute to an inaccurate pain assessment and ineffective pain management (McCaffery & Ferrell, 1997). Recently, the study provided that nurses still underestimated patients' pain and did not use proper pain scale even though it is now available (Ene, Nordberg, Bergh, Johansson, & Sjöström, 2008). Nurses administered the analgesics as needed rather than fixed order and gave less analgesic than prescribed (Manias, Bucknall, & Botti, 2005).

Observations have been defined as any information pertained to a patient whom the nurse acquires when she is on duty (Orlando, 1990). Assessment of pain is a crucial observation for obtaining efficient postoperative pain relief and it is an essential activity that must occur prior to therapy and throughout treatment (McGuire, 1992). The nurse is professionally prepared and responsible for helping patients to communicate their needs and to see them being met. The nurses' observations are the starting point from which she makes and implements her plans for the patients' care (Orlando, 1990). Nurses as

well as physicians are obliged to document care, including assessments of care needs, planned and implemented care interventions and outcomes of care, in patients' records (SFS, 1985; SOSFS, 1993). The documentation serves several purposes, to ensure continuity in the patients' care, to be a tool for health professionals, for quality assurance, for supervision and control as a legal instrument and for research (SOSFS, 1993). The documentation should reflect the process of care for the patient and facilitate a follow-up of the care process (SOSFS, 2005). Pain assessment, interventions, follow-up and evaluation should routinely be documented in the patients' record. Nursing notes are an essential part of patient care. These notes provide a comprehensive document of a patient's stay in hospital, but are also an explicit record of the nurses' professional competence (Manias, 2003).

Orthopaedic surgery involves surgical intervention to the structures of the musculoskeletal system either elective or emergency. The structure of the musculoskeletal system consists of bones and associated muscles, ligaments, tendons and cartilage. Therefore, it can be concluded that orthopaedic surgery is not isolated to one component, resulting in severe pain which is further exacerbated by oedema, haematoma and muscle spasms (Smeltzer, Bare, Hinkle & Cheever, 2008). The South African Society of Anaesthesiologists (SASA, 2009) acknowledges that orthopaedic surgery can be painful and therefore, effective pain management is essential to promote early mobilisation and prevent complications. Pain management is a critical aspect of the post-operative setting, therefore it is vital that the patient's pain needs are met to optimize and expedite the post-operative recovery process.

1.2 Problem Statement

Pain is a significant problem in all patients and a special problem in orthopedics patients and the patients who have received orthopaedic surgery are managed inadequately for their pain in the post-operative period. This could be attributed to the knowledge and practice of nurses which appears to be inadequate for adult postoperative orthopaedic pain management.

Unrelieved pain has negative and psychological consequence. Successful assessment and control of pain depends on a positive relationship between the health professionals with the parents and their families. However, nurses may not do a good job managing pain. This may be due to inadequate knowledge related to pain. Also, nurses may have attitudes that are not conducive to good pain management. Very few studies regarding pain management focus on nurses who have had advanced training in the areas of pharmacology and physical assessment (Plaisance & Logan, 2006).

Many nurses lack the education and training for effectively managing pain, resulting in longer hospital stays and reducing the quality of life of patients. This knowledge deficit is glaringly obvious in our educational programs and is also demonstrated by practicing nurses (Plaisance & Logan, 2006). Nurses must be adequately prepared to undertake an active role in post-operative pain management.

Hence, the healthcare professionals, the nurses need to be well-equipped with knowledge and practices in order to keep up with the pace. Knowledge and practices among nurses are the approaches to achieve quality patient and nursing care. Through extensive reading on knowledge and practices of pain management, the perspective of society towards nursing can be improved.

1.3 Research Objectives

1.3.1 General Objective

The general objective is to determine the knowledge and practice among nurses regarding post-operative pain management in orthopaedic ward at Hospital Universiti Sains Malaysia (Hospital USM).

1.3.2 Specific Objectives

1.3.2.1 To determine the level of knowledge and clinical practice regarding post-operative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia

1.3.2.2 To examine the difference between years of working experience and response to clinical practice and knowledge regarding postoperative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia

1.4 Research Questions

1.4.1 What is the level of knowledge and clinical practice regarding post-operative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia?

1.4.2 Is there any difference between years of working experience and response to clinical practice and knowledge regarding post-operative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia?

1.5 Research Hypothesis

1.5.1 Null hypothesis, H_0 : There is no significant difference between years of working experience and response to clinical practice and knowledge regarding post-operative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia.

Alternative hypothesis, H_A : There is significant difference between years of working experience and response to clinical practice and knowledge regarding post-operative pain management among nurses in orthopaedic ward at Hospital Universiti Sains Malaysia.

1.6 Significance of the Study

This research offers an approach to explore what the nurses in Hospital Universiti Sains Malaysia (Hospital USM) know about knowledge and practice among nurses regarding post-operative pain management in orthopedic wards. Moreover, nurses spend most of their time at the patient's bedside as compared to other healthcare professionals, they perform an instrumental role in the management and evaluation of pain. Therefore, nurses must become the primary agents of change for better pain management outcomes within patient populations. Consequently, if nurses are insufficiently educated and ill prepared to effectively relieve pain, the patient ultimately suffers. For this reason, nurses must be well wisely and well practising about pain and pain management to improve patient outcomes and collaborate efficiently with other healthcare professionals to successfully manage pain.

Nurses play a central role in the management of patients' pain which stress on the explicit need for nurses to demonstrate excellence in every area of pain management to enable the appropriate and effective management of patients' pain. The

encouragement for this study venture was grounded by the understanding that unrelieved acute postoperative pain is a central health-care problem in contemporary times. The findings established from this current research study will expose and contribute to the understanding of nurses' practises in clinical of pain management. As a result, the information caused from this will be valuable for reasons that appropriate educational strategies and initiatives can be developed and implemented to address any practical deficits determined in this current research initiative. It will have implications for both further research and educational initiatives as the findings originating from this study can be utilized to incite strategies aimed at improving pain management.

1.7 Definition of Operational Terms (Conceptual/operational)

Knowledge of nurses regarding post-operative pain management:

Knowledge of nurses regarding post-operative pain management referred to nurses' understanding and valuing about post-operative pain, assessment, evaluation, and management of post-operative pain including both pharmacological and non-pharmacological management. The knowledge of nurses regarding post-operative pain management was measured by using the Nurses' Knowledge and Practice Regarding Post-Operative Pain Management Questionnaire (NKPPQ) which was adapted from Theresa Wulff Nurses' Knowledge and Practice Regarding Post-Operative Pain Management (2008). The higher score indicated the high level of knowledge and high practices among nurses toward post-operative pain management.

1.7.2 Practices of nurses regarding post-operative pain management:

Practices of nurses regarding post-operative pain management referred to nurses' perception of their own nursing actions performed to reduce the post-operative pain. These include pain assessment, evaluation, and management including both pharmacological and non-pharmacological management for post-operatives patients. These include pain assessment, evaluation, and management for post-operatives patients. Practices of nurses regarding post-operative pain were measured by using the Nurses' Caring Behavior Regarding Post-Operative Pain Management Questionnaire (NCBPQ) adapted from Theresa Wulff. The higher scores indicated that the more actions nurses performed to reduce the post-operative pain.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review in this study covers the concept of pain and post-operative pain, pain assessment, post-operative pain management and barriers to effective pain management. Knowledge and practice of nurses regarding post-operative pain management was also reviewed.

2.2 Concept of pain

2.2.1 Definition of pain

Pain is whatever the experiencing person says it is and exists whenever he or she says it does (McCaffery, 1979). Pain is perceived to be a protective mechanism for the body. It occurs when tissues are being damaged (Guyton, 1991). Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Merskey et al., 1979). Indeed pain is the number one symptom or complaint that causes people to seek health care (Shorten et al., 2006).

Pain has classified into two types, acute and chronic. Acute pain usually last for a short period of time (less than three to six months) and is associated with tissue injury and inflammation (Cadden, 2007). Acute pain is usually accompanied by physiological and behavioural responses of the patients. Physiological responses include increased high blood pressure, pulse rate, and respiration rate. Behavioural responses include

increased anxiety, sleep disturbances, restlessness, and mobilization difficulties (Mackintosh, 2007). Chronic pain is a pain which last beyond 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 (Cadden). There is no physiological response in chronic pain but behavioural responses are prominent particularly in those with long term pain (Mackintosh).

2.2.2 Post-operative pain

Post-operative pain is a result of chemical, thermal or mechanical stimulus associated with surgery and trauma (Coll, Ameen & Mead, 2003). Post-surgical pain is a complex response to tissue trauma during surgery that stimulus hypersensitivity of the central nervous system. Post-operative pain can be felt after any surgical procedure, whether it is minor dental surgery or a triple- bypass heart operation.

2.2.3 Pain theories and post-operative pain mechanism

According to review of Alexander, Fawcett, and Runciman (1999), three ancient pain were addressed, the specificity theory, the pattern theory, and the affect theory. Later, the gate control theory developed by Melzack and Wall was introduced in 1966. It is the most well-known theory that has been used to guide pain research for more than five decades.

The gate control theory explains the relationship between pain and emotion. It postulates that the pain is not just a physiological response but has psychological responses, such as behavioural and emotional responses and can be influence the perception of pain. Melzack and Wall 1966, also articulates the existence of the pain, modulating system (Alexander et al., 1999). They explained that similar gating mechanisms exist in the descending nerve fibers from the thalamus and the cerebral

cortex. These areas of the brain regulate the person's thought and emotions, including beliefs and values. When pain occurs, a person's thought and emotions can influence whether pain impulses reach the level of conscious awareness (Meinhart & McCaffery, 1983). In other words, thoughts and emotions can change the perception of the pain.

This theory offers that stimulation of the skin evokes nerve impulses that are then transmitted by three systems located in the spinal cord. The substantia gelatinosa in the dorsal horn, the dorsal column fibers, and the central transmission cells act to influence nociceptive impulses. The noxious impulses are influenced by a 'gating mechanism' located in the spinal cord (Bare & Smeltzer, 2008).

The above theories help explain pain mechanism in post-operative patients. The conception of gate control theory has now expanded to include multiple mechanisms. For patients undergoing surgical procedures, skin and other tissues damage at the surgical sites, application of thermal and chemical stimuli to wound, and often prolonged traction to somatic and visceral structures activate the following processes, nociceptive transduction, sensitization of peripheral somatic and visceral nociceptive nerve terminal and central neurons, and loss of local and descending inhibition of neurons in the brain stem and spinal cord (Chaturvedi & Chaturvedi, 2007; Dirks, Moiniche, Hilsted, & Dahl, 2002).

2.2.4 Causes of post-operative pain

Any surgical procedures can be the cause of post-operative pain, as a result of tissue trauma to the area that was operated during surgery. Prior traumatic event, leading the patients' presence in the operating room, can also be the principle cause of tissue injuries and nerve injuries. The nerve injuries may contribute to the development of post-operative neuropathic pain (McCaffery & Beebe, 1994).

2.2.5 Consequences of post-operative pain

Consequences of pain post-operatives include unnecessary suffering, physical and psychosocial dysfunction, impaired recovery from acute illness and surgery, immunosuppression, and sleep disturbances. Unrelieved pain can result in increased morbidity, increased muscular contraction and spasm and also impaired cognitive function (Lewis, Heitkemper, Dirksen, O'Brien & Bucher, 2007).

2.2.6 Pain assessment

Principles of pain assessment

Pain is a subjective experience which is perceived directly only by the sufferer or the patient. It is a multidimensional phenomenon that can be described by pain location, intensity, temporal aspects, quality, impacts and meaning. Hinshaw, Feethaw, and Shaver, 1999 described the six dimensions of pain. There are physiological, sensory, behavioural, cognitive, affective, and socio-cultural dimensions of pain. Each dimension is described as follows:

Physiological dimension.

The pain is closely related to the physical function and some physical symptoms. The physiological dimensions includes the location, onset, duration, etiology, post-operative complications and associated symptoms are fatigue, anorexia, sleeplessness, constipation, and nausea that can be increased when pain is not controlled (Hinshaw et. al., 1999).

Sensory dimension.

The sensory dimension of post-operative pain is related to how the pain is actually felt by the individual who suffers from it (Ahles et. al., 1992). It includes post-operative pain intensity, quality and pattern of the pain.

Behavioral dimension.

The behavioral dimension of post-operative pain is related to the way the patients respond to pain. It consists of two components. The first component is the severity of the pain which is commonly expressed by the following behaviors; grimacing, non-verbal vocalizations and communicating with reporting to others. The second component is patients' behavior that the patient control his or her pain, such as use of medications, positioning, sleep, work activity, and relationship with others.

Cognitive behavior.

The cognitive behavior reflects how cognition plays a in pain experience. It includes thought-provoking factors, such as the meaning of pain, the view of pain, previous therapy, attitudes and therapy and belief and prior exposure to pain and coping strategies.

Affective behavior.

The affective behavior is related to how the patient feels or suffers in post-operative pain. It consists of mood of patient and includes anxiety, and emotional state of patient (McGuire, 1992).

Pain assessment methods

The pain assessment methods available to the nurse are observation, physiological responses, self-report from the patient using pain scales, location and intensity of the pain and assessing pain at rest and during movement (SASA, 2009; Robertson, 2007).

The patient's self-report is considered to be the "gold standard" to assess the existence and intensity of pain (McCaffery & Pasero, 2011). Nurses agree that the patient is the most accurate judge of their pain intensity (Zanolin et al., 2007). However, the patient's report of pain is not always believed by the nurses, who rely on their own judgement about the presence of pain and the associated behaviour of the patient (Zanolin et al., 2007; Klopper et al., 2006; Pasero & McCaffery, 2001; Schafheutle et al., 2001). Although the nurse may not believe the patient's statement of pain, the nurse should accept the statement, assess the patient's pain and provide appropriate management (Pasero & McCaffery, 2001).

In response to acute pain, the patient may demonstrate physiological and behavioural changes. Physiological changes can include raised blood pressure, pulse and respiration and diaphoresis. Behavioural responses associated with the presence of pain include restlessness, crying, moaning, grimacing or protection of the affected area (Robertson, 2007).

However, these responses to pain may be transient and are therefore considered unreliable and should not represent the only aspect of pain assessment (Smeltzer et al., 2008; Robertson, 2007). Pasero and McCaffery (2011) point out that a lack of pain expression by the patient does not equate to a lack of pain. However, results of a survey have indicated that nurses responded positively to patients grimacing in pain compared

to patients who are smiling (McCaffery, Ferrell & Pasero, 2000). Australian nursing research revealed that behavioural pain cues received attention from nurses during the recording of vital signs and on completion of dressings (Manias, Bucknall & Botti, 2004; Manias, Botti & Bucknall, 2002). Regardless of the presence or absence of physiological and behavioural changes, Pasero and McCaffery (2011) emphasise that the patient's report of pain remains the most reliable indicator of pain.

The South African Acute Pain Guidelines recommend that pain is assessed when the patient is at rest and during mobilisation (SASA, 2009). Ene, Nordberg, Bergh, Johansson and Sjöström (2008) found that nurses seldom or never assessed pain on both occasions. Despite acknowledging that it was important to relieve pain prior to mobilisation, few nurses were observed to reassess the patient's pain before or during mobilisation (Dihle, Bjølseth & Helseth, 2006; Manias *et al.*, 2004).

Pain assessment scales

Pain assessment scales assist patients to "self-report", namely to communicate the intensity of their pain and provide a guide for pain management (SASA, 2009; Smeltzer *et al.*, 2008; Robertson, 2007). A patient-appropriate pain scale should be selected and explained by the nurse (Robertson, 2007; Bird, 2003). The available pain scales include Visual analogue scale (VAS); Verbal numeric rating scale (VNRS); Verbal rating scale (VRS) and Wong-Baker facial expressions scale for adults with cognitive impairment (SASA, 2009).

Williamson and Hoggart (2005) confirmed the validity and reliability of the three commonly used pain rating scales, thereby reinforcing their essential value in practice. However, international nursing studies have found that some nurses do not use a pain scale (Idvall & Berg, 2008; Ene *et al.*, 2008; Dihle *et al.*, 2006; Manias *et al.*,

2004). Nurses have also expressed distrust of the pain rating selected by the patient as a true reflection of the pain level experienced by the patient (Layman Young, Horton & Davidhizar, 2006; Schafheutle et al., 2001).

Even when pain rating tools are used, nurses have a tendency to underestimate the pain intensity experienced by the patient in comparison to the patient's own pain rating (Sloman, Rosen, Rom & Shir, 2005; Klopper et al., 2006). However, following a pain management programme, Ene et al. (2008) found that the nurses showed slight improvement in their pain assessments in accordance with those of the patients.

2.2.7 Post-operatives pain management

Post-operatives pain management strategies include both pharmacological and non-pharmacological interventions. These approaches are selected on the basis of the requirements and goals of particular patients.

Pharmacological interventions

Pharmacological interventions refer to the nurses' actions to provide effective and therapeutic analgesics to alleviate a patient's pain after surgery. Usually three types of pain medication are provided to alleviate patient's pain after surgery. These are opioid analgesics (morphine, fentanyl, pethidine, hydromorphone, meperidine, codeine, and methadone), non-opioid analgesics (acetaminophen, non-steroidal anti-inflammatory drugs, NSAIDs), adjuvants (anticonvulsants, antidepressants, local anesthetics) (Urden, Stacy, & Lough, 2008).

Analgesics administration is applied as a preventive approach to pain management. These analgesics are administered through several routes including oral, sublingual, rectal, transdermal, transmucosal, parenteral (subcutaneous, intramuscular, intravenous), and neuraxial (epidural or intrathecal) (Krenzischek, Dunwoody,

Polomano, & Rathmell, 2008). If the pain is predictable, such as post-operative pain and cancer pain, the decision to use analgesics are more effective when given around the clock (ATC) rather than as needed (PRN). An ATC schedule maintains therapeutic blood levels of the analgesics. The ATC schedule is usually based on how long the drug lasts. If the drug lasts in every 3-4 hours, it should be administered after every 3-4 hours to maintain pain relief. Pain should be assessed before administering the analgesics for effective management (Linton & Maebius, 2003). If the pain is unpredictable, PRN schedule is appropriate approach. Waiting for analgesics often results in increased pain intensity. In such situation, pain control is so difficult.

Non-pharmacological interventions

Non-pharmacological interventions are the effective method for pain management. It can reduce the requirements of the doses of drug therapy and thereby minimize the side effects of drug. Analgesic is an essential component of pain management, but it might be more effective if both strategies are utilized together (Ignatavicius & Workman, 2002). These interventions also increase the sense of personal control and coping skills about pain management. These methods provide the emotional support, help in daily activities, and create a comfortable environment, and promote pain relief (Ylinen, Vehvilainen-Julkunen, & Pietila, 2007). Non-pharmacological interventions can be categorized as physical or cognitive strategies (Lewis et al., 2007; Polkki, Pietila, Vehvilainen-Julkunen, Laukkala, & Kiviluoma, 2008). Physical strategies include acupuncture, application of heat and cold, exercise, massage, percutaneous electrical nerve stimulation (PENS), and transcutaneous electrical nerve stimulation (TENS). Cognitive strategies include distraction, hypnosis, imagery and relaxation (breathing, imagery, meditation, art therapy, and music therapy and muscle relaxation) (Richards & Hubbert, 2007).

2.2.8 Barriers to effective post-operative pain management

The Agency for Healthcare Research and Quality (AHRQ) divides the barriers to effective pain management into three categories, healthcare system barrier, healthcare professionals' barrier and patients' barrier (McCaffery & Pasero, 2004).

Healthcare professionals' barriers.

The community believes and patients expect that the nurses and physicians should have good quality education and experiences, and have a comprehensive knowledge of pain management that is readily interpreted into clinical practice. However, the fact is that several studies identified health care professionals' lacking of education, poor pain assessment, having concerns about opioids particularly in addiction and respiratory depression, lack of communication, having inadequate pain assessment tools, and misjudging of pain severity (Clarke et al., 1996; Ely, 2001; McCaffery & Ferrell, 1997; McCaffery & Pasero, 1999; Urden et al., 2008). Concerns regarding tolerance, dependence, and addiction are common barriers of effective pain management. Patients, family members, and health care providers often share these concerns (Urden et al., 2008).

An educational program for pain management addressing issues mentioned above is needed to be incorporated into basic nursing education and should be provided to all health care professionals. However, educational preparation for pain management is still lacking (McCaffery & Pasero, 1999). Nursing concerns with addiction because it can contribute to misinterpretation of signs during the pain assessment process. In fact, a patient who received opioid analgesics has less than 1% of addiction rate, even in a sample of chronic non cancer pain (Noble, Tregear, Ireadwell, & Schaelles, 2008). Another concern of the health care professionals is the fear that aggressive management

of pain with opioids will cause critical respiratory depression. The incidence of respiratory depression is also less than 1%. More than half of the nurses indicated that they had conflicting experiences regarding the pain management (Niekerk & Martin, 2003). Thus, the pain education should incorporate all these issues in the program.

Patients' barriers.

Patients are cornerstone of their own effective pain management. However, research evidence showed that several barriers are from themselves. As addressed earlier, best pain assessment is self-report. In the reality, some patients are reluctant to report the intensity of pain. More than 70% patient felt reluctant to report pain, even reluctant to take pain medication, especially opioids. They have fear of addiction, fear of tolerance, concern about side effects, fear of injection, desire to be a 'good' patient, desire to be stoic, forgetting to take analgesic, fear to distracting to health care, concern that pain signifies disease progression, sense of fatalism, and ineffective medication (Lewis et al., 2007; Worakul, Petpichetchin, & Nilmanat, 2008).

2.4 Knowledge and practice of nurses regarding post-operative pain management

2.4.1 Knowledge of nurses regarding post-operative pain management

Knowledge and practice of nurses regarding post-operative pain management is based on the assumption about what nurses should know and value to provide a high quality of care of patients suffering from pain and nurse can perform many interventions for pain relief (Coll et al., 2005; Richards & Hubbert, 2005; Sloman et al., 2005; Textor & Porock, 2006). Knowledge and practice of nurses about pain management is a significant part of nursing care. Many experts expressed the formal nursing education

fails to prepare nurses adequately to care for patients in pain. The study showed that 86% of nurses expressed that their basic nursing education did not prepare them well to take care of patients with pain and 88% indicates there is a need to increase knowledge and practice in the area of pain management (Clarke et al., 1996). Despite this, very little changes in the clinical practice and improvement of pain management are observed (Ward & Gordon, 1997).

Nurses had inadequate knowledge and practice in many areas evidence by several studies in 20 years (Clarke et al., 1996). They found that the overall mean score on nurses' knowledge and practice was 61% (range from 41-90%). They lacked knowledge on the anatomy and physiology of pain and they could not distinguish between acute and chronic pain which is considered quite a basic knowledge necessary in the initial step on pain assessment. Another area is related to pain assessment. The commonly reported its lacking areas were when the pain occurs in the elders and whether patient's self-report is reliable (de Ront, de Wit & Dam, 2001). The major area that has been reported repeatedly in most studies is related to pain management, particularly opioids and misconceptions about its use. For instance, opiate properties, addiction, risk of respiratory depression, use of adjuvant drugs were reported to be content area that nurses were lacking (Cason Jones, Brock, Maese, & Milligan, 1999; de Ront et al., 2001; Dihle, Bjolseth, & Helseth, 2005; Matthews & Malcolm, 2007; Sandal & Heindel, 1999; Schafheutle, Cantrill, & Noyce, 2001).

2.4.2 Practice of nurses regarding post-operative pain management

Nurses are the key persons and 24-hour providers of acute pain management in hospital setting. They assess pain and plan to minimize the pain appropriately by using the available resources and facilities, and evaluate the effective of their actions and interventions. Nurses are usually responsible for monitoring the effects of medications,

which are administered in variety of ways, including PRN or as ‘needed’ medications, fixed order medications, epidural infusions, and PCA (Manias, 2003). Nurses’ practices in pain assessment and evaluation and pain intervention will be described below:

Pain assessment and evaluation.

Regarding pain assessment, several studies provide evidence support for many years that nurses tend to underestimate the patient’s pain. A classical study conducted by Seers (1996) was cited in many documents. In 1987, Seers compared nurses’ and patient’s pain ratings over 7-day period post-operatively and found that on 67% of occasions nurses and patients disagreed on pain ratings, with 54% nurses of nurses rating the pain at a lower level that patients did. A decade later, Field replicated the Seer’s study. She used a convenience of sample 39 patients and 78 nurses. They were asked to rate the patient’s pain intensity independently using a 5-point verbal rating scale. It was found that nurses gave consistently lower ratings than patients. Even worse, in Clarke et al., (1996) study, on their pain audit findings, they found more percent or nurses (76%) did not document the use of a patient self-report tool in their practice.

Until recently, the study provides support the nurses still underestimated patients’ pain and did not use proper scale pain even though it is now available as evident in Ene, Nordberg, Bergh, Johansson, and Sjorstorm’s study (2008). The researchers conducted a two-part study. Part one was the baseline comparison and part two was after they implemented the training program for nurses and physicians. Patients for both parts were asked to rate their pain intensity using the VAS (1-100), 24-48 hours post-surgery. The scores on document patients’ records, indicating the nurses’ pain assessment were used to compare with the patients’ self-report pain scores. Nurses in

this study overestimated mild pain but underestimated severe pain. The nurses' ability to assess in accordance with patients was better after two years. However, the number of documented pain scores in patients' records decreased. Moreover, 40% nurses reported that they did not use the VAS and they did not assess pain both at rest and activity (Ene et al., 2008). These findings indicated the problems in pain assessment still exist and providing the education to increase knowledge alone may not always warrant the change in nurses' practice. Our aim is then to determine and help make the extent to which nurses can use the pain assessment data to inform the decision for taking the next step, giving pain interventions, pharmacological and non-pharmacological interventions, to relieve the pain.

Several studies provide evidence to support the nurses' practice in pain pharmacological intervention is less than optimal. Nurses administered the analgesics as needed rather than fixed order and gave less analgesic than prescribed (Dihle et al., 2005; Manias, Bucknall, & Botti, 2005). Previous studies showed that on the first post-operative day nurses administered far less analgesia than the PRN schedule would have permitted, although 91% of patients were in pain (Gillies et al., 1999; Richards & Hubbert, 2007). Titler et al., (2007) found that out of 709 hospitalized patients for hip fracture, analgesic orders were PRN basis during the first 24 hours after admission, and only 22.3% received around the clock administration of analgesics. In addition, 172 nurses who cared these patients and completed the pain management practice questionnaires reported that around the clock administration of analgesics were preferable, but only 33.7% believed and applied these methods (Titler et al., 2007). Despite nurses' theoretical knowledge about post-operative pain management, they did not apply appropriately in clinical setting, and they did not seem to prioritize pain

problem and pain management (Twycross, 2007). Moreover, nurses accept that it is a normal phenomenon of post-operative patients (Ebe et al., 2008).

In addition to pharmacological interventions, nurses play important role in implementing the non-pharmacological methods for pain alleviation. Some studies demonstrated that nurses seldom used non-pharmacological treatment for post-operative pain relief and also less than expected. Manias et al., (2005) conducted an observational study in Australia to examine how nurses managed patients' pain after surgery. 52 nurses were randomly observed for 316 pain events. They found that nurses performed the following non-pharmacological interventions to manage pain; apply the heat compression (0.6%), hot bath (1.3%), massage (1.3%), changing position, relieving pressure (11.1%), bandaging, splinting (12.7%), discussing management options with patients (17.4%) and discussing management options with health professional (17.4%). Another study conducted in the US revealed that nurses did not document their use of non-pharmacological intervention in 90% of the patient's record charts being audited (Clarke et al., 1996). Findings from these studies flag the necessity to further explore what factors may help explain why nurses seldom use them.

Pain intervention: Pharmacological and non-pharmacological.

Over the long time, several surveys have shown that many patients still suffer from moderate to severe post-operative pain as a result of inadequate pain interventions given to them (Carr & Thomas; Cohen; Marks & Sachar; Dolin et al., ; as cited in Ene et al., 2008). Even though there are clinical practice guidelines for pain management available, analgesics are more effective and new technology of drug administration are developed, the management of post-operative pain continues to remain problematic and

unsatisfactory (Coulling, 2005). One factor contributing to this problem comes from the nurses' practice.

Nurses are responsible for the administration of all medications, according to doctors' prescription. In particular, when medication is prescribed on a PRN basis, nurses choose which one currently is still the predominant order for post-operative analgesia. Nurses assess the patients' pain, decide to administer analgesics, choose the medication and route the administration, and evaluate the outcome of such intervention (Schafheutle et al., 2001). Nurses are able to identify the discrepancies between the amounts of analgesics and what the analgesics are administered according the prescription.

2.4.3 Knowledge and practice of nurses regarding post-operative pain management and related factors

There are some factors contributed to nurses' knowledge and practices of nurses regarding postoperative pain management. Literature has shown that nurses' age, experience of pain, nursing education or training, and years of working experience may have relationship with knowledge and practices but the findings were inconclusive.

In a literature review conducted by Allcock (1996), she conducted that age of nurses does not seem to be influential in relation to their assessment to pain. However, some study found that nurses who were over 30 years tend to overestimate and nurses who were less than 25 years tent to underestimate burn pain (Iafrafi, 1996).

The evidence that personal experience of pain was correlated with nurses' knowledge and practices was inconclusive. Clarke et. al., and Patraki-Kou Bani et. al., (2003) found no correlation between nurses' level of pain intensity was the only variable that predicted significantly perceptions of patients' physical suffering and